Transcript Exhibit(s)

Docket #(s): L-00000FF-07-0134-00133

Arizona Corporation Commission
DOCKETED
OCT 23 2007
DOCKETED BY

Exhibit # : A1-A19, S1-S8, C1, E1 and E2, M-1-M11

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2007 OCT 23 P 2:41
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EXHIBIT
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A-1.
Admitted

AFFIDAVIT OF PUBLICATION

Kingman Daily Miner

3015 Stockton Hill Road, Kingman, AZ 86401
web: www.kingmandailyminer.com • e-mail: legals@kingmandailyminer.com
Phone (928) 753-6397, ext. 242 • Fax (928) 753-5661
"Serving Kingman since 1882"

STATE OF ARIZONA)
County of Mohave) ss.

I, **Melinda Mauser**, being first duly sworn on her oath says:
That she is the Legals Clerk of THE KINGMAN DAILY MINER
An Arizona corporation, which owns and publishes the Miner,
a Daily Newspaper published in the City of Kingman, County of Mohave,
Arizona; and the Golden Valley Gazette a weekly publication, published in the City of Kingman,
County of Mohave, Arizona, that the notice attached hereto, namely,

Notice of Sale

Has, to the personal knowledge of affiant, been published in the newspaper aforesaid, according to law, from **14th** day of **March, 2007** to the **21st** day of **March, 2007** inclusive without change, interruption or omission, amounting in **2** insertions, made on the following dates:
3/14, 3/21/2007

By _____
Legal Clerk, **22nd** Day of **March, 2007**

State of Arizona

County of Mohave

On this 23 day of March, 2007

Legal Clerk, whom I know personally to be
the person who signed the above document
and she proved she signed it.

_____
Notary Public
My Commission Expires November 30, 2009

OFFICIAL SEAL
REBECCA MUNGER
NOTARY PUBLIC - State of Arizona
MOHAVE COUNTY
My Comm. Expires Nov. 30, 2009

Notice of Proof of Publication

STATE OF ARIZONA

COUNTY OF MOHAVE, ss

Angelique Van Meter

ANGELIQUE VAN METER,
being duly sworn, says that during the publication of the notice, as herein mentioned, she was and now is an Authorized Agent of **Today's News-Herald**, a seven-times weekly newspaper published on Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday of each and every week at the City of Lake Havasu City, in Mohave County, State of Arizona. That said newspaper was printed and published as aforesaid on the following dates, to-wit:

NOTICE OF HEARING DOCKET NO. L-00000FF-07-0134-00133
CASE NO. 133/ ARIZONA POWER PLANT & TRANSMISSION LINE SITING COMMITTEE

Published date(s):

March 14, 2007

of which the annexed copy is a printed and true copy, was printed and inserted in each and every copy of said newspaper, printed and published on the dates aforesaid, and in the body of said newspaper and not in a supplement there. Subscribed and sworn to before me this 15th day of March, 2007.

Sandra LoGalbo
Notary Public

OFFICIAL SEAL
SANDRA LOGALBO
Notary Public - State of Arizona
MOHAVE COUNTY
My Comm. Expires July 24, 2008

My Commission Expires

Proof of Publication

STATE OF ARIZONA } ss.
County of Mohave }

Linda Delano, being first duly sworn, says that during the publication of the notice, as herein mentioned, he/she was and now is the Legal Clerk of the MOHAVE VALLEY DAILY NEWS, six times weekly newspaper published on Sunday, Monday, Tuesday, Wednesday, Thursday and Friday of each and every week at the city of Bullhead City, in said county.

That said newspaper was printed and published as aforesaid on the following dates, to-wit:

March 14, 2007
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That the Notice of Hearing
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of which the annexed copy is a printed and true copy, was printed and inserted in each and every copy of said newspaper printed and published on the dates aforesaid, and in the body of said newspaper and not in a supplement thereto.

Linda Delano

Subscribed and sworn to before me this 27th day of March, 2007

Susan L. Anderson
Notary Public

(My commission expires: July 14, 2007)

OFFICIAL SEAL
SUSAN L. ANDERSON
NOTARY PUBLIC-ARIZONA
MOHAVE COUNTY
My Comm. Expires July 14, 2007

A-2

Viad Corporate Center
1850 North Central Avenue
Suite 1100
Phoenix, Arizona 85004
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MOYES STOREY

LAW OFFICES

Jay I. Moyes

Telephone: 602-604-2106
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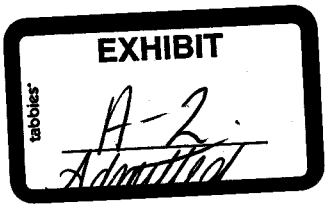
Email: jimoyes@lawms.com



April 10, 2007

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Ronnie Walker, Manager
Mohave County, Arizona
700 W. Beale Street
P.O. Box 7000
Kingman, AZ 86402-7000

Re: Northern Arizona Energy Project

Dear Mr. Walker:

Pursuant to the request of Laurie Woodall, Chairman of the Arizona Power Plant and Transmission Line Siting Committee, enclosed is a copy of the notice of hearing executed by Ms. Woodall in the above-referenced matter.

If there are any questions, please feel free to contact us at any time.

Very truly yours,

LuAnn Kay Kornegay
Assistant to Jay I. Moyes

LKK/me
Enclosure
Cc: Ms. Laurie Woodall

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Ronnie Walker, Mohave County Atty
Street, Apt. No., or PO Box No.: 700 W. Beale / PO Box 7000
City, State, ZIP+4: Kingman AZ 86402

PS Form 3800, April 2002 — See Reverse for Instructions

7002 1000 0004 5778 4076

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
Ronnie Walker
Mohave County, Arizona
700 W. Beale St.
PO Box 7000
Kingman, AZ 86402-7000

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature]
☐ Agent
☐ Addressee

B. Received by (Printed Name) John Carter — C. Date of Delivery 4/16/07

D. Is delivery address different from item 1? ☑ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7002 1000 0004 5778 4076

PS Form 3811, August 2001 — Domestic Return Receipt — 102595-02-M-1540

BEFORE THE ARIZONA POWER PLANT AND

TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF NORTHERN ARIZONA ENERGY, LLC, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES, SECTIONS 40-360.03 AND 40-360.06 FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING CONSTRUCTION OF A 175 MW NATURAL GAS-FIRED, SIMPLE CYCLE GENERATING FACILITY AND ASSOCIATED TRANSMISSION LINE INTERCONNECTING THE GENERATING FACILITY TO THE ADJACENT WESTERN AREA POWER ADMINISTRATION GRIFFITH SWITCHYARD, ALL LOCATED IN MOHAVE COUNTY, APPROXIMATELY 9 MILES SOUTHWEST OF KINGMAN, AZ	Docket No. L-00000FF-07-0134-00133 Case No. 133

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NOTICE OF HEARING

A PUBLIC HEARING WILL BE HELD before the Arizona Power Plant and Transmission Line Siting Committee ("Committee") to consider the Application of Northern Arizona Energy, LLC, for a Certificate of Environmental Compatibility ("CEC") authorizing the Northern Arizona Energy Project ("NAEP") in Mohave County, Arizona. **The proposed project was originally referred to in prior public forums and communications as the *Arroyo Energy Project.* This is the same project, at the same location; but it is now named the "**Northern Arizona Energy Project" or "NAEP." The hearing will be held at **The Hampton Inn, 1791 Sycamore Avenue, Kingman, AZ,** beginning on **May 1, 2007 at 9:30 a.m. and continuing on May 2, 2007, at 9:30 a.m.** The hearings will adjourn at approximately 5:00 p.m.

Public comment will be taken at the beginning of each hearing day, and in a special **evening public comment session on May 1, 2007 at 6:30 p.m. at the same location.** The Committee may deem it appropriate at some point to recess the hearing to additional date(s), time(s) and/or place(s) to be announced during the hearing or to be determined after the recess, at the discretion of the Committee. These dates, times and places of the resumed hearing(s) will be posted on the Arizona Corporation Commission ("ACC") website, at: **www.azcc.gov/utility/electric/linesiting-calendar.htm** and on the Project website at: **www.northernarizonaenergy.com**.

NOTE: NOTICE OF SUCH RESUMED HEARING WILL BE GIVEN AS NOTED ABOVE. PUBLISHED NOTICE OF SUCH RESUMED HEARING IS NOT REQUIRED.

The Committee may conduct a tour of the Project area, proposed route and proposed alternative route on a future date. The map and itinerary for the tour will be available at the hearings and posted on the Project website. Members of the public may follow the Committee in their own private vehicles. During any tour, the Committee will not discuss or deliberate in any manner concerning the Application.

A general overview description of the Project is set forth below. Detailed maps and textual and graphic descriptions of the Project site, equipment and facilities, interconnecting transmission line routes and structures, and other relevant Project information are available in the Application itself, which is on file and available for public inspection at the Docket Control Center of the Arizona Corporation Commission, 1200 West Washington Street, Suite 108, Phoenix, Arizona 85007.

Project Facilities Overview: The NAEP site is located on the northern-most approximately 40 acres of the original 160-acre approved site of the existing Griffith Energy Project, in the Southwest Quarter of Section 6, T. 19 N., R 17 W., in Mohave County, just west of Interstate Highway 40 and East of Apache Road, North of the Griffith Interchange, approximately 9 miles Southwest of Kingman, Arizona. The NAEP consists of four individual nominal 45 MW General Electric LM6000 natural gas-fired simple-cycle combustion turbine generators with inlet air chillers and associated emissions control equipment and ancillary facilities, together with approximately 2,700 feet of 230kV transmission lines and tower structures necessary to electrically interconnect the generators with the Western Area Power Administration transmission system at the adjacent existing 230kV Griffith Switchyard owned by Western. The Project is designed to produce approximately 175 MW of net electrical output when all four units are in operation under design ambient conditions. These simple-cycle generating units are often referred to as "peakers" because they are capable of rapid start-up, individually or in combination, within about ten minutes, allowing the NAEP to respond quickly to fluctuations in electricity demand. The NAEP will supply wholesale power to load serving utilities in Arizona and surrounding regions for the purpose of serving their customers during periods of peak electricity demand.

Each county and municipal government and state agency interested in the proposed Project and desiring to become a party to the proceeding, shall, not less than ten (10) days before the date set for hearing, file with the Director of Utilities, Arizona Corporation Commission, 1200 West Washington Street, Phoenix, Arizona 85007, a notice of its intent to be a party.

Any domestic, non-profit corporation or association, formed in whole or in part to promote conservation of natural beauty, to protect the environment, personal health or other biological values, to preserve historical sites, to promote consumer interests, to represent commercial and industrial groups or to promote the orderly development of the area in which the Project is to be located and desiring to become a party to the certification proceeding, shall, not less than ten (10) days before the date set for hearing, file with the Director of Utilities, Arizona Corporation Commission, 1200 West Washington Street, Phoenix, Arizona 85007, a notice of its intent to be a party.

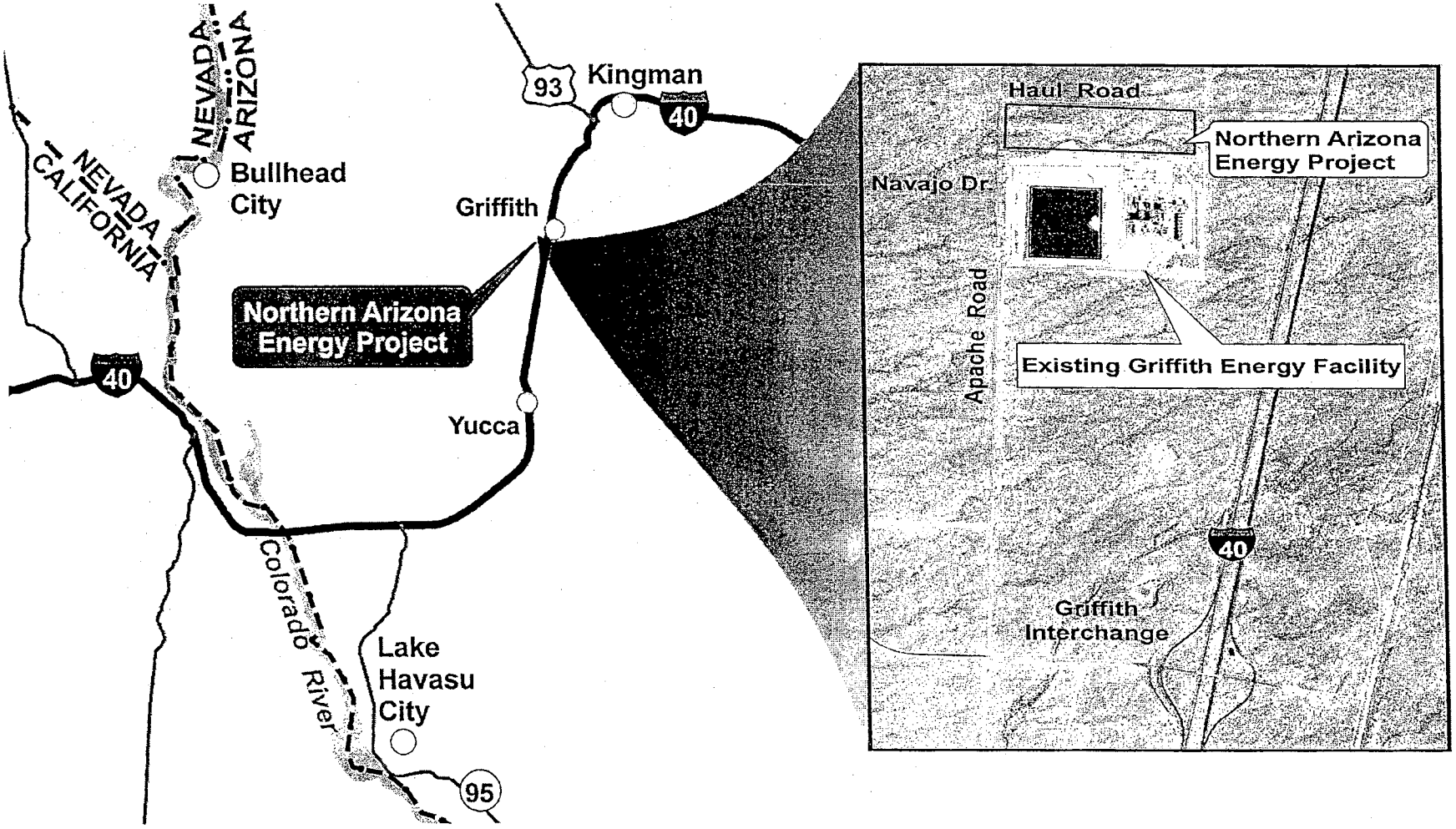
The Committee or its Chairman, at any time deemed appropriate, may make other persons parties to the proceedings. Any person may make a limited appearance at the hearing by filing a statement in writing with the Director of Utilities, Arizona Corporation Commission, 1200 West Washington Street, Phoenix, Arizona 85007, not less than five (5) days before the date set for hearing. A person making a limited appearance shall not be a party or have the right to present testimony or cross-examine witnesses.

This proceeding is governed by Arizona Revised Statutes (A.R.S.) §§ 40-360 to 40-360.13 and Arizona Administrative Code Rules (A.A.C.) R14-3-201 to R14-3-219. This proceeding is also subject to the *ex parte* rules; A.A.C. R14-3-113 and R14-3-220. No substantive communication relative to this proceeding not on the public record may be made to a member of the Committee. The applicable Arizona Revised Statutes can be obtained online at www.azleg.state.az.us/ArizonaRevisedStatutes.asp?Title=40. The applicable Administrative Codes can be obtained at http://www.azsos.gov/public_services/Title_14/14-03.htm and http://www.azsos.gov/aar/2006/45/final.pdf. The written decision of the Committee shall be submitted to the Arizona Corporation Commission pursuant to A.R.S. § 40-360.07. Any person intending to be a party before the Arizona Corporation Commission must be a party to the certification proceedings before the Committee.

ORDERED this 6th day of March, 2007.

Laurie A. Woodall
Assistant Attorney General
Chairman, Arizona Power Plant and
Transmission Line Siting Committee

311423 (3/6/07)


NEVADA
ARIZONA
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CALIFORNIA
Bullhead City
93
Kingman
40
Griffith
Northern Arizona Energy Project
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Yucca
Colorado River
Lake Havasu City
95
Haul Road
Northern Arizona Energy Project
Navajo Dr
Apache Road
Existing Griffith Energy Facility
40
Griffith Interchange

Tucson Electric Power Company
P.O. Box 711, Tucson, AZ 85702
3950 East Irvington Road
Tucson, Arizona 85714

EXHIBIT
A-3
Admitted

Leland Snook
General Manager, Wholesale Energy Supply

April 23, 2007

The Honorable Michael Gleason
Chairman
Arizona Corporation Commission
1200 W. Washington
Phoenix, AZ 85007

and

Ms Laurie Woodall
Chairman
Arizona Power Plant and Transmission Line Siting Committee
1200 W Washington
Phoenix, AZ 85007

Re: Mohave County Need for Peaking Resources

Dear Chairman Gleason and Chairman Woodall,

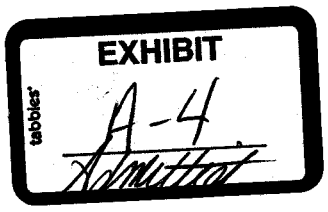
An application for a Certificate of Environmental Compatibility for the Northern Arizona Energy Project (NAEP) is before the Arizona Power Plant and Transmission Line Siting Committee (Docket #L-00000FF-07-0134-00133). The NAEP is proposed as four General Electric LM6000 combustion turbine generators to be located adjacent to the existing Griffith Energy Project in Mohave County Simple cycle projects such as the proposed NAEP are typically constructed and operated to serve peak electric loads.

As the largest load serving entity for Mohave County, UNS Electric wants to communicate to the Commission the forecasted need for additional peaking generation resources in the 2008 to 2012 time period

Forecasted near term peak load growth in Mohave County for 2008 to 2012 exceeds 6% on average per year or approximately 32 MW peak Generation resource alternatives provided by market participants such as Northern Arizona Energy, LLC contribute to the assurance of an adequate future supply of generation resources to meet the growing peak load of Mohave County.

Sincerely,

Leland Snook
General Manager
Wholesale Energy Supply



Arizona Power Plant and Transmission Line Siting Committee

Public Hearing for the Northern Arizona Energy Project (NAEP)

Applicant Testimony

May 1-2, 2007

[redacted]

Presentation Overview

Applicant Discussion	Kevin Johnson
Market Need	Joe Gorberg
Project Description Technical Description Electrical Interconnection Gas Supply and Transportation Water and Wastewater	Dana Diller, Joe Otahal, Joe Gorberg
Environmental Compatibility Water Other	 Steve Noel Randy Schroeder
Other Environmental Permit Processes Air Quality Environmental Assessment and Other	 Gary Rubenstein Randy Schroeder
Public Information Program	Dana Diller

Applicant Discussion

Applicant

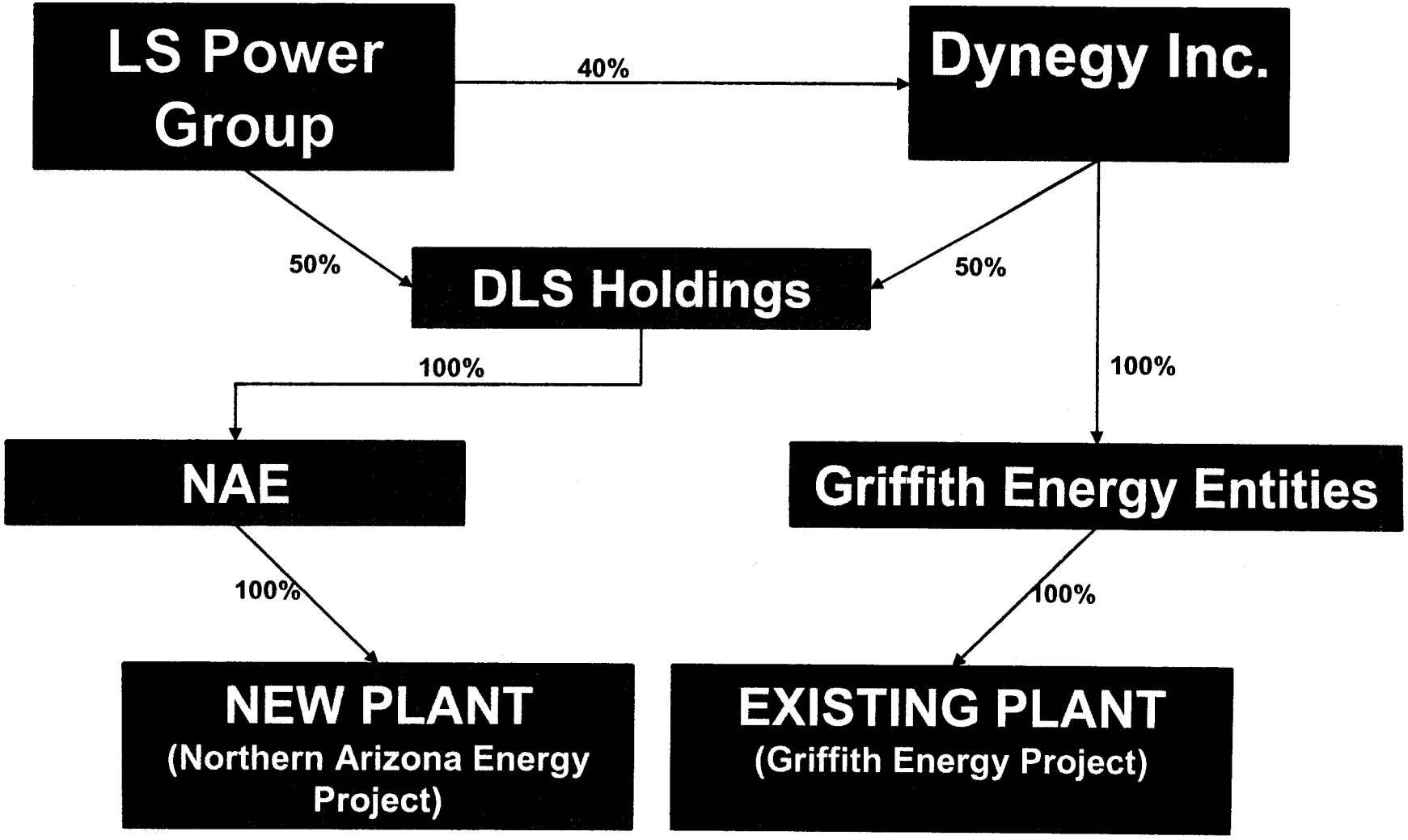
- **Northern Arizona Energy, LLC (NAE)**
  - Special purpose company (project-specific) to develop, own and operate the Northern Arizona Energy Project

- **DLS Holdings, a joint venture between LS Power Group and Dynegy Inc.**
  - Exclusive focus on developing brown and green field energy opportunities
  - Using a variety of fuels, including natural gas, solid fuel (coal), and renewables
  - 50-50 ownership of all projects

- **LS Power Group**
  - Founded in 1990, a fully integrated power plant owner, developer and manager
  - Developed over 3,400 MWs of independent power
  - Combined energy assets with Dynegy in April 2007 – owns 40% of Dynegy stock
  - Acquiring 3,600 MWs of generation from Mirant
  - LS Power provides development expertise to joint venture

- **Dynegy**
  - NYSE company providing wholesale power, capacity and ancillary services
  - Portfolio of 20,000 MWs nationwide, including Griffith and Arlington Valley
  - Dynegy provides construction and operations for joint venture

NAEP Ownership Structure



Project Features

- **Market**
  - Customer interest in peaking units
  - Local and Regional energy demand
  - Positions Applicant to quickly respond to generation needs

- **Efficient Use of Natural Resources**
  - Minimizes water use with modern equipment
  - Maximizes water efficiency by sharing Griffith Energy's recycling facilities
  - Minimizes emissions with natural gas fuel and modern technology
  - No offsite infrastructure required

- **Economic**
  - Brings approximately $150 million in new investment to Mohave County
  - Generates local tax revenue
  - New construction activity in local economy

Market Need

Market Need: Growth

- **AZ Population Growth[1]**
  - AZ leads US States in population growth
  - 16.3% population change since 2001
  - Current population 6.2 million; expected to reach 10.7 million by 2030

- **Mohave County Population growth[2]**
  - 178% population growth between 1980-2000
  - 21% growth 2000-2005 and projected to be 113% growth for 2000-2030

- **Arizona-New Mexico-Southern Nevada Power Area Load Growth[3]**
  - Peak demand and annual energy requirements are projected to grow at annual compound rates of 3%
  - 6,345 MW of new generation needed through 2014 to maintain summer reserve requirements

Notes:

[1] Population data from Pinnacle West Feb-2007 8-K/Credit Suisse 2007 Energy Summit

[2] Arizona Town Hall presentation April 2006

[3] Western Electricity Coordinating Council 10-Year Coordinated Plan Summary, June 2005

Market Need: Utilities

- **UniSource Energy Services March 2007 RFP**
  - May-Oct energy and capacity needs beginning June 2008 for up to 20+ years
- **TEP Letter reflecting Mohave County peaking resource needs**
- **Southwest Public Power Resources Group 2006 RFP**
  - Additional expected capacity requirements
    - 1,123 MW by 2015
    - 2,322 MW by 2024.
  - Base load, intermediate and peaking capacity required
- **APS**
  - Base load capacity 2006/2007 RFP- converted to summer-only capacity requirements
  - 2005 long-term summer capacity 1000+ MW RFP
  - Annual peak load forecast from 2006 to 2007 increasing by 3.5%[1]

[1] ACC 2007 Summer Assessment

Project Description

Project Description

- **The "Project" is a 4 unit gas-fired, efficient, simple cycle power generation facility with associated balance of plant equipment and on-site transmission line**
  - Net Plant Output: 175 MW
  - Net Plant Heat Rate 9,975 btu/kWh (HHV)
  - Each CTG gross output 45 MW

- **The Project is proposed to serve the peak generation resource needs projected for 2008 and beyond.**

- **The Project is located adjacent to an existing generation facility**
  - 40 acre parcel (Project Property) is a portion of original Griffith Energy property evaluated in 1998 (Case No. 90/Decision No. 61295)
  - 8 acre Project Site contains equipment, stormwater basin, and interconnection facilities

- **All infrastructure for gas, water and electric interconnections are available within the Project Property or the adjacent Griffith Energy property.**

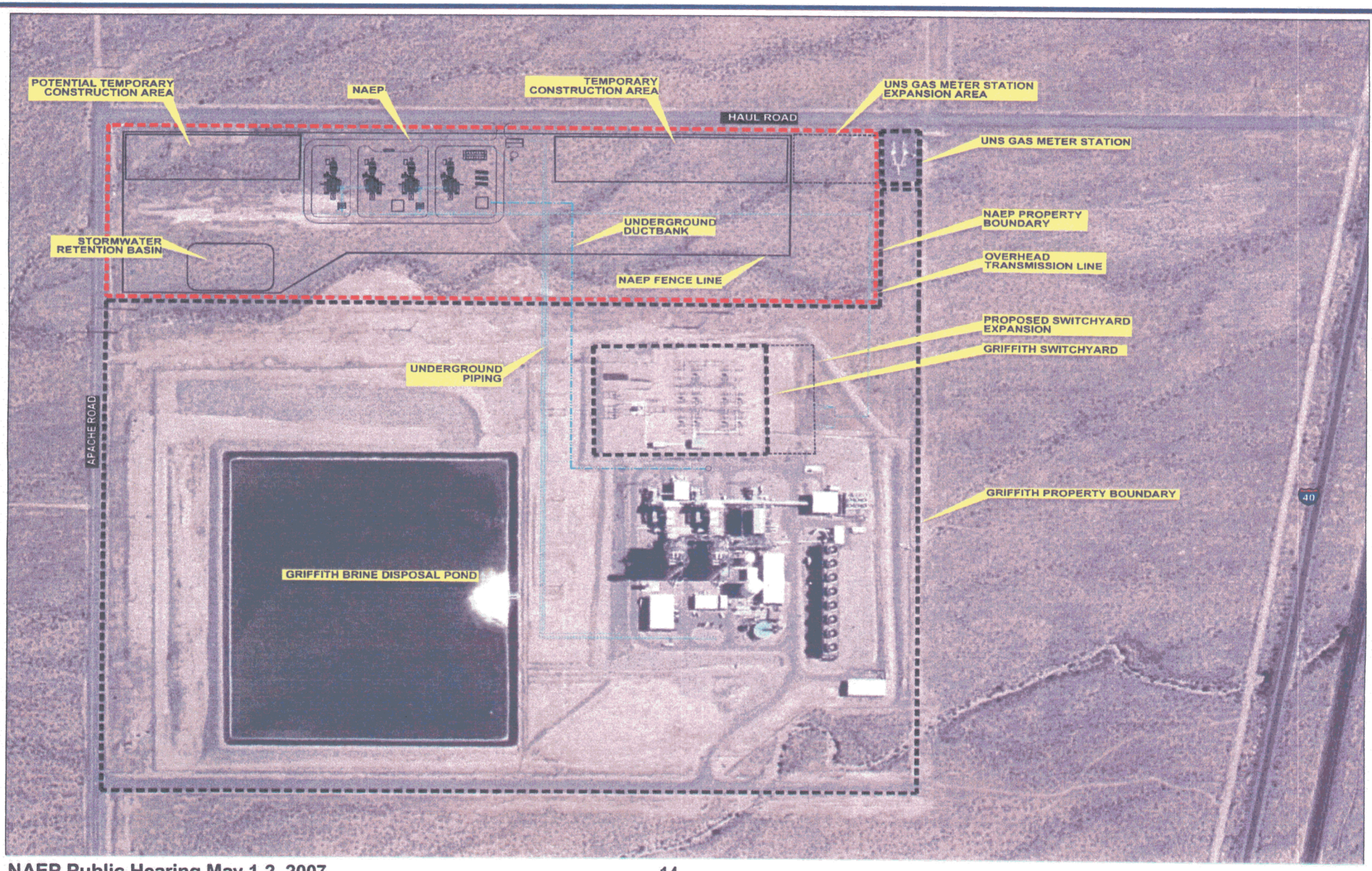
Project Description - Interconnections

- Electric interconnection with existing Western Area Power Administration (Western) Griffith 230kV Switchyard on adjacent property
- Gas interconnection with existing UNS Gas distribution system located adjacent to Project Property
- Water and wastewater interconnection with Griffith Energy facilities for treatment, recycling and reuse to maximize water use efficiency
- Water source is Sacramento Valley Aquifer (to be addressed at later hearing)

Project and Project Site Advantages

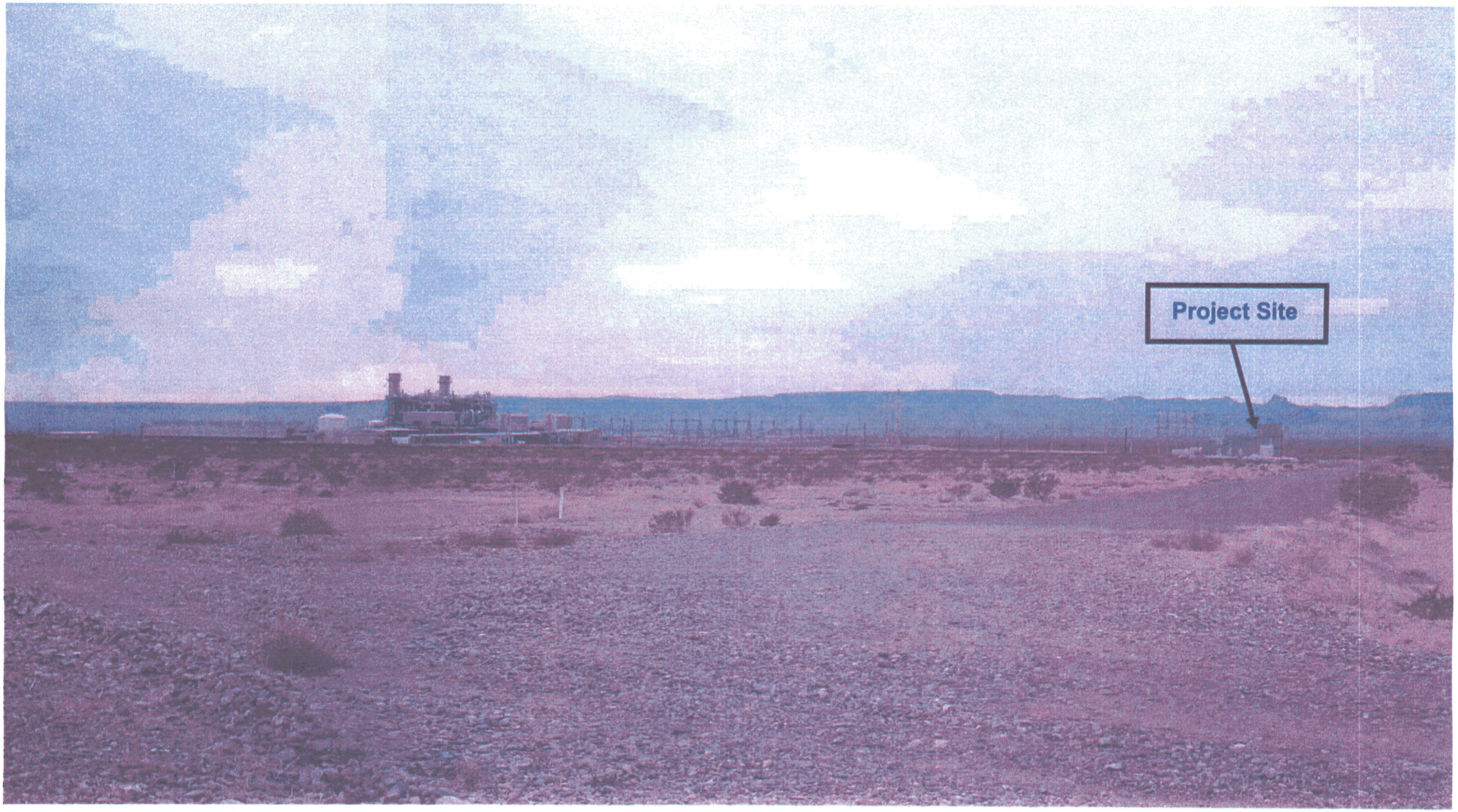
- **Selected Project Site to minimize environmental impacts**
  - Utilization of existing I-40 Industrial Corridor and Griffith infrastructure within the existing property boundaries
  - No off-site infrastructure required for electric transmission, gas or water interconnection
- **Technology offers quick start capability (10 minutes) to respond to peak market demand**
- **Reliability**
  - GE LM6000 is proven technology (98%+ availability factor)
  - 3 interstate gas transportation pipelines serving I-40 Industrial Corridor
- **Capital intensive Project offers incremental local economic benefit in the form of sales tax and property tax revenue to Mohave County general fund, schools, fire district and other tax recipients**

Aerial View of Project Site and Related Infrastructure



Visual Simulation

Visual simulation of proposed Northern Arizona Energy Project viewed from Interstate 40



Technical Description

Technical Description

- **NAEP Plant Location and General Arrangement**
  - NAEP to utilize existing infrastructure to minimize environmental impacts
  - General Arrangement of Project Site
    - Combustion Turbines (water injection and "*SPRINT*" technology)
    - Inlet Air Conditioning and Chilling
    - Emission Control Equipment
    - Fuel System
    - Water Treatment Trailers
    - Retention Basin

- **Griffith Energy to provide contracted services to NAEP**
  - Raw Water Treatment by existing pretreatment system
  - Wastewater Processing to recycle and ultimately dispose of NAEP wastewater
  - Firewater extended to NAEP
  - Operations and maintenance from existing control room and staff

- **NAEP will utilize excess Griffith design capacity (no functional modification to Griffith facilities)**

Technical Description

- **Construction**
  - Engineering and procurement 12 to 15 months in advance of construction
  - 9 to 12 months of construction field work
  - Potential phased construction (2 x 2)
  - Up to 160 craft labor on site
  - Use I-40 to deliver all equipment and materials
- **Operations and Maintenance**
  - Add 2 to 4 new full time positions
  - Major maintenance on 25,000 operating hour cycles
    - No maintenance cost penalty for unit starts
  - Ten minute start capability

Electrical Interconnection

Electrical Interconnection

- **Physical Description of Electric Interconnection**
  - Interconnect with Western 230 kV transmission system at the existing Griffith Switchyard located adjacent to the Project Property
  - Interconnecting facilities consist of approximately twelve (12) structures (100 to 120 foot tubular steel poles) supporting conductor that connects the generator step up transformers (GSU) to the Griffith Switchyard
  - The transmission line will be approximately 2,657 feet long
  - Approximately 1 acre expansion of Griffith Switchyard to add a new breaker-and-a-half bay consisting of three (3) new 230kV circuit breakers.

- **System Impact Study (SIS) Status**
  - Preliminary draft of SIS issued for Applicant review
  - Final SIS Report expected by end of May

- **SIS Report and testimony will be submitted later in the proceeding**

Gas Supply and Transportation

Gas Supply and Transportation

- **Project maximum daily gas requirement is 42 Mcf**

- **Gas Supply Options**
  - Primary – San Juan Basin, Permian Basin, Anadarko Basin
  - Secondary – Rocky Mountain, LNG (2008)
- **Interstate Gas Transportation**
  - **El Paso** Natural Gas Company pipeline capacity from the San Juan and Permian basins to the California border is over **1.5 Bcf per day**.
  - **Transwestern** Pipeline Company pipeline capacity from the San Juan and Permian basins to the California border is over **1.2 Bcf per day**.
  - **Questar** Corporation (Questar Southern Trails) pipeline capacity from the San Juan and the Rocky Mountain basins to Long Beach, California and Unisource Energy Services delivery points is approximately **120 MMcf per day**.
  - **Kern River** transports from the Rocky Mountain basin to California's Southern California gas system at Daggett hub.
- **UNS Gas – Local Gas Distribution**
  - Each of existing pipeline laterals transporting gas from El Paso, Transwestern/Questar have adequate capacity for combined NAEP gas requirements and existing Griffith Energy peak flow

- **Gas Supply and Transportation options offer unique, highly reliable fuel supply to NAEP**

Water and Wastewater

Water Use and Wastewater Recycling and Disposal

- **Water Use**
  - Maximum of 380 GPM on a hot summer day (113F)
  - Expected to use 160 acre-ft annually
    - Equivalent to 320 homes or irrigating 25-30 acres of alfalfa
  - Reduces emissions
    - Water injection to CTG reduces emissions...over 75% NOx reduction
  - Increases fuel efficiency
  - Maintains capacity during periods of high electricity demand
    - Water used in inlet air chiller module and SPRINT...adds 70 MW of capacity on a hot summer day

- **Wastewater Recycling and Disposal**
  - Wastewater recycling and reuse through Griffith water treatment system
  - Produces 21 net GPM to the Brine Disposal Pond on a hot summer day (113F)
  - NAEP adds an expected 8 acre-feet/year to the existing Brine Disposal Pond.... well within available operating margin of 31 acre-feet/year

Water Supply

- Working with Mohave County on water supply

- Given continuing discussions with Mohave County on water supply from the existing Mohave County Water system, Applicant and other parties have agreed to defer the water supply and water source portions of the case to future NAEP hearing

Environmental Compatibility

Environmental Compatibility: Water

Applicant and other parties have agreed to defer the water source portions of the case to future NAEP hearing.

Environmental Compatibility: Other

- **Land Use**
  - Project Property is zoned industrial
  - Within County designated I-40 Industrial Corridor
  - Adjacent to existing Griffith Energy Project
  - Nearest residence is approximately 2.5 miles away
- **Biology**
  - No sensitive species affected
  - Only 8 acres permanently disturbed
- **Cultural Resources**
  - Conducted additional site survey with Hualapai tribe
  - No resources in area of impact
- **Existing Plans – State and Local**
  - Consistent with County planning and zoning
- **Noise**
  - No nearby receptors; Project noise profile below background noise levels
  - Local area already influenced by major sources (e.g. I-40, railroad)
- **Special Factors**
  - Low visual impact (in industrial area, no nearby residences, short view-time from highway)

Other Environmental Permits

Environmental Permits: Air Quality

Arizona Department of Environmental Quality-Air Quality Division

- **Seeking separate air permit and expedited permit process from ADEQ**
  - Filed Title V and Title IV applications with ADEQ on April 2, 2007

- **Overview of Air Quality Regulatory Process**
  - Minor modification to an existing major stationary source
  - Compliance with applicable federal requirements (New Source Performance Standards)
  - Air Quality Impact Analysis

- **Proposed Permit Limits:**

Emission	Emission Rate Limit
NO_x	5.0 ppm
CO	6.0 ppm
VOC	5.0 ppm
PM_{10}	2.7 lbs/hour

Environmental Permits: Air Quality

- **Conclusions**
  - NAEP complies with all applicable state and federal air quality requirements
  - NAEP will employ emission controls equivalent to Best Available Control Technology established for other similar projects in Arizona
  - Air quality impacts analysis, conducted in accordance with ADEQ's Air Dispersion Modeling Guidelines for Arizona Air Quality Permits, demonstrates that **the Project will not cause or contribute to a violation of any federal or state ambient air quality standards**

- **ADEQ process and expected schedule**

Permit Process Milestone	Completion Date (estimate for future dates)
Application filed with ADEQ	April 2, 2007
Received letter from ADEQ: Application "Complete"	April 25, 2007
Proposed Permit issued for Public Comment	July 2007
EPA Review	August 2007
Final Permit Issued	September 2007

Environmental Permits – Corps of Engineers

Corp of Engineers (Corps) – Nationwide Permit

- **No Corps permit required for Project Site (no impacts to waters of the U.S.)**
  - Corps has confirmed that pipelines and conduit crossings of one arroyo within Project Property boundary are covered under Nationwide Permit (No. 12)

Environmental Permits: NEPA

National Environmental Policy Act (NEPA)-Environmental Assessment (EA)

- **Electric interconnection with Western triggers NEPA**
  - Lead agency: Western
  - Cooperating agencies: Mohave County
- **Environmental Analysis**
  - Evaluates all components of the Project
- **Status / Schedule**
  - Scoping period ended on April 8, 2007
  - Publication of Draft EA anticipated early summer 2007
  - Final Western decision expected by late summer 2007

Environmental Permits: Wastewater

Arizona Department of Environmental Quality-Wastewater Division

- **No off-site wastewater streams; final wastewater from recycling and reuse process will be piped to Griffith Brine Disposal Pond**

- **Griffith Brine Disposal Pond has adequate capacity to include NAEP wastewater flows for Project life**

- **ADEQ is advancing administrative amendment to Griffith Aquifer Protection Permit (APP No. 1000940) that will add NAEP wastewater source to permit description**
  - Combined existing Griffith wastewater flows plus additional NAEP wastewater flows will be below all APP permit limits
  - Griffith and NAEP wastewater quality is identical (same source - water treatment and recycling process)

- **Status of Administrative Amendment**
  - Administrative amendment form signed
  - ADEQ expects to complete administrative process within 135 to 150 days

Public Information Program

Public Information Program

- **Local Public Meetings Conducted by Applicant**
  - Meetings with County Supervisors and Stakeholders (January 2007)
  - Project Forum (Lake Havasu, February 2, 2007)
  - Project Open House (Golden Valley, February 2, 2007)
    - Comment cards were utilized to engage public questions/concerns
    - Response letters to comment cards
  - Kingman Civic Organizations
  - Tour of Griffith Energy/NAEP site with local community residents (March 2007)

- **Project Website and Information**
  - Project 'Fact Sheet' produced and disseminated to key stakeholders (Jan. 2007)
  - Newsletter #1 produced and mailed to all property owners of record within 5 mile radius of Project Site (Feb 2007)
  - Established project website: www.NorthernArizonaEnergy.com (March 2007)
  - Newsletter #2 mailed to all property owners of record within 5 mile radius of Project Site

- **Road Signs Notice of Public Hearing**
  - Griffith Exit of Interstate 40
  - Golden Valley (Highway 68/Adobe Road)

Public Information Program

- **Additional communication with local stakeholders:**
  - Superintendent, Kingman Unified School District
  - Chancellor, Mohave County Community College
  - Kingman Mayor/City Council
  - Lake Havasu Chamber of Commerce
  - Bullhead Chamber of Commerce
  - Kingman Chamber of Commerce
  - Kingman Airport Authority

- **Additional communication with state stakeholders:**
  - Governor Napalitano's Office (Lori Faeth/Lynette Evans)
  - Senator Ron Gould (State Legislative District 3)
  - Representative Nancy McLain (State Legislative District 3)
  - Representative Trish Groe (State Legislative District 3)
  - Congressman Trent Franks (staff)
  - Nancy Wrona (ADEQ Director Air Quality Division)

A-5

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov

Janet Napolitano
Governor

Stephen A. Owens
Director

EXHIBIT
A-5
Admitted

Notice of Administrative Completeness

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

April 25, 2007

Kevin R. Johnson, Vice President
Northern Arizona Energy, LLC
1735 Technology Drive, Suite 820
San Jose, CA 95110

Re: Air Quality Control Permit No. 43801
Electricity Generation Plant - Place ID: 6081

Dear Mr. Johnson:

The Arizona Department of Environmental Quality received the above-referenced application on March 26, 2007. ADEQ's review of this application is subject to the requirements of the licensing time frames ("LTF") statute under Arizona Revised Statutes ("A.R.S.") § 41-1072 through § 41-1079 and the LTF rules under Arizona Administrative Code ("A.A.C.") R18-1-501 through R18-1-525.

Under A.R.S. § 41-1074, ADEQ has determined your application is administratively complete. This determination ends the Administrative Completeness Review time frame and begins the Substantive Review time frame for your application. Any substantive deficiencies in your application will be noted in a separate written request for additional information.

Please contact me at (602) 771-2323 if you have questions regarding this Notice or the status of your application.

Sincerely,

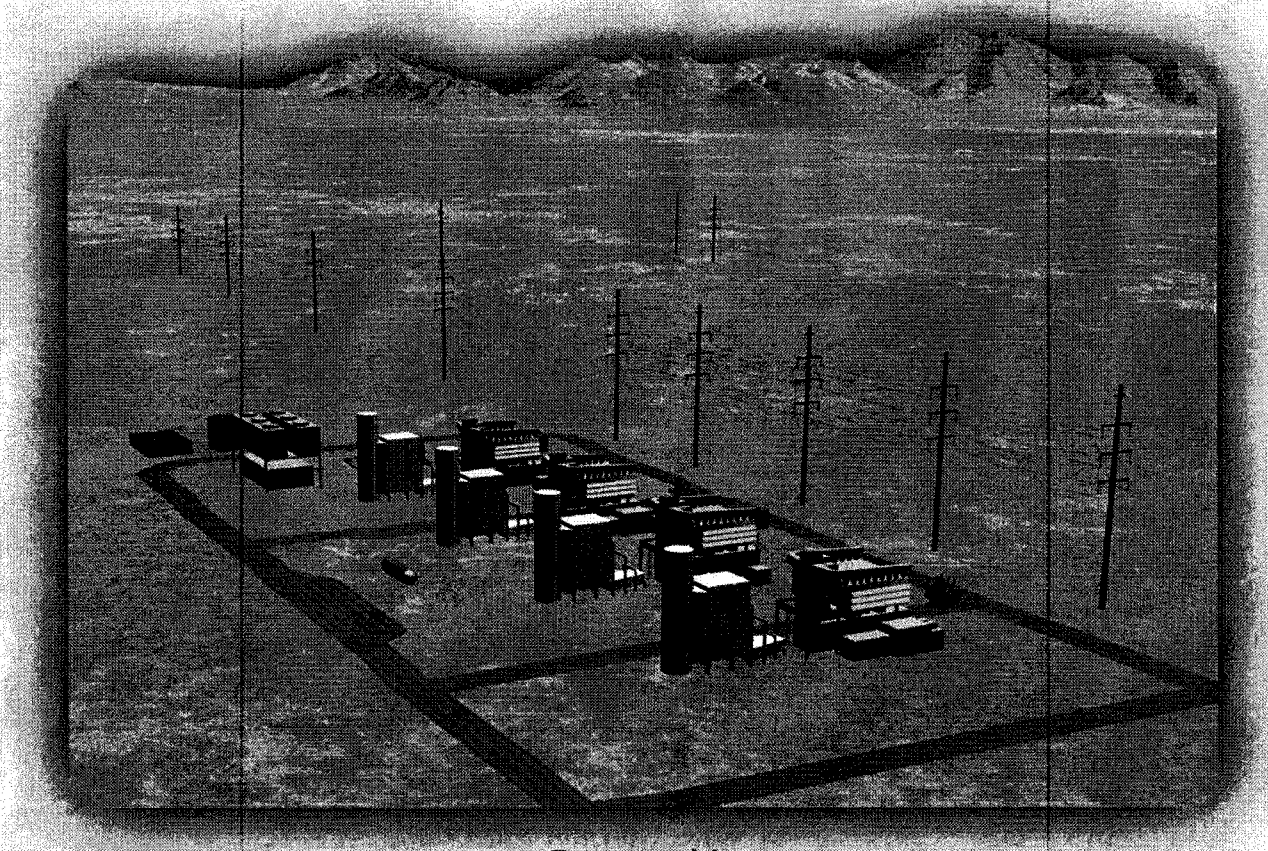
Vivek Kapur
Environmental Engineering Specialist
Existing Source & General Permits Unit

CC: Dana Diller, Project Director, High Energy Resources Services, LLC
Mark L. Peak, Sierra Research

EXHIBIT
tabbies
A-6
Admitted

Class I Permit Application

Northern Arizona Energy, LLC
Mohave County, Arizona



Prepared by:

Sierra Research, Inc.
1801 J Street
Sacramento, California 95814
(916) 444-6666

Submitted by:

Northern Arizona Energy, LLC

March 2007

Viad Corporate Center
1850 North Central Avenue
Suite 1100
Phoenix, Arizona 85004
www.lawyers.com/lawms/

MOYES STOREY

LAW OFFICES

Jay I. Moyes

Telephone: 602-604-2106
Facsimile: 602-274-9135
Email: jimoyes@lawms.com

April 24, 2007

RECEIVED
2007 APR 24 A 11: 55
AZ CORP COMMISSION
DOCKET CONTROL

VIA HAND-DELIVERY

Docket Control
Arizona Corporation Commission
1200 W. Washington
Phoenix, AZ 85004

Re: Northern Arizona Energy Project
Docket No. L-00000FF-07-0134-00133

Dear Sir or Madam:

Enclosed for filing are is an original and 26 copies of the Class I Permit Application for the above-referenced matter. Please return to us one date stamped/conformed copy.

Please note that we are having copies of this document delivered to:

1. Laurie Woodall, Chairman, Arizona Power Plant & Transmission Line Siting Committee
2. Maureen Scott, Esq. – Staff
3. Ken Sundlof, Esq. – Intervenor – Mohave County, AZ

If you have any questions or need anything further, please do not hesitate to contact us. Thank you for your assistance.

Sincerely,

LuAnn Kay Kornegay
Assistant to Jay I. Moyes

LKK/me
Enclosures

sierra
research

1801 J Street
Sacramento, CA 95814
Tel: (916) 444-6666
Fax: (916) 444-8373

Ann Arbor, MI
Tel: (734) 761-6666
Fax: (734) 761-6755

March 26, 2007

Trevor Baggiore
Permit Section Manager
Air Quality Bureau
Arizona Department of Environmental Quality
1110 W. Washington St.
Phoenix, AZ 85007

Subject: Class I Air Quality Permit Application for Northern Arizona Energy, LLC

Dear Trevor:

Sierra Research, on behalf of Northern Arizona Energy, LLC (NAE), hereby submits a Class I Air Quality Permit Application to the Arizona Department of Environmental Quality (ADEQ) for the proposed Northern Arizona Energy peaking power project in Mohave County, Arizona. On January 22, 2007, NAE, under the name Arroyo Energy, LLC, submitted a request for accelerated permit processing to ADEQ for this project along with a fee of $15,000. The project and company names changed from Arroyo Energy to Northern Arizona Energy subsequent to that request. While this application will be reviewed as a minor modification to a major stationary source (Griffith Energy Facility), NAE is requesting a separate stand-alone permit for the new facility due to the possible future sale of the facility to an independent owner.

Should you have any questions, please feel free to contact me (916) 444-6666 or Dana Diller (480) 664-8154.

Sincerely,

Mark L Peak
Permit Engineer
Sierra Research

attachments

cc: Dana Diller
Kevin Johnson
Joe Otahal
Gary Rubenstein

sierra research

Class I Permit Application
Northern Arizona Energy, LLC
Mohave County, Arizona

prepared for:

Northern Arizona Energy, LLC

March 2007

prepared by:

Sierra Research, Inc.
1801 J Street
Sacramento, California 95814
(916) 444-6666

Submitted by:
Northern Arizona Energy, LLC

CLASS I PERMIT APPLICATION
NORTHERN ARIZONA ENERGY, LLC
MOHAVE COUNTY, ARIZONA

prepared for:

Northern Arizona Energy, LLC

March 2007

Sierra Research, Inc.
1801 J Street
Sacramento, CA 95814
(916) 444-6666

CLASS I PERMIT APPLICATION
NORTHERN ARIZONA ENERGY, LLC
MOHAVE COUNTY, ARIZONA

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1. INTRODUCTION AND PERMIT APPLICATION

Northern Arizona Energy, LLC (Northern Arizona Energy or Applicant) presents this permit application for a proposed nominal 175 megawatt (MW) natural gas fired peaking power generation project (Standard Classification Code 4911). The Northern Arizona Energy Project (Project) will be constructed and operated in the existing Interstate 40 Industrial Corridor, approximately three (3) miles north of the Griffith Interchange in Mohave County, Arizona. The Project will interconnect with the Western Area Power Administration (Western) 230kV system at the Griffith Switchyard.

The project area is classified Attainment for all applicable pollutants and is under the jurisdiction of the Arizona Department of Environmental Quality (ADEQ). The Project meets the requirements to obtain a Class I permit. ADEQ has been delegated full authority for major source permitting and will serve as the primary authority for the air permit approvals.

The proposed Project is located on a forty (40) acre parcel of land (Project Property) that is controlled by the Applicant. The Project Property occupies the northern-most seven hundred (700) feet of the original one hundred, sixty (160) acre parcel of land owned by Griffith Energy LLC. Griffith Energy's 650 MW power generation facility (Griffith Energy Project) is located on the southern portion (remaining 120 acres) of the original parcel. Within the Project Property, the equipment and interconnection facilities occupy approximately eight (8) acres (Project Site). During construction, up to six (6) acres of the Project Property has also been designated for the contractor trailers, equipment and material lay down area and worker parking (Temporary Construction Area).

The Applicant is seeking a separate air permit from that of Griffith Energy LLC, the owner and operator of the Griffith Energy Project. A business transaction is pending between LS Power, the upstream owner of Northern Arizona Energy and Griffith Energy and Dynegy Corporation. Upon completion of this transaction, operating assets such as the Griffith Energy Project will be owned by Dynegy, and development projects such as the Northern Arizona Energy Project will be separately owned by a Joint Venture of LS Power and Dynegy. Due to this separate ownership structure a separate permit is required for the Northern Arizona Energy Project.

It is understood by the Applicant that from a regulatory process perspective, ADEQ will approach the application and regulatory process as a modification to the Griffith Energy Project. Since Griffith has a Class I Prevention of Significant Deterioration (PSD) permit, Northern Arizona Energy will also be issued a Class I permit.

All emissions from the Project are below PSD significance levels; therefore the application is considered a minor modification to an existing major source. The Project is subject to Federal New Source Performance Standard for Stationary Combustion Turbines (40 CFR Part 60 Subpart KKKK); therefore it is considered a Title V source for fee purposes. While emissions for all pollutants are below 100 tons per year, Northern Arizona Energy will be issued a Title V permit. As an electric generation facility with units having the potential to generate more than 25 MW, the Project will also be subject to the requirements of the Title IV Acid Rain program.

Northern Arizona Energy presents this application requesting flexibility for a "phased construction" permit. The potential phased construction is described in Chapter 2 of this application along with the general project description.

This application is presented pursuant to the requirements codified in Title 18 Chapter 2 of the Arizona Administrative Code (AAC) and has been certified by a responsible official of Northern Arizona Energy. The permit application forms are included at the end of this section. The application is organized in the following manner

Section 1 – Introduction and ADEQ Permit Application Forms
Section 2 – Project Description
Section 3 – Emissions Inventory
Section 4 – Ambient Air Quality Impacts
Section 5 – Applicable Requirements
Section 6 – Control Technology Review
Section 7 – Compliance and Monitoring

The responsible persons concerning all matters in this permit application are:

Ms. Dana Diller
Project Director (Contractor)
High Energy Resource Services, LLC
6410 E. Everett Drive
Scottsdale, AZ 85254
Phone: (480) 664-8154
Facsimile: (480) 636-8531
E-mail: ddiller@cox.net

For written correspondence, please copy
Jay Moyes
Moyes Storey Law Offices
1850 N Central Avenue, Suite 1100
Phoenix, Arizona 85004
Phone: (602) 604-2106
Facsimile: (602) 274-9135
E-mail: jimoyes@lawms.com

Mr. Kevin R. Johnson
Vice President
LS Power Generation
1735 Technology Dr, Ste 820
San Jose, CA 95110
Phone: (408) 572-1290
Facsimile: (408) 392-9757
E-mail: KJohnson@lspower.com

Mr. Mark Peak
Senior Engineer
Sierra Research
1801 J Street
Sacramento, California 95814
Phone: (916) 444-6666
Facsimile: (916) 444-8373
E-mail: mpeak@sierraresearch.com

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
Air Quality Division
1110 West Washington • Phoenix, AZ 85007 • Phone: (602) 771-2338

STANDARD PERMIT APPLICATION FORM
(As required by A.R.S. § 49-426, and Chapter 2, Article 3, Arizona Administrative Code)

1. Permit to be issued to: (Business license name of organization that is to receive permit) _____
   Northern Arizona Energy, LLC
2. Mailing Address: 1735 Technology Drive, Suite 820
   City: San Jose State: CA ZIP: 95110
3. Previous Company Name: (if applicable) _____
4. Name (or names) of Owners/Principals: Northern Arizona Energy, LLC
   Phone: _____ Fax: _____ Email: _____
5. Name of Owner's Agent: _____
   Phone: _____ Fax: _____ Email: _____
6. Plant/Site Manager/Contact Person and Title: Mark Peak, Sierra Research
   Phone: 916-444-6666 Fax: 916-444-8373 Email: mpeak@sierraresearch.com
7. Plant Site Name: Northern Arizona Energy Project
   Plant Site Location/Address: Apache Road
   City: _____ County: Mohave ZIP: _____
   Indian Reservation (if applicable, which one): _____
   Latitude/Longitude, Elevation: 35° 03' 30" N, 114° 08' 22" W, 2475 feet
8. Equipment Purpose: Power generation
   Equipment List/Description: See Attached Equipment List
9. Type of Organization:
   ☐ Corporation ☐ Individual Owner
   ☐ Partnership ☐ Government Entity (Government Facility Code: _____)
   ☒ Other Limited Liability Company
10. Permit Application Basis: ☒ New Source ☐ Revision ☐ Renewal of Existing Permit
    (Check all that apply.) ☐ Portable Source ☐ General Permit
    For renewal or modification, include existing permit number (and exp. date): _____
    Date of Commencement of Construction or Modification: 4th quarter 2007 (earliest)
    Is **any** of the equipment to be leased to another individual or entity? ☐ Yes ☒ No
    Standard Industrial Classification Code: 4911 State Permit Class: Class I
11. Signature of Responsible Official of Organization: _____
    Official Title of Signer: Vice President
12. Typed or Printed Name of Signer: Kevin R. Johnson
    Date: March 23, 2007 Telephone Number: (408) 572-1290
    Company Name: Northern Arizona Energy, LLC

NORTHERN ARIZONA ENERGY EMISSION SOURCES

DATE _____

Estimated "Potential to Emit" per R18-2-101.
Review of applications and issuance of permits will be expedited by supplying all necessary information on this Table.

REGULATED AIR POLLUTANT DATA					EMISSION POINT DISCHARGE PARAMETERS										
EMISSION POINT [1]		CHEMICAL COMPOSITION OF TOTAL STREAM	AIR POLLUTANT EMISSION RATE		UTM COORDINATES OF EMISSION POINT [5]			STACK SOURCES [6]					NONPOINT	
NUMBER	NAME	REGULATED AIR POLLUTANT NAME [2]	#/ HR. [3]	TONS/ YEAR [4]	ZONE	EAST (Mtrs)	NORTH (Mtrs)	HEIGHT ABOVE GROUND (feet)	HEIGHT ABOVE STRUC. (feet)	EXIT DATA			SOURCES [7]		
										DIA (ft.)	VEL. (fps)	TEMP. (°F)	LENGTH (ft.)	WIDTH (ft.)	
0001	CT1	NOx	7.90	*	11	761,137.48	3,883,051.21	85	29	10	134.7	829.1	NA	NA	
0001	CT1	CO	5.77	*	"	"	"	"	"	"	"	"	NA	NA	
0001	CT1	SO2	6.14	*	"	"	"	"	"	"	"	"	NA	NA	
0001	CT1	PM10/PM2.5	2.70	*	"	"	"	"	"	"	"	"	NA	NA	
0001	CT1	VOC	2.75	*	"	"	"	"	"	"	"	"	NA	NA	

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL 2475 feet
ADEQ STANDARD CONDITIONS ARE 293K AND 101.3 KILOPASCALS (A.A.C. R18-2-101)
* Combined emissions cap for all turbines (CT1 – CT4) - NOx – 39.71 TPY, CO – 35.90 TPY, SO2 – 32.30 TPY, PM10/PM2.5 – 14.31 TPY, VOC – 15.54 TPY

General Instructions:

1. Identify each emission point with a unique number for this plant site, consistent with emission point identification used on plot plan, previous permits, and Emissions Inventory Questionnaire. Include fugitive emissions. Limit emission point number to eight (8) character spaces. For each emission point use as many lines as necessary to list regulated air pollutant data. Typical emission point names are: heater, vent, boiler, tank, reactor, separator, baghouse, fugitive, etc. Abbreviations are O.K.
2. Components to be listed include regulated air pollutants as defined in R18-2-101. Examples of typical component names are: Carbon Monoxide (CO), Nitrogen Oxides (NO_X), Sulfur Dioxide (SO_2), Volatile Organic Compounds (VOC), particulate matter (PM), particulate less than 10 microns (PM_{10}), etc. Abbreviations are O.K.
3. Pounds per hour (#/HR) is maximum potential emission rate expected by applicant.
4. Tons per year is annual maximum potential emission expected by applicant, which takes into account process operating schedule.
5. As a minimum applicant shall furnish a facility plot plan as described in the filing instructions. UTM coordinates are required only if the source is a major source or is required to perform refined modeling for the purposes of demonstrating compliance with ambient air quality guidelines.
6. Supply additional information as follows if appropriate:
   (a) Stack exit configuration other than a round vertical stack. Show length and width for a rectangular stack. Indicate if horizontal discharge with a note.
   (b) Stack's height above supporting or adjacent structures if structure is within 3 "stack height above the ground" of stack.
7. \Dimensions of nonpoint sources as defined in R18-2-101.

NORTHERN ARIZONA ENERGY EMISSION SOURCES

DATE _____

Estimated "Potential to Emit" per R18-2-101.
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0002	CT2	NOx	7.90	*	11	761,175.58	3,883,052.46	85	29	10	134.7	829.1	NA	NA	
0002	CT2	CO	5.77	*	"	"	"	"	"	"	"	"	NA	NA	
0002	CT2	SO2	6.14	*	"	"	"	"	"	"	"	"	NA	NA	
0002	CT2	PM10/PM2.5	2.70	*	"	"	"	"	"	"	"	"	NA	NA	
0002	CT2	VOC	2.75	*	"	"	"	"	"	"	"	"	NA	NA	

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL 2475 feet
ADEQ STANDARD CONDITIONS ARE 293K AND 101.3 KILOPASCALS (A.A.C. R18-2-101)
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NORTHERN ARIZONA ENERGY EMISSION SOURCES

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0003	CT3	NOx	7.90	*	11	761,213.68	3,883,053.70	85	29	10	134.7	829.1	NA	NA
0003	CT3	CO	5.77	*	"	"	"	"	"	"	"	"	NA	NA
0003	CT3	SO2	6.14	*	"	"	"	"	"	"	"	"	NA	NA
0003	CT3	PM10/PM2.5	2.70	*	"	"	"	"	"	"	"	"	NA	NA
0003	CT3	VOC	2.75	*	"	"	"	"	"	"	"	"	NA	NA

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ADEQ STANDARD CONDITIONS ARE 293K AND 101.3 KILOPASCALS (A.A.C. R18-2-101)
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General Instructions:

1. Identify each emission point with a unique number for this plant site, consistent with emission point identification used on plot plan, previous permits, and Emissions Inventory Questionnaire. Include fugitive emissions. Limit emission point number to eight (8) character spaces. For each emission point use as many lines as necessary to list regulated air pollutant data. Typical emission point names are: heater, vent, boiler, tank, reactor, separator, baghouse, fugitive, etc. Abbreviations are O.K.
2. Components to be listed include regulated air pollutants as defined in R18-2-101. Examples of typical component names are: Carbon Monoxide (CO), Nitrogen Oxides (NO_X), Sulfur Dioxide (SO_2), Volatile Organic Compounds (VOC), particulate matter (PM), particulate less than 10 microns (PM_{10}), etc. Abbreviations are O.K.
3. Pounds per hour (#/HR) is maximum potential emission rate expected by applicant.
4. Tons per year is annual maximum potential emission expected by applicant, which takes into account process operating schedule.
5. As a minimum applicant shall furnish a facility plot plan as described in the filing instructions. UTM coordinates are required only if the source is a major source or is required to perform refined modeling for the purposes of demonstrating compliance with ambient air quality guidelines.
6. Supply additional information as follows if appropriate:
   (a) Stack exit configuration other than a round vertical stack. Show length and width for a rectangular stack. Indicate if horizontal discharge with a note.
   (b) Stack's height above supporting or adjacent structures if structure is within 3 "stack height above the ground" of stack.
7. Dimensions of nonpoint sources as defined in R18-2-101.

NORTHERN ARIZONA ENERGY EMISSION SOURCES

Estimated "Potential to Emit" per R18-2-101.
Review of applications and issuance of permits will be expedited by supplying all necessary information on this Table.

REGULATED AIR POLLUTANT DATA					EMISSION POINT DISCHARGE PARAMETERS									
EMISSION POINT [1]		CHEMICAL COMPOSITION OF TOTAL STREAM	AIR POLLUTANT EMISSION RATE		UTM COORDINATES OF EMISSION POINT [5]			STACK SOURCES [6]					NONPOINT	
NUMBER	NAME	REGULATED AIR POLLUTANT NAME [2]	#/HR. [3]	TONS/YEAR [4]	ZONE	EAST (Mtrs)	NORTH (Mtrs)	HEIGHT ABOVE GROUND (feet)	HEIGHT ABOVE STRUC. (feet)	EXIT DATA			SOURCES [7]	
										DIA (ft.)	VEL. (fps)	TEMP. (°F)	LENGTH (ft.)	WIDTH (ft.)
0004	CT4	NOx	7.90	*	11	761,251.78	3,883,054.94	85	29	10	134.7	829.1	NA	NA
0004	CT4	CO	5.77	*	"	"	"	"	"	"	"	"	NA	NA
0004	CT4	SO2	6.14	*	"	"	"	"	"	"	"	"	NA	NA
0004	CT4	PM10/PM2.5	2.70	*	"	"	"	"	"	"	"	"	NA	NA
0004	CT4	VOC	2.75	*	"	"	"	"	"	"	"	"	NA	NA

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL 2475 feet
ADEQ STANDARD CONDITIONS ARE 293K AND 101.3 KILOPASCALS (A.A.C. R18-2-101)
* Combined emissions cap for all turbines (CT1 – CT4) - NOx – 39.71 TPY, CO – 35.90 TPY, SO2 – 32.30 TPY, PM10/PM2.5 – 14.31 TPY, VOC – 15.54 TPY

General Instructions:

1. Identify each emission point with a unique number for this plant site, consistent with emission point identification used on plot plan, previous permits, and Emissions Inventory Questionnaire. Include fugitive emissions. Limit emission point number to eight (8) character spaces. For each emission point use as many lines as necessary to list regulated air pollutant data. Typical emission point names are: heater, vent, boiler, tank, reactor, separator, baghouse, fugitive, etc. Abbreviations are O.K.
2. Components to be listed include regulated air pollutants as defined in R18-2-101. Examples of typical component names are: Carbon Monoxide (CO), Nitrogen Oxides (NO_X), Sulfur Dioxide (SO_2), Volatile Organic Compounds (VOC), particulate matter (PM), particulate less than 10 microns (PM_{10}), etc. Abbreviations are O.K.
3. Pounds per hour (#/HR) is maximum potential emission rate expected by applicant.
4. Tons per year is annual maximum potential emission expected by applicant, which takes into account process operating schedule.
5. As a minimum applicant shall furnish a facility plot plan as described in the filing instructions. UTM coordinates are required only if the source is a major source or is required to perform refined modeling for the purposes of demonstrating compliance with ambient air quality guidelines.
6. Supply additional information as follows if appropriate:
   (a) Stack exit configuration other than a round vertical stack. Show length and width for a rectangular stack. Indicate if horizontal discharge with a note.
   (b) Stack's height above supporting or adjacent structures if structure is within 3 "stack height above the ground" of stack.
7. Dimensions of nonpoint sources as defined in R18-2-101.

NORTHERN ARIZONA ENERGY EMISSION SOURCES

DATE _____

Estimated "Potential to Emit" per R18-2-101.
Review of applications and issuance of permits will be expedited by supplying all necessary information on this Table.

REGULATED AIR POLLUTANT DATA					EMISSION POINT DISCHARGE PARAMETERS										
EMISSION POINT [1]		CHEMICAL COMPOSITION OF TOTAL STREAM	AIR POLLUTANT EMISSION RATE		UTM COORDINATES OF EMISSION POINT [5]			STACK SOURCES [6]					NONPOINT	
NUMBER	NAME	REGULATED AIR POLLUTANT NAME [2]	#/ HR. [3]	TONS/ YEAR [4]	ZONE	EAST (Mtrs)	NORTH (Mtrs)	HEIGHT ABOVE GROUND (feet)	HEIGHT ABOVE STRUC. (feet)	EXIT DATA			SOURCES [7]	
										DIA (ft.)	VEL. (fps)	TEMP. (°F)	LENGTH (ft.)	WIDTH (ft.)
0005	Inlet Air Chiller Module (6 cells)	PM10/PM2.5	0.16	0.47									NA	NA
	Cell 1		*		11	761,271.15	3,883,063.89	45	2	12	19.9	90.0		
	Cell 2		*		11	761,276.60	3,883,063.89	45	2	12	19.9	90.0		
	Cell 3		*		11	761,282.05	3,883,063.89	45	2	12	19.9	90.0		
	Cell 4		*		11	761,271.15	3,883,067.70	45	2	12	19.9	90.0		
	Cell 5		*		11	761,276.60	3,883,067.70	45	2	12	19.9	90.0		
	Cell 6		*		11	761,282.05	3,883,067.70	45	2	12	19.9	90.0		

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL 2475 feet
ADEQ STANDARD CONDITIONS ARE 293K AND 101.3 KILOPASCALS (A.A.C. R18-2-101)
* total emissions equally divided to each cell – 0.0259 lb/hr/cell

General Instructions:

1. Identify each emission point with a unique number for this plant site, consistent with emission point identification used on plot plan, previous permits, and Emissions Inventory Questionnaire. Include fugitive emissions. Limit emission point number to eight (8) character spaces. For each emission point use as many lines as necessary to list regulated air pollutant data. Typical emission point names are: heater, vent, boiler, tank, reactor, separator, baghouse, fugitive, etc. Abbreviations are O.K.
2. Components to be listed include regulated air pollutants as defined in R18-2-101. Examples of typical component names are: Carbon Monoxide (CO), Nitrogen Oxides (NO_X), Sulfur Dioxide (SO_2), Volatile Organic Compounds (VOC), particulate matter (PM), particulate less than 10 microns (PM_{10}), etc. Abbreviations are O.K.
3. Pounds per hour (#/HR) is maximum potential emission rate expected by applicant.
4. Tons per year is annual maximum potential emission expected by applicant, which takes into account process operating schedule.
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   (a) Stack exit configuration other than a round vertical stack. Show length and width for a rectangular stack. Indicate if horizontal discharge with a note.
   (b) Stack's height above supporting or adjacent structures if structure is within 3 "stack height above the ground" of stack.
7. Dimensions of nonpoint sources as defined in R18-2-101.

EQUIPMENT LIST

The following table should include all equipment utilized in the Project and be completed with all data requested. Be sure to notate the units (tons/hour, horsepower, etc.) when recording the Maximum Rated Capacity information. Be sure to notate the Serial Number and/or the Equipment ID Number. The date of manufacture must be included in order to determine if portions of the facility are NSPS applicable. Make additional copies of this form if necessary.

Type of Equipment	Maximum Rated Capacity	Make	Model	Serial Number	Date of Manufacture	Equipment ID Number
Combustion Turbines 1-4	48 MW	General Electric	LM6000 PC SPRINT Nxgen	TBD	TBD	CT1, CT2, CT3, & CT4
Chiller for Combustion Turbines 1-4	345 gpm – Recirculation Rate	TBD	TBD	TBD	TBD	Chiller

COMPLIANCE CERTIFICATION AND CERTIFICATION OF TRUTH, ACCURACY, AND COMPLETENESS

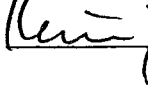
This certification must be signed by the Responsible Official. Applications without a signed certification will be deemed incomplete.

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by ADEQ as public record. I also attest that I am in compliance with the applicable requirements of the General Permit and will continue to comply with such requirements and any future requirements that become effective during the life of the General Permit. I will present a certification of compliance to ADEQ no less than semiannually and more frequently if specified by ADEQ. I further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with Arizona Administrative Code, Title 18, Chapter 2 and any permit issued thereof.

Typed or Printed Company Name: Northern Arizona Energy, LLC

Official Title of Signer: Vice President

Typed or Printed Name of Signer: Kevin R. Johnson

Signature of Responsible Official:  Date: March 23, 2007

2. PROJECT DESCRIPTION

The Northern Arizona Energy Project (Project) will be a nominal 175 MW natural gas fired simple cycle power generation facility. It is comprised of four (4) General Electric (GE) LM6000 PC SPRINT NxGen combustion turbine generators (CTGs) with inlet air chillers. The Project will be designed to produce 175 MW of net electrical output with a heat rate of 9975 Btu/kWh (HHV) based upon the design condition ambient temperature of 90 degrees Fahrenheit (°F). Pipeline quality natural gas will be the only fuel combusted by the CTGs The Project will utilize an average of approximately 1,750 Million British Thermal Units (MMBtu) (HHV) of gas per hour, 28,000 MMBtu per 16-hour day, and 42,000 MMBtu per 24-hour day.

The Project is located in Mohave County, Arizona, just west of Interstate 40, approximately three (3) miles north of the Griffith interchange. The Project is approximately 110 miles southeast of Las Vegas, Nevada via Arizona Highway 93 and 200 miles northwest of Phoenix, Arizona. The Project location is shown in Figure 2-1.

The Griffith Energy Project (Griffith) is a 600 MW natural gas-fired, combined cycle power plant located south of the Project. In 1998, Griffith was sited in the I-40 Industrial Corridor. As noted previously, the northern 40 acres of the prior original Griffith site forms the Project Property. The Project Property and Project Site are shown in Figure 2-2.

Northern Arizona Energy proposes to have the flexibility to construct the four (4) CTGs in a "phased construction". If the initial capacity requirement of power purchase agreements require the generation capability of only two (2) CTGs, Northern Arizona Energy would initially construct two CTGs and delay the installation of the second pair of CTGs. However, the application evaluates the potential air quality impacts of the total Project at full capacity, or all four (4) CTG in operation from Project inception.

The Project has been designed to supply energy to the customer within ten (10) minutes of a CTG startup. Given this quick start capability and the associated operating performance and fuel efficiency of the LM6000 technology, the Project will serve the peak load requirements of customers in Mohave County, the broader state of Arizona load, and surrounding regional load centers.

The Project will interconnect with the Western Area Power Administration (WAPA) 230kV system at the Griffith Switchyard. There will be one generator step-up (GSU) transformer per CTG pair.

The LM6000 combustion turbine is a two-shaft gas turbine engine derived from the core of the CF6-80C2 engine, which is GE's high thrust, high efficiency aircraft engine. The LM6000 uses state-of-the-art technology to efficiently burn clean natural gas with reduced nitrogen oxides (NOx) and carbon monoxide (CO) emissions. Each unit is equipped with water injection to the combustors for reducing the production of NOx. In addition, a selective catalytic reduction (SCR) system further reduces NOx and an oxidation catalyst reduces CO and volatile organic compound (VOC) emissions.

Each CTG will also be equipped with a SPRINT (SPRay INTer-cooling) system, which enhances the efficiency and output of the gas turbine engine by spraying micro-droplets of water into the inter-stage air stream between the low pressure compressor and the high pressure compressor. The water is atomized to a droplet diameter of less than 20 microns by using inter-stage bleed air and special nozzles. As the droplets evaporate, the air temperature is reduced and the mass flow is increased. This results in greater power output and better fuel efficiency.

The CTGs will be housed in a metal enclosure to protect the units from the elements and to reduce noise.

The combustion gases will exit the turbine at approximately 830°F and then pass through an oxidization catalyst for control of CO and VOC emissions and the SCR system for NOx emission control. The SCR system is used in conjunction with ammonia injection to reduce NOx emissions. A 19 percent aqueous ammonia solution (NH_3) is injected into the CTG exhaust gas stream that passes over a catalyst bed that reduces the oxides of nitrogen to inert nitrogen. The SCR equipment includes a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors. The ammonia unloading area will consist of a curbed concrete pad and containment vault. After passing through the SCR system, the exhaust gases exit through the attached stack. Each exhaust stack will be 85 feet in height and 10 feet in diameter. The stack will be equipped with continuous emissions monitors (CEMS) for CO and NOx, and test connections for performance monitoring.

Auxiliary equipment will include inlet air filters with chiller coils, chiller module, circulating water pumps, water treatment equipment, natural gas compressors, generator step-up and auxiliary transformers, and water storage tanks.

The air intake system provides filtered air to the combustion turbine compressors. Mounted above each combustion turbine, the intake system is equipped with a self-cleaning filter system to clean particulates from the air. The system is provided with access for inspection and maintenance. Inlet air chilling will be used to enhance gas turbine performance during times of high ambient air temperatures. The inlet chilling system consists of heat exchanger coils located in the inlet air stream. Chilled water from the chiller module flows through the coils to cool the incoming air. This results in increased electrical output and improved fuel efficiency for the units.

The chiller module will provide heat rejection for the centrifugal chiller used to supply chilled water to the air inlet coils. Makeup water will be pre-treated water from Griffith, as well as any condensate from the chiller coils. The circulating water will be continuously treated and controlled in order to achieve approximately 6 cycles of concentration.

Makeup water will replace water lost from evaporation, drift, and blowdown. A chemical feed system will supply water-conditioning chemicals to the circulating water to minimize corrosion and control the formation of mineral scale and bio-fouling.

The aqueous ammonia system provides for the receipt, storage, and delivery of 19 percent aqueous ammonia to the SCR systems to reduce NOx emissions. Aqueous ammonia will be delivered to the Project Site via tanker trucks and offloaded to an aboveground 10,000 gallon storage tank.

High-pressure natural gas will be supplied to the Project from the El Paso Natural Gas Company (El Paso) and Transwestern Pipeline Company (Transwestern) natural gas interstate pipelines to the Unisource Energy Services (UES) gas distribution system located adjacent to the Project Site. A new UES-owned metering station will be constructed adjacent to the existing Griffith metering station. From this new metering station, gas will be piped to the gas compressor and conditioning equipment skids. The gas conditioning skids will filter gas particulates and drop out moisture contained in the gas. The natural gas system line pressure is expected to be 600 psig at the Project Site boundary. Gas compressors will increase the natural gas supply pressure for the CTGs to approximately 675 psig. Pressure reduction and control valves are used to feed gas to the CTGs.

The Project layout is shown in Figure 2-3, Facility Layout Plan.

Figure 2-1
General Location Map

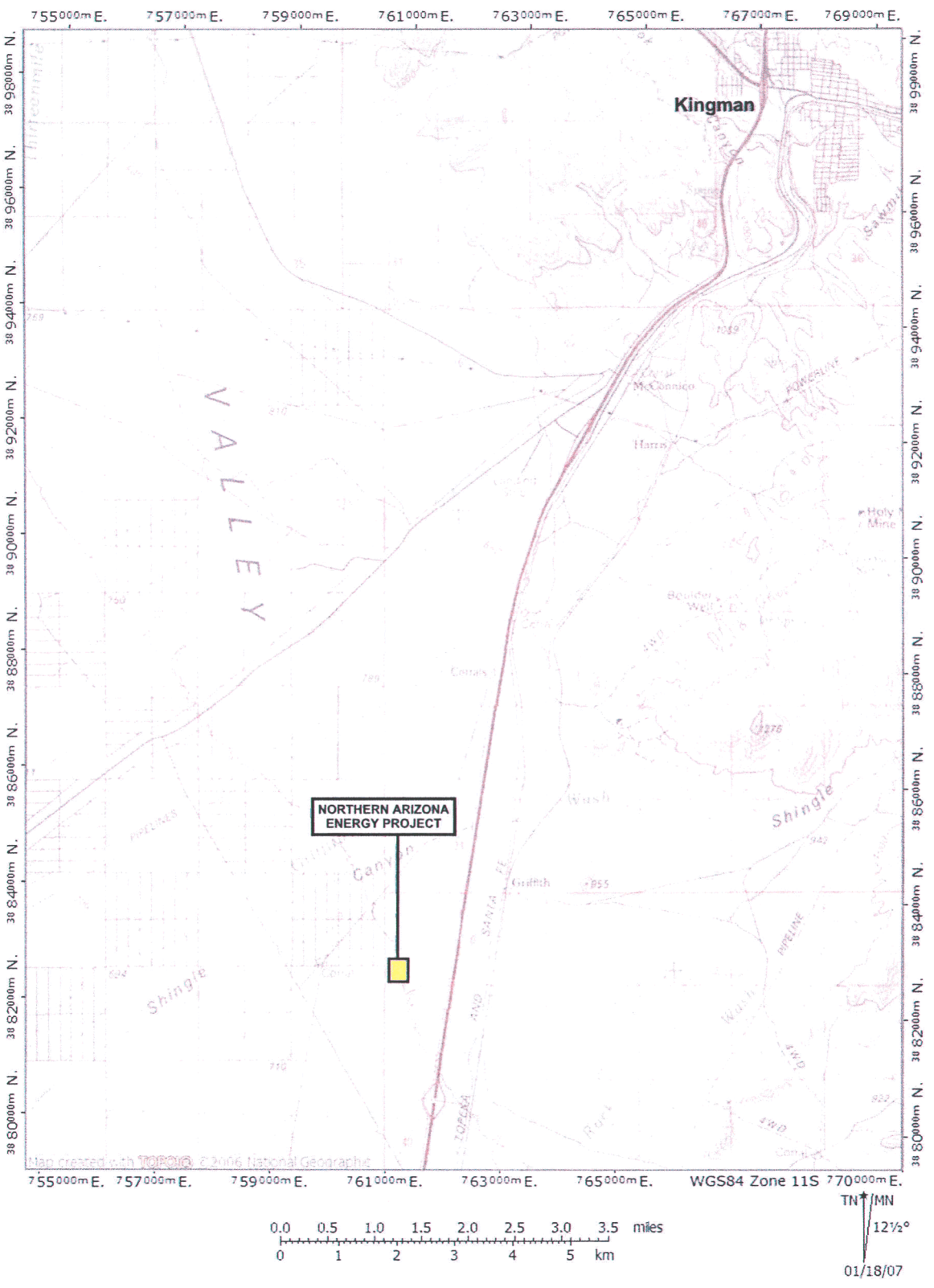


Figure 2-2
Project Property and Project Site

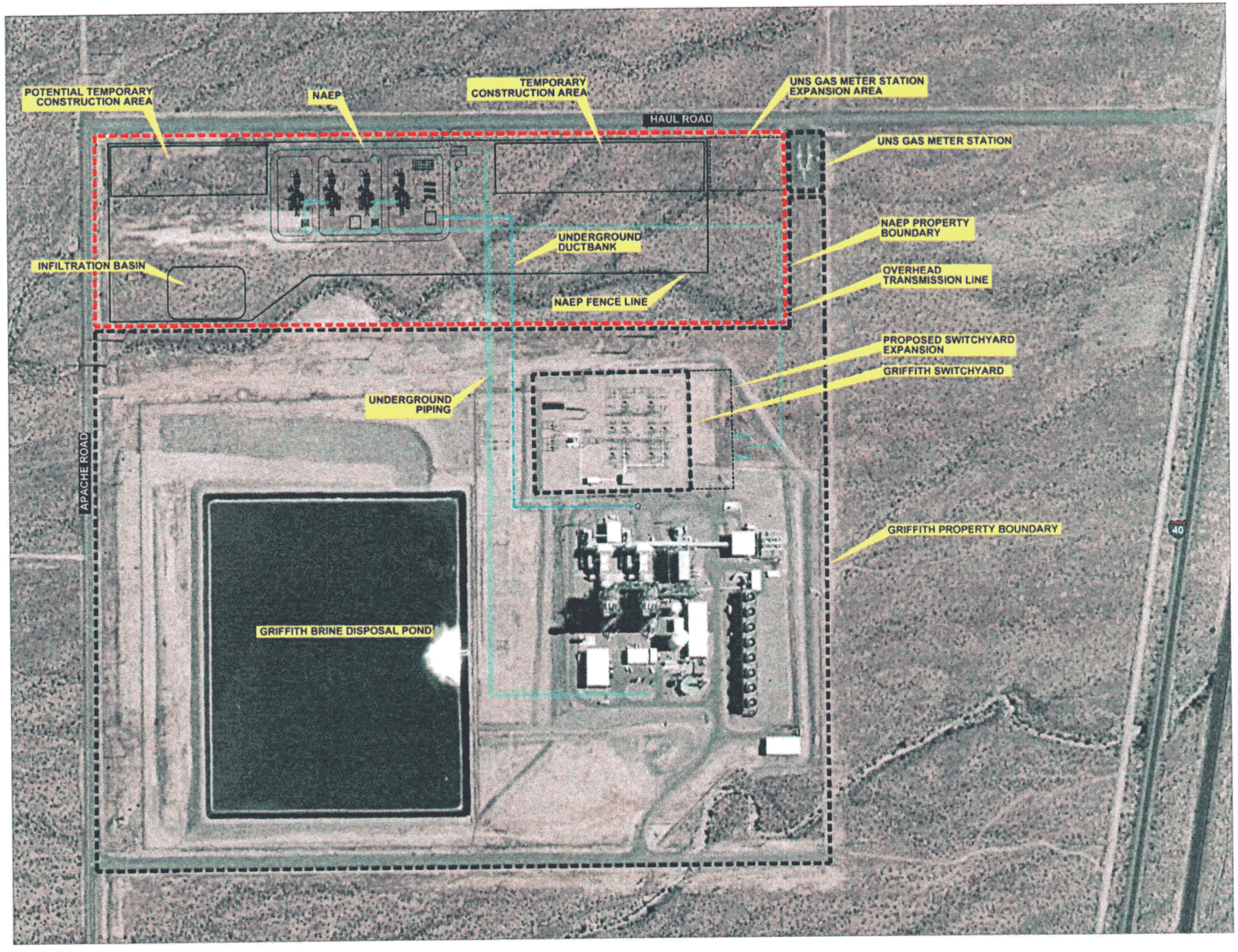
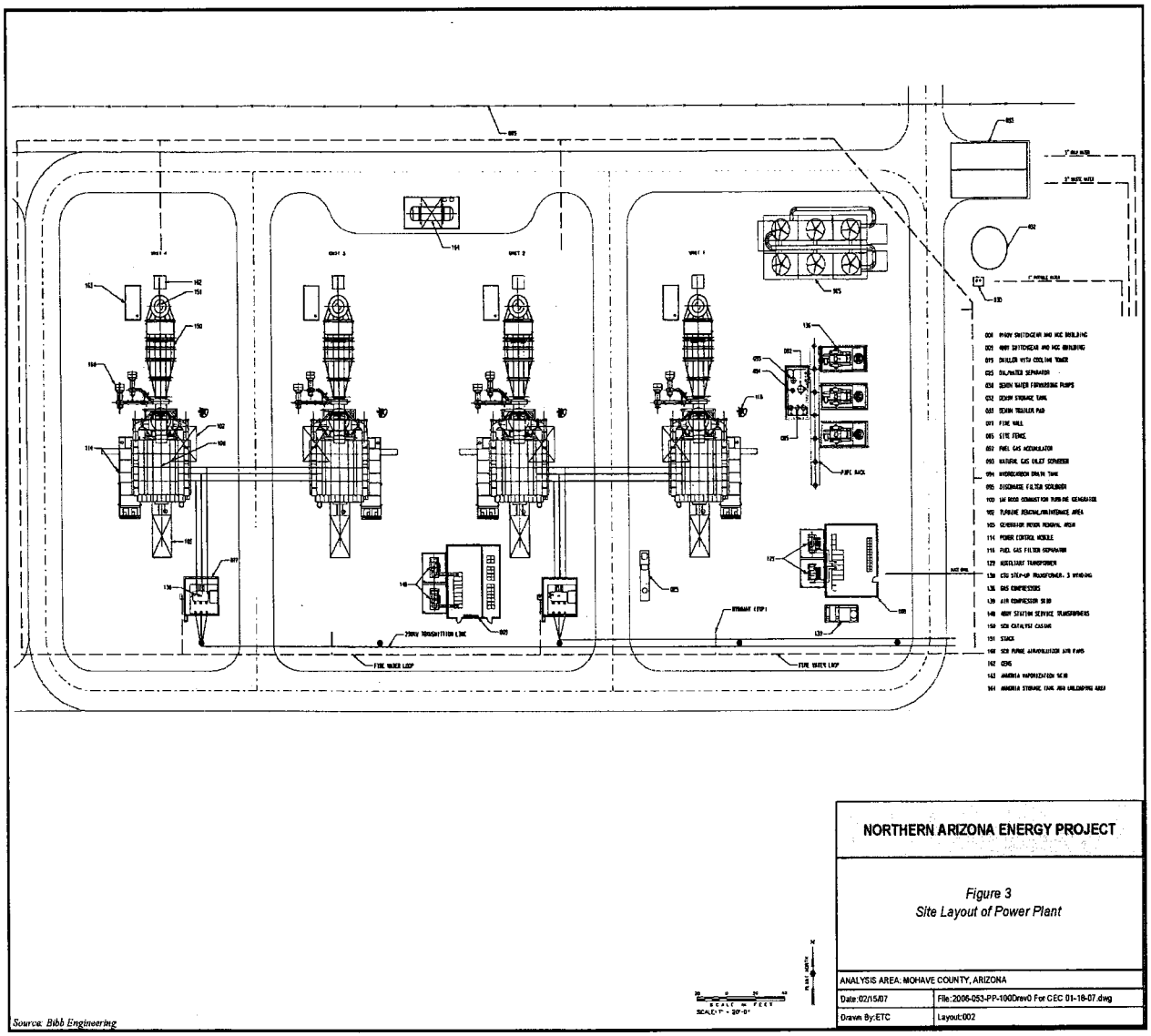


Figure 2-3
Facility Layout Plan



3. EMISSIONS INVENTORY

3.1 Criteria Pollutant Emissions

The estimated combustion turbine performance and emissions calculations sheet is shown in Appendix A. Maximum hourly emissions at full load are the highest during cold temperatures and lowest during hot temperatures. Therefore annual emissions are based on an average temperature around which the turbine operates a majority of the time, while short-term emissions are based on the coldest temperature. Northern Arizona Energy Project's (NAEP) estimated annual emissions are based on emission factors at 100 percent load and an ambient temperature of 90°F. This temperature was selected for a design basis since the units are peaking units and operate during the high load episodes which typically occur on warmer days. The worst-case hourly emissions are based on emission factors at full load and an ambient temperature of 25°F. Table 3-1 shows the estimated maximum hourly and annual emissions of criteria pollutants (i.e., NOx, CO, VOC, SO_x and PM_{10}) from the equipment to be permitted.

Table 3-1
Criteria Pollutant Emissions
Northern Arizona Energy, Mohave County, Arizona

		NOx [1]	CO [1]	SO_2 [1]	VOC [1]	PM_{10}
CTG (each)	ppm	5	6	2.8	5	NA
	lb/hr[2]	7.90	5.77	6.14	2.75	2.7
Chiller	lb/hr					0.16
	ton/yr					0.47
Expected Annual Emissions	ton/yr[3]	39.71	35.90	32.30	15.54	14.78
Requested Annual Emission Limits	ton/yr	40.0	100.0	40.0	40.0	15.0

[1] ppm measured as ppmvd @ 15% O_2
[2] Worst case base load operation, not including startup/shutdown
[3] Based on 10,600 hrs total operation (four units) including startup/shutdown

The Project will be operated within the regulatory annual emission limits for a minor modification to a major source. The Applicant will seek to maximize operating flexibility with respect to full load, part load operating hours, and startup and shutdown emissions within these annual emission limits. Compliance with the limits will be achieved through the use of continuous emission monitors (CEMs) for NOx and CO and approved emission factors for the remainder of the pollutants.

3.2 Hazardous Air Pollutants

In addition to the criteria pollutant emissions discussed in Section 3.1, NAEP will emit small amounts of non-criteria or hazardous air pollutants (HAPs).

NAEP's emissions of non-criteria pollutants are compared to the Federal Clean Air Act (1990) amendments Title III thresholds for major sources of HAPs.

An estimate of NAEP's annual average emissions of non-criteria pollutants is summarized in Table 3-2. These estimates are based on data contained in the EPA's AP-42 document (Volume 1, 5th Ed.). It is important to note that these emission factors were developed using conservative assumptions and may overestimate actual emissions.

Table 3-2
Hazardous Air Pollutant Emissions
Northern Arizona Energy, Mohave County, Arizona

Hazardous Air Pollutant	NAEP Total Emissions (4 units)			Griffith Energy[1]	NAEP + Griffith
	#/hr	lb/yr[1]	Tons/year[2]	Tons/year	Tons/year
1,3-Butadiene	0.0007	1.97	0.001	0.008	0.009
Acetaldehyde	0.0692	183.25	0.092	0.636	0.728
Acrolein	0.0111	29.32	0.015	0.105	0.120
Benzene	0.0207	54.98	0.027	0.199	0.226
Ethylbenzene	0.0553	146.6	0.073	0.515	0.588
Formaldehyde	0.3803	1,007.90	0.504	3.482	3.986
Hexane	0.2975	788.45	0.394	2.710	3.104
Naphthalene	0.0022	5.96	0.003	0.022	0.025
PAHs	0.0038	10.08	0.005	0.037	0.042
Propylene Oxide	0.0501	132.86	0.066	0.613	0.679
Toluene	0.1106	595.58	0.298	2.088	2.386
Xylene	0.0007	293.21	0.147	1.040	1.187
Total, All HAPs			1.625	11.455	13.080

[1] Based on unrestricted operation of 2 CTGs with heat recovery steam generator duct burners and an auxiliary boiler

[2] Based on 10,600 hrs total operation (four units) including startup/shutdown

Since the application is classified as a modification to the existing Griffith, emissions from NAEP must be combined with Griffith in order to determine the entire emissions total for both facilities when determining compliance with the federal HAP thresholds. As shown in Table 3-2, none of the individual HAPs emitted equals or exceeds 10 tpy, and the total of all HAP emissions is less than 25 tpy. Therefore, the Project will not be a major source of HAPs, as defined by the Federal Clean Air Act (1990) amendments.

3.3 Operating Parameters

The following tables provide data for the maximum operating rates for the Project.

Table 3-3
Operating Parameters for Combustion and Power Generation Processes

Process	Heat Input (HHV)		Natural Gas Usage[1]	
	MMBtu/hr	MMBtu/yr[2]	MMscf/hr	MMscf/yr[2]
4 CTGs	1750.0	4.64E+6	1.724	4568.7

[1] Natural gas usage based on a natural gas heat content of 1015 Btu/scf (HHV)
[2] Based on 10,600 hrs total operation (four units) including startup/shutdown

Table 3-4
Operating Parameters for Chiller

Process	Water Circulation Rate	Total Dissolved Solids	Drift Rate
	Gal/min	mg/l	Gpm
Chillers	345	3100	0.10

###

4. AIR QUALITY IMPACT ANALYSIS

4.1 Air Quality Modeling Methodology

In accordance with ADEQ's December 2004 Modeling Guidance Document, NAEP submitted an Air Dispersion Modeling Protocol to ADEQ on January 31, 2007 describing the air dispersion modeling techniques NAEP proposed for assessing air quality impacts from the Project. ADEQ approved the methodology presented in the protocol on February 22, 2007. A summary of the approved methodology is described below. The protocol is included in Appendix C of this application.

An assessment of potential impacts on ambient air quality from the Project alone, and in combination with the existing Griffith Energy Project (Griffith), has been conducted using SCREEN3 and Version 3 (Release 02035) of the Industrial Source Complex – Short Term model (ISCST3), both USEPA-approved air quality dispersion models. These models are mathematical descriptions of atmospheric diffusion and dispersion, allowing a pollutant source impact to be calculated at specified locations out to distances up to 50 kilometers. While AERMOD has been adopted as the EPA guideline model to replace ISCST3 after November 9, 2006,* a full meteorological data set has not yet been established for the Project area. Due to this factor and since the Project is a minor source, ADEQ has agreed that the use of ISCST3 is acceptable for this Project.

The impact analysis was used to determine the maximum ground-level impacts of the Project alone, and combined with Griffith. The results were compared with established state and federal ambient air quality standards and PSD significance levels.† If the standards are not exceeded by these potential maximum impacts, then it is demonstrated that no exceedances are expected under any conditions. In accordance with the air quality impact analysis guidelines developed by USEPA (40 CFR Part 51, Appendix W: Guideline on Air Quality Models), the ground-level impact analysis includes the following assessments:

- Impacts in simple, intermediate, and complex terrain;
- Aerodynamic effects (downwash) due to nearby building(s) and structures; and

* AERMOD was adopted for use November 9, 2005, but a one-year grace period was granted to regulatory agencies to provide time to phase in its substitution for ISCST3, the previous official guideline model for this type of application.

† The Project is not a PSD source, but PSD significance levels are used as convenient thresholds of potential significance for maximum ground-level impacts.

- Impacts from inversion breakup (fumigation).

Simple, intermediate, and complex terrain impacts were assessed for all meteorological conditions that would limit the amount of final plume rise because plume impaction on elevated terrain might cause high ground-level concentrations, especially under stable atmospheric conditions.

Another dispersion condition that can cause high ground-level pollutant concentrations is caused by building downwash. Building downwash can occur when wind speeds are high and a building or structure is in close proximity to the emission stack. This can result in building wake effects where the plume is drawn down toward the ground by the lower pressure region that exists in the lee side (downwind) of the building or structure.

Fumigation conditions occur when the plume is emitted into a low-lying layer of stable air (inversion) that then becomes unstable, resulting in a rapid mixing of pollutants towards the ground. The low mixing height that results from this condition allows little diffusion of the stack plume before it is carried downwind to the ground. Although fumigation conditions rarely last as long as an hour, relatively high ground-level concentrations may be reached during that period. Fumigation tends to occur under clear skies and light winds, and is more prevalent in the summer.

The basic equation used in the ISCST3 modeling assumes that the concentrations of emissions within a plume can be characterized by a Gaussian distribution about the centerline of the plume. Concentrations at any location downwind of a point source such as a stack can be determined from the following equation:

$$C(x,y,z,H) = \left(\frac{Q}{2\pi\sigma_y\sigma_z u}\right) * \left(e^{-1/2(y/\sigma_y)^2}\right) * \left[\left\{e^{-1/2(z-H/\sigma_z)^2}\right\} + \left\{e^{-1/2(z+H/\sigma_z)^2}\right\}\right]$$

where

C	=	the concentration in the air of the substance or pollutant in question
Q	=	the pollutant emission rate
σyσz	=	the horizontal and vertical dispersion coefficients, respectively, at downwind distance x
u	=	the wind speed at the height of the plume center
x,y,z	=	the variables that define the 3-dimensional Cartesian coordinate system used; the downwind, crosswind, and vertical distances from the base of the stack
H	=	the height of the plume above the stack base (the sum of the height of the stack and the vertical distance that the plume rises due to the momentum and/or buoyancy of the plume)

Gaussian dispersion models are approved by USEPA for regulatory use and are based on conservative assumptions (i.e., the models tend to overpredict actual impacts by assuming steady-state conditions, no pollutant loss through conservation of mass, no chemical reactions, etc.). Air dispersion modeling was used to determine if ambient air quality standards would be exceeded, and whether a more detailed modeling procedure would be warranted to determine the potential maximum impact. The following sections describe:

- Screening modeling procedures;
- Refined air quality impact analysis;
- Existing ambient pollutant concentrations; and
- Results of the ambient air quality modeling analyses.

The ISCST3 model is capable of assessing impacts from a variety of source types in areas of simple, intermediate, and complex terrain. The model can account for settling and dry deposition of particulates; area, line, and volume source types; downwash effects; and gradual plume rise as a function of downwind distance. The model is capable of estimating concentrations for a wide range of averaging times (from one hour to one year). Inputs required by the ISCST3 model include model options, meteorological data, source data, and receptor data.

Model options refer to user selections that account for conditions specific to the area being modeled or to the emissions source that needs to be examined. Examples of model options include use of site-specific vertical profiles of wind speed and temperature; consideration of stack and building wake effects; and time-dependent exponential decay of pollutants. The model supplies recommended default options for the user. Except where explicitly stated (such as for building downwash), default values were used. A number of these default values are required for USEPA and ADEQ approval of model results and are listed below.

- Rural dispersion coefficients
- Gradual plume rise
- Stack tip downwash
- Buoyancy induced dispersion
- Calm processing
- Default rural wind profile exponents = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55
- Default vertical temperature gradients = 0.02, 0.035

In addition, missing data were processed with MSGPRO.

ISCST3 uses hourly meteorological data to characterize plume dispersion. The representativeness of the data depends on the proximity of the meteorological monitoring site to the area under consideration, the complexity of the terrain, the exposure of the

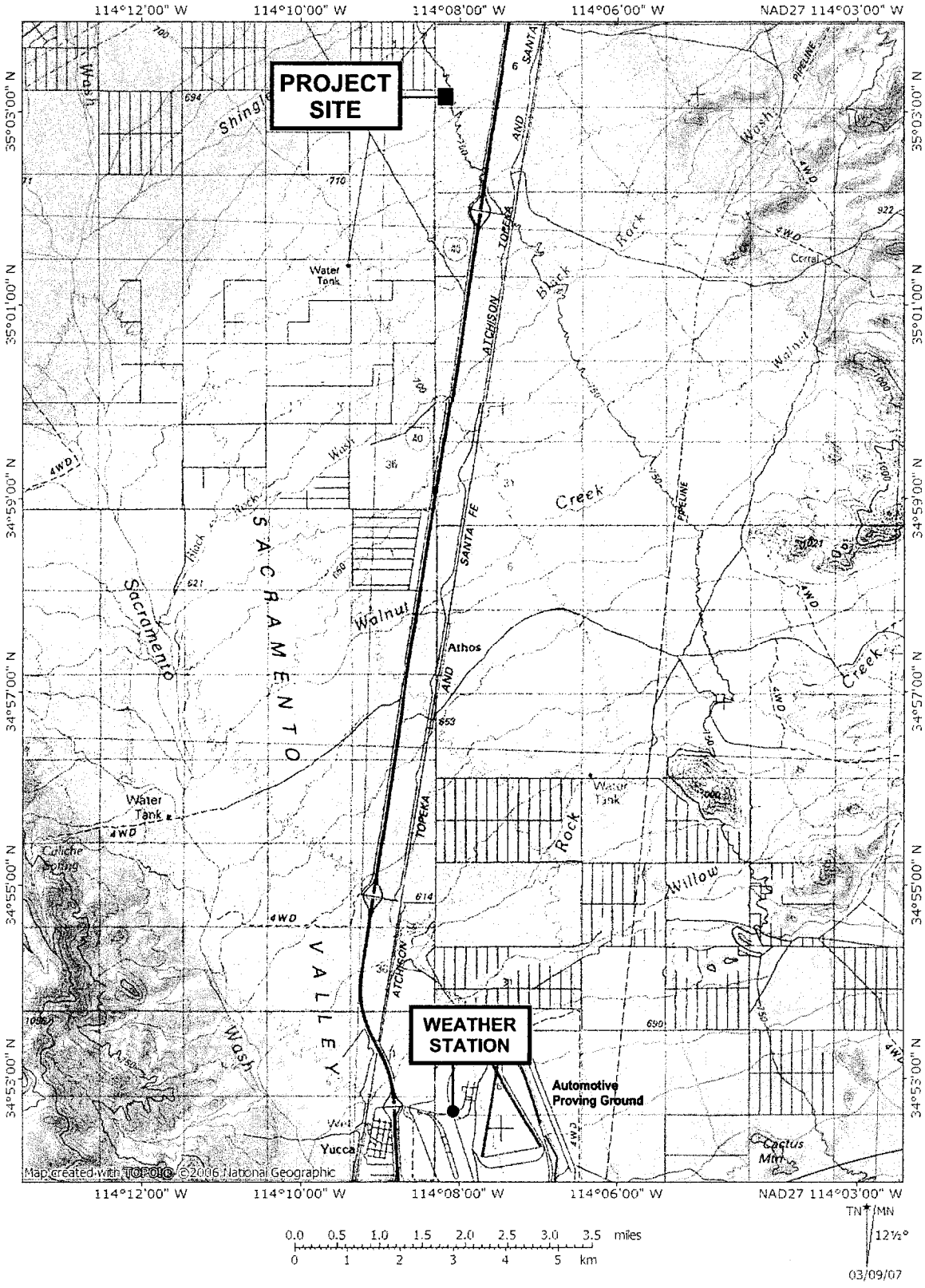
meteorological monitoring site, and the period of time during which the data are collected. The surface meteorological data used in this analysis were collected during 1997 at Ford Motor Company's Arizona Proving Ground facility, which is located approximately 12 miles south of the Project Site. This one-year data set is representative of meteorological conditions at the Project Site and meets the requirements of the USEPA "On-Site Meteorological Program Guidance for Regulatory Model Applications" (EPA-450/4-87-013, August 1995). This data set was selected for consistency with previous modeling of the existing Griffith.

The area surrounding the Project Site can be characterized, for dispersion purposes, as rural. The area within three kilometers of the Project Site includes undeveloped desert within the I-40 Industrial Corridor and surrounding properties. The nearest residence is approximately 2.5 miles (4 km) northwest of the Project Site. In accordance with the Auer land use classification methodology (USEPA's *"Guideline on Air Quality Models"*), land use within the area circumscribed by a three km radius around the modified facility is greater than 50 percent rural. Therefore, in the modeling analyses supporting the permitting of the facility, rural dispersion coefficients have been assigned.

Representativeness has also been defined in the *"Workshop on the Representativeness of Meteorological Observations"* (Nappo et al., 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Representativeness was assured because the meteorological monitoring and project sites are climatologically similar.

The large-scale topographic features that influence the meteorological monitoring site also influence the proposed project site in the same manner. Additional discussion of the selection of the meteorological data set is provided in the modeling protocol, included in Appendix C to this application.

Figure 4-1
Locations of Facility and Meteorological Monitoring Station



For the purposes of modeling, a stack height beyond what is required by Good Engineering Practices (GEP) is not allowed. However, this requirement does not place a limit on the actual constructed height of a stack. GEP as used in modeling analyses is the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes that may be created by the source itself, nearby structures, or nearby terrain obstacles. In addition, the GEP modeling restriction assures that any required regulatory control measure is not compromised by the effect of that portion of the stack that exceeds the GEP. The USEPA guidance ("Guideline for Determination of Good Engineering Practice Stack Height," Revised 6/85) for determining GEP stack height is as follows:

Hg = H + 1.5L, where
Hg = Good Engineering Practice stack height, measured from the ground-level elevation at the base of the stack
H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack
L = lesser dimension, height or maximum projected width, of nearby structure(s)

In using this equation, the guidance document indicates that both the height and width of the structure are determined from the frontal area of the structure, projected onto a plane perpendicular to the direction of the wind.

For each of the CTG stacks, the nearby (influencing) structures are the CTG enclosures, which are 51 feet (15.54 m) high and 70 feet (21.33 m) long. Thus H = 51 ft and L = 51 feet, Hg = 51 ft + (1.5 * 51 ft) = 127.5 ft, and the proposed stack height of 85 feet does not exceed GEP stack height.

For regulatory applications, a building is considered sufficiently close to a stack to cause wake effects when the downwind distance to the stack is not more than five times the greater of the height or the projected width of the building.

Table 4-1 includes a list of structures that were included in the BPIP analysis for NAEP. Modeling input files from the original modeling analysis for Griffith were used for the combined analysis. The Griffith inputs included a BPIP file which provided the downwash analysis for structures at Griffith, therefore, no additional information on buildings at Griffith was required and Table 4-1 includes only new structures associated with the Project.

Table 4-1 Parameters for Significant Structures at the Northern Arizona Energy Project	
Structure	Dimensions (feet – W x L x H)
Chiller	71.5'W x 37.4'L x 43.1'H
SCR Catalyst Casing	24.3'W x 29.5'L x 43'H
CTG Transition	24.3'W x 21.5'L x 21.5'H
CTG Housing	48.9'W x 63'L x 51'H
Compressor Buildings	39.3'W x 60.7'L x 15'H

4.2 Screening Procedure

To assure that the impacts analyzed were for maximum emission levels and worst-case dispersion conditions, a screening procedure was used to determine the inputs to the impact modeling. The screening procedure analyzed the CTG operating conditions that would result in the maximum impacts on a pollutant-specific basis. The operating conditions examined in this screening analysis, along with their exhaust and emission characteristics, are shown in Appendix B, Table B-2. These operating conditions represent maximum and minimum CTG loads (100 percent and 50 percent) at expected maximum, average and minimum ambient operating temperatures (113, 90 and 25°F).* The effects of evaporative cooling are also evaluated in the screening analysis.

The operating conditions were screened for maximum ambient impact using ISCST3 model and the meteorological data described above. The stack parameters and emission rates for the maximum-impact operating conditions were used in the refined modeling analyses to evaluate the modeled impacts of the entire Project for the corresponding pollutant and averaging period.

4.3 Refined Air Quality Impact Analysis: Criteria Pollutants

The operating conditions and emission rates used to model ambient air quality impacts from the Project are summarized in Table 4-2, and from Griffith in Table 4-3. The complete modeling input for each pollutant and averaging period is shown in Appendix B.

* Ambient temperature affects turbine performance through the density of the intake air. When ambient temperature is lower, the air is denser and more fuel can be burned by the turbine at the same fuel to air ratio, increasing turbine output. The minimum design temperature used in this analysis, 25 °F, was used to define the expected maximum hourly heat input and turbine output. The applicant will accept a permit condition limiting the hourly heat input to each CTG of 436 MMBtu/hr (HHV). This limiting condition will assure that CTG emissions stay at or below the levels evaluated in this application even if ambient temperatures are below 25 °F.

Table 4-2 Emission Rates and Stack Parameters for Northern Arizona Energy Project at 90°F			
	CTG1 – CTG4		Chiller Cells 1-6
Emission Rates, g/s	Base Load	50% Load	
-- NOx	0.99	0.60	---
-- SO_2	0.77	0.47	---
-- CO	0.72	0.44	---
-- PM_{10}/ $PM_{2.5}$	0.34	0.34	0.0033
Stack Height, m	25.91		13.72
Stack Diameter, m	3.05		3.66
Exhaust Temp, deg K	716.2	656.3	305.6
Exhaust Velocity, m/s	40.15	29.03	6.06

Table 4-3 Emission Rates and Stack Parameters for Griffith at 90°F				
	CTG1 & CTG2	Auxiliary Boiler	Cooling Tower Cells 1-8	Chiller Cells 1-6
Emission Rates, g/s				
-- NOx	3.604	0.439	---	---
-- SO_2	0.718	0.011	---	---
-- CO	12.417	0.262	---	---
-- PM_{10}	3.556	0.024	0.047	0.015
Stack Height, m	39.62	9.14	18.29	10.67
Stack Diameter, m	5.79	0.61	9.144	6.401
Exhaust Temp, deg K	349.7	421.9	310.8	310.8
Exhaust Velocity, m/s	11.88	17.53	8.17	4.94

A nested grid was developed to fully represent the maximum impact area(s). This grid had 25-meter resolution along the Project Property boundary in a single tier of receptors composed of four segments extending out to 100 meters from the Project Property boundary, 100-meter resolution from 100 meters to 1,000 meters, 250-meter spacing out to 5 km, and 500 meter spacing out to 10 km. Concentrations within the Project Property were not calculated.

Figures 4-2 and 4-3 show the receptor grids around both facilities and full receptor grid respectively.

Receptor and source base elevations were determined from USGS Digital Elevation Model (DEM) data using 7½-minute format (10- to 30-meter spacing between grid nodes). All coordinates were referenced to UTM North American Datum 1927 (NAD27), Zone 11. The ISCST3 receptor elevations were interpolated among the DEM nodes.

Figure 4-2
Fenceline Receptor Grids

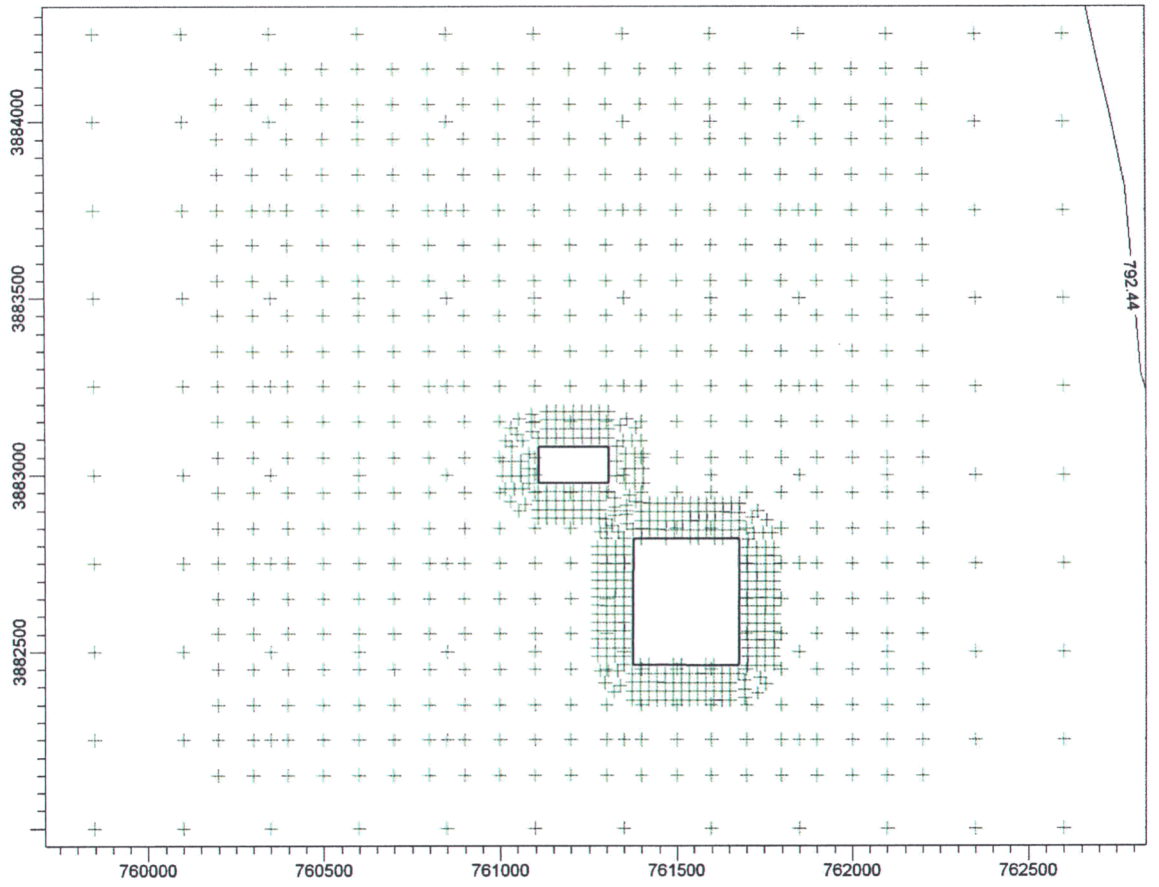
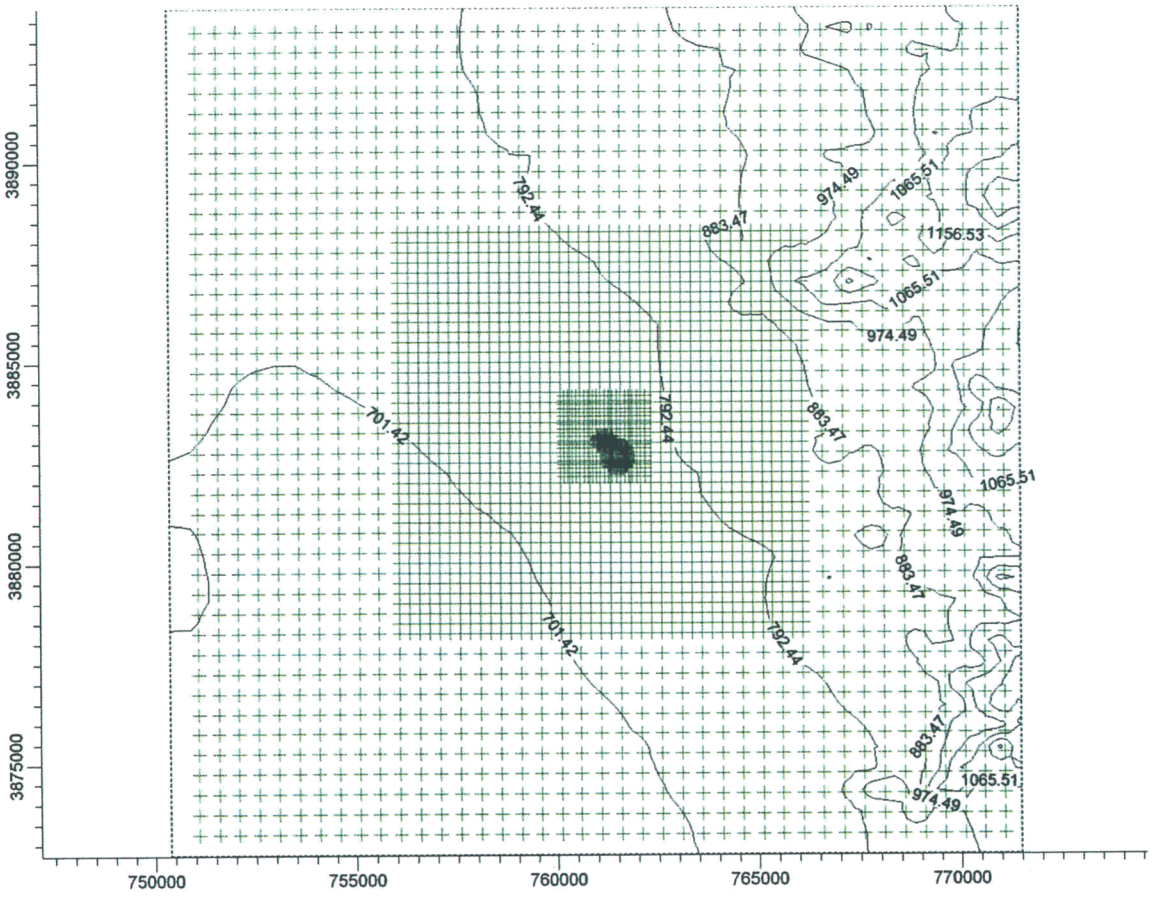


Figure 4-3
Full Receptor Grid



4.4 Specialized Modeling Analyses

Fumigation Modeling

Fumigation occurs when a stable layer of air lies a short distance above the release point of a plume and unstable air lies below. Under these conditions, an exhaust plume may be drawn to the ground, causing high ground-level pollutant concentrations. Although fumigation conditions rarely last as long as one hour, relatively high ground-level concentrations may be reached during that time.

The SCREEN3 model was used to evaluate maximum ground-level concentrations for short-term averaging periods (24 hours or less). Guidance from the USEPA* was followed in evaluating fumigation impacts. Because SCREEN3 is a single-source model, only one turbine was modeled. Fumigation impacts for the turbines were predicted to

* USEPA-454/R-92-019, "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised."

occur at about 19 km from the facility. This analysis, which is shown in more detail in Appendix B, showed that impacts under fumigation conditions are expected to be lower than the maximum concentrations calculated by ISCST3 under downwash conditions.

4.5 Results of the Ambient Air Quality Modeling Analyses

The maximum impacts calculated from each of the modeling analyses described above are summarized in Table 4-4.

Table 4-4
Maximum Potential Impact From Refined Modeling

Pollutant	Averaging Time	Modeled Concentration (µg/m3)		
		NAEP		Combined
		ISCST3	Fumigation	NAEP + Griffith
NOX	Annual	0.091	n/a	8.38
SO_2	3-hour	6.40	2.30	8.28
	24-hour	0.92	0.89	2.37
	Annual	0.070	n/a	0.31
CO	1-hour	12.5	2.1	590.4
	8-hour	2.47	1.53	93.9
PM_{10}/ $PM_{2.5}$	24-hour	0.74	0.56	13.9
	Annual	0.039	n/a	1.42

4.6 Ambient Air Quality Impacts

To determine a project's air quality impacts, the modeled concentrations are added to the maximum background ambient air concentrations and then compared to the applicable ambient air quality standards.

Background ambient air quality data for the project area were provided by the ADEQ air assessment section and are presented in Table 4-5. Ambient NO_2, SO_2, PM_{10}, $PM_{2.5}$, and CO data are collected at various monitoring stations around Mohave County and have been deemed adequate for use in evaluating impacts from the NAEP.

Maximum ground-level impacts due to operation of the Project are shown together with the ambient air quality standards in Table 4-6. Using the conservative assumptions described earlier, the results indicate that the Project will not cause or contribute to violations of any state or federal air quality standards.

Table 4-5 ADEQ Background Concentrations for Northern Arizona Energy Project		
Pollutant	Averaging Time	Background Value (μg/m3)
NO2[a]	Annual	4
SO2[b]	3-hour	246
	24-hour	52
	Annual	6
CO[c]	1-hour	582
	8-hour	582
PM10[d,e]	24-hour	46
	Annual	14

[a] Long-term average value (0.002 ppm) of several monitors located near power plants in rural areas of Arizona.
[b] Maximum values over 3-year period from Bullhead City – SCE monitoring station (Mohave County).
[c] Typical continental ambient CO background value (0.5 ppm) used in most regional models.
[d] Average maximum values over 3-year period from Kingman – Praxair monitoring station (Mohave County).
e No monitoring background levels provided for $PM_{2.5}$

Table 4-6 Modeled Maximum Project Impacts with Griffith Energy Facility							
						% of Standard	
Pollutant	Averaging Time	Maximum Facility Impact Combined μg/m3	Background (μg/m3)	Total Impact (μg/m3)	Federal Standard (μg/m3)	Modeled Facility Impact	Total Impact
NO2	Annual	8	4	12	100	8%	12%
SO2	3-hour	8	246	254	1300	1%	20%
	24-hour	2	52	54	365	1%	15%
	Annual	0.3	6	6	80	<1%	8%
CO	1-hour	590	582	1,172	40,000	2%	3%
	8-hour	94	582	676	10,000	1%	7%
PM10	24-hour	14	46	60	150	9%	40%
	Annual	1	14	15	50	3%	31%

4.7 Evaluation of Compliance with the Arizona Ambient Air Quality Guidelines

The procedure described above for determining criteria pollutant impacts was also followed in determining the ambient impacts of noncriteria pollutants for demonstrating compliance with the Arizona Ambient Air Quality Guidelines (AAAQG). These guidelines define allowable one-hour, 24-hour, and annual average concentrations for noncriteria pollutants to protect public health. Tables 4-7 and 4-8 summarizes the results

of the analysis for the NAEP and the combined facilities respectively. The addition of the NAEP project will not cause or contribute to an exceedence of any of the AAAQG's

Table 4-7
Summary of AAAQG Modeling Results for NAEP Facility

AAAQG Pollutant	1-Hour Impact ($\mu g/m^3$)	1-Hour AAAQG ($\mu g/m^3$)	24-Hour Impact ($\mu g/m^3$)	24-Hour AAAQG ($\mu g/m^3$)	Annual Impact ($\mu g/m^3$)	Annual AAAQG ($\mu g/m^3$)
1,3-Butadiene	3.88E-04	7.20E+00	2.63E-05	1.90E+00	2.09E-06	6.70E-02
Acetaldehyde	3.61E-02	2.30E+03	2.44E-03	1.40E+03	1.95E-04	5.00E-01
Acrolein	5.78E-03	6.70E+00	3.91E-04	2.00E+00	--	--
Ammonia			8.27E-01	1.40E+02		
Benzene	1.08E-02	6.30E+02	7.33E-04	5.10E+01	5.84E-05	1.40E-01
Ethylbenzene	2.89E-02	4.50E+03	1.96E-03	3.50E+03	--	--
Formaldehyde	1.99E-01	2.00E+01	1.34E-02	1.20E+01	1.07E-03	8.00E-02
Hexane	1.55E-01	5.30E+03	1.05E-02	1.40E+03		
Napthalene	1.17E-03	6.30E+02	7.94E-05	4.00E+02	--	--
Propylene Oxide	2.62E-02	1.50E+03	1.77E-03	4.00E+02	1.41E-04	2.00E+00
Toluene	1.17E-01	4.70E+03	7.94E-03	3.00E+03	--	--
Xylenes	5.78E-02	5.50E+03	3.91E-03	3.50E+03	--	--

Table 4-8
Summary of AAAQG Combined Modeling Results for NAEP and Griffith

AAAQG Pollutant	1-Hour Impact ($\mu g/m^3$)	1-Hour AAAQG ($\mu g/m^3$)	24-Hour Impact ($\mu g/m^3$)	24-Hour AAAQG ($\mu g/m^3$)	Annual Impact ($\mu g/m^3$)	Annual AAAQG ($\mu g/m^3$)
1,3-Butadiene	1.78E-03	7.20E+00	2.90E-04	1.90E+00	2.00E-05	6.70E-02
Acetaldehyde	1.67E-01	2.30E+03	2.76E-02	1.40E+03	1.99E-03	5.00E-01
Acrolein	2.76E-02	6.70E+00	4.63E-03	2.00E+00	--	--
Ammonia			1.69E+00	1.40E+02		
Benzene	6.57E-02	6.30E+02	1.16E-02	5.10E+01	1.04E-03	1.40E-01
Ethylbenzene	1.51E-01	4.50E+03	2.58E-02	3.50E+03	--	--
Formaldehyde	9.46E-01	2.00E+01	1.57E-01	1.20E+01	1.12E-02	8.00E-02
Hexane	7.26E-01	5.30E+03	1.20E-01	1.40E+03		
Napthalene	8.15E-03	6.30E+02	1.46E-03	4.00E+02	--	--
Propylene Oxide	4.45E+00	1.50E+03	2.37E-01	4.00E+02	3.77E-02	2.00E+00
Toluene	6.12E-01	4.70E+03	1.04E-01	3.00E+03	--	--
Xylenes	3.20E-01	5.50E+03	5.52E-02	3.50E+03	--	--

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5. APPLICABLE REQUIREMENTS

This section describes those state and federal regulatory requirements that applicable to the Project.

5.1 Federal Requirements

Certain federal regulations related to criteria pollutant emissions are potentially applicable to emission units at the NAEP. These regulations are reviewed in the following sections, and applicability determinations are provided along with their rationale.

5.1.1 Ambient Air Quality Standards

Table 5.1 shows the national ambient air quality standards. The primary and secondary air quality standards are the ambient concentrations of pollutants that are necessary to protect public welfare. Arizona does not have separate ambient air quality standards for criteria pollutants.

Emissions of NOx, SOx, CO and PM_{10} from the Project were assessed relative to compliance with National Ambient Air Quality Standards listed below. Results of this analysis are included in Section 4 – Air Quality Impact Assessment of this application. The analysis demonstrates that the Project, either alone or in combination with Griffith, will not cause or contribute to violations of any national ambient air quality standard.

Table 5-1 National Ambient Air Quality Standards			
Pollutant	Averaging Time	Primary Standard $\mu g/m^3$	Secondary Standard $\mu g/m^3$
SO_2	Annual[1]	80 (0.030 ppm)	-
	24-Hour[2]	365 (0.14 ppm)	-
	3-Hour[2]	-	1,300 (0.5 ppm)
PM_{10}	Annual[1]		
	24-Hour[2]	150	150
$PM_{2.5}$	Annual[1]	15	15
	24-Hour[2]	35	35
CO	8- Hour[2]	10,000 (9 ppm)	-
	1- Hour[2]	40,000 (35 ppm)	-
Ozone	8- Hour[3]	157 (0.08 ppm)	157 (0.08 ppm)
NO_2	Annual[1]	100 (0.05 ppm)	100 (0.05 ppm)
Lead	Quarter[1]	1.5	-

$\mu g/m^3$ = micrograms per cubic meter
ppm = parts per million
1. Arithmetic mean.
2. Block average.
3. Rolling average.

5.1.2 Arizona Performance Standards for New Stationary Sources

The Arizona performance standards for new stationary sources are listed in Article 9 of the Arizona air quality regulations. Arizona has incorporated by reference the federal new source regulations listed in Section 5.3 of this application.

5.1.3 Attainment, Nonattainment, and Unclassifiable Area Designations

The Project Site is within the Arizona Air Quality Control Region that encompasses Mohave, LaPaz, and Yuma Counties. This area is in attainment for all pollutants except for PM_{10}. The portion of Mohave County west of the Black Mountains is in non-attainment for PM_{10}. The Project will be located in the portion of Mohave County that is in attainment for PM_{10}.

5.2 Prevention of Significant Deterioration (PSD)

As previously noted, while the Project will be a minor source, it will be classified as a minor modification at an existing PSD major stationary source (Griffith). The addition of this equipment will result in emissions less than the significance threshold for each regulated pollutant (see Table 5.2). Therefore the Project is not subject to further PSD review pursuant to 40 CFR 52.21.

Table 5-2 Northern Arizona Energy Facility Source Classification Data					
	NOx (t/yr)	**CO (t/yr)**	**SO_2 (t/y)**	**VOC (t/y)**	**PM_{10} (t/y)**
Annual Emissions – NAEP	39.7	35.9	32.3	15.5	14.8
Major Source Threshold Emissions	100.0	100.0	100.0	100.0	100.0
PSD Significant Emissions Threshold	40.0	100.0	40.0	40.0	15.0

5.3 New Source Performance Standards

The New Source Performance Standards (NSPS) are codified Title 40 Code of Federal Regulations (CFR) Part 60. Specific subparts to the NSPS address a variety of sources; however, only one NSPS is applicable to the emissions from the new CTGs described in this permit application. The CTGs will comply with the standards of 40 CFR 60 Subpart KKKK (Standards of Performance for Stationary Combustion Turbines). This regulation has been incorporated by reference into the Arizona air quality regulations.

A summary of the regulation is presented below.

Table 5-3 Summary of NSPS Requirements (requirements shown for each unit)	
Regulation	**40CFR60.KKKK**
NAEP Source	**CTG**
Applicability	≥ 10MMBtu/hr
SO_x Limit	0.060 lb/MMBtu
NOx Limit	25 ppm @ 15% O_2
Continuous monitoring	**Monitor fuel sulfur content as required **CEM operates all times including start-up, shut-down, malfunctions, emergencies, except during monitoring equipment breakdown, repairs, etc. **At least 2 points/hr for 1 hour averages
Reporting	**Emergency actions **Submit information on date of construction, anticipated startup, actual startup, design heat capacity, and fuels to be combusted

5.4 National Emission Standards for Hazardous Air Pollutants

The National Emission Standards for Hazardous Air Pollutants (NESHAPS) are contained within 40 CFR Parts 61 and 63. Specific subparts of the NESHAPS address a variety of sources; however, as discussed in Section 3.2, the total HAPS emissions from the four (4) NAEP CTGs and the existing Griffith are well below the Major Source thresholds of 10 tons/year of a single HAP (highest – 3.99 ton/yr) and 25 tons/year (total-13.1 ton/yr) of all HAPS collectively. Consequently, the Project is a minor source for HAPS and is exempt from 40 CFR 61 and 63 requirements.

5.5 Compliance Assurance Monitoring

It is anticipated that specific emission and parameter monitoring requirements will be included to demonstrate compliance with applicable requirements identified in the Title V Operating Permit. With respect to the Compliance Assurance Monitoring (CAM) rules (40 CFR 64), the new CTGs are not subject to the CAM rules since they will be monitoring emissions under 40 CFR 60 Subpart KKKK.

5.6 Chemical Accident Prevention Provisions (1990 CAA Title III)

40 CFR Part 68, Chemical Accident Prevention Provisions, is a federal regulation designed to prevent the release of hazardous materials in the event of an accident and minimize impacts when releases do occur. The regulation contains a list of substances and threshold quantities for determining applicability of the rule to a facility. If a facility stores, handles or processes one or more substances on this list and at a quantity equal to or greater than specified in the regulation, the facility must prepare and submit a risk management plan (RMP). If a facility does not have a listed substance on-site, or the quantity of a listed substance is below the applicability threshold, the facility does not have to prepare an RMP. However, it must still comply with requirements of the general duty provisions in Section 112(r)(1) of the 1990 Clean Air Act Amendments if it has any regulated substance or other extremely hazardous substance on-site. The general duty provision is as follows:

> *"The owners and operators of stationary sources producing, processing, handling and storing [a chemical in 40 CFR Part 68 or any other extremely hazardous substance] such substances have a general duty [in the same manner and to the same extent as the general duty clause in the Occupational Safety and Health Act (OSHA)], to identify hazards which may result from .. such releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur."*

Table 5-4 lists the hazardous substances stored at NAEP and Griffith, and the applicable threshold quantity. Griffith Energy has an existing Risk Management Plan for the storage of anhydrous ammonia. NAEP will not be storing any chemicals which exceed the

threshold quantities, therefore the existing RMP will not need to be revised. The Applicant will maintain awareness of hazard issues and meet the goals of the above-listed general duty provisions.

Table 5-4
Hazardous Substances Present at NAEP and Griffith

Regulated Hazardous Substance (40 CFR Part 68)	NAEP	Griffith	Threshold	RMP Required
Ammonia (conc 20% or greater)	10,000 gal, 19% concentration	30,000 gal, 19% concentration	20,000 lb, ≥20% concentration	No
Hydrochloric Acid (conc 37% or greater)	N/A	2 x 6,000 gal 35% concentration	15,000 lb ≥37% concentration	No
Ammonia (anhydrous)	N/A	144,000 lb	10,000 lb	Yes

5.7 Acid Rain Program

The Project is subject the federal Acid Rain Permitting Program (40 CFR Part 72). Northern Arizona Energy, LLC has submitted a Certificate of Representation identifying the Designated Representative for the Project to EPA. The Acid Rain permit application is included as Appendix E.

5.8 Operating Permit Program

Since Griffith is a major source (100 tons/year) of criteria pollutants, it is subject to the requirements for federal operating permits under 40 CFR Part 70. As such, the Project is also subject to the Title V Operating Permit Program. With the submission of this application the NAEP is in compliance with applicable portions of 40 CFR 70.

5.8.1 Insignificant Sources

Several insignificant sources and trivial activities related to electric utilities may occur onsite. General activities which fall under the definitions of "Insignificant Activities" pursuant to AAC R18-2-101(57) and/or "Trivial Activities" are defined in A.A.C. R18-2-101 (119). The ADEQ has also promulgated a standardized list of insignificant sources for purposes of the Title V Operating Permit. Table 5.5 lists the insignificant sources and trivial activities that relate to NAEP and provides a justification as to why they are insignificant or trivial:

Table 5-5 Insignificant Sources	
Source Description	**Justification**
Turbine Compartment Ventilation Exhaust Vents	Vent the operating compartments of the combustion turbines. May vent insignificant amounts of VOCs from turbine lube oils.
Compressed Air Systems	Vent only air. No pollutant emissions.
Turbine Lube Oil Vapor Extractors and Lube Oil Mist Eliminator Vents	These vents allow for the removal of water vapor and lube oil vapor/mist from the lube oil system. Insignificant amounts of VOCs are emitted from these vents.
Sulfuric Acid Storage Tank Vents	A sulfuric acid storage tank will be used as part of the water treatment/demineralization/pH control system. Venting will occur during tank filling and over pressurization. Sulfuric acid has a low vapor pressure and therefore emissions from this source are expected to be insignificant.
Welding Equipment	Emissions from welding activities are generated during routine maintenance and will be insignificant
Water Wash System Storage Tank Vents	This is an on-line system that periodically washes the combustion turbine blades. The tanks contain water, soap detergent, and a water/soap detergent solution thus they are not expected to be a source of air pollution.
Fuel Purge Vents	Insignificant emissions of VOCs are expected from the fuel purge vents during normal operations.
Oil/ Water Separator Waste Oil Collection Tank Vents	Underground tanks are used for the collection of waste oils during leaks or spills. These tanks are used infrequently thus emissions from their vents are expected to be insignificant.

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6. CONTROL TECHNOLOGY OVERVIEW

NAEP is proposing emission limits and annual emission caps and will maintain Project emissions below major modification thresholds. Pursuant to AAC §R18-2-306.01, these limits must be permanent, quantifiable and otherwise enforceable as a practical manner.

The air pollution control equipment anticipated for the Project consists of a water injection combined with a selective catalytic reduction (SCR) system for NOx emissions control and an oxidation catalyst system for CO and VOC emissions control for each CTG unit. In addition, high efficiency drift eliminators will be used on the inlet air chiller module.

NAEP will limit the fuels burned in the CTGs to natural gas, a clean burning fuel. By contrast, burning of liquid fuels in the CTGs would result in greater criteria pollutant emissions than if the units burned only gaseous fuels. This measure acts to minimize the formation of all criteria air pollutants.

NOx emissions from the CTGs will be controlled with the use of low NOx emitting equipment and post-combustion controls. The CTGs are configured to utilize water injection to control NOx emissions. In addition, the Project has included SCR system to reduce NOx emissions to 5 ppmvd NOx, corrected to 15 percent O_2 on a three-hour average basis. This is consistent with permitted emission limits for other similar turbine projects in Arizona.

The SCR system consists of catalyst modules located between the turbine, an ammonia storage tank, and ammonia transfer, vaporization, and injection equipment. The performance of the SCR system is controlled primarily by comparing the continuously monitored NOx levels in the CTG stack to the emission level set point (typically an outlet concentration level slightly lower than the permitted emission limit). Depending on the measured NOx levels, the SCR control system will increase or decrease the amount of ammonia being injected ahead of the catalyst in order to increase or decrease the NOx control efficiency.

CO emissions will controlled by using oxidation catalysts to reduce CO emissions to 6.0 ppmvd, corrected to 15 percent O_2. This is consistent with permitted emission limits for other similar turbine projects in Arizona.

VOC emissions will be controlled by use of good combustion practices in the CTGs. Oxidation catalyst will also provide some reduction in VOC emissions. VOC emissions

leaving the stacks will not exceed 5.0 ppmvd, corrected to 15 percent oxygen. This level of emissions is consistent with recent BACT determinations for similar projects in Arizona.*

Control for PM_{10} is best combustion practices and the use of gaseous fuels. The CTGs will burn exclusively pipeline quality natural gas with an expected maximum sulfur content of 5 grains per 100 scf, which will result in minimal SO_2 emissions.

Drift eliminators will be installed in each chiller module cell as a means to reduce the amount of water entrained as droplets in the exhaust air from the towers. Performance (in terms of drift elimination rate) is generally a function of the device design. These eliminators are static, physical devices that are installed within the chiller module structures and their performance is not controlled or monitored by any physical devices.

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* Although the Project will be equipped with oxidation catalysts, no VOC control effectiveness has been assumed.

7. COMPLIANCE AND MONITORING

7.1 Test Methods for Determining Compliance

Performance compliance of the SCR and oxidation catalyst is anticipated to be determined on the basis of new source stack testing followed by continuous monitoring of NOx and CO emissions. Because testing for cooling tower drift eliminator performance is very difficult to accomplish and is seldom performed, a compliance determination method for this control equipment is not being proposed. Compliance with drift eliminator efficiency will be demonstrated through vendor guarantees.

Measurement of SCR and oxidation catalyst control efficiencies or ammonia injection rate is not necessary for compliance purposes because required performance of the control system is determined by monitoring the resulting NOx and CO emission level from the CTG stacks.

7.2 Rated Operating Efficiency

The SCR control efficiency rate will need to be approximately 85 percent based on reduction of a CTG outlet NOx level of 25 ppm down to the anticipated NOx emission limit of 5 ppm. However, the actual control efficiency can be greater in order to achieve a lower NOx emission level set point to provide some margin under the actual emission limit; the control efficiency may be lower under conditions when the CTG exhaust NOx concentration is lower than 25 ppm. The SCR will be designed to meet the anticipated emission limit of 5 ppm under varying operating conditions. Similarly, the oxidation catalyst for CO control will be designed to provide a control efficiency in excess of 82% to allow for additional capacity to meet the anticipated emission limit of 6 ppm under varying operating conditions. However, as is the case with the SCR control system, the actual efficiency of the oxidation catalyst system will vary.

7.3 Data Necessary to Establish Required Efficiency

As stated above, specific control efficiency requirements are not anticipated for the air pollution control equipment. The performance of the SCR and oxidation catalyst will be monitored and controlled as necessary to maintain compliance with the NOx and CO emission limits proposed for each CTG. Thus, a specific control efficiency demonstration is not necessary or appropriate. Stack monitoring data will be utilized to

determine compliance with required SCR and oxidation catalyst performance. Setting a control efficiency standard for the chiller module drift eliminators and determining compliance with such a requirement is also not necessary or appropriate.

7.4 Evidence that Operation Will Not Violate Air Quality Standards

The emission levels used in the air dispersion modeling analysis to demonstrate the Project will not cause or contribute to any violations of the NAAQS and AAAQG include the operation of the air pollution control equipment described above. For example, the NOx emission rate used in the dispersion modeling analysis was based on the anticipated operation of the SCR system. CTG stack emissions monitoring data and new source stack test results will indicate operation of the air pollution control equipment, compliance with the emission limits, and resulting compliance with allowable air quality impact levels.

7.5 Applicable Requirements which are the Basis of the Certification

The basis of compliance certification for NAEP will be those regulations listed as applicable requirements in Section 5 of this application.

7.6 Compliance Methods and Schedule

This section provides the proposed methods for which compliance with applicable requirements will be demonstrated. This section is organized by source.

7.6.1 CTG

Each CTG will use the following method(s) for determining compliance with the applicable requirements:

- Continuous Emission Monitoring (CEM):
  - Pollutant(s) NOx, CO
- Initial stack test pollutant(s):
  - VOC, PM, Opacity
- Compliance certification reports will be submitted to the Department according to the following schedule:
  - Start date: 60 days after successful completion of new source compliance testing, and every 12 months thereafter.

- Compliance monitoring reports will be submitted to the Department according to the following schedule:
  - Start date: 90 days after successful completion of new source compliance testing and every 3 months thereafter.

PM_{10} limits will be met through use of good combustion practices. Good combustion practices in this case shall be the use of adequate excess air and good air/fuel mixing during combustion.

SOx limits will be met through the use of natural gas with a sulfur content less than 5 grains per 100 scf.

NOx limits will be met by use of water injection and selective catalytic reduction (SCR) systems when firing natural gas.

CO and VOC limits will be met using oxidation catalysts and good combustion practices. Good combustion practices in this case shall be the use of adequate excess air and good air/fuel mixing during combustion.

The permittee will submit to the Department, within 30 days after the end of each calendar quarter, a report that contains the information and data listed in Special Conditions of the permit.

Each CTG of the Project is subject to the requirements of NSPS Subpart KKKK, which are listed below:

Emission related limitations:

40 CFR 60.4320(a):	NOx emission limit (25 ppmvd @ 15% O2)
40 CFR 60.4330(a)(2):	SO_2 emission limit (0.060 lb/MMBTU)

Note: The above limitations are less stringent than the corresponding emission limits proposed for these pollutants in this air permit application

Operations monitoring/reporting requirements:

40 CFR 60.4345:	NOx CEM equipment requirements
40 CFR 60.4365(a):	Fuel sulfur content monitoring exemption
40 CFR 60.4375 & 40 CFR 60.4395:	Required reports & submittal schedules

Excess emissions monitoring/reporting requirements:

40 CFR 60.4350:	NOx data conversion for identifying excess emissions
40 CFR 60.4380(b):	Definition of NOx excess emission (4-hour rolling average) and monitor downtime

Test Method and Procedure Requirements:

40 CFR 60.4405 & 40 CFR 4415: Performance testing requirements for NOx CEM and SO_2

The permittee will install, calibrate, maintain and operate a continuous emission monitoring system for measuring NOx and CO emissions discharged to the atmosphere to show compliance with the proposed emission limits.

Compliance with the proposed limit for CEM measured NOx emissions will be based on a 3-hour rolling average (excluding periods of start-up, shutdown, and malfunction).

Compliance with the proposed limit for CEM measured CO emissions will be based on a 1-hour rolling average (excluding periods of start-up, shutdown, and malfunction).

7.7 Certification of Truth, Accuracy, and Completeness

A certification of truth, accuracy, and completeness is included with this application package.

The permittee will operate the unit in compliance with the attached Acid Rain permit application (Appendix E) and the superseding Acid Rain permit (40 CFR 72.9(a)).

The permittee will comply with the monitoring requirements under 40 CFR 75 (40 CFR 72.9(b)).

The permittee will hold allowances, as of the allowances transfer deadline, in the units' allowance subaccounts of not less than the total annual emissions of SO_2 for the previous calendar year (40 CFR 72.9(c)).

The permittee will keep the following records on site at the facility for a period of 5 years after document creation:

- Certificate of representation;
- All 40 CFR 75 monitoring information; and
- Copies of all Acid Rain program reports, compliance certifications, submission records, permit applications, and documentation used to demonstrate compliance (40 CFR 72.9(f)(1)).

For each year in which this unit is subject to an Acid Rain emission limitation, the permittee will meet the compliance certification requirements of this subpart including annual compliance reports (40 CFR 72 Subpart I).

The permittee will comply with the general provisions under 40 CFR 75 Subpart A, including submission of an Acid Rain permit application (Appendix E) and installation of CEMS (40 CFR 75 Subpart A).

The permittee will comply with the monitoring procedures under 40 CFR 75 Subpart B (40 CFR 75 Subpart B).

The permittee will comply with the CEMS operation and maintenance requirements under 40 CFR 75 Subpart C (40 CFR 75 Subpart C).

When necessary, as specified under 40 CFR 75 Subpart D, the missing data substitution procedures under this subpart will be followed (40 CFR 75 Subpart D).

The permittee will comply with the CEMS record keeping requirements under 40 CFR 75 Subpart F (40 CFR 75 Subpart F).

The permittee will comply with the CEMS reporting requirements under 40 CFR 75 Subpart G (40 CFR 75 Subpart G).

If initial stack testing indicates a CTG to be in compliance with applicable opacity and VOC emission limitations and the CTG is operated in accordance with manufacturer's recommendations including good combustion practice, it is expected that emissions of these pollutants will not increase over time. Therefore, it is proposed that no ongoing compliance demonstration be required for VOC or opacity.

7.6.2 Inlet Air Chiller module

The Applicant will use the following method(s) for determining compliance with the applicable requirements for the inlet air chiller module:

- Other (if applicable)
  - Pollutant(s): PM_{10}

- Compliance certification reports will be submitted to the Department according to the following schedule:
  - Start date: None – see below

- Compliance monitoring reports will be submitted to the Department according to the following schedule:
  - Start date: None – see below

It is proposed that no ongoing compliance demonstration with particulate emission limits be required for the chiller module. These eliminators are static, physical devices that are installed within the structure and performance is not controlled or monitored by any physical devices. Because testing for drift eliminator performance is very difficult to

accomplish and is seldom performed, a compliance determination method for this control equipment is not being proposed. Initial compliance will be demonstrated through vendor guarantees. No ongoing compliance demonstrations with the PM_{10} limits for the chiller module need be required.

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APPENDIX A

EMISSION CALCULATIONS

Northern Arizona Energy Project, Mohave County, Arizona
Emissions and Operating Parameters for GE LM6000 Combustion Turbines
Natural Gas Firing

Case	1) Hot Base	2) Hot Low	3) Avg. Base	4) Avg. Low	5) Cold Base	6) Cold Low
Engine Load, kW	45,702	22,851	45,702	22,851	46,822	23,411
Ambient Temp, F	113	113	90	90	25	25
Engine Load	100%	50%	100%	50%	100%	50%
Heat input, MMBtu/hr (HHV)	432	263	432	263	436	263
Stack flow, lb/hr	1,013,573	806,056	999,072	794,367	1,031,783	832,853
Stack flow, acfm	634,682	458,994	620,818	448,753	614,523	445,370
Stack flow, dscfm	198,112	161,067	198,112	161,067	209,975	173,545
Stack temp, F	829.1	721.4	829.1	721.4	792.3	674.6
Stack exhaust, vol %						
O2 (dry)	14.48%	16.10%	14.48%	16.10%	14.79%	16.45%
CO2 (dry)	3.72%	2.79%	3.72%	2.79%	3.54%	2.60%
H2O	15.04%	12.47%	13.15%	10.47%	9.66%	6.66%
Emissions						
NOx, ppmvd @ 15% O2	5.0	5.0	5.0	5.0	5.0	5.0
NOx, lb/hr	7.83	4.77	7.83	4.77	7.90	4.78
NOx, lb/MMBtu	0.0181	0.0181	0.0181	0.0181	0.0181	0.0181
SO2, ppmvd @ 15% O2	2.79	2.79	2.79	2.79	2.79	2.79
SO2, lb/hr	6.09	3.71	6.09	3.71	6.14	3.71
SO2, lb/MMBtu	0.0141	0.0141	0.0141	0.0141	0.0141	0.0141
CO, ppmvd @ 15% O2	6.0	6.0	6.0	6.0	6.0	6.0
CO, lb/hr	5.72	3.48	5.72	3.48	5.77	3.49
CO, lb/MMBtu	0.0132	0.0132	0.0132	0.0132	0.0132	0.0132
VOC, ppmvd @ 15% O2	5	5	5	5	5	5
VOC, lb/hr	2.73	1.66	2.73	1.66	2.75	1.67
VOC, lb/MMBtu	0.0063	0.0063	0.0063	0.0063	0.0063	0.0063
PM10, lb/hr	2.7	2.7	2.7	2.7	2.7	2.7
PM10, lb/MMBtu	0.0062	0.0103	0.0062	0.0103	0.0062	0.0102
PM10, gr/dscf	0.00159	0.00196	0.00159	0.00196	0.00150	0.00182
NH3, ppmvd@15% O2	10.0	10.0	10.0	10.0	10.0	10.0
NH3, lb/hr	5.80	3.53	5.80	3.53	5.85	3.54

Northern Arizona Energy Project, Mohave County, Arizona
Hazardous Air Pollutants (HAPs)

Pollutant	Emission Factor[2] lb/10^6 BTU		Emission Rate/turbine			Facility Emissions
				lbs/hr	g/s	tpy
1,3-Butadiene	<	4.3E-07	<	0.0002	0.0000	0.001
Acetaldehyde		4.0E-05		0.0173	0.0022	0.092
Acrolein		6.4E-06		0.0028	0.0003	0.015
Benzene		1.2E-05		0.0052	0.0007	0.027
Ethylbenzene		3.2E-05		0.0138	0.0017	0.073
Formaldehyde[3]		2.2E-04		0.0951	0.0120	0.504
Hexane		1.7E-04		0.0744	0.0094	0.394
Naphthalene		1.3E-06		0.0006	0.0001	0.003
PAHs[4]		2.2E-06		0.0010	0.0001	0.005
Propylene Oxide	<	2.9E-05	<	0.0125	0.0016	0.066
Toluene		1.3E-04		0.0562	0.0071	0.298
Xylene		6.4E-05		0.0277	0.0035	0.147
Total Organic HAPs				0.3066	0.0386	**1.625**

Natural Gas Flow Rate = $0.43 * 10^6$ scfh 432.2 MMBtu/hr

Notes:
1) The emission values are based on Natural Gas at 1017 Btu/scf.
2) Emission Factors are from AP-42 Section 3.1, Stationary Combustion Turbines, except for formaldehyde.
3) Formaldehyde emission factor is base on new EPA test data contained in an EPA Memorandum, authored by Sims Roy, dated August 21, 2001 and entitled *Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines*.
4) PAH is polycyclic aromatic hydrocarbons. This value includes naphthalene.

Northern Arizona Energy Project, Mohave County, Arizona
Chiller Emissions Calculations

Calculation of Drift rate: 0.10 gpm

Basis: Vendor guaranteed drift rate:

$$\frac{0.10 \text{ gallon}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} \times \frac{8.34 \text{ lb } H_2O}{\text{gallon}} = \frac{50 \text{ lb } H_20 \text{ mist}}{\text{hr}}$$

Max solids loading for chiller: 3100 ppm

Basis: Water analysis 517 ppm TDS content with 6 cycles of concentration

Emission Rate: 6000 hr/yr

Basis: All solids fall out as PM10

$$\frac{50 \text{ lb } H_2O}{\text{hr}} \times \frac{3100 \text{ lbs } PM_{10}}{1{,}000{,}000 \text{ lb } H_2O} = \frac{0.16 \text{ lbs } PM_{10}}{\text{hr}}^{1}$$

$$\frac{0.16 \text{ lbs } PM_{10}}{\text{hr}} \times \frac{6{,}000 \text{ hr}}{\text{yr}} \times \frac{1 \text{ ton}}{2{,}000 \text{ lb}} = \frac{0.47 \text{ ton } PM_{10}}{\text{yr}}^{1}$$

Notes:

1. Emission rate is for the entire chiller. Individual cell emissions are calculated by dividing the total emissions by the number of cells in the chiller.

chiller air flowrate	405000	cfm/3 cells
	135000	cfm/cell
cell diam =	12	ft
cell velocity	1193.66	ft/min
	19.8944	ft/sec

Air flowrate provided by Joe Stuparich, Turbine Air Systems, 2/23/2007

Northern Arizona Energy Project, Mohave County, Arizona
Simple Cycle Emissions by Source

LM6000	NO_X Emission Rate			CO Emission Rate			VOC Emission Rate			$PM_{10}/PM_{2.5}$ Emission Rate		SO_2 Emission Rate	
Source	Startup/ Shutdown Max lb/hr	Max lb/hr[1]	ton/yr	Startup/ Shutdown Max lb/hr	Max lb/hr[1]	ton/yr	Startup/ Shutdown Max lb/hr	Max lb/hr[1]	ton/yr	Max lb/hr[1]	ton/yr	Max lb/hr[1,2]	ton/yr
CT1	35.50	7.90	9.93	15.00	5.77	8.98	4.50	2.75	3.88	2.70	3.58	6.14	8.08
CT2	35.50	7.90	9.93	15.00	5.77	8.98	4.50	2.75	3.88	2.70	3.58	6.14	8.08
CT3	35.50	7.90	9.93	15.00	5.77	8.98	4.50	2.75	3.88	2.70	3.58	6.14	8.08
CT4	35.50	7.90	9.93	15.00	5.77	8.98	4.50	2.75	3.88	2.70	3.58	6.14	8.08
Subtotal		31.60	39.71		23.09	35.90		11.02	15.54	10.80	14.31	24.56	32.30

Other 8760 hr/yr	NO_X Emission Rate			CO Emission Rate			VOC Emission Rate			$PM_{10}/PM_{2.5}$ Emission Rate		SO_2 Emission Rate	
Source Name	Startup/Shutdown Max lb/hr	Max lb/hr	ton/yr	Startup/Shutdown Max lb/hr	Max lb/hr	ton/yr	Startup/Shutdown Max lb/hr	Max lb/hr	ton/yr	Max lb/hr	ton/yr[5]	Max lb/hr	ton/yr
Chiller										0.16	0.47		
Subtotal										0.16	0.47		

Facility Total[3]	NO_X			CO			VOC			$PM_{10}/PM_{2.5}$		SO_2	
	Startup/Shutdown Max lb/hr	Max lb/hr	ton/yr	Startup/Shutdown Max lb/hr	Max lb/hr	ton/yr	Startup/Shutdown Max lb/hr	Max lb/hr	ton/yr	Max lb/hr	ton/yr	Max lb/hr	ton/yr
			39.71			35.90			15.54		14.78		32.30

Notes:

1) The maximum combustion turbine emission rates are based on full load operation at an ambient air temperature of 25°F.
2) SO2 emission rates are based on natural gas with 5 grains S/100 scf.
3) The annual combustion turbine emission totals are calculated based on a per turbine average of 2650 hour/yr operation, with 300 hr/yr in startup/shutdown mode.
4) Highlighted cells will be the proposed maximum allowable emission rates & facility totals for the permit application. Individual turbines will not be limited to a ton/yr cap. Total emissions from all operating units will be covered by the plantwide caps highlighted.
5) Chiller will operate when ambient temperature is greater than 60 F. Annual emissions based on 6000 hour/yr operation.

Northern Arizona Energy Project, Mohave County, Arizona
Griffith Toxic Air Pollutant Summary

Hazardous Air Pollutant	*Individual Stack Emissions* 7FA Turbines		*Individual Stack Emissions* Duct Burners		*Individual Stack Emissions* Boiler		*Individual Stack Emissions* Fire Pump		*TOTAL EMISSIONS* All Equipment
	#/hr	g/s	#/hr	g/s	#/hr	g/s	#/hr	g/s	tons/year
Organics									
1,3-Butadiene	0.00077	0.00010	0.00000	0.00000	0.00000	0.00000	0.00309	0.00039	0.008
Acetaldehyde	0.07169	0.00903	0.00058	0.00007	0.00009	0.00001	0.01112	0.00140	0.636
Acrolein	0.01147	0.00145	0.00051	0.00006	0.00008	0.00001	0.00048	0.00006	0.105
Benzene	0.02151	0.00271	0.00109	0.00014	0.00017	0.00002	0.00265	0.00033	0.199
Chlorobenzene	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.000
Ethylbenzene	0.05735	0.00723	0.00128	0.00016	0.00020	0.00003	0.00015	0.00002	0.515
Formaldehyde	0.39428	0.04968	0.00231	0.00029	0.00036	0.00005	0.02451	0.00309	3.482
Hexane	0.30843	0.03886	0.00083	0.00010	0.00014	0.00002	0.00038	0.00005	2.710
Hydrogen Chloride	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00265	0.00033	0.001
Naphthalene	0.00233	0.00029	0.00019	0.00002	0.00001	0.00000	0.00028	0.00004	0.022
PAHs	0.00394	0.00050	0.00026	0.00003	0.00001	0.00000	0.00079	0.00010	0.037
Propylene Oxide	0.05197	0.00655	0.00994	0.00125	0.01566	0.00197	0.00663	0.00084	0.613
Toluene	0.23298	0.02936	0.00499	0.00063	0.00078	0.00010	0.00150	0.00019	2.088
Xylenes	0.11470	0.01445	0.00371	0.00047	0.00058	0.00007	0.00060	0.00008	1.040
Total Organic HA									**11.456**
Metals									
Arsenic							2.27E-05	2.86E-06	5.68E-06
Cadmium							2.13E-05	2.68E-06	5.33E-06
Total Chromium							8.52E-06	1.07E-06	2.13E-06
Hexavelent Chromium							1.42E-06	1.79E-07	3.55E-07
Copper							5.82E-05	7.34E-06	1.46E-05
Lead							1.18E-04	1.49E-05	2.95E-05
Manganese							4.40E-05	5.55E-06	1.10E-05
Mercury							2.84E-05	3.58E-06	7.10E-06
Nickel							5.54E-05	6.98E-06	1.38E-05
Selenium							3.12E-05	3.94E-06	7.81E-06
Zinc							3.18E-04	4.01E-05	7.95E-05
Total Metal HAPs									**1.77E-04**

APPENDIX B

AMBIENT AIR QUALITY MODELING RESULTS

Northern Arizona Energy Project, Mohave County, Arizona
Summary Results of Air Quality Impact Analysis for New Facility

Criteria Pollutant	Full Load (µg/m3)			50% Load (µg/m3)		
	Hot	Normal	Cold	Hot	Normal	Cold
Nox 1hr	16.201	16.425	17.058	13.754	13.994	14.439
Nox annual	0.087	0.089	0.091	0.067	0.068	0.070
CO 1hr	11.783	11.945	12.452	10.086	10.262	10.589
CO 8 hr	2.352	2.386	2.466	1.773	1.790	1.818
SO2 1hr	12.601	12.775	13.135	10.774	10.962	11.311
SO2 3 hr	6.159	6.260	6.407	4.798	4.850	4.945
SO2 24 hr	0.852	0.864	0.881	0.866	0.885	0.919
SO2 annual	0.068	0.069	0.070	0.053	0.053	0.055
PM10/PM2.5 24 hr	0.387	0.392	0.389	0.731	0.741	0.665
PM10/PM2.5 annual	0.031	0.031	0.031	0.039	0.039	0.039

NH3	Full Load (µg/m3)			50% Load (µg/m3)		
	Hot	Normal	Cold	Hot	Normal	Cold
1 hr	11.947	12.111	12.623	10.086	10.262	10.829
3 hr	5.839	5.935	6.158	4.492	4.540	4.735
8 hr	2.384	2.419	2.499	1.773	1.790	1.859
24 hr	0.808	0.819	0.846	0.811	0.829	0.880
annual	0.064	0.065	0.068	0.049	0.050	0.052

HAPs (Full Load, Normal Operation)	1 hr (µg/m3)	24 hr (µg/m3)	Annual (µg/m3)
1,3-Butadiene	3.88E-04	2.63E-05	2.09E-06
Acetaldehyde	3.71E-02	2.51E-03	2.00E-04
Acrolein	5.94E-03	4.00E-04	--
Benzene	1.11E-02	7.50E-04	6.00E-05
Ethylbenzene	2.97E-02	2.01E-03	--
Formaldehyde	2.04E-01	1.38E-02	1.09E-03
n-Hexane	1.60E-01	1.08E-02	--
Naphthalene	1.21E-03	8.00E-05	--
Propylene Oxide	2.69E-02	1.82E-03	1.40E-04
Toluene	1.21E-01	8.15E-03	--
Xylene	5.94E-02	4.01E-03	--

Northern Arizona Energy Project, Mohave County, Arizona
Summary Results of Air Quality Impact Analysis for NAEP and Griffith

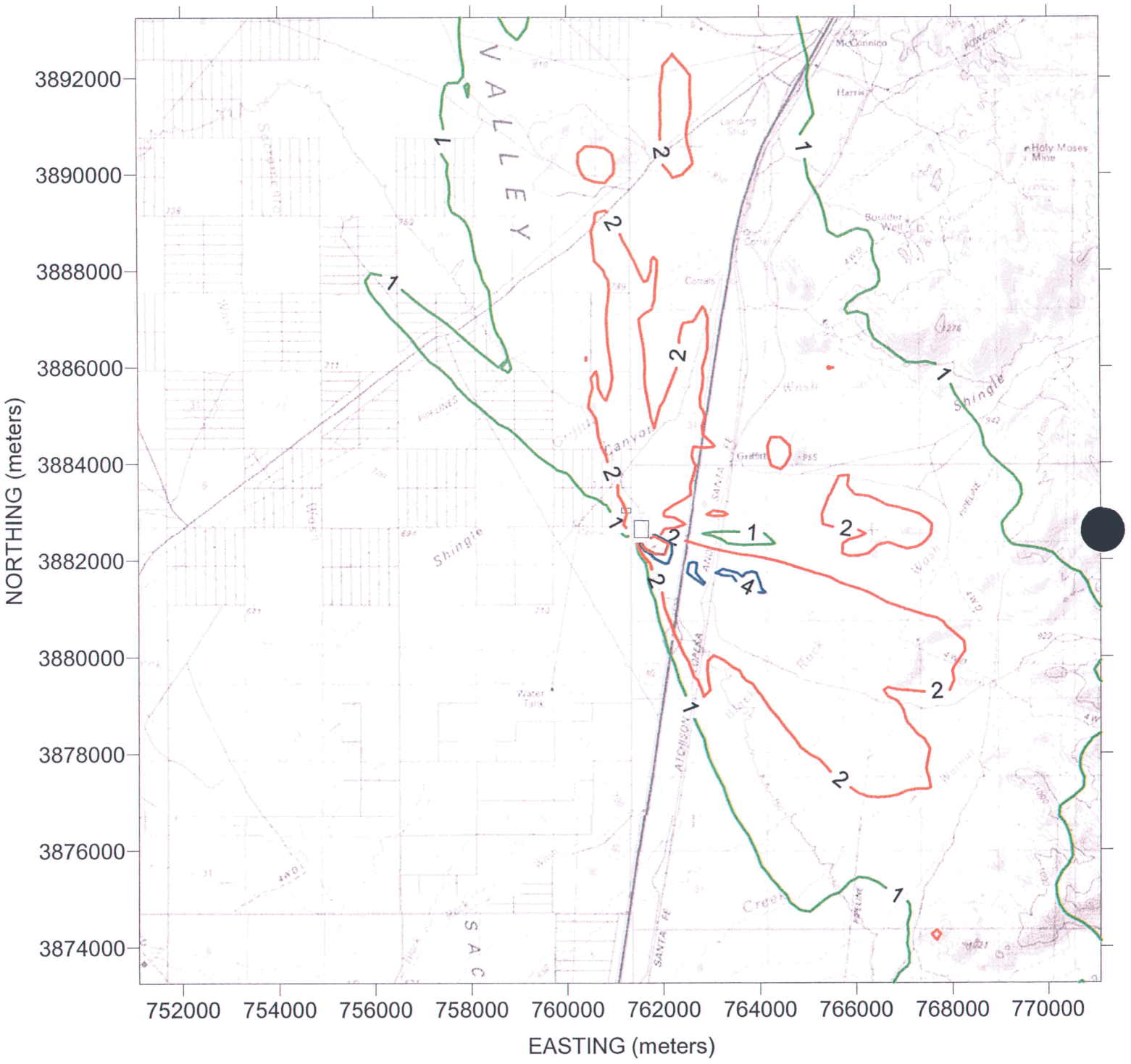
Criteria Pollutant	Full Load (µg/m3)			50% Load (µg/m3)		
	Hot	Normal	Cold	Hot	Normal	Cold
Nox 1hr	989.20	989.20	989.20	989.20	989.20	989.20
Nox annual	8.38	8.38	8.38	8.38	8.38	8.38
CO 1hr	590.40	590.40	590.40	590.40	590.40	590.40
CO 8 hr	93.95	93.95	93.95	93.95	93.95	93.95
SO2 1hr	24.79	24.79	24.79	24.79	24.79	24.79
SO2 3 hr	8.28	8.28	8.28	8.28	8.28	8.28
SO2 24 hr	2.21	2.22	2.22	2.36	2.37	2.37
SO2 annual	0.31	0.31	0.31	0.31	0.31	0.31
PM10/PM2.5 24 hr	13.86	13.86	13.86	13.86	13.86	13.86
PM10/PM2.5 annual	1.41	1.41	1.41	1.42	1.42	1.41

TAPs (Full Load, Normal Operation)	1 hr (µg/m3)	24 hr (µg/m3)	Annual (µg/m3)
1,3-Butadiene	1.78E-03	2.90E-04	2.00E-05
Acetaldehyde	1.67E-01	2.76E-02	1.99E-03
Acrolein	2.76E-02	4.63E-03	--
Ammonia	1.98E+01	1.69E+00	1.09E-01
Benzene	6.57E-02	1.16E-02	1.04E-03
Ethylbenzene	1.51E-01	2.58E-02	--
Formaldehyde	9.46E-01	1.57E-01	1.12E-02
n-Hexane	7.26E-01	1.20E-01	--
Naphthalene	8.15E-03	1.46E-03	--
Propylene Oxide	4.45E+00	2.37E-01	3.77E-02
Toluene	6.12E-01	1.04E-01	--
Xylene	3.20E-01	5.52E-02	--

Northern Arizona Energy Project, Griffith, Mohave County, Arizona
Summary Results of Air Quality Fumigation Analysis for New Facility

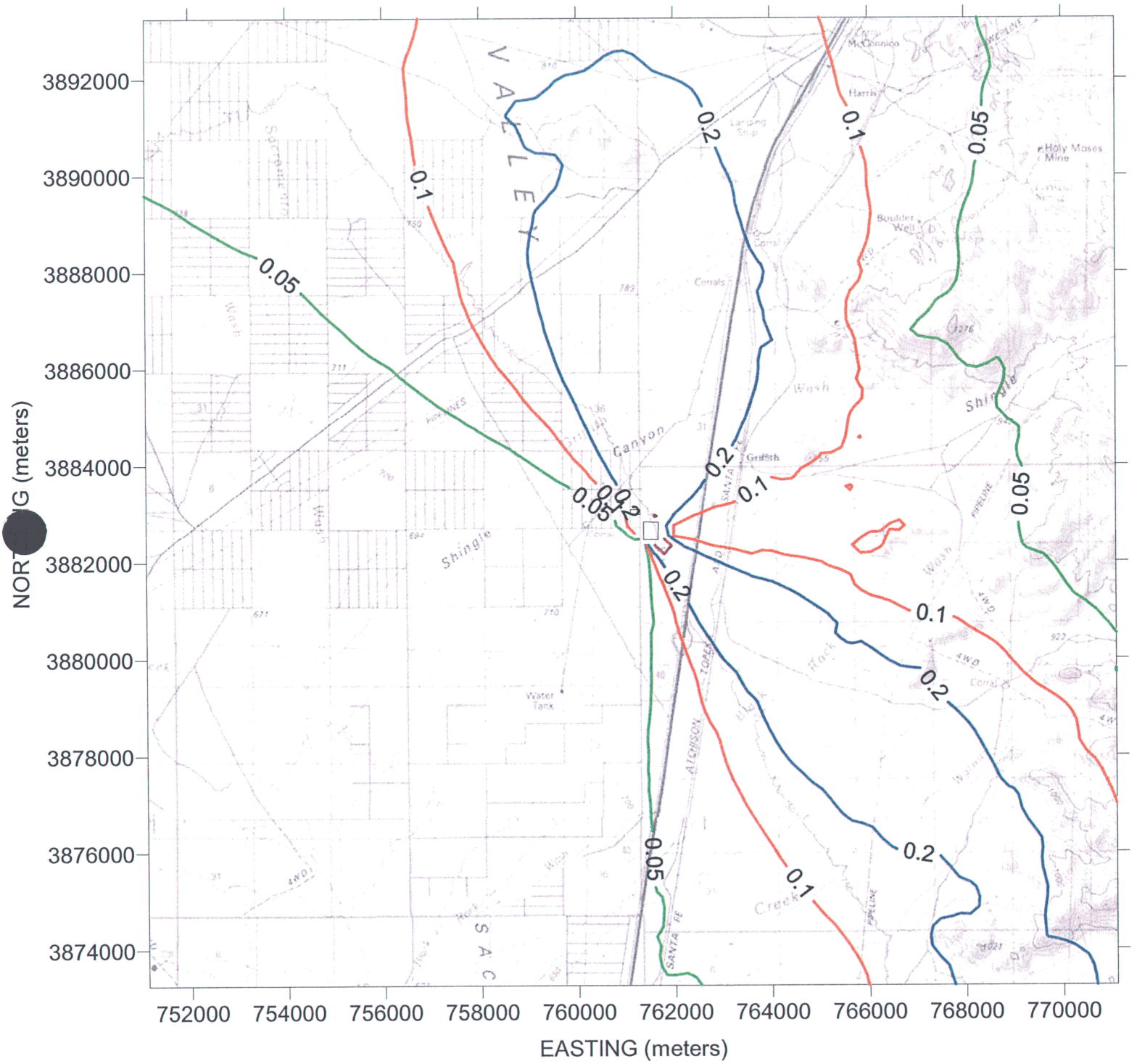
	Emission Rate	Total Impact (ug/m3) - all CTG's			
Northern Arizona Energy - Full Load, Hot Case	g/s	1-hr	3-hr	8-hr	24-hr
NOx	0.99	2.81	2.96	2.09	1.15
CO	0.72	2.05	2.16	1.53	0.84
VOC	0.34	0.98	1.03	0.73	0.40
PM10/PM2.5	0.34	0.97	1.02	0.72	0.40
SO2	0.77	2.18	2.30	1.63	0.89
Northern Arizona Energy - 50% Load, Hot Case	g/s	1-hr	3-hr	8-hr	24-hr
NOx	0.60	2.44	2.46	1.78	0.99
CO	0.44	1.78	1.80	1.30	0.72
VOC	0.21	0.85	0.86	0.62	0.35
PM10/PM2.5	0.34	1.38	1.39	1.01	0.56
SO2	0.47	1.89	1.91	1.39	0.77
Northern Arizona Energy - Full Load, Normal Cas	g/s	1-hr	3-hr	8-hr	24-hr
NOx	0.99	2.79	2.99	2.09	1.14
CO	0.72	2.04	2.18	1.53	0.83
VOC	0.34	0.97	1.04	0.73	0.40
PM10/PM2.5	0.34	0.96	1.03	0.72	0.39
SO2	0.77	2.17	2.32	1.62	0.89
Northern Arizona Energy - 50% Load, Normal Cas	g/s	1-hr	3-hr	8-hr	24-hr
NOx	0.60	2.43	2.48	1.79	0.99
CO	0.44	1.78	1.81	1.31	0.72
VOC	0.21	0.85	0.87	0.62	0.35
PM10/PM2.5	0.34	1.38	1.41	1.01	0.56
SO2	0.47	1.89	1.93	1.39	0.77
Northern Arizona Energy - Full Load, Cold Case	g/s	1-hr	3-hr	8-hr	24-hr
NOx	1.00	2.66	3.03	2.05	1.10
CO	0.73	1.95	2.22	1.50	0.80
VOC	0.35	0.93	1.06	0.72	0.38
PM10/PM2.5	0.34	0.91	1.04	0.70	0.38
SO2	0.77	2.07	2.36	1.59	0.86
Northern Arizona Energy - 50% Load, Cold Case	g/s	1-hr	3-hr	8-hr	24-hr
NOx	0.60	2.31	2.49	1.74	0.95
CO	0.44	1.69	1.82	1.27	0.69
VOC	0.21	0.80	0.87	0.61	0.33
PM10/PM2.5	0.34	1.30	1.41	0.98	0.53
SO2	0.47	1.79	1.94	1.35	0.74

Max Distance to Breakup Fumigation	
CTGs	19.65 km

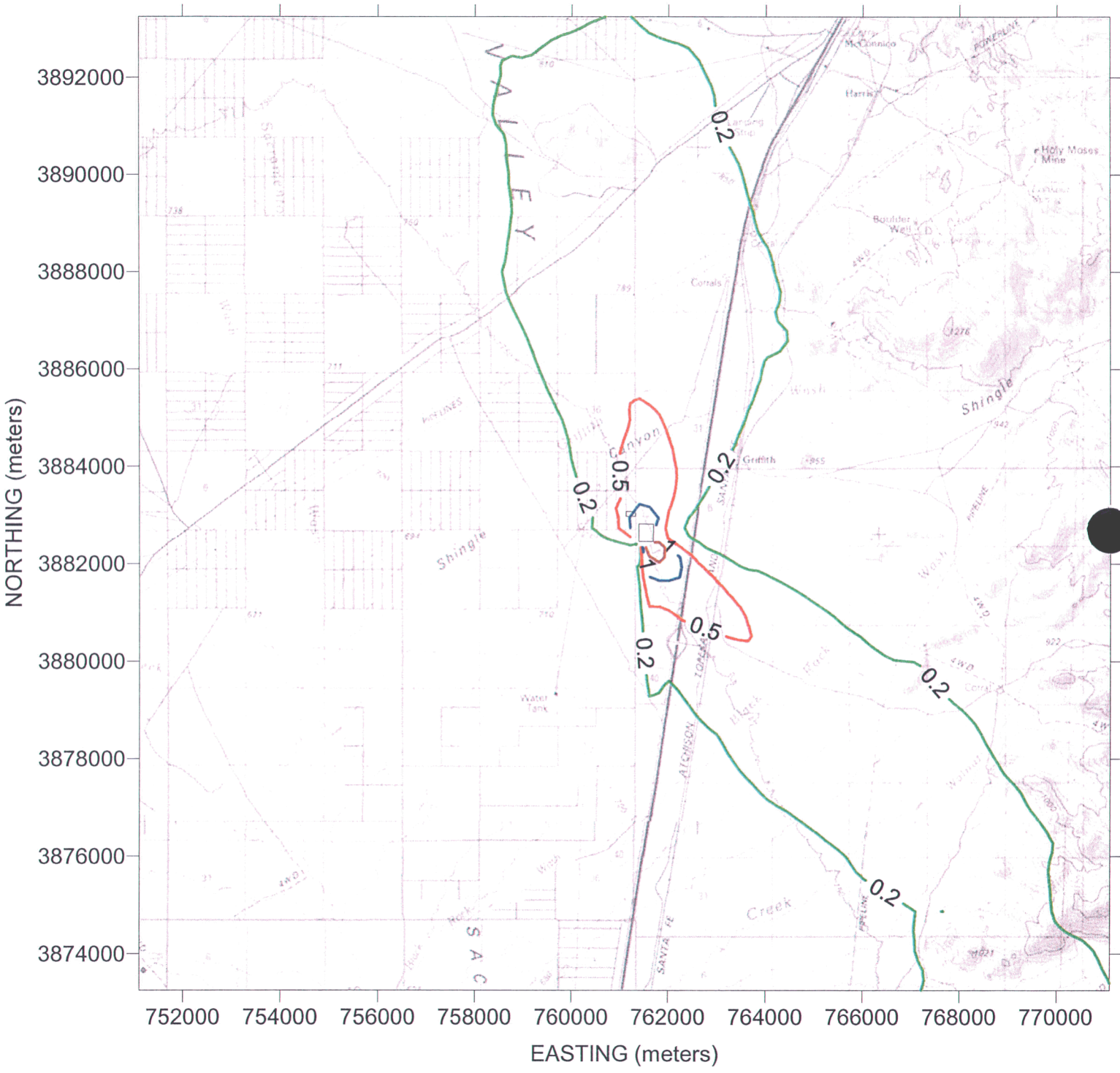


Northern Arizona Energy Project, Mohave County, Arizona
24 Hour Impacts for PM10/PM2.5 Emissions Based on Operations at NAEP and Griffith

Appendix B



Northern Arizona Energy Project, Mohave County, Arizona
Annual Impacts for PM10/PM2.5 Emissions based on Operations at NAEP and Griffith



Northern Arizona Energy Project, Mohave County, Arizona
Annual Impacts for NOx Emissions Based on Operations at NAEP and Griffith

APPENDIX C

AMBIENT AIR QUALITY MODELING INPUTS

Northern Arizona Energy Project, Mohave County, Arizona
Stack Parameters for Modeling Analysis

Stack ID #	Base Elevation ft	Base Elevation m	Stack Height ft	Stack Height m	Stack Diameter ft	Stack Diameter m
CT1	2,490.00	758.95	85.00	25.91	10.00	3.05
CT2	2,490.00	758.95	85.00	25.91	10.00	3.05
CT3	2,490.00	758.95	85.00	25.91	10.00	3.05
CT4	2,490.00	758.95	85.00	25.91	10.00	3.05
CHLRs1- 6	2,490.00	758.95	45.00	13.72	12.00	3.66

CTG Emission Rates (g/s)

Pollutant	Full Load Hot	Full Load Normal	Full Load Cold	50% Load Hot	50% Load Normal	50% Load Cold
NOx	0.99	0.99	1.00	0.60	0.60	0.60
CO	0.72	0.72	0.73	0.44	0.44	0.44
VOC	0.34	0.34	0.35	0.21	0.21	0.21
PM10/PM2.5	0.34	0.34	0.34	0.34	0.34	0.34
SO2	0.77	0.77	0.77	0.47	0.47	0.47
NH3	0.73	0.73	0.74	0.44	0.44	0.45

Chiller Emission Rates (g/s) - per cell

Pollutant	Full Load Hot	Full Load Normal	Full Load Cold	50% Load Hot	50% Load Normal	50% Load Cold
PM10/PM2.5	0.0033	0.0033	*	0.0033	0.0033	*

*Chiller will be shut off at temperatures below 60°F; therefore no emissions during Cold Case

Stack areas		
CTG	78.54	ft2
Chiller Cell	113.10	ft2

Structure	Dimensions (ft) Width	Length	Height
Chiller	71.50	37.40	43.10
SCR Catalyst Casing	24.30	29.50	43.00
CTG Transition	24.30	21.50	21.50
CTG Housing	48.90	63.00	51.00
Compressor Buildings	39.30	60.70	15.00

The SCR is adjacent to the stack and the CTG mates up via the CTG transtion with the SCR, so the CTG is 48.6 ft from the side of the stack.

Full Load - Hot Case (113°F)				50% Load - Hot Case (113°F)			
Max Flow Rate		Temperature		Max Flow Rate		Temperature	
ft/sec	m/sec	°F	K	ft/sec	m/sec	°F	K
134.68	41.05	829.10	716.17	97.40	29.69	721.40	656.33
134.68	41.05	829.10	716.17	97.40	29.69	721.40	656.33
134.68	41.05	829.10	716.17	97.40	29.69	721.40	656.33
134.68	41.05	829.10	716.17	97.40	29.69	721.40	656.33
19.89	6.06	113.00	318.33	19.89	6.06	113.00	318.33

Full Load - Normal Case (90°F)				50% Load - Normal Case (90°F)			
Max Flow Rate		Temperature		Max Flow Rate		Temperature	
ft/sec	m/sec	°F	K	ft/sec	m/sec	°F	K
131.74	40.15	829.10	716.17	95.23	29.03	721.40	656.33
131.74	40.15	829.10	716.17	95.23	29.03	721.40	656.33
131.74	40.15	829.10	716.17	95.23	29.03	721.40	656.33
131.74	40.15	829.10	716.17	95.23	29.03	721.40	656.33
19.89	6.06	90.00	305.56	19.89	6.06	90.00	305.56

Full Load - Cold Case (25°F)				50% Load - Cold Case (25°F)			
Max Flow Rate		Temperature		Max Flow Rate		Temperature	
ft/sec	m/sec	°F	K	ft/sec	m/sec	°F	K
130.41	39.75	792.30	695.72	94.51	28.81	674.60	630.33
130.41	39.75	792.30	695.72	94.51	28.81	674.60	630.33
130.41	39.75	792.30	695.72	94.51	28.81	674.60	630.33
130.41	39.75	792.30	695.72	94.51	28.81	674.60	630.33
*	*	*	*	*	*	*	*

Northern Arizona Energy Project, Mohave County, Arizona
Toxic Air Pollutants Emission Rates at NAEP and Griffith for AAAQS Analysis

Pollutant	GEC Turbines	GEC Boiler	NAEP Turbines
	g/s/unit	g/s	g/s/unit
1,3-Butadiene	9.7098E-05	0.0000E+00	2.3416E-05
Acetaldehyde	9.1050E-03	1.1544E-05	2.1783E-03
Acrolein	1.5097E-03	1.0054E-05	3.4852E-04
Ammonia	5.1484E-01	0.0000E+00	7.3080E-01
Benzene	3.7983E-03	2.1598E-05	6.5348E-04
Ethylbenzene	8.5066E-03	2.5694E-05	1.7426E-03
Formaldehyde	5.1983E-02	4.5803E-05	1.1980E-02
Hexane	3.9694E-02	1.7130E-05	9.3720E-03
Naphthalene	4.8566E-04	1.1171E-06	7.0794E-05
Propylene Oxide	1.6493E-02	1.9736E-03	1.5792E-03
Toluene	3.4350E-02	9.8681E-05	7.0794E-03
Xylene	1.8166E-02	7.3359E-05	3.4852E-03

Appendix C

From: Peter G. Hyde [Hyde.Peter@azdeq.gov]
Sent: Thursday, February 22, 2007 7:49 AM
To: Mark Peak
Cc: Balaji Vaidyanathan; jwhite@lspower.com; Dana Diller; Marc Valdez
Subject: RE: Arroyo Energy Modeling Protocol
February 22, 2007

Mark Peak:

The modeling protocol for this natural-gas fired turbine facility near Kingman adequately covers all the essential elements for the air quality modeling. I know of no reason not to proceed with the modeling work.

Cordially,

Peter Hyde

602 771 7642

From: Mark Peak [mailto:MPeak@sierraresearch.com]
Sent: Wednesday, January 31, 2007 2:38 PM
To: Peter G. Hyde
Cc: Balaji Vaidyanathan; jwhite@lspower.com; Dana Diller; Mark Peak; Marc Valdez
Subject: Arroyo Energy Modeling Protocol

Peter ☺
Thanks for meeting with the Arroyo Energy project team earlier today. Attached please find our proposed modeling protocol for the project. If you have any questions or need us to clarify any of the proposed methodology, please let me know as soon as possible. We look forward to hearing back from in the next week or so, so that we can proceed with our modeling as quickly as possible.
Best Regards

Mark L. Peak
Sierra Research
1801 J Street
Sacramento, CA 95814
Tel: 916-444-6666
Fax: 916-444-8373
www.sierraresearch.com

Appendix C

From: Peter G. Hyde [Hyde.Peter@azdeq.gov]
Sent: Thursday, January 18, 2007 3:24 PM
To: Mark Peak
Subject: RE: Follow-up on modeling for proposed Arroyo Energy project near Kingman, AZ

Attachments: arroyo background.doc
January 18, 2007

Mark:

Proceed with ISC on this project; I'll await the protocol. Background concentrations attached.

P. Hyde

From: Mark Peak [mailto:MPeak@sierraresearch.com]
Sent: Thursday, January 18, 2007 2:14 PM
To: Peter G. Hyde
Cc: Marc Valdez; Eric Walther; Mark Peak; Balaji Vaidyanathan
Subject: Follow-up on modeling for proposed Arroyo Energy project near Kingman, AZ

Peter ☺

Based on your phone call earlier today, we will proceed with modeling the Arroyo Energy project utilizing ISC. As requested, we will prepare a modeling protocol for your review and approval. Can you please confirm the use of ISC by responding to this e-mail so that we have a written record for our files. Also, can you please forward me the background air quality values you would like us to use for the modeling report.

Best Regards,

Mark L. Peak
Senior Project Engineer
Sierra Research
1801 J Street
Sacramento, CA 95814
Tel: 916-444-6666
Fax: 916-444-8373
www.sierraresearch.com

From: Mark Peak
Sent: Tuesday, January 16, 2007 12:44 PM

Appendix C

To: Peter Hyde (Hyde.Peter@azdeq.gov)
Cc: Marc Valdez; Mark Peak; Eric Walther
Subject: Follow-up on modeling for proposed Arroyo Energy project near Kingman, AZ

Peter,

Based on our discussion earlier today, you indicated that you are going to contact EPA Region 9 and query them as to the acceptability of using ISC vs AERMOD for evaluating impacts from the proposed Arroyo Energy project. Since the project will be emitting below PSD major significance thresholds and is therefore a minor modification at a major stationary source, doesn't the department have discretion on the choice of model? The new equipment which will be included in the modeling analysis consists of 4 LM6000 combustion gas turbines (peaking units) and a chiller. Based on the previous e-mails with the permit staff, emissions from the existing Griffith facility will also need to be included to show the cumulative impacts from the 2 facilities do not exceed any NAAQS or Arizona state standards.

I look forward to hearing from you soon regarding the final decision on the model. Can you forward me the background air quality values we discussed during our call? Have a great day!

Best Regards,

Mark L. Peak
Senior Project Engineer
Sierra Research
1801 J Street
Sacramento, CA 95814
Tel: 916-444-6666
Fax: 916-444-8373
www.sierraresearch.com

January 18, 2007

These are adequate background concentrations for the Arroyo project.

TABLE 5-2. ADEQ BACKGROUND CONCENTRATIONS FOR KINGMAN

Pollutant	Averaging Time	Background Value ($\mu g/m^3$)
NO_2 [a]	Annual	4
CO [b]	1-hour	582
	8-hour	582
PM_{10} [c]	24-hour	46
	Annual	14
SO_2 [d]	3-hour	246
	24-hour	52
	Annual	6

[a] Long-term average value (0.002 ppm) of several monitors located near power plants in rural areas of Arizona.
[b] Typical continental ambient CO background value (0.5 ppm) used in most regional models.
[c] Average max. values over 3-year period from Kingman - Praxair monitoring station (Mohave County).
[d] Max. values over 3-year period from Bullhead City - SCE monitoring station (Mohave County).

Peter Hyde, ADEQ

sierra research

Air Dispersion Modeling Protocol
Arroyo Energy Project
Griffith, Mohave County, Arizona

prepared for:

Arroyo Energy, LLC

January 31, 2007

prepared by:

Sierra Research, Inc.
1801 J Street
Sacramento, California 95814
(916) 444-6666

AIR DISPERSION MODELING PROTOCOL
ARROYO ENERGY PROJECT

Submitted to:

Arizona Department of Environmental Quality

January 31, 2007

AIR DISPERSION MODELING PROTOCOL

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Attachment 1 – Regional View of the Project Location

Attachment 2 – Aerial View of the Arroyo Energy Project Site

Attachment 3 – Detailed Facility Plot Plan

1. INTRODUCTION

Arroyo Energy LLC (Arroyo) is planning to submit a Class I Air Quality Permit Application to Construct and Operate to the Arizona Department of Environmental Quality (ADEQ) for the installation of four natural gas-fired combustion turbine generating units in Mohave County, Arizona. This modeling protocol outlines the proposed air dispersion modeling techniques that will be used to assess impacts from the proposed sources and is consistent with the ADEQ's December 2004 modeling guidance document.

2. FACILITY DESCRIPTION AND SOURCE INFORMATION

The Project is a natural gas-fired, simple cycle power generating plant that will supply power to load-serving entities in Arizona and surrounding regions for the purpose of serving their customers during periods of peak electricity demand. The Project is comprised of four General Electric (GE) LM6000 PC SPRINT NxGen combustion turbine generators (CTGs) with inlet air chillers. The Project will be designed to produce 175 MW of net electrical output with a heat rate of 9975 Btu/kWh (HHV) based upon the design condition ambient temperature of 90 degrees Fahrenheit (°F). The CTGs are capable of rapid start-up, allowing the Project to respond to fluctuations in electric demand within 10 minutes.

Emissions from the CTGs will be controlled by a combination of water injection and selective catalytic reduction (SCR) to reduce nitrogen oxides (NOx) emissions and an oxidation catalyst to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions.

Impacts from operation of the facility will be compared to the following:

Air Quality Criteria	NO_2	$PM_{2.5}$	PM_{10}	CO	SO_2	TAPs
Arizona Ambient Air Quality Guidelines List						√
National Ambient Air Quality Standards	√	√	√	√	√	

Project Location

The proposed CTGs will be constructed on a 40-acre site north of and adjacent to the existing Griffith Energy Power Generating Plant (Griffith) approximately 9 miles southeast of Kingman in Mohave County, Arizona. The UTM coordinates of the site are

approximately 213735 meters easting, 3883633 meters northing (NAD 27, Zone 12). The nominal site elevation is 2,475 feet above mean sea level.

Meteorological Data

Twelve months of meteorological data will be used in the dispersion modeling analysis to determine ambient air quality impacts. Surface meteorological data for this analysis was collected at Ford Motor Company's Arizona Proving Ground facility, which is located approximately 12 miles south of the proposed Arroyo site. The meteorological data set covers the time interval from September 1, 1996 (when the electronic archives began) to February 28, 1998. The data proposed for use for the Arroyo Energy Project was collected between January 1, 1997 and December 31, 1997.

Existing Ambient Air Quality Data

Background ambient air quality data for the project area were provided by the ADEQ air assessment section. Ambient NO_2, SO_2, PM_{10}, $PM_{2.5}$, and CO data are collected at various monitoring stations around Mohave County and have been deemed adequate for use in evaluating impacts from the Arroyo Energy Project.

Table 2-1
ADEQ Background Concentrations for Arroyo Energy Project

Pollutant	Averaging Time	Background Value ($\mu g/m^3$)
NO_2[a]	Annual	4
CO[b]	1-hour	582
	8-hour	582
PM_{10}[c]	24-hour	46
	Annual	14
SO_2[d]	3-hour	246
	24-hour	52
	Annual	6

[a] Long-term average value (0.002 ppm) of several monitors located near power plants in rural areas of Arizona.
[b] Typical continental ambient CO background value (0.5 ppm) used in most regional models.
[c] Average maximum values over 3-year period from Kingman – Praxair monitoring station (Mohave County).
[d] Maximum values over 3-year period from Bullhead City – SCE monitoring station (Mohave County).

3. DISPERSION MODEL OVERVIEW AND INPUTS

Air Quality Dispersion Models

Overview – Several US EPA dispersion models are proposed for use to quantify pollutant impacts on the surrounding environment based on the emission sources' operating parameters and their locations. The models proposed for use are the Building Profile Input Program (BPIP, current version 95086), Industrial Source Complex Short Term Model (ISCST3, current version 02035), and the SCREEN3 (current version). These models, along with options for their use and how they are used, are discussed below.

Simple, Complex, and Intermediate Terrain Impacts – For modeling the project in simple, complex, and intermediate terrain, the guideline ISCST3 model will be used with the aforementioned hourly meteorological data from the Arizona Proving Ground monitoring station for the project site. The ISCST3 model is a steady-state, multiple-source, Gaussian dispersion model designed for use with stack emission sources situated in terrain where ground elevations can exceed the stack heights of the emission sources. While AERMOD has been adopted as a guideline model, a full meteorological data set has not yet been established for the project area. Due to this factor and since the project is a minor source, ADEQ has agreed that the use of ISCST3 is acceptable for this project.

The ISCST3 model requires hourly meteorological data consisting of wind vector, wind speed, temperature, stability class, and mixing height. The model assumes that there is no variability in meteorological parameters over a one-hour time period, hence the term steady-state. The ISCST3 model allows input of multiple sources and source groupings, eliminating the need for multiple model runs. Complex phenomena such as building-induced plume downwash are treated in this model.

The ISCST3 model is also capable of calculating pollutant concentrations in intermediate terrain. Intermediate terrain is defined as terrain between stack top and final plume height. In calculating pollutant concentrations in intermediate terrain, the model will select the higher of the simple and complex terrain calculations on an hour-by-hour, source-by-source, and receptor-by-receptor basis.

Technical options selected for the ISCST3 model are listed below. Use of these options follows the US EPA's (1986, 1987, 1990, and 1994) modeling guidance and/or sound scientific practice. An explanation of these options and the rationale for their selection is provided below.

- Default option (includes gradual plume rise, stack-tip downwash except for Schulman-Scire [SS] downwash, buoyancy-induced dispersion except for SS downwash, default wind profile exponents, default temperature gradients);
- Anemometer height = 10 meters;
- Rural dispersion parameters; and
- Elevated receptor terrain heights option.

Final plume rise option does not consider the possible effects of gradual plume rise on ambient concentrations during the rising phase of the plume downwind transport. Gradual plume rise is recommended by US EPA (1986, 1987, 1990, 1994) when there is significant terrain close to the stacks. Buoyancy-induced dispersion, which accounts for the buoyant growth of a plume caused by entrainment of ambient air, will be included because of the relatively warm exit temperature and subsequent buoyant nature of the exhaust plumes. Stack-tip downwash, which adjusts the effective stack height downward following the methods of Briggs (1972) for cases where the stack exit velocity is less than 1.5 times the wind speed at stack top, will be selected per US EPA guidance.

Based on the land use classification procedure of Auer (1978), land use within the area circumscribed by a three-km radius around the Arroyo Energy Project site was evaluated and determined to be predominantly rural. In these modeling analyses supporting the permitting of the facility, dispersion coefficients will be assigned "rural" in accordance with this evaluation.

The calm processing option allows the user to direct the program to exclude hours with persistent calm winds in the calculation of concentrations for each averaging period. The ISCST3 model recognizes a calm wind condition as a wind speed less than or equal to one meter per second and a wind direction equal to that of the previous hour (a wind speed of zero m/sec is used in the ASCII meteorological data file). The calm processing option in the ISCST3 model will then exclude these hours from the calculation of concentrations.

Ambient Ratio Method and Ozone Limiting Method – Annual NO_2 concentrations will initially be based on the assumption that there is total conversion of NO to NO_2 and be equivalent to the modeled NOx values. This value will be compared to the NAAQS. If the concentration exceeds the allowable level, the annual NOx estimate will be adjusted using the Ambient Ratio Method (ARM), as specified in ADEQ's Modeling Guideline (ADEQ, 2004). The Guideline allows a nationwide default conversion rate of 75% for annual NO_2/NOx ratios.

Should NO_2 concentrations need to be examined in a more rigorous manner, the Ozone Limiting Method (OLM) will be used. In accordance with ADEQ policy, average background hourly ozone data will be used in the OLM to calculate hourly NO_2 concentrations from hourly NOx concentrations. The OLM involves an initial comparison of the estimated maximum NOx concentration and the ambient O_3 concentration to determine which is the limiting factor to NO_2 formation. If the O_3 concentration is greater than the maximum NOx concentration, total conversion is assumed. If the NOx concentration is greater than the O_3 concentration, the formation of NO_2 is limited by the ambient O_3 concentration. In this case, the NO_2 concentration is set equal to the O_3 concentration plus a correction factor that accounts for in-stack and near-stack thermal conversion. US EPA's ISC-OLM model will then be used to calculate the NO_2 concentration based on the OLM method.

Fumigation – The SCREEN3 model will be used to evaluate inversion breakup and fumigation impacts for short-term averaging periods (24 hours or less), as appropriate. The methodology in US EPA 454/R-92-019 (Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised) and in the ADEQ modeling guidelines will be followed for these analyses. Combined impacts for all sources under fumigation conditions will be evaluated, based on US EPA and any applicable ADEQ modeling guidelines.

Good Engineering Practice Stack Height and Downwash

ISCST3 can account for building downwash effects on dispersing plumes. Stack locations and heights and building locations and dimensions will be input to BPIP. The first part of BPIP determines and reports on whether a stack is being subjected to wake effects from a structure or structures. The second part calculates direction-specific building dimensions for each structure that are used by ISCST3 to evaluate wake effects. The BPIP output is formatted for use in ISCST3 input files.

Receptor Selection

Receptor and source base elevations will be determined from USGS Digital Elevation Model (DEM) data using the 7½-minute format (10- to 30-meter spacing between grid nodes). All coordinates will be referenced to UTM North American Datum 1927 (NAD27), zone 12. The ISCST3 receptor elevations will be interpolated among the DEM nodes.

Cartesian coordinate receptor grids will be used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. A 500-meter resolution coarse receptor grid will be developed and will extend outwards at least 10 km (or more as necessary to calculate the significant impact area).

For the full impact analyses, a nested grid will be developed to fully represent the maximum impact area(s). This grid will have 25-meter resolution along the process area boundary (PAB) in a single tier of receptors composed of four segments extending out to 100 meters from the PAB, 100-meter resolution from 100 meters to 1,000 meters from the PAB, 250-meter spacing out to 5 km from the PAB, and 500 meter spacing out to at least as far as 10 km from the PAB. If a predicted concentration at an individual receptor exceeds 90% of the applicable standard or guideline, additional refined receptor grids with 25-meter resolution will be placed around the maximum coarse grid impacts and extend out 1,000 meters in all directions. Concentrations within the facility PAB will not be calculated.

Modeling Scenarios

Pollutant emissions to the atmosphere from the proposed facility will occur from combustion of natural gas in the combustion turbines, and from the small chiller cooling tower. Emission rates will be included in the permit application for the project and will be based on vendor data and additional conservative assumptions of equipment performance. Turbine emissions and stack parameters, such as flow rate and exit temperature, exhibit some variation with ambient temperature and operating load. In order to calculate the worst-case air quality impacts, a screening analysis will be performed to evaluate each operating scenario (based on operating load and atmospheric conditions) to predict the worst-case facility configuration on a pollutant-specific basis.

In the modeling analysis, maximum impacts will be predicted for maximum (100%) and reduced load conditions. In addition, different ambient temperatures will be evaluated for each load condition. Each of these conditions has unique performance characteristics that affect plume dispersion and thus predicted impacts. This analysis is most relevant to

analyses for short-term impacts. The temperatures selected for the short-term screening analysis will closely reflect the range of possible site conditions. The results of this screening analysis will be used to select the worst-case operational scenarios for the modeling analyses in order to provide maximum operating flexibility. Refined modeling for the permit application will be based on these worst-case scenarios.

The screening modeling will use one complete year of meteorological data and the nested receptor grid described above to determine the worst-case source configuration (i.e., configuration that produces maximum facility impacts). This worst-case source configuration will then be executed with all available meteorological data (here, one complete year of 1997 Arizona Proving Ground met data) and, if necessary, coarse grid impacts will be refined with fine grid receptors spaced 25 meters apart.

Table 3-1
Criteria Pollutant Emissions
Arroyo Energy, Mohave County, Arizona

		NOx[a]	CO[a]	SOx[a]	VOC[a]	PM_{10}
CTG (each)	ppmc	5	6	2.8	5	NA
	lb/hr[b]	7.90	5.77	6.14	2.75	2.7
	Startup[c]	35.5	15.0	6.14	4.50	2.7
Chiller	lb/hr					0.16
	ton/yr					0.68
All Sources	ton/yr[d]	39.71	35.90	32.30	15.54	14.99

[a] ppm measured as ppmvd @ 15% O_2.
[b] worst-case base load operation, not including startup/shutdown.
[c] startup/shutdown worst-case.
[d] CTG emission totals are calculated based on a per turbine average of 2650 hour/yr operation including 300 hr/yr in startup/shutdown mode.

Table 3-2 Toxic Air Pollutant Emissions Arroyo Energy, Mohave County, Arizona			
Hazardous Air Pollutant	Total Emissions (4 units)		Tons/year (4 units)
	#/hr	lb/yr	
1,3-Butadiene	0.0007	1.97	0.001
Acetaldehyde	0.0692	183.25	0.092
Acrolein	0.0111	29.32	0.015
Benzene	0.0207	54.98	0.027
Ethylbenzene	0.0553	146.60	0.073
Formaldehyde	0.3803	1,007.90	0.504
Hexane	0.2975	788.45	0.394
Naphthalene	0.0022	5.96	0.003
PAHs	0.0038	10.08	0.005
Propylene	0.0501	132.86	0.066
Toluene	0.2247	595.58	0.298
Xylene	0.1106	293.21	0.147
Total, All HAPs			4.1

4. DISPERSION MODELING REPORT CONTENT AND ORGANIZATION

Ambient Air Quality Impact Analyses

In evaluating the impacts of the proposed project on ambient air quality, we will model the ambient impacts of the project, add those impacts to background concentrations, and compare the results to the state and federal ambient standards for SO_2, NO_2, PM_{10}, $PM_{2.5}$, and CO. Pursuant to ADEQ's request, the modeling analysis will include an evaluation of the new facility as a standalone project, and separately combined with the emissions of the existing Griffith facility to ensure no NAAQS or AAAQG's are exceeded.

In accordance with US EPA (40 CFR part 51, Appendix W, Sections 11.2.3.2 and 11.2.3.3) and ADEQ guidance, the highest second-high modeled concentrations will be used to demonstrate compliance with the short-term federal standards and the highest modeled concentration will be used to demonstrate compliance with the federal annual and all state standards.

Final Modeling Submittal

The final modeling analyses will also include the following materials:

- Modeling summaries of maximum impacts for each air quality model showing meteorological conditions and receptor location and elevation;
- All modeling outputs (including BPIP and meteorological files) in electronic format, together with a description of all filenames;
- A Plot plan showing emission points, nearby buildings (including dimensions), cross-section lines, property lines, fence lines, roads, and UTM coordinates; and
- A table showing building heights used in the modeling analysis.

Class I Area Impact Methodology

The project is not subject to PSD review because the emissions are not sufficiently high to exceed EPA's review thresholds, and hence, no significant impacts are expected on Class I areas.

Arizona Ambient Air Quality Guideline Analysis

A screening-level analysis will be performed to determine the impact of the toxic air pollutant emissions associated with the Arroyo project. This analysis will be performed according to the ADEQ's Analysis Procedures for Non-PSD sources (ADEQ, 2004).

5. REFERENCES

Arizona Department of Environmental Quality (ADEQ), 2004. Air Dispersion Modeling Guidelines for Arizona Air Quality Permits. ADEQ, December 2004

Briggs, G.A., 1972. Discussion on Chimney Plumes in Neutral and Stable Surroundings. Atmos. Environ. 6:507-510.

National Climatic Data Center (NCDC), 2007. Local Climatological Data (LCD) - Annual Summary with Comparative Data for Yuma for 2006.

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USEPA, 1985. Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) - Revised. EPA-450/4-80-023R.

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USEPA, 1988. Workbook for Plume Visual Impact Screening and Analysis. Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/4-88-015 (Including October 1992 Revisions).

USEPA, 1990. Supplement B to the Guideline on Air Quality Models (Revised). Office of Air Quality Planning and Standards, Research Triangle Park, NC.

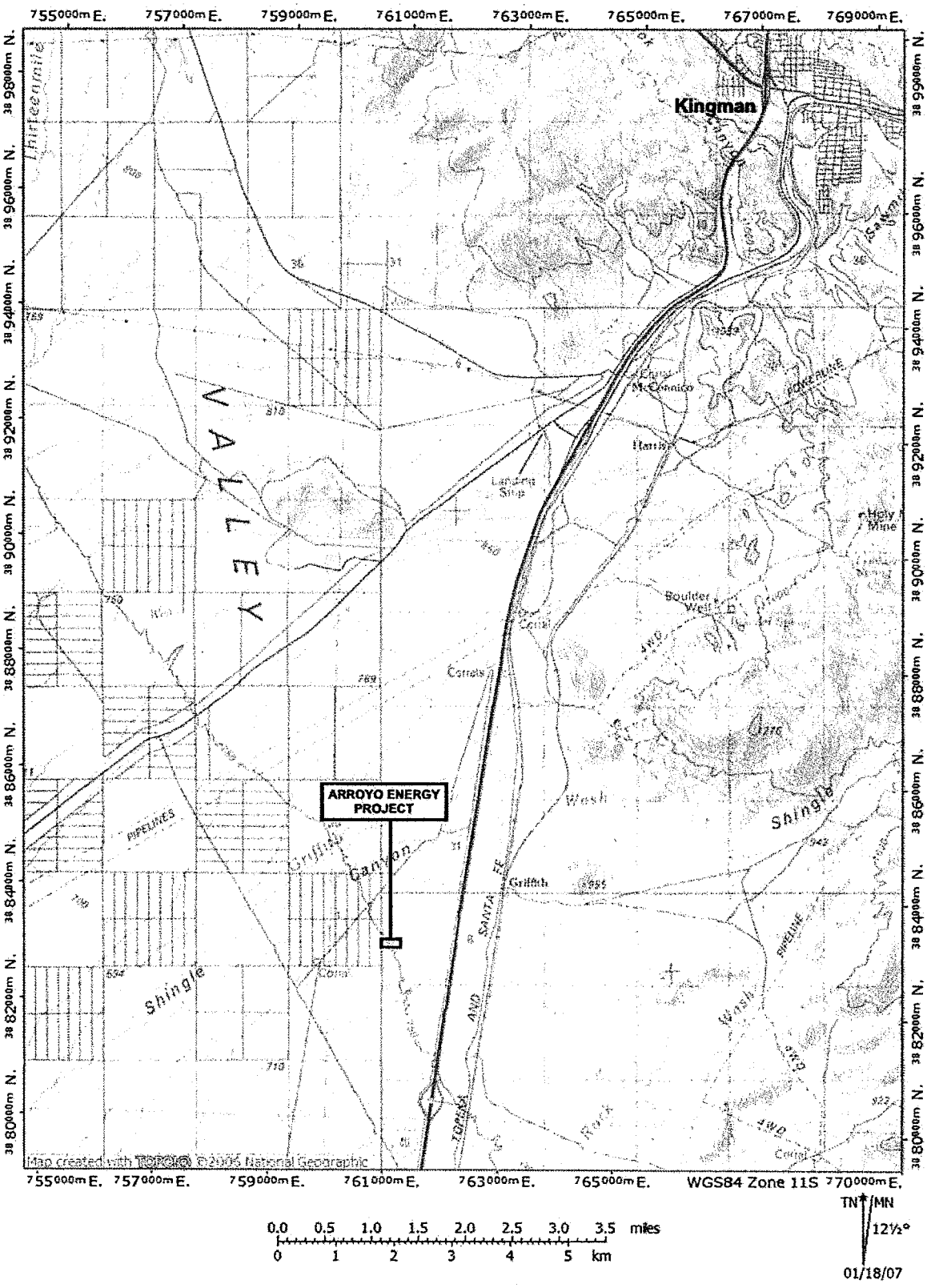
USEPA, 1990. New Source Review Workshop Manual — Draft. Office of Air Quality Planning and Standards, Research Triangle Park, NC.

USEPA, 1992. Procedures for Substituting Values for Missing NWS Meteorological Data for Use in Regulatory Air Quality Models. Dennis Atkinson and Russell F. Lee, Office of Air Quality Planning and Standards, Research Triangle Park, NC. July 7, 1992.

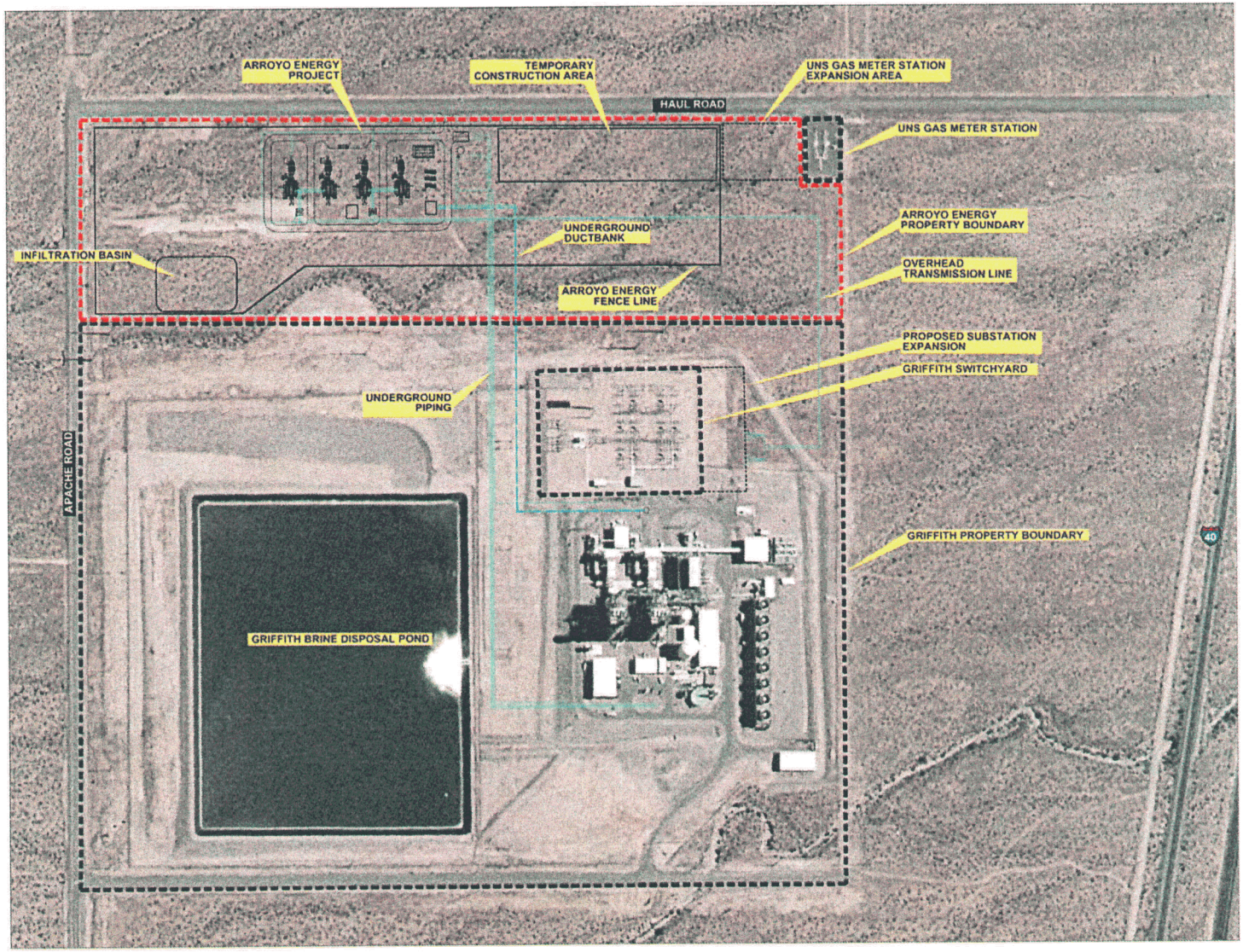
USEPA, 1995. Supplement C to the Guideline on Air Quality Models (revised). Office of Air Quality Planning and Standards, Research Triangle Park, NC.

USEPA, 2003. 40 CFR Part 51, Appendix W. Guideline on Air Quality Models. Last update 5/13/2003.

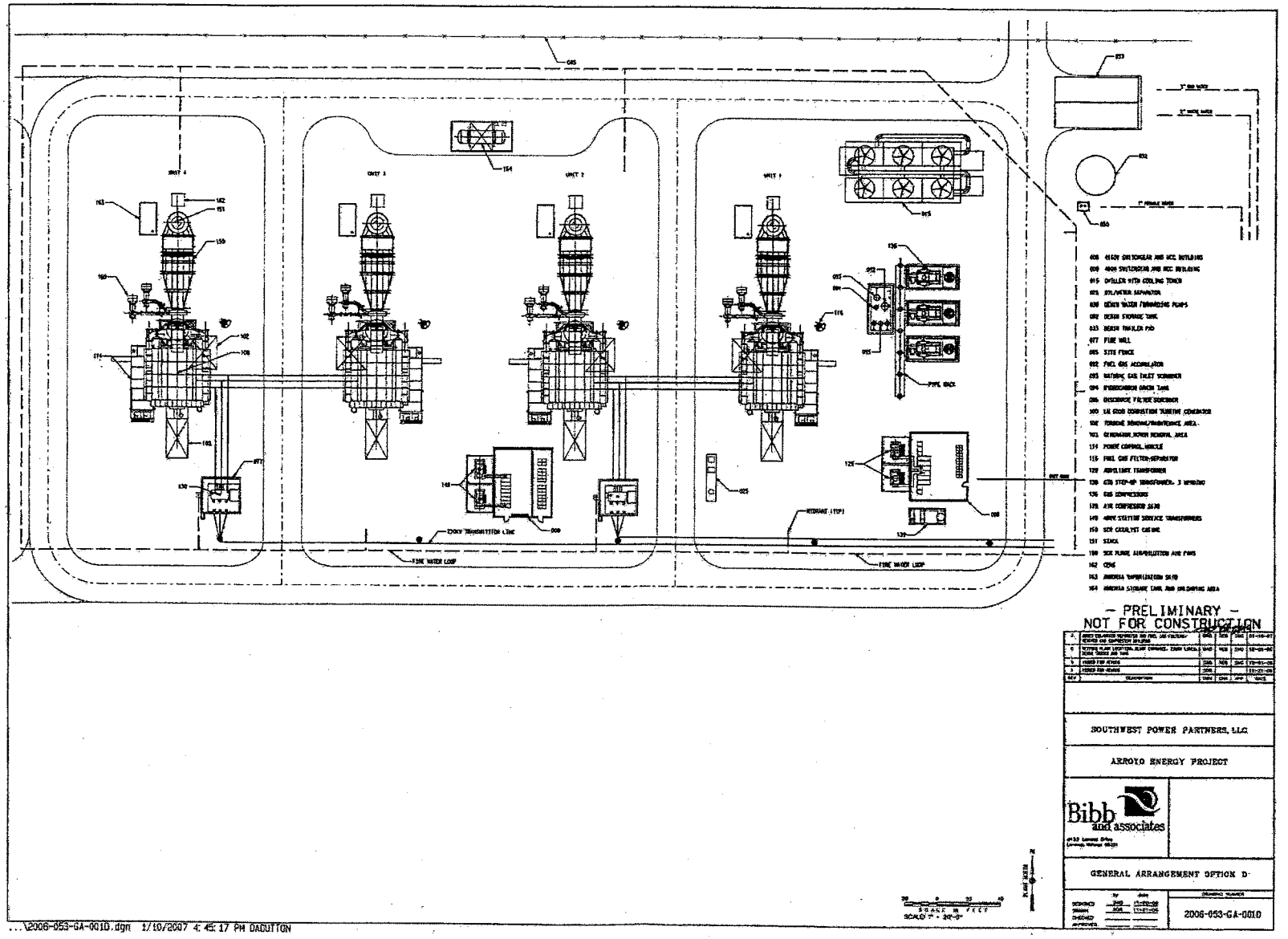
Attachment 1
Regional View of the Project Location

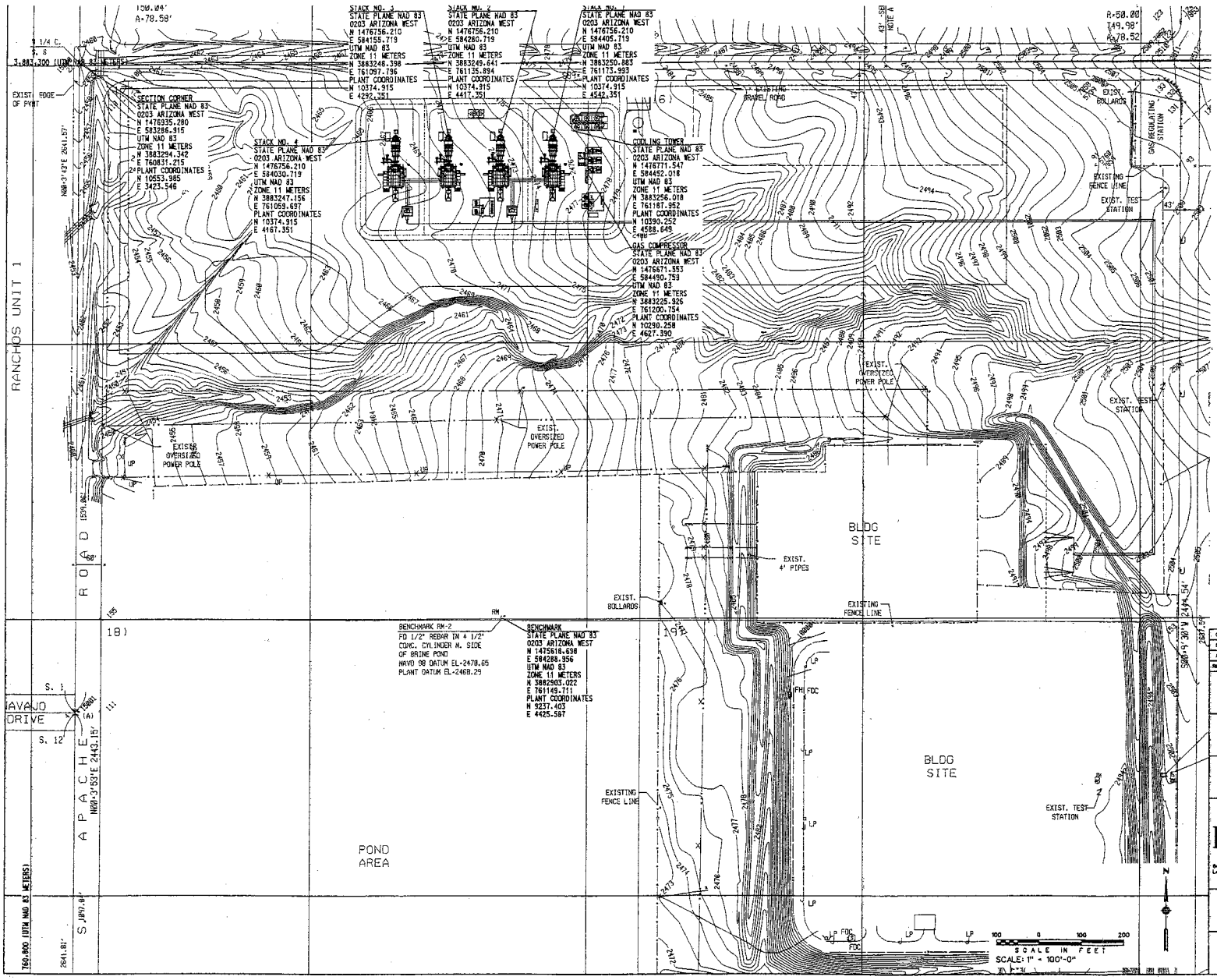


Attachment 2
Aerial View of the Arroyo Energy Project Site



Attachment 3
Detailed Facility Plot Plan





- PRELIMINARY -
NOT FOR CONSTRUCTION

REV	DESCRIPTION	DWN	CHK	APP	DATE
C	CHANGED PROJECT NAME	SMC	ROD	SMG	03-14-07
B	COORDINATES MODIFIED USING NAD 83, INSTEAD OF NAD 27	SMC	ROD	SMG	02-13-07
A	ISSUED FOR PERMIT	SMC	ROD	SMG	02-02-07

SOUTHWEST POWER PARTNERS, LLC

NORTHERN ARIZONA ENERGY PROJECT

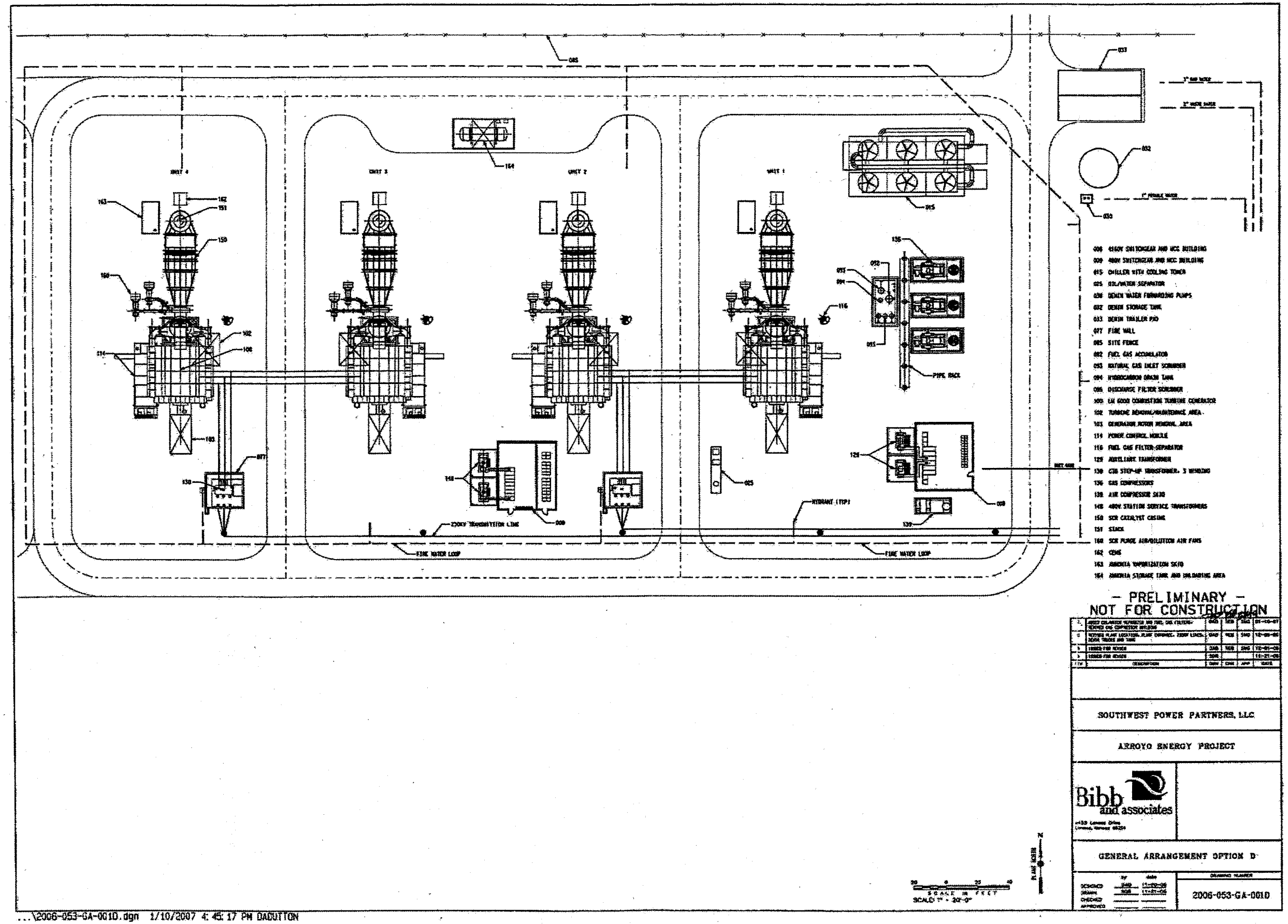
Bibb and associates
8455 Lenexa Drive
Lenexa, Kansas 66214

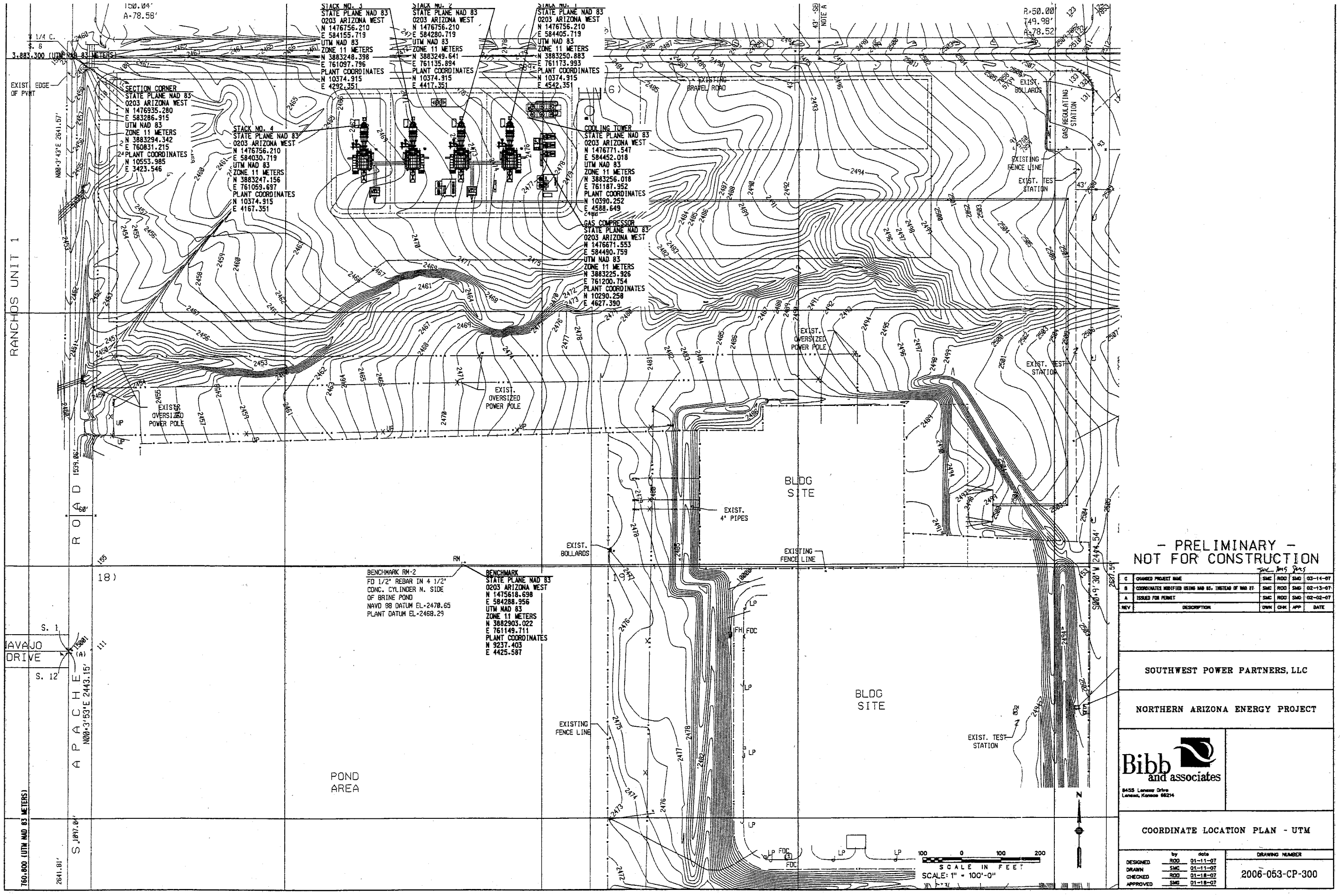
COORDINATE LOCATION PLAN - UTM

	by	date
DESIGNED	ROD	01-11-07
DRAWN	SMC	01-11-07
CHECKED	ROD	01-18-07
APPROVED	SMG	01-18-07

DRAWING NUMBER
2006-053-CP-300

Attachment 3
Detailed Facility Plot Plan





- PRELIMINARY -
NOT FOR CONSTRUCTION

REV	DESCRIPTION	DWN	CHK	APP	DATE
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SOUTHWEST POWER PARTNERS, LLC

NORTHERN ARIZONA ENERGY PROJECT

Bibb and associates
8455 Lenexa Drive
Lenexa, Kansas 66214

COORDINATE LOCATION PLAN - UTM

	by	date
DESIGNED	RDD	01-11-07
DRAWN	SMC	01-11-07
CHECKED	RDD	01-18-07
APPROVED	SMG	01-18-07

DRAWING NUMBER
2006-053-CP-300

APPENDIX D

VENDOR-SUPPLIED INFORMATION

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

Performance By: **REBROWN**
Project Info: **Arroyo Energy Project**

Date: **11/28/2006**
Time: **11:54:31 AM**
Version: **3.4.7**

Engine: **LM6000 PC-SPRINT w/ FIGV at -5 Degrees**
Deck Info: **GE125M - Multiple Cardpacks being used, See Cardpack Row Below**
Generator: **BDAX 290ERT 60Hz, 13.8kV, 0.9PF (14839)**
Fuel: **Site Gas Fuel#900-774T, 20443 Btu/lb,LHV**

	Base Load			50% Load		
	Hot	Summer Avg	Cold	Hot	Summer Avg	Cold
Case #	**1**	**2**	**3**	**4**	**5**	**6**
Ambient Conditions						
Dry Bulb, °F	113.0	90.0	25.0	113.0	90.0	25.0
Wet Bulb, °F	74.0	70.0	22.0	74.0	70.0	22.0
RH, %	16.5	38.3	64.4	16.5	38.3	64.4
Altitude, ft	2490.0	2490.0	2490.0	2490.0	2490.0	2490.0
Ambient Pressure, psia	13.421	13.421	13.421	13.421	13.421	13.421
Engine Inlet						
Comp Inlet Temp, °F	48.0	48.0	25.0	48.0	48.0	25.0
RH, %	95.0	95.0	64.4	95.0	95.0	64.4
Conditioning	CHILL	CHILL	NONE	CHILL	CHILL	NONE
Tons or kBtu/hr	1608	1311	0	1598	1303	0
Pressure Losses						
Inlet Loss, inH20	5.00	5.00	5.00	5.00	5.00	5.00
Volute Loss, inH20	4.00	4.00	4.00	4.00	4.00	4.00
Exhaust Loss, inH20	12.00	12.00	12.00	12.00	12.00	12.00
kW, Gen Terms	**45702**	**45702**	**46822**	**22851**	**22851**	**23411**
Est. Btu/kW-hr, LHV	**8530**	**8530**	**8395**	**10385**	**10385**	**10148**
Fuel Flow						
MMBtu/hr, LHV	389.8	389.8	393.1	237.3	237.3	237.6
lb/hr	19068	19068	19228	11608	11608	11621
scf/hr	426,011	426,011	429,617	259,344	259,344	259,672
NOx Control	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Water Injection						
lb/hr	20586	20586	21524	8634	8634	9256
Temperature, °F	100.0	100.0	100.0	100.0	100.0	100.0
SPRINT	**LPC**	**LPC**	**OFF**	**LPC**	**LPC**	**OFF**
lb/hr	3905	3905	0	3905	3905	0

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

Performance By: **REBROWN**
Project Info: **Arroyo Energy Project**

Date: **11/28/2006**
Time: **11:54:31 AM**
Version: **3.4.7**

Engine: **LM6000 PC-SPRINT w/ FIGV at -5 Degrees**
Deck Info: **GE125M - Multiple Cardpacks being used, See Cardpack Row Below**
Generator: **BDAX 290ERT 60Hz, 13.8kV, 0.9PF (14839)**
Fuel: **Site Gas Fuel#900-774T, 20443 Btu/lb,LHV**

	Base Load			50% Load		
	Hot	Summer Avg	Cold	Hot	Summer Avg	Cold
Case #	**1**	**2**	**3**	**4**	**5**	**6**
Control Parameters						
HP Speed, RPM	10522	10522	10393	9673	9673	9584
LP Speed, RPM	3600	3600	3600	3600	3600	3600
PS3 - CDP, psia	422.8	422.8	437.0	311.0	311.0	325.3
T3CRF - CDT, °F	998	998	983	853	853	844
T48IN, °R	2040	2040	2002	1778	1778	1730
T48IN, °F	1580	1580	1542	1318	1318	1270
Exhaust Parameters						
Temperature, °F	829.1	829.1	792.3	721.4	721.4	674.6
lb/sec	274.7	274.7	287.6	218.2	218.2	232.2
lb/hr	988896	988896	1035476	785469	785469	835954
Energy, Btu/s- ref 0 °R	91662	91662	92252	65342	65342	66039
Cp, Btu/lb-R	0.2766	0.2766	0.2726	0.2677	0.2677	0.2635
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)						
NOx ppmvd Ref 15% O2	25	25	25	25	25	25
NOx as NO2, lb/hr	39	39	39	24	24	24
CO ppmvd Ref 15% O2	24	24	40	23	23	36
CO, lb/hr	22.91	22.91	38.03	13.22	13.22	21.07
CO2, lb/hr	51423.92	51423.92	51644.95	31397.25	31397.25	31319.54
HC ppmvd Ref 15% O2	3	3	5	2	2	4
HC, lb/hr	1.41	1.41	2.47	0.81	0.81	1.36
SOX as SO2, lb/hr	6.10	6.10	6.15	3.71	3.71	3.72
* Assumed max sulfur, grains/100 scf	5.00	5.00	5.00	5.00	5.00	5.00
VOC ppmvd Ref 15% O2	2.0	2.0	3.0	2.0	2.0	2.4
VOC, lb/hr	0.9	0.9	1.5	0.8	0.8	0.8
Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)						
AR	1.2271	1.2271	1.2349	1.2455	1.2455	1.2533
N2	71.9598	71.9598	72.4123	73.0366	73.0366	73.4946
O2	14.7213	14.7213	15.1602	16.7626	16.7626	17.2583
CO2	5.2001	5.2001	4.9876	3.9973	3.9973	3.7466
H20	6.8865	6.8865	6.1986	4.9541	4.9541	4.2425
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0023	0.0023	0.0037	0.0017	0.0017	0.0025
HC	0.0001	0.0001	0.0002	0.0001	0.0001	0.0002
NOX	0.0027	0.0027	0.0026	0.0021	0.0021	0.0020

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

Performance By: **REBROWN**
Project Info: **Arroyo Energy Project**

Date: **11/28/2006**
Time: **11:54:31 AM**
Version: **3.4.7**

Engine: **LM6000 PC-SPRINT w/ FIGV at -5 Degrees**
Deck Info: **GE125M - Multiple Cardpacks being used, See Cardpack Row Below**
Generator: **BDAX 290ERT 60Hz, 13.8kV, 0.9PF (14839)**
Fuel: **Site Gas Fuel#900-774T, 20443 Btu/lb,LHV**

	Base Load			50% Load		
	Hot	Summer Avg	Cold	Hot	Summer Avg	Cold
Case #	**1**	**2**	**3**	**4**	**5**	**6**
Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)						
AR	0.9666	0.9666	0.9650	0.9584	0.9584	0.9567
N2	80.8321	80.8321	80.6983	80.1422	80.1422	79.9964
O2	14.4774	14.4774	14.7914	16.1033	16.1033	16.4462
CO2	3.7183	3.7183	3.5381	2.7920	2.7920	2.5959
H20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0026	0.0026	0.0041	0.0019	0.0019	0.0027
HC	0.0003	0.0003	0.0005	0.0002	0.0002	0.0003
NOX	0.0027	0.0027	0.0026	0.0020	0.0020	0.0019
Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)						
AR	0.8629	0.8629	0.8714	0.8837	0.8837	0.8926
N2	72.1528	72.1528	72.8705	73.8956	73.8956	74.6368
O2	12.9229	12.9229	13.3566	14.8482	14.8482	15.3443
CO2	3.3190	3.3190	3.1949	2.5744	2.5744	2.4219
H20	10.7374	10.7374	9.7001	7.7944	7.7944	6.6998
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0023	0.0023	0.0037	0.0017	0.0017	0.0026
HC	0.0003	0.0003	0.0004	0.0002	0.0002	0.0003
NOX	0.0024	0.0024	0.0023	0.0019	0.0019	0.0018

Aero Energy Fuel Number	**900-774 (Design Gas)**	
	Volume %	**Weight %**
Hydrogen	0.0000	0.0000
Methane	96.0700	91.0132
Ethane	1.4900	2.6458
Ethylene	0.0000	0.0000
Propane	0.3300	0.8593
Propylene	0.0000	0.0000
Butane	0.1200	0.4119
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.0300	0.1278
Cyclopentane	0.0000	0.0000
Hexane	0.0300	0.1527
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	1.6900	4.3923

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

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Time: **11:54:31 AM**
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Fuel: **Site Gas Fuel#900-774T, 20443 Btu/lb,LHV**

	Base Load			50% Load		
	Hot	Summer Avg	Cold	Hot	Summer Avg	Cold
Case #	**1**	**2**	**3**	**4**	**5**	**6**
Nitrogen	0.2400	0.3970				
Water Vapor	0.0000	0.0000				
Oxygen	0.0000	0.0000				
Hydrogen Sulfide	0.0000	0.0000				
Ammonia	0.0000	0.0000				
Btu/lb, LHV	20443					
Btu/scf, LHV	915					
Btu/scf, HHV	1014					
Btu/lb, HHV	22666					
Fuel Temp, °F	100.0					
NOx Scalar	0.981					
Specific Gravity	0.58					
Engine Exhaust						
Exhaust MW	28.1	28.1	28.2	28.3	28.3	28.4
Inlet Flow Wet, pps	266.0	266.0	279.5	264.4	264.4	274.1
Inlet Flow Dry, pps	264.1	264.1	279.0	262.5	262.5	273.6
Shaft HP	62383	62383	63903	31453	31453	32209
Generator Information						
Capacity kW	64115	55225	72280	47526	55225	72280
Efficiency	0.975	0.982	0.983	0.974	0.974	0.975
Inlet Temp, °F	113.0	90.0	25.0	113.0	90.0	25.0
Gear Box Loss	N/A	N/A	N/A	N/A	N/A	N/A
TRQ48, Torque Limit Cold End	112560	112560	116273	67954	67954	71282
Correct Control Parameters						
PS3JQA, psia	428.569	428.569	442.962	315.243	315.243	329.738
XN25R3, rpm	6282	6282	6238	6062	6062	6024
8th Stage Bleed						
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000
Temperature, °R	0	0	0	0	0	0

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Fuel: **Site Gas Fuel#900-774T, 20443 Btu/lb,LHV**

	Base Load			50% Load		
	Hot	Summer Avg	Cold	Hot	Summer Avg	Cold
Case #	**1**	**2**	**3**	**4**	**5**	**6**
CDP Bleed						
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000
Est. Gas Pressure at Baseplate, psia	**563.6**	**563.6**	**576.2**	**391.0**	**391.0**	**402.6**
CardPack	**88u**	**88u**	**88v**	**88u**	**88u**	**88v**
Exhaust CardPack	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**
NSI	**304**	**304**	**315**	**0**	**0**	**0**
NSI	**0**	**0**	**0**	**0**	**0**	**0**
NSI	**0**	**0**	**0**	**0**	**0**	**0**

Certificate of Analysis

SINCE 1985

Quality Controlled Through Analysis

10630 FALLSTONE RD. HOUSTON, TEXAS 77099
P.O. BOX 741905, HOUSTON, TEXAS 77274

TEL: (281) 495-2400
FAX: (281) 495-2410

CLIENT:	Griffith Energy Project	**REQUESTED BY:**	Mr. Brian Henderson
SAMPLE:	Natural Gas Sample CT # 1 (Golden Valley, AZ)	**REPORT DATE:**	October 18, 2006
LABORATORY NO:	43161-01	**PURCHASE ORDER NO:**	Pending

TEST **RESULTS**

Composition of Natural Gas by Gas Chromatography, ASTM D 1945:

TEST	***Mol %***
Nitrogen	0.314
Hydrogen	0.081
Oxygen	0.004
Carbon dioxide	1.681
Carbon Monoxide	0.000
Methane	95.979
Ethane	1.422
Propane	0.338
Iso-butane	0.060
N-butane	0.059
Iso-Pentane	0.019
N-pentane	0.012
Hexanes Plus	0.031
TOTAL	**100.000**

Caloric Value and Specific Gravity of Gases, ASTM D 3588:

Specific Gravity at 60°F (air=1)	0.5844

Calculated B.T.U./cu.ft. @ 14.650 psia and 60°F

NET (Dry basis)	909.6
Gross (Dry basis)	1,009.9

Calculated B.T.U./lb.

NET (Dry basis)	20,396.4
Gross (Dry basis)	22,646.8

Total Sulfur by Microcoulometer, ASTM D 3246, ppm	<1.0
Total Sulfur by Microcoulometer, ASTM D 3246, Grains/100Scf.....	<0.032
Organically Bound nitrogen by Chemiluminesence, ASTM D 4629, ppm	2.3

Respectfully submitted
FOR TEXAS OILTECH LABORATORIES, L.P.

A. Phil Sorurbakhsh
Director of Laboratory Operations

These analyses, opinions or interpretations are based on material supplied by the client to whom, and for whose exclusive and confidential use this report is made. Texas Oiltech Laboratories, Inc. and its officers assume no responsibility and make no warranty for proper operations of any petroleum, oil, gas or any other material in connection with which this report is used or relied on.

Cert. No. 5085

Certificate of Analysis

SINCE 1985

Quality Controlled Through Analysis

10630 FALLSTONE RD. HOUSTON, TEXAS 77099
P.O. BOX 741905, HOUSTON, TEXAS 77274

TEL: (281) 495-2400
FAX: (281) 495-2410

CLIENT:	Griffith Energy Project	**REQUESTED BY:**	Mr. Brian Henderson
SAMPLE:	Natural Gas Sample CT # 2 (Golden Valley, AZ)	**REPORT DATE:**	October 18, 2006
LABORATORY NO:	43161-02	**PURCHASE ORDER NO:**	Pending

TEST **RESULTS**

Composition of Natural Gas by Gas Chromatography, ASTM D 1945:

TEST	***Mol %***
Nitrogen	0.312
Hydrogen	0.074
Oxygen	0.009
Carbon dioxide	1.676
Carbon Monoxide	0.000
Methane	95.974
Ethane	1.423
Propane	0.340
Iso-butane	0.061
N-butane	0.060
Iso-Pentane	0.020
N-pentane	0.013
Hexanes Plus	0.038
TOTAL	**100.000**

Caloric Value and Specific Gravity of Gases, ASTM D 3588:

Specific Gravity at 60°F (air=1)	0.5846

Calculated B.T.U./cu.ft. @ 14.650 psia and 60°F

NET (**Dry basis**)	910.0
Gross (**Dry basis**)	1,010.4

Calculated B.T.U./lb.

NET (**Dry basis**)	20,397.2
Gross (**Dry basis**)	22,647.4

Total Sulfur by Microcoulometer, ASTM D 3246, ppm	<1.0
Total Sulfur by Microcoulometer, ASTM D 3246, Grains/100Scf.....	<0.032
Organically Bound nitrogen by Chemiluminesence, ASTM D 4629, ppm	2.2

Respectfully submitted
FOR TEXAS OILTECH LABORATORIES, L.P.

A. Phil Sorurbakhsh
Director of Laboratory Operations

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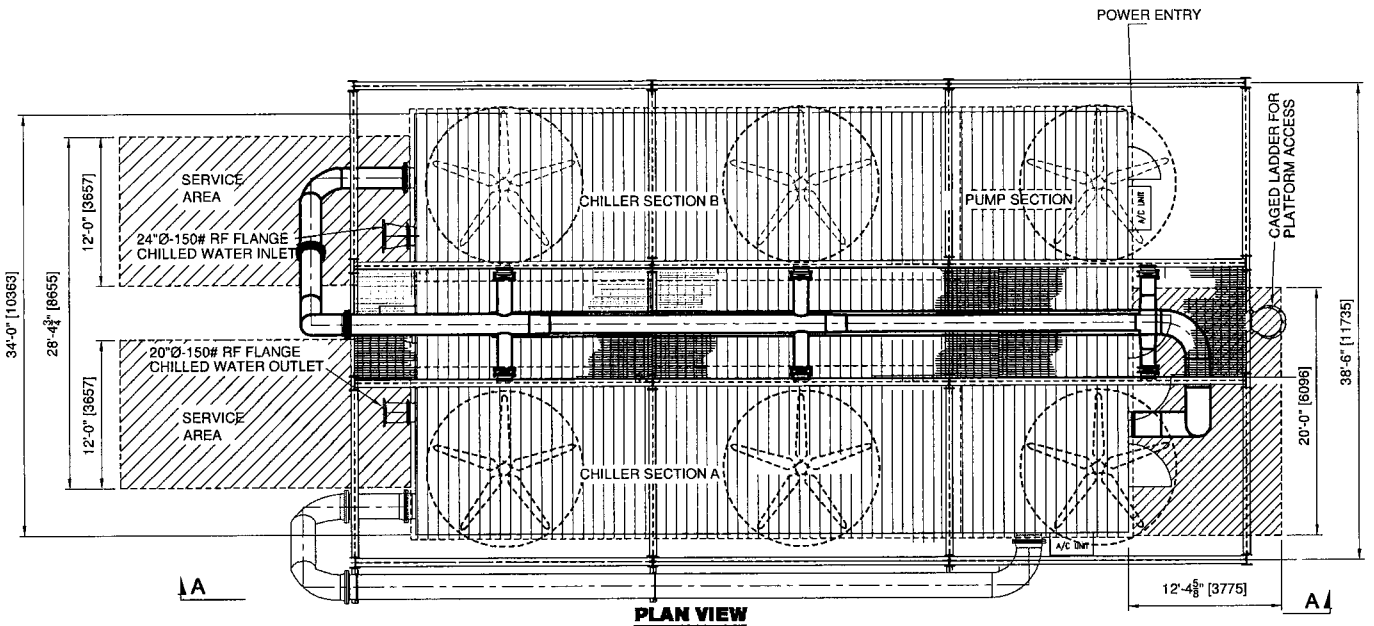
Cert. No. 5085

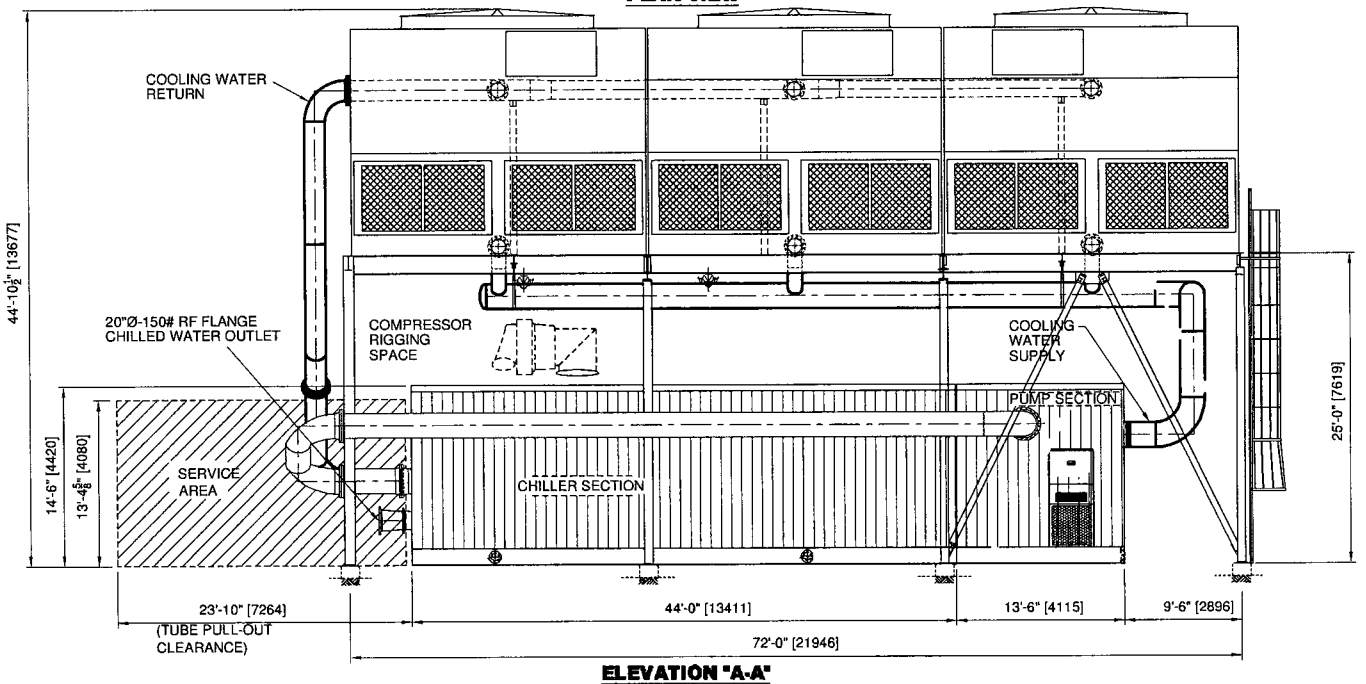
MODELS G-60C & G-70C

Water-Cooled Series Super-Duplex Centrifugal Compressor System
Available in 60 Hz only

Nominal Capacity:	5300 to 8000 Tons (18,639 to 28134 KWth)
Nominal Parasitics:	0.690 kw/ton (COP: 5.10)
Maximum Flow Rate:	8,800 gpm (555 L/s)



PLAN VIEW



ELEVATION "A-A"

EQUIPMENT		SHIPPING WEIGHT, LB (KG.)		SHIPPING DIMENSIONS, FT. [MM]		
ITEM	QTY.	UNIT WT.	TOTAL WEIGHT	LENGTH	WIDTH	HEIGHT
CHILLER SECTION	2	125,000 (56,818)	250,000 (113,636)	44'-0" [13411]	13'-6" [4115]	13'-6" [4115]
PUMP SECTION	1	85,000 (38,636)	85,000 (38,636)	34'-0" [10363]	13'-6" [4115]	13'-6" [4115]
WALKWAY SKID	1	12,000 (5,455)	12,000 (5,455)	44'-0" [13411]	7'-0" [2133]	1'-4" [406]
CT UPPER SECTION	6	13,660 (6,209)	81,960 (37,255)	24'-0" [7315]	14'-0" [4267]	11'-8" [3558]
CT LOWER SECTION	6	7,180 (3,264)	43,080 (19,582)	24'-0" [7315]	14'-0" [4267]	8'-3" [2514]
CT STRUCTURE	LOT	70,000 (31,818)	70,000 (31,818)	PALLETIZED AND SHIPPED IN TWO 40-FT TRAILER		
CT EXT. PIPING	LOT	15,000 (6,818)	15,000 (6,818)	PALLETIZED AND SHIPPED IN TWO 40-FT TRAILER		

EST. FOUNDATION WEIGHTS, LB (KG.)	
ITEM	OPERATING WEIGHT
CHILLER/PUMP SKID	400,000 (181,800)
CT, STRUCT. & PIPING	370,000 (168,200)

NOTES:
1. WEIGHTS SHOWN ARE ESTIMATED ONLY.
2. THIS DWG. NOT TO BE USED FOR CONSTRUCTION.
3. DIMENSIONS SHOWN IN [ ] ARE IN MILLIMETERS.

RELEASED DATE: 09/02/04 -- 2:16pm

APPENDIX E

ACID RAIN PERMIT APPLICATION FORM

United States
Environmental Protection Agency
Acid Rain Program

OMB No. 2060-0258

Acid Rain Permit Application

For more information, see instructions and refer to 40 CFR 72.30 and 72.31

This submission is: [X] New [ ] Revised

Plant Name	State	ORIS Code
Northern Arizona Energy Project	AZ	56507

STEP 1

Identify the source by plant name, State, and ORIS code.

STEP 2

Enter the unit ID# for every affected unit at the affected source in column "a." For new units, enter the requested information in columns "c" and "d."

a	b	c	D
Unit ID#	Unit Will Hold Allowances in Accordance with 40 CFR 72.9(c)(1)	New Units Commence Operation Date	New Units Monitor Certification Deadline
CT1	Yes	05/31/08	11/31/08
CT2	Yes	05/31/08	11/31/08
CT3	Yes	05/31/08	11/31/08
CT4	Yes	05/31/08	11/31/08
	Yes		
	Yes		
	Yes		
	Yes		
	Yes		
	Yes		
	Yes		
	Yes Yes Yes Yes Yes		

STEP 3

Read the standard requirements

Permit Requirements

(1) The designated representative of each affected source and each affected unit at the source shall:
(i) Submit a complete Acid Rain permit application (including a compliance plan) under 40 CFR part 72 in accordance with the deadlines specified in 40 CFR 72.30; and
(ii) Submit in a timely manner any supplemental information that the permitting authority determines is necessary in order to review an Acid Rain permit application and issue or deny an Acid Rain permit;
(2) The owners and operators of each affected source and each affected unit at the source shall:
(i) Operate the unit in compliance with a complete Acid Rain permit application or a superseding Acid Rain permit issued by the permitting authority; and
(ii) Have an Acid Rain Permit.

Monitoring Requirements

(1) The owners and operators and, to the extent applicable, designated representative of each affected source and each affected unit at the source shall comply with the monitoring requirements as provided in 40 CFR part 75.
(2) The emissions measurements recorded and reported in accordance with 40 CFR part 75 shall be used to determine compliance by the unit with the Acid Rain emissions limitations and emissions reduction requirements for sulfur dioxide and nitrogen oxides under the Acid Rain Program.
(3) The requirements of 40 CFR part 75 shall not affect the responsibility of the owners and operators to monitor emissions of other pollutants or other emissions characteristics at the unit under other applicable requirements of the Act and other provisions of the operating permit for the source.

Sulfur Dioxide Requirements

(1) The owners and operators of each source and each affected unit at the source shall:
(i) Hold allowances, as of the allowance transfer deadline, in the unit's compliance subaccount (after deductions under 40 CFR 73.34(c)), or in the compliance subaccount of another affected unit at the same source to the extent provided in 40 CFR 73.35(b)(3), not less than the total annual emissions of sulfur dioxide for the previous calendar year from the unit; and
(ii) Comply with the applicable Acid Rain emissions limitations for sulfur dioxide.
(2) Each ton of sulfur dioxide emitted in excess of the Acid Rain emissions limitations for sulfur dioxide shall constitute a separate violation of the Act.
(3) An affected unit shall be subject to the requirements under paragraph (1) of the sulfur dioxide requirements as follows:
(i) Starting January 1, 2000, an affected unit under 40 CFR 72.6(a)(2); or
(ii) Starting on the later of January 1, 2000 or the deadline for monitor certification under 40 CFR part 75, an affected unit under 40 CFR 72.6(a)(3).
(4) Allowances shall be held in, deducted from, or transferred among Allowance Tracking System accounts in accordance with the Acid Rain Program.
(5) An allowance shall not be deducted in order to comply with the requirements under paragraph (1) of the sulfur dioxide requirements prior to the calendar year for which the allowance was allocated.
(6) An allowance allocated by the Administrator under the Acid Rain Program is a limited authorization to emit sulfur dioxide in accordance with the Acid Rain Program. No provision of the Acid Rain Program, the Acid Rain permit application, the Acid Rain permit, or an exemption under 40 CFR 72.7 or 72.8 and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization.
(7) An allowance allocated by the Administrator under the Acid Rain Program does not constitute a property right.

STEP 3, Cont'd.

Nitrogen Oxides Requirements The owners and operators of the source and each affected unit at the source shall comply with the applicable Acid Rain emissions limitation for nitrogen oxides.

Excess Emissions Requirements

(1) The designated representative of an affected unit that has excess emissions in any calendar year shall submit a proposed offset plan, as required under 40 CFR part 77.
(2) The owners and operators of an affected unit that has excess emissions in any calendar year shall:
(i) Pay without demand the penalty required, and pay upon demand the interest on that penalty, as required by 40 CFR part 77; and
(ii) Comply with the terms of an approved offset plan, as required by 40 CFR part 77.

Recordkeeping and Reporting Requirements

(1)Unless otherwise provided, the owners and operators of the source and each affected unit at the source shall keep on site at the source each of the following documents for a period of 5 years from the date the document is created. This period may be extended for cause, at any time prior to the end of 5 years, in writing by the Administrator or permitting authority:
(i) The certificate of representation for the designated representative for the source and each affected unit at the source and all documents that demonstrate the truth of the statements in the certificate of representation, in accordance with 40 CFR 72.24; provided that the certificate and documents shall be retained on site at the source beyond such 5-year period until such documents are superseded because of the submission of a new certificate of representation changing the designated representative;
(ii) All emissions monitoring information, in accordance with 40 CFR part 75, provided that to the extent that 40 CFR part 75 provides for a 3-year period for recordkeeping, the 3-year period shall apply.
(iii) Copies of all reports, compliance certifications, and other submissions and all records made or required under the Acid Rain Program; and,
(iv) Copies of all documents used to complete an Acid Rain permit application and any other submission under the Acid Rain Program or to demonstrate compliance with the requirements of the Acid Rain Program.
(2)The designated representative of an affected source and each affected unit at the source shall submit the reports and compliance certifications required under the Acid Rain Program, including those under 40 CFR part 72 subpart I and 40 CFR part 75.

Liability

(1) Any person who knowingly violates any requirement or prohibition of the Acid Rain Program, a complete Acid Rain permit application, an Acid Rain permit, or an exemption under 40 CFR 72.7 or 72.8, including any requirement for the payment of any penalty owed to the United States, shall be subject to enforcement pursuant to section 113(c) of the Act.
(2) Any person who knowingly makes a false, material statement in any record, submission, or report under the Acid Rain Program shall be subject to criminal enforcement pursuant to section 113(c) of the Act and 18 U.S.C. 1001.
(3) No permit revision shall excuse any violation of the requirements of the Acid Rain Program that occurs prior to the date that the revision takes effect.
(4) Each affected source and each affected unit shall meet the requirements of the Acid Rain Program.

Step 3, Cont'd.

Liability, Cont'd.

(5) Any provision of the Acid Rain Program that applies to an affected source (including a provision applicable to the designated representative of an affected source) shall also apply to the owners and operators of such source and of the affected units at the source.
(6) Any provision of the Acid Rain Program that applies to an affected unit (including a provision applicable to the designated representative of an affected unit) shall also apply to the owners and operators of such unit. Except as provided under 40 CFR 72.44 (Phase II repowering extension plans) and 40 CFR 76.11 (NO_x averaging plans), and except with regard to the requirements applicable to units with a common stack under 40 CFR part 75 (including 40 CFR 75.16, 75.17, and 75.18), the owners and operators and the designated representative of one affected unit shall not be liable for any violation by any other affected unit of which they are not owners or operators or the designated representative and that is located at a source of which they are not owners or operators or the designated representative.
(7) Each violation of a provision of 40 CFR parts 72, 73, 74, 75, 76, 77, and 78 by an affected source or affected unit, or by an owner or operator or designated representative of such source or unit, shall be a separate violation of the Act.

Effect on Other Authorities

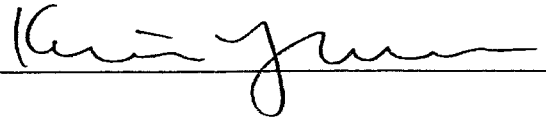
No provision of the Acid Rain Program, an Acid Rain permit application, an Acid Rain permit, or an exemption under 40 CFR 72.7 or 72.8 shall be construed as:
(1) Except as expressly provided in title IV of the Act, exempting or excluding the owners and operators and, to the extent applicable, the designated representative of an affected source or affected unit from compliance with any other provision of the Act, including the provisions of title I of the Act relating to applicable National Ambient Air Quality Standards or State Implementation Plans;
(2) Limiting the number of allowances a unit can hold; *provided*, that the number of allowances held by the unit shall not affect the source's obligation to comply with any other provisions of the Act;
(3) Requiring a change of any kind in any State law regulating electric utility rates and charges, affecting any State law regarding such State regulation, or limiting such State regulation, including any prudence review requirements under such State law;
(4) Modifying the Federal Power Act or affecting the authority of the Federal Energy Regulatory Commission under the Federal Power Act; or,
(5) Interfering with or impairing any program for competitive bidding for power supply in a State in which such program is established.

STEP 4

Read the certification statement, sign, and date

Certification

I am authorized to make this submission on behalf of the owners and operators of the affected source or affected units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Name Kevin R. Johnson	
Signature 	Date March 23, 2007

EPA

Acid Rain Program

Instructions for Acid Rain

Permit Application (40 CFR 72.30- 72.31)

The Acid Rain Program requires the designated representative to submit an Acid Rain permit application for each source with an affected unit. A complete Certificate of Representation must be received by EPA before the permit application is submitted to the title V permitting authority. A complete Acid Rain permit application, once submitted, is binding on the owners and operators of the affected source and is enforceable in the absence of a permit until the title V permitting authority either issues a permit to the source or disapproves the application.

Please type or print. The alternate designated representative may sign in lieu of the designated representative. If assistance is needed, contact the title V permitting authority.

STEP 1 Use the plant name and ORIS Code listed on the Certificate of Representation for the plant. An ORIS code is a 4 digit number assigned by the Energy Information Agency (EIA) at the U.S. Department of Energy to power plants owned by utilities. If the plant is not owned by a utility but has a 5 digit facility code (also assigned by EIA), use the facility code. If no code has been assigned or if there is uncertainty regarding what the code number is, contact EIA at (202) 287-1730 (for ORIS codes), or (202) 287-1927 (for facility codes).

STEP 2 For column "a," identify each affected unit at the affected source by providing the appropriate unit identification numbers, consistent with the unit identification numbers entered on the Certificate of Representation and with unit identification numbers used in reporting to DOE and/or EIA. For new units without identification numbers, owners and operators may assign such numbers consistent with EIA and DOE requirements.

For columns "c" and "d," enter the commence operation date(s) and monitor certification deadline(s) for new units in accordance with 40 CFR 72.2 and 75.4, respectively.

Submission Deadlines

For new units, an initial Acid Rain permit application must be submitted to the title V permitting authority 24 months before the date the unit commences operation. Acid Rain permit renewal applications must be submitted at least 6 months in advance of the expiration of the acid rain portion of a title V permit, or such longer time as provided for under the title V permitting authority's operating permits regulation.

Submission Instructions

Submit this form to the appropriate title V permitting authority. If you have questions regarding this form, contact your local, State, or EPA Regional Acid Rain contact, or call EPA's Acid Rain Hotline at (202) 343-9620.

Paperwork Burden Estimate

The burden on the public for collecting and reporting information under this request is estimated at 17 hours per response. Send comments regarding this collection of information, including suggestions for reducing the burden, to: Chief, Information Policy Branch (PM-223), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave. NW, Washington, D.C. 20460; and to: Paperwork Reduction Project (OMB#2060-0258), Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503. ***Do not submit forms to these addresses; see the submission instructions above.***

United States
Environmental Protection Agency
Acid Rain and CAIR Trading Programs

OMB Nos. 2060-0258, 2060-0570, and 2060-0584

Certificate of Representation

For more information, see instructions and 40 CFR 72.24, 40 CFR 96.113, 96.213, or 96.313, or a comparable state regulation under the Clean Air Interstate Rule (CAIR) NO_x Annual, SO_2, and NO_x Ozone Season Trading Programs, or 40 CFR 97.113, 97.213, or 97.313, as applicable.

This submission is: ☒ New ☐ Revised (revised submissions must be complete; see instructions)

FACILITY (SOURCE) INFORMATION

STEP 1
Provide information for the facility (source).

Facility (Source) Name Northern Arizona Energy Project	State AZ	Plant Code 56507
County Name Mohave		
Latitude 350330	Longitude 1140822	

STEP 2
Enter requested information for the designated representative.

Name Kevin R. Johnson	Title Vice President
Company Name Northern Arizona Energy, LLC	
Address 1735 Technology Dr, Ste 820, San Jose, CA 95110	
Phone Number (408) 572-1290	Fax Number (408) 392-9757
E-mail address KJohnson@lspower.com	

STEP 3
Enter requested information for the alternate designated representative.

Name Randall Hickok	Title
Company Name Northern Arizona Energy, LLC	
Address 1735 Technology Dr, Ste 820, San Jose, CA 95110	
Phone Number	Fax Number
E-mail address RHickok@lspower.com	

Facility (Source) Name (from Step 1) Northern Arizona Energy Project

UNIT INFORMATION

STEP 4: **Complete one page for each unit located at the facility identified in STEP 1** (i.e., for each boiler, simple cycle combustion turbine, or combined cycle combustion turbine.) Do not list duct burners. Indicate each program to which the unit is subject, and enter all other unit-specific information, including the name of each owner and operator of the unit and the generator ID number and nameplate capacity of each generator served by the unit. If the unit is subject to a program, then the facility (source) is also subject. (For units subject to the NO_X Budget Trading Program, a separate "Account Certificate of Representation" form must be submitted to meet requirements under that program.)

Applicable Program(s): √ Acid Rain ~ CAIR NO_X Annual ~ CAIR SO_2 ~ CAIR NO_X Ozone Season

CT1 Unit ID#	CT Unit Type	Source Category Small Power Generator NAICS Code 221119	Generator ID Number	Acid Rain Nameplate Capacity (MWe)	CAIR Nameplate Capacity (MWe)
			CTG1	45	
Date unit began (or will begin) serving any generator producing electricity for sale (including test generation) (mm/dd/yyyy): 05/01/2008		Check One: Actual ~ Projected √			

Company Name: Northern Arizona Energy, LLC	√ Owner √ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator

Facility (Source) Name (from Step 1) Northern Arizona Energy Project

UNIT INFORMATION

STEP 4: **Complete one page for each unit located at the facility identified in STEP 1** (i.e., for each boiler, simple cycle combustion turbine, or combined cycle combustion turbine.) Do not list duct burners. Indicate each program to which the unit is subject, and enter all other unit-specific information, including the name of each owner and operator of the unit and the generator ID number and nameplate capacity of each generator served by the unit. If the unit is subject to a program, then the facility (source) is also subject. (For units subject to the NO_X Budget Trading Program, a separate "Account Certificate of Representation" form must be submitted to meet requirements under that program.)

Applicable Program(s): √ Acid Rain ~ CAIR NO_X Annual ~ CAIR SO_2 ~ CAIR NO_X Ozone Season

Unit ID#	Unit Type	Source Category / NAICS Code	Generator ID Number	Acid Rain Nameplate Capacity (MWe)	CAIR Nameplate Capacity (MWe)
CT2	CT	Source Category Small Power Generator	CTG2	45	
		NAICS Code 221119			

Date unit began (or will begin) serving any generator producing electricity for sale (including test generation) (mm/dd/yyyy): 05/01/2008

Check One: Actual ~ Projected √

Company Name: Northern Arizona Energy, LLC	√ Owner √ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator

Facility (Source) Name (from Step 1) Northern Arizona Energy Project

UNIT INFORMATION

STEP 4: Complete one page for each unit located at the facility identified in STEP 1 (i.e., for each boiler, simple cycle combustion turbine, or combined cycle combustion turbine.) Do not list duct burners. Indicate each program to which the unit is subject, and enter all other unit-specific information, including the name of each owner and operator of the unit and the generator ID number and nameplate capacity of each generator served by the unit. If the unit is subject to a program, then the facility (source) is also subject. (For units subject to the NO_X Budget Trading Program, a separate "Account Certificate of Representation" form must be submitted to meet requirements under that program.)

Applicable Program(s): √ Acid Rain ~ CAIR NO_X Annual ~ CAIR SO_2 ~ CAIR NO_X Ozone Season

CT3	CT	Source Category Small Power Generator	Generator ID Number	Acid Rain Nameplate Capacity (MWe)	CAIR Nameplate Capacity (MWe)
			CTG3	45	
Unit ID#	Unit Type	NAICS Code 221119			
Date unit began (or will begin) serving any generator producing electricity for sale (including test generation) (mm/dd/yyyy): 05/01/2008		Check One: Actual ~ Projected √			

Company Name: Northern Arizona Energy, LLC	√ Owner √ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator

Facility (Source) Name (from Step 1) Northern Arizona Energy Project

UNIT INFORMATION

STEP 4: Complete one page for each unit located at the facility identified in STEP 1 (i.e., for each boiler, simple cycle combustion turbine, or combined cycle combustion turbine.) Do not list duct burners. Indicate each program to which the unit is subject, and enter all other unit-specific information, including the name of each owner and operator of the unit and the generator ID number and nameplate capacity of each generator served by the unit. If the unit is subject to a program, then the facility (source) is also subject. (For units subject to the NO_X Budget Trading Program, a separate "Account Certificate of Representation" form must be submitted to meet requirements under that program.)

Applicable Program(s): √ Acid Rain ~ CAIR NO_X Annual ~ CAIR SO_2 ~ CAIR NO_X Ozone Season

CT4	CT	Source Category Small Power Generator	Generator ID Number	Acid Rain Nameplate Capacity (MWe)	CAIR Nameplate Capacity (MWe)
			CTG4	45	
Unit ID#	Unit Type	NAICS Code 221119			
Date unit began (or will begin) serving any generator producing electricity for sale (including test generation) (mm/dd/yyyy): 05/01/2008		Check One: Actual ~ Projected √			

Company Name: Northern Arizona Energy, LLC	√ Owner √ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator
Company Name:	~ Owner ~ Operator

STEP 5: Read the certifications, sign and date.

Acid Rain Program

I certify that I was selected as the designated representative or alternate designated representative (as applicable) by an agreement binding on the owners and operators of the affected source and each affected unit at the source (i.e., the source and each unit subject to the Acid Rain Program, as indicated in "Applicable Program(s)" in Step 4).

I certify that I have all necessary authority to carry out my duties and responsibilities under the Acid Rain Program on behalf of the owners and operators of the affected source and each affected unit at the source and that each such owner and operator shall be fully bound by my representations, actions, inactions, or submissions.

I certify that the owners and operators of the affected source and each affected unit at the source shall be bound by any order issued to me by the Administrator, the permitting authority, or a court regarding the source or unit.

Where there are multiple holders of a legal or equitable title to, or a leasehold interest in, an affected unit, or where a utility or industrial customer purchases power from an affected unit under a life-of-the-unit, firm power contractual arrangement, I certify that:

> I have given a written notice of my selection as the designated representative or alternate designated representative (as applicable) and of the agreement by which I was selected to each owner and operator of the affected source and each affected unit at the source; and
>
> Allowances, and proceeds of transactions involving allowances, will be deemed to be held or distributed in proportion to each holder's legal, equitable, leasehold, or contractual reservation or entitlement, except that, if such multiple holders have expressly provided for a different distribution of allowances, allowances and proceeds of transactions involving allowances will be deemed to be held or distributed in accordance with the contract.

Clean Air Interstate Rule (CAIR) NO_X Annual Trading Program

I certify that I was selected as the CAIR designated representative or alternate CAIR designated representative (as applicable), by an agreement binding on the owners and operators of the CAIR NO_X source and each CAIR NO_X unit at the source (i.e., the source and each unit subject to the CAIR NO_X Annual Trading Program, as indicated in "Applicable Program(s)" in Step 4).

I certify that I have all necessary authority to carry out my duties and responsibilities under the CAIR NO_X Annual Trading Program on behalf of the owners and operators of the CAIR NO_X source and each CAIR NO_X unit at the source and that each such owner and operator shall be fully bound by my representations, actions, inactions, or submissions.

I certify that the owners and operators of the CAIR NO_X source and each CAIR NO_X unit at the source shall be bound by any order issued to me by the Administrator, the permitting authority, or a court regarding the source or unit.

Where there are multiple holders of a legal or equitable title to, or a leasehold interest in, a CAIR NO_X unit, or where a utility or industrial customer purchases power from a CAIR NO_X unit under a life-of-the-unit, firm power contractual arrangement, I certify that:

> I have given a written notice of my selection as the CAIR designated representative or alternate CAIR designated representative (as applicable) and of the agreement by which I was selected to each owner and operator of the CAIR NO_X source and each CAIR NO_X unit at the source; and
>
> CAIR NO_X allowances and proceeds of transactions involving CAIR NO_X allowances will be deemed to be held or distributed in proportion to each holder's legal, equitable, leasehold, or contractual reservation or entitlement, except that, if such multiple holders have expressly provided for a different distribution of CAIR NO_X allowances by contract, CAIR NO_X allowances and proceeds of transactions involving CAIR NO_X allowances will be deemed to be held or distributed in accordance with the contract.

Clean Air Interstate Rule (CAIR) SO_2 Trading Program

I certify that I was selected as the CAIR designated representative or alternate CAIR designated representative (as applicable), by an agreement binding on the owners and operators of the CAIR SO_2 source and each CAIR SO_2 unit at the source (i.e., the source and each unit subject to the SO_2 Trading Program, as indicated in "Applicable Program(s)" in Step 4).

I certify that I have all necessary authority to carry out my duties and responsibilities under the CAIR SO_2 Trading Program, on behalf of the owners and operators of the CAIR SO_2 source and each CAIR SO_2 unit at the source and that each such owner and operator shall be fully bound by my representations, actions, inactions, or submissions.

I certify that the owners and operators of the CAIR SO_2 source and each CAIR SO_2 unit at the source shall be bound by any order issued to me by the Administrator, the permitting authority, or a court regarding the source or unit.

Where there are multiple holders of a legal or equitable title to, or a leasehold interest in, a CAIR SO_2 unit, or where a utility or industrial customer purchases power from a CAIR SO_2 unit under a life-of-the-unit, firm power contractual arrangement, I certify that:

I have given a written notice of my selection as the CAIR designated representative or alternate CAIR designated representative (as applicable) and of the agreement by which I was selected to each owner and operator of the CAIR SO_2 source and each CAIR SO_2 unit at the source; and

CAIR SO_2 allowances and proceeds of transactions involving CAIR SO_2 allowances will be deemed to be held or distributed in proportion to each holder's legal, equitable, leasehold, or contractual reservation or entitlement, except that, if such multiple holders have expressly provided for a different distribution of CAIR SO_2 allowances by contract, CAIR SO_2 allowances and proceeds of transactions involving CAIR SO_2 allowances will be deemed to be held or distributed in accordance with the contract.

Clean Air Interstate Rule (CAIR) NO_X Ozone Season Trading Program

I certify that I was selected as the CAIR designated representative or alternate CAIR designated representative (as applicable), by an agreement binding on the owners and operators of the CAIR NO_X Ozone Season source and each CAIR NO_X Ozone Season unit at the source (i.e., the source and each unit subject to the CAIR NO_X Ozone Season Trading Program, as indicated in "Applicable Program(s)" in Step 4).

I certify that I have all necessary authority to carry out my duties and responsibilities under the CAIR NO_X Ozone Season Trading Program on behalf of the owners and operators of the CAIR NO_X Ozone Season source and each CAIR NO_X Ozone Season unit at the source and that each such owner and operator shall be fully bound by my representations, actions, inactions, or submissions.

I certify that the owners and operators of the CAIR NO_X Ozone Season source and each CAIR NO_X Ozone Season unit shall be bound by any order issued to me by the Administrator, the permitting authority, or a court regarding the source or unit.

Where there are multiple holders of a legal or equitable title to, or a leasehold interest in, a CAIR NO_X Ozone Season unit, or where a utility or industrial customer purchases power from a CAIR NO_X Ozone Season unit under a life-of-the-unit, firm power contractual arrangement, I certify that:

I have given a written notice of my selection as the CAIR designated representative or alternate CAIR designated representative (as applicable) and of the agreement by which I was selected to each owner and operator of the CAIR NO_X Ozone Season source and each CAIR NO_X Ozone Season unit; and

CAIR NO_X Ozone Season allowances and proceeds of transactions involving CAIR NO_X Ozone Season allowances will be deemed to be held or distributed in proportion to each holder's legal, equitable, leasehold, or contractual reservation or entitlement, except that, if such multiple holders have expressly provided for a different distribution of CAIR NO_X Ozone Season allowances by contract, CAIR NO_X Ozone Season allowances and proceeds of transactions involving CAIR NO_X Ozone Season allowances will be deemed to be held or distributed in accordance with the contract.

Facility (Source) Name (from Step 1) Northern Arizona Energy Project

Certificate of Representation - Pag

General

I am authorized to make this submission on behalf of the owners and operators of the source or units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Signature (Designated Representative)	Date 3/9/07
Signature (Alternate Designated Representative)	Date 3/9/07

EPA Instructions for the Certificate of Representation

Note: The Certificate of Representation information can be submitted online through the CAMD Business System (CBS) at https://cfint.rtpnc.epa.gov/camd/cbs/index.cfm. You must have a user ID and password. If you need a user ID and password, or if you have questions about CBS, contact Laurel DeSantis at desantis.laurel@epa.gov or (202) 343-9191, or Alex Salpeter at salpeter.alex@epa.gov or (202) 343-9157.

Any reference in these instructions to the Designated Representative means the Acid Rain Designated Representative and/or CAIR Designated Representative, as applicable. Any reference to the Alternate Designated Representative means the Alternate Acid Rain Designated Representative and/or the Alternate CAIR Designated Representative, as applicable. As reflected in this form, the Acid Rain Designated Representative and the CAIR Designated Representative for a facility (source) must be the same individual, and the Alternate Acid Rain Designated Representative and the Alternate CAIR Designated Representative for a facility (source) must be the same individual, if such a facility (source) has units subject to both the Acid Rain and CAIR Trading Programs.

Please type or print. Submit one copy of page 2 for each unit subject to the Acid Rain or CAIR Trading Programs at the facility (source), and indicate the page order and total number of pages (*e.g.*, 1 of 4, 2 of 4, etc.) in the boxes in the upper right hand corner of page 2. **A Certificate of Representation amending an earlier submission supersedes the earlier submission in its entirety and must therefore always be complete.** Submit one Certificate of Representation form with original signature(s). For assistance, contact Laurel DeSantis at desantis.laurel@epa.gov or (202) 343-9191.

STEP 1 (i) A Plant Code is a 4 or 5 digit number assigned by the Department of Energy=s (DOE) Energy Information Administration (EIA) to facilities that generate electricity. For older facilities, APlant Code@ is synonymous with AORISPL@ and AFacility@ codes. If the facility generates electricity but no Plant Code has been assigned, or if there is uncertainty regarding what the Plant Code is, contact EIA at (202) 287-1732 or (202) 287-1745. For facilities that do not produce electricity, use the facility identifier assigned by EPA (beginning with A88@). If the facility does not produce electricity and has not been assigned a facility identifier, contact Laurel DeSantis at desantis.laurel@epa.gov or (202) 343-9191.

(ii) Enter the latitude and longitude representing the location of the units in the following format:

DDMMSS	Latitude
DDDMMSS	Longitude

Where **DD** represents degrees of latitude (a two-digit decimal number ranging from 00 through 90), **DDD** represents degrees of longitude (a three-digit decimal number ranging from 000 through 180), **MM** represents minutes of latitude or longitude (a two-digit decimal number ranging from 00 through 60), and **SS** represents seconds of latitude or longitude (a two-digit whole number ranging from 00 through 60).

STEPS 2 & 3 The Designated Representative and the Alternate Designated Representative must be individuals (i.e., natural persons) and cannot be a company. Enter the company name and address of the representative as it should appear on all correspondence. If an email address is provided, most correspondence will be emailed. **Although not required, EPA strongly encourages owners and operators to designate an Alternate Designated Representative to act on behalf of the Designated Representative.**

STEP 4 (i) Complete one page for each unit subject to the Acid Rain or CAIR Trading Programs, and indicate the program(s) to which the unit is subject. (For units subject to the NO_X Budget Trading Program, a separate "Account Certificate of Representation" form must be submitted to meet requirements under that program.) Identify each unit at the facility by providing the appropriate unit identification number, consistent with the identifiers used in previously submitted Certificates of Representation (if applicable) and with submissions made to DOE and/or EIA. Do not list duct burners. For new units without identification numbers, owners and operators must assign identifiers consistent with EIA and DOE requirements. Each submission to EPA that includes the unit identification number(s) (e.g., monitoring plans and quarterly reports) should reference those unit identification numbers in exactly the same way that they are referenced on the Certificate of Representation. Do not identify units that are not subject to the above-listed programs but are part of a common monitoring configuration with a unit that is subject to any of these programs. To identify units in a common monitoring configuration that are not subject to any of these programs, call the CAMD Hotline at (202) 343-9620, and leave a message under the ACEMS@ submenu.

(ii) Identify the type of unit using one of the following abbreviations:

Boilers		Boilers		Turbines	
AF	Arch-fired boiler	**OB**	Other boiler	**CC**	Combined cycle
BFB	Bubbling fluidized bed boiler	**PFB**	Pressurized fluidized bed boiler	**CT**	Combustion turbine
C	Cyclone boiler	**S**	Stoker	**OT**	Other turbine
CB	Cell burner boiler	**T**	Tangentially-fired boiler	Others	
CFB	Circulating fluidized bed boiler	**WBF**	Wet bottom wall-fired boiler	**ICE**	Internal combustion engine
DB	Dry bottom wall-fired boiler	**WBT**	Wet bottom turbo-fired boiler	**KLN**	Cement kiln
DTF	Dry bottom turbo-fired boiler	**WVF**	Wet bottom vertically-fired boiler	**PRH**	Refinery process heater
DVF	Dry bottom vertically-fired boiler				

If there is uncertainty about how a unit should be characterized, contact Robert Miller at miller.robertl@epa.gov or (202) 343-9077.

(iii) Indicate the source category description that most accurately describes the purpose for which the unit is operated by entering one of the following terms. If none of these descriptions applies to your unit, contact Robert Miller at miller.robertl@epa.gov or (202) 343-9077.

Automotive Stampings	Industrial Boiler	Petroleum Refinery
Bulk Industrial Chemical	Industrial Turbine	Portland Cement Plant
Cement Manufacturing	Institutional	Pulp and Paper Mill
Cogeneration	Iron and Steel	Small Power Producer
Electric Utility	Municipal Waste Combustor	Theme Park

(iv) Provide the primary North American Industrial Classification System (NAICS) code that most accurately describes the business type for which the unit is operated. If unknown, go to http://www.census.gov for guidance on how to determine the proper NAICS code for the unit.

(v) Enter the date the unit began (or will begin) serving any generator producing electricity for sale, including test generation. Enter this date and check the Aactual@ box for any unit that has begun to serve a generator producing electricity for sale as of the date of submission of this form. (This information should be provided even if the unit does not currently serve a generator producing electricity for sale.) For any unit that will, but has not begun, as of the date of submission of this form, to serve a generator producing electricity for sale, estimate the future date on which the unit will begin to produce electricity for sale and check the Aprojected@ box. When the actual date is established, revise the form accordingly by entering the actual date and checking the Aactual@ box. Enter "NA" if the unit has not ever served, is not currently serving, and is not projected to serve, a generator that producing electricity for sale. **You are strongly encouraged to use the CAMD Business System to update information regarding when a unit begins serving a generator producing electricity for sale.**

If you have questions regarding this portion of the form, contact Robert Miller at miller.robertl@epa.gov or (202) 343-9077.

(vi) For a unit subject to the Acid Rain Program or a CAIR unit that, as of the date of submission of this form, serves one or more generators (whether or not the generator produces electricity for sale), indicate the generator ID number and the nameplate capacity (in MWe) of each generator served by the unit. A unit serves a generator if it produces, or is able to produce, steam, gas, or other heated medium for generating electricity at that generator. For combined cycle units, report separately the nameplate capacities of the generators associated with the combustion turbine and the steam turbine. Please ensure that the generator ID numbers entered are consistent with those reported to the EIA.

The definitions of Anameplate capacity@ under the Acid Rain Program and the CAIR Programs differ slightly. Therefore, for a unit subject to the Acid Rain Program and any CAIR Program, the nameplate capacity for the same generator under the Acid Rain Program and under the CAIR Program may differ in certain limited circumstances. Specifically, for a unit subject to the Acid Rain Program, the nameplate capacity of a generator, if listed in the National Allowance Database ("NADB"), is not affected by physical changes to the generator after initial installation that result in an increase in the maximum electrical generating output that the generator is capable of producing. Otherwise, for a unit subject to the Acid Rain Program or a CAIR Program, the nameplate capacity of a generator is affected by physical changes to the generator after initial installation that result in an increase in the maximum electrical generating output that the generator is capable of producing. In such a case, the higher maximum electrical generating output number in MWe should be reported in the nameplate capacity column. Enter ANA@ if, as of the date of submission of this form, the unit does not serve a generator.

See the definition of Anameplate capacity@ at 40 CFR 72.2, 96.102, 97.102, 96.202, 97.202, 96.302, and 97.302, as applicable. The NADB is located at the CAMD website at http://www.epa.gov/airmarkets/allocations/index.html. If you have questions regarding nameplate capacity, contact Robert Miller at miller.robertl@epa.gov or (202) 343-9077; if you have questions regarding the NADB, contact Craig Hillock at hillock.craig@epa.gov or (202) 343-9105.

(vii) Enter the company name of each owner and operator in the ACompany Name@ field. Indicate whether the company is the owner, operator, or both. For new units, if the operator of a unit has not yet been chosen, indicate that the owner is both the owner and operator and submit a revised form when the operator has been selected within 30 days of the effective date of the selection. EPA must be notified of changes to owners and operators within 30 days of the effective date of the change. **You are strongly encouraged to use the CAMD Business System to provide updated information on owners and operators.**

Mail this form to:

For regular/certified mail:

U.S. Environmental Protection Agency
Clean Air Markets Division (6204J)
Attention: Designated Representative
1200 Pennsylvania Avenue, NW
Washington, DC 20460

For overnight mail:

U.S. Environmental Protection Agency
Clean Air Markets Division (6204J)
Attention: Designated Representative
1310 L Street, NW
Second Floor
Washington, DC 20005
(202) 343-9191

Submit this form prior to making any other submissions under the Acid Rain Program, CAIR NO_X Trading Program, CAIR SO_2 Trading Program, or CAIR NO_X Ozone Season Trading Program. Submit a revised Certificate of Representation when any information in the existing Certificate of Representation changes. **You are strongly encouraged to use the CAMD Business System to provide updated information.**

Paperwork Burden Estimate

The public reporting and record keeping burden for this collection of information is estimated to average 15 hours per response annually. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW., Washington, D.C. 20460. Include the OMB control number in any correspondence. **Do not send the completed form to this address.**

APPENDIX F

COMPLETENESS CHECKLIST

Completeness Checklist of Application for Air Quality Control Permit

Permittee: Northern Arizona Energy, LLC
App. Recvd. Date: _____

Address: 1735 Technology Dr, Ste 820,
San Jose, CA 95110
Permit No.: _____
Incomp Ltr. Date: _____

Equipment Location:
New Source: Approximately 9 miles southeast of the town Kingman, in Mohave County, Arizona
Addl. Info. Recvd.: _____

Renewal: _____ Revision: _____

Permit Class: 1 Title V Source: _____

Permit Engineer: _____ Portable: _____

Facility I.D. Number: _____ Engineer Initials: _____

Appx 1 Item #	Requirement	Meets Requirement			See Rmk No.	Refer to this application for Section No. & Item No.
		Yes	No	See Rmk No.		
R18-2-326	Have the appropriate application fees been included with the application if required?					Acc App Fee
Form	Has the standard application form been completed?					Sec. 1
Form	Has the responsible official signed the application?					Sec. 1
17.a.5	Has a Certification of Truth, Accuracy and Completeness been included?					Sec. 1
1.	Has a Description of the process to be carried out in each unit been included?					Sec. 2
2.	Has a product and raw material description been included?					Sec. 2
3.	Has a complete description of Alternate Operating Scenarios been included? (Optional)					NA
5.	Has a Flow Diagram for all processes been provided?					NA
6.	Has a Material Balance been included (if applicable)?					NA
7.	Has the Emission Sources form been completed and does it include potential emissions of regulated air pollutants (including fugitives)?					Sec. 1
8.	Have all the applicable SIP requirements been identified?					Sec. 5
8.	Have all the applicable NSPS requirements been identified?					Sec. 5
8.	Have all the applicable NESHAP requirements been identified?					Sec. 5
8.	Have all the applicable Installation Permit requirements been identified?					Sec. 5
9.	Have any proposed exemptions and insignificant activities been included (if applicable)? If so, has the applicant provided sufficient evidence?					Sec. 5
10 a., c.	Have the maximum annual and hourly process rates for each piece of equipment which generates air emissions been included?					Sec. 3
10 b., d.	Have the maximum annual and hourly process rates for the whole plant been included?					Sec. 3
10. e.	Has the fuel type and maximum usage (hourly and annual) information been included?					Sec. 3
10. f.	Has a description of all raw materials used and the maximum annual and hourly, monthly, or quarterly usage information been included?					NA
10. g.	Have the anticipated Operating Schedules been included?					Sec 2

Date Application Received:
Name of Engineer:

Completeness Checklist of Application for Air Quality Control Permit

Permittee: Northern Arizona Energy, LLC
App. Recvd. Date: _____

Address: 1735 Technology Dr, Ste 820,
San Jose, CA 95110
Permit No.: _____
Incomp Ltr. Date: _____

Equipment Location:
New Source: Approximately 9 miles southeast of the town Kingman, in Mohave County, Arizona
Addl. Info. Recvd.: _____

Renewal: _____ Revision: _____

Permit Class: 1 Title V Source: _____

Permit Engineer: _____ Portable: _____

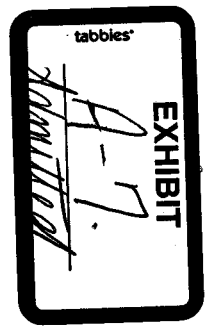
Facility I.D. Number: _____ Engineer Initials: _____

Appx 1 Item #	Requirement	Meets Requirement			See Rmk No.	Refer to this application for Section No. & Item No.
		Yes	No	See Rmk No.		
R18-2-326	Have the appropriate application fees been included with the application if required?					Acc App Fee
Form	Has the standard application form been completed?					Sec. 1
Form	Has the responsible official signed the application?					Sec. 1
17.a.5	Has a Certification of Truth, Accuracy and Completeness been included?					Sec. 1
1.	Has a Description of the process to be carried out in each unit been included?					Sec. 2
2.	Has a product and raw material description been included?					Sec. 2
3.	Has a complete description of Alternate Operating Scenarios been included? (Optional)					NA
5.	Has a Flow Diagram for all processes been provided?					NA
6.	Has a Material Balance been included (if applicable)?					NA
7.	Has the Emission Sources form been completed and does it include potential emissions of regulated air pollutants (including fugitives)?					Sec. 1
8.	Have all the applicable SIP requirements been identified?					Sec. 5
8.	Have all the applicable NSPS requirements been identified?					Sec. 5
8.	Have all the applicable NESHAP requirements been identified?					Sec. 5
8.	Have all the applicable Installation Permit requirements been identified?					Sec. 5
9.	Have any proposed exemptions and insignificant activities been included (if applicable)? If so, has the applicant provided sufficient evidence?					Sec. 5
10 a., c.	Have the maximum annual and hourly process rates for each piece of equipment which generates air emissions been included?					Sec. 3
10 b., d.	Have the maximum annual and hourly process rates for the whole plant been included?					Sec. 3
10. e.	Has the fuel type and maximum usage (hourly and annual) information been included?					Sec. 3
10. f.	Has a description of all raw materials used and the maximum annual and hourly, monthly, or quarterly usage information been included?					NA
10. g.	Have the anticipated Operating Schedules been included?					Sec 2

Appx 1 Item #	Requirement	Meets Requirement				Refer to this application for Section No. & Item No.
		Yes	No	See Rmk No.	See Rmk No.	
10. h.	Have any Limitations on source operations and any work practice standards effecting emissions been included (if applicable)?					Sec. 1.2 & Appendix B
11.	Does the application include an equipment list with the type, name, make, model, serial number, and date of manufacture (if available)?					Sec. 1
12.	Does the application include the necessary stack information including: stack identification, description, exit height, inside dimensions, exit gas temperature and velocity, and building dimensions?					Sec. 4
13.	Does the application include a site diagram which includes: property boundaries, adjacent streets or roads, directional arrow, elevation, equipment layout, location of emission points, emission areas and air pollution control equipment and the closest distance between emissions and property boundary?					Sec 2
14. a.	Have the applicable test methods for determining compliance with each applicable requirement been included?					Sec. 7
14. b.	Does the application include an identification, description and location of air pollution control equipment?					Sec. 6
14. c.	Has the rated and operating efficiency of air pollution control equipment been included?					NA
14. d.	Has the data necessary to establish required efficiency for air pollution control equipment been included?					NA
14. e.	Has evidence that operation of the new or modified pollution control equipment will not violate any ambient air quality standards, or PSD increments been provided?					NA
15.	Have equipment manufacturer's bulletins and shop drawings been included (optional).					Appendix D
16. a.-d.	Has a Compliance Plan been included? (the compliance plan must address acid rain provisions, if applicable)					NA
16. a.	Does the application include a description of the compliance status of the source with respect to all applicable requirements (for constructed/operating sources)?					NA
16. a., b.	Has a description of how the new source or alteration will comply with applicable requirements been included (for new sources or modifications to existing sources)?					Sec. 7
16.b.1.	Does the application include a statement that the source will continue to comply with the applicable requirements with which they currently comply? (for constructed/operating sources).					NA
16. b.2.	Has a statement that the source will meet in a timely manner applicable requirements that become effective during the permit term been included?					Sec 7
16. b. 3.	Has a compliance schedule with remedial measures, including an enforceable sequence of actions with milestones, leading to compliance been included for applicable requirements with which the source does not currently comply?					NA
16. c.	Has a schedule for submission of certified progress reports no less frequently than every 6 months been included? (for sources required to have a schedule of compliance)					NA
17.	Has a certification of compliance by a responsible official been included?					Sec. 1
17. a. 1.	Does the application include an identification of the applicable requirements which are the basis of the certification?					Sec. 5

Appx 1 Item #	Requirement	Meets Requirement		See Rmk No.	See Rmk No.	Refer to this application for Section No. & Item No.
		Yes	No			
17. a. 2.	Has a statement of methods used for determining compliance been included?					Sec. 7
17. a. 3.	Has a schedule for submission of compliance submitted no less frequently than annually been provided?					Sec 7
17. a. 4.	Does the application include a statement indicating the source's compliance status with any applicable enhanced monitoring and compliance certification requirements? (if applicable)					NA
18.	Does the application include an acid rain compliance plan? (if applicable)					Sec 7
19. a. 1	Does the application include a LAER determination and the data and information used to determine LAER?					NA
19. a. 2.	Has a certification pursuant to A.A.C. R18-2-403(A)(2) been included? Such certification should list and describe all existing major sources owned and operated by the applicant and a statement of compliance.					NA
19. a. 3.	For sources subject to the offset requirements of R18-2-403(A)(3), does the application include a demonstration of the manner in which the source or modification meets the requirements of R18-2-404?					NA
19. a. 4.	Does the application include the analysis described in R18-2-403(B), if required (only for VOC or CO sources in photochemical oxidant or CO non-attainment areas)?					NA
19. b. 1.	Does the application include a demonstration of the manner in which the new source or modification will meet the requirements of R18-2-406?					NA
19. b. 2.	Does the application include a BACT determination and the data and information used to determine BACT?					NA
19. b. 3.	Does the application include an air impact analysis as per R18-2-407 and R18-2-406?					Sec. 4, Appendix B, C
19. b. 4.	If the applicant seeks an exemption from any of the requirements of R18-2-407 and R18-2-406, does the application include sufficient information to demonstrate compliance with the requirements of the subsections under which an exemption is sought?					NA
20.	Have the calculations on which all information is based been included in the application?					Appendix A
	Does the notification precisely identify in the application which is to be considered confidential?					NA
	Does the notification contain sufficient supporting information to allow the Director to evaluate whether the information satisfies the requirements related to trade secrets or, if applicable, how the information, if disclosed, is likely to cause substantial harm to the person's competitive position?					NA

Table B-1 Northern Arizona Energy Project Environmental Regulatory Requirements			
Authorizing Agency	**Law or Regulation**	**Type of Permit/ Approval/Action/Constraint**	**Purpose of Permit/Regulated Project Component**
Arizona Corporation Commission	— Arizona Revised Statutes	— Certificate of Environmental Compatibility	Siting of power plant.
Arizona Department of Environmental Quality	— Federal Clean Air Act — Arizona Department of Environmental Quality Regulations	— Air Quality Permit	Emissions of regulated pollutants from plant.
		— Fugitive Dust Permit	Construction dust control.
	— Arizona Ambient Air Quality Guidelines	— Toxic Air Pollutants Standards	Emissions of toxic air contaminants.
	— Clean Water Act	— Stormwater Discharge Permit	Separate permits for construction and operation at plant site.
		— Spill Prevention Control and Countermeasure Plan	Separate plans for construction and operation.
	— SARA Title III	— Community Right-to-Know Reporting	Chemical storage and use during operations.
	— Resource Conservation and Recovery Act (RCRA)	— Hazardous Waste and Hazardous Materials Storage and Handling Permits	Chemical storage and use during operations.



U.S. Army Corps of Engineers	— Clean Water Act	— Section 404 Permit	Nationwide authorization for pipelines and transmission line interconnections.
U.S. Fish & Wildlife Service	— Endangered Species Act	— Section 7 Consultation, if necessary (Biological Opinion)	Required by NEPA.
U.S. Environmental Protection Agency	— Clean Air Act	— Air Quality Permits to Construct and Operate (PSD/Title V)	Review of air permit
Arizona Game and Fish Department	— Arizona Revised Statutes	— Biological Consultation	Input in CEC/EA
Arizona State Historic Preservation Office	— National Historic Preservation Act	— Cultural Resources Consultation with Western and COE	Commentor on EA, approves cultural resource plans and mitigation, if needed.
Arizona Department of Agriculture	— Native Plant Law	— Salvage or Removal Permit	Notice of clearing on private lands.
Mohave County	— County Ordinances	— Building Permit — Excavation Permit (pipeline) — Grading Permit	Approvals for power plant and infrastructure.
Western Area Power Administration	— National Environmental Policy Act of 1969 (NEPA)	— Decision (Western)	Western for transmission line interconnection.
	— National Historic Preservation Act (NHPA) of 1966 as amended	— Cultural Resources Data Recovery Plan — Native American Consultations	Required by NEPA, included in EA.
	— Archaeologic Resources Protection Act (ARPA) of 1979	— Cultural Resources Mitigation Native American Consultations	Required by NEPA, included in EA.
	— Native American Graves Protection and Repatriation Act	— Protection of remains and Funerary objects — Native American Consultations	Required by NEPA, included in EA.
	— Executive Order 11988	— Floodplain management	Required by NEPA, included in EA.
	— Executive Order 11990	— Protection of Wetlands	Required by NEPA, included in EA.
	— Executive Order 12898	— Environmental Justice in Minority Populations and Lower Income Populations	Required by NEPA, included in EA.
	— Executive Order 13007	— Protection of Indian Sacred Sites and their Religious Practices	Required by NEPA, included in EA.
	— Endangered Species Act	— Biological Assessment and Consultation with USFWS	Required by NEPA, included in EA.
	— Migratory Bird Treaty Act of 1918	— Protection of Migratory Birds	Required by NEPA, included in EA.

The Golden Valley sign is located on the northeast corner of Adobe Road and Highway 68. It's in front of the new GV Medical Clinic and next to Maverick's convenience store. The sign is also directly visible from Highway 68.

tabbies

EXHIBIT

8

The near-site sign is located at the Griffith Road exit off I-40. If traveling west on I-40, exit at Griffith Road, make a right turn – sign is located on the right side. It's installed underneath the existing old MCEDA sign installed years ago. The sign is install here instead of at the NAEP site based on local traffic patterns.

EXHIBIT
A-9
Admitted

Application for a Certificate of Environmental Compatibility

Northern Arizona Energy Project

Prepared for:

State of Arizona Power Plant and Transmission Line Siting Committee

Prepared by:

Greystone/Arcadis
630 Plaza Drive #100
Highlands Ranch, Colorado 80129

Submitted by:

Northern Arizona Energy, LLC

Date: _____
Case No. _____

This Project was originally referred to as the Arroyo Energy Project (Project). It is now known as the Northern Arizona Energy Project (Project or NAEP). This Project was presented to agencies, officials and the public in applicant-sponsored open house and Project forums as the Arroyo Energy Project prior to the name change. The project description has not changed since the initiation of public communication regarding the Project.

BEFORE THE
ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

In the matter of the Application of Northern Arizona Energy, LLC, in conformance with the requirements of Arizona Revised Statutes 40-360.03 and 40-360.06, for a Certificate of Environmental Compatibility authorizing construction of a 175 MW natural gas-fired, simple cycle generating facility and associated transmission line interconnecting the generating facility to the adjacent Western Area Power Administration Griffith Switchyard, all located in Mohave County approximately 9 miles southwest of Kingman, Arizona.	))))))))))	Case No. _____

APPLICATION FOR
CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

EXECUTIVE SUMMARY

Northern Arizona Energy, LLC (Applicant) requests a Certificate of Environmental Compatibility (CEC) from the Arizona Power Plant and Transmission Line Siting Committee (Committee) for construction of the Northern Arizona Energy Project (Project), a natural gas fired, simple cycle power plant, located on private lands south of Kingman, Arizona. The Project will supply power to load serving entities in Arizona and surrounding regions for the purpose of serving their customers during periods of peak electricity demand. Power purchases by load serving entities will be voluntary and economic risk will be borne by the Applicant, not the rate-payers.

This Project was originally referred to as the Energy Project (Project). It is now known as the Northern Arizona Energy Project (Project or NAEP). This Project was presented to agencies, officials, and the public in applicant sponsored open house and Project forums as the Arroyo Energy Project prior to the name change. The project description has not changed since the initiation of public communication regarding the Project. This CEC application (Application) focuses on the existing conditions and potential effects for the proposed power plant and related transmission facilities and site. The Applicant is seeking a separate CEC from that of Griffith Energy, LLC (Griffith Owner), the owner and operator of the Griffith Energy Project (Griffith), a 600 MW combined cycle generation facility located adjacent to the Project . This request is critical to the future ownership and financing rights of the Northern Arizona Energy Project. A business combination is pending between LS Power, the upstream owner of Applicant and Griffith Owner, and the Dynegy Corporation. Upon completion of such transaction, operating assets such as Griffith, will be owned by Dynegy and development projects such as the Northern Arizona Energy Project will be separately owned by a Joint Venture of LS Power and Dynegy. Due to this separate ownership structure and the associated unique equity and financing rights and obligations, a separate CEC is required.

Western Area Power Administration (Western) is currently preparing an Environmental Assessment (EA) which will provide detailed analysis of the environmental effects of the electrical interconnection to the Western transmission system. A draft of that EA will be available for the Committee during the review period for this Application.

The Project is comprised of four (4), General Electric (GE) LM6000 PC SPRINT NxGen combustion turbine generators (CTG) with inlet air chillers. The Project will be designed to produce 175 MW of net electrical output with a heat rate of 9975 Btu/kWh (HHV) based upon the design condition ambient temperature of 90 degrees Fahrenheit (°F). The CTGs are capable of rapid start-up, allowing the Project to respond to fluctuations in electric demand within ten (10) minutes.

Emissions from the CTGs will be controlled by a combination of water injection and selective catalytic reduction (SCR) to reduce nitrogen oxides (NOx) emissions and an oxidation catalyst to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions.

Existing infrastructure for the gas, water and electric interconnections and access roads are available to the Project within its property boundary or the adjacent property containing the existing Griffith. No new laterals or other off-site infrastructure development are required for the Project thereby minimizing the environmental impacts associated with the Project.

Water supply for the Project will be obtained from Griffith Owner through a physical interconnection with the Griffith water treatment and recycling systems. Griffith Owner will allocate a portion of its existing water capacity allotment under contract with Mohave County. Therefore, no additional incremental water supply allocation from the water system currently serving the I-40 Industrial Corridor is required to serve the Project.

The Project will electrically interconnect with the Western 230kV transmission system at the existing 230kV switchyard (Griffith Switchyard) owned and operated by Western. An application for generation interconnection was filed with Western on September 27, 2006 and was determined to be a valid application by Western on September 28, 2006.

Natural gas will be transported to the Project through the existing UNS Arizona Gas (UNS) gas distribution facilities currently serving the I-40 Industrial Corridor.

This application includes evaluation of relevant environmental issues associated with the proposed plant and associated transmission line site and certain related actions. The analysis of the Northern Arizona Energy Project concludes that no significant impacts will result from the Project. This conclusion was reached after analyzing the environmental elements specified in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219.

The Project site was selected for the following reasons:

- The Project is located on private land adjacent to an existing power generation facility and is able to utilize existing infrastructure that was developed for the I-40 Industrial Corridor and the Griffith project.
- The Project location is situated in an area evaluated in previous environmental studies for the Griffith project (Case No. 90, Docket No. L00000H-98-0090, Decision No. 61295).
- The Project is located within the I-40 Industrial Corridor established by the Mohave County Planning and Zoning Department making it in conformance with the Mohave County General Plan and zoning regulations. This industrial corridor has been designated for industrial development and contains highways, railroads, gas pipelines, and electric transmission lines.
- The small amount of water needed for the Project will be supplied from existing water capacity allotments controlled by Griffith Owner; therefore no additional incremental water allotments from the Sacramento Valley aquifer or the I-40 Industrial Corridor water system will be required to serve the Project.
- There is no existing or planned residential development within two miles of the Project site.
- No critical habitat will be affected by the Project, nor will there be any significant impacts to any threatened or endangered species.

The analyses for this application also show that several critical elements or concerns are not present or will not be affected by the siting, construction, and operation of the Project, including: wild and scenic rivers, areas of critical environmental concern (ACEC), wetlands or riparian areas, and solid and hazardous waste.

The analyses also show there will be no significant direct, indirect or cumulative adverse effects on land use, cultural resources, wilderness areas, biological resources, including special interest wildlife and plant species, ground or surface water quality, earth and soil resources, air quality, or noise. Consultation with tribes regarding Native American concerns or traditional cultural properties will continue, but no specific conflicts have been identified. No low income or minority groups will be disproportionately affected.

There will be socioeconomic benefits derived from the Project. In the short-term, the construction work force will increase revenues in the retail and service sectors of the economy. In the long-term, the available power will provide greater reliability of service in area communities. This unique peaking resource with quick start capability will offer ancillary service benefits to the local utilities and the control area to adjust to shifts in demand due to fluctuations in ambient conditions or generation outages scenarios. The Project will require two (2) to four (4) additional operations and maintenance workers. This offers attractive long-term compensation for new personnel resources.

The Applicant therefore requests approval of its application and submits that the Project and its location are environmentally compatible based on the environmental analysis.

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APPLICATION

1. *Name and address of the applicant:*

Northern Arizona Energy, LLC
1735 Technology Drive, Suite 820
San Jose, California 95110

2. *Name, address, and telephone number of a representative of the applicant who has access to technical knowledge and background information concerning this application, and who will be available to answer questions or furnish additional information:*

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(480) 664-8154

With a copy to:

Mr. Kevin R. Johnson
Northern Arizona Energy, LLC
1735 Technology Drive, Suite 820
San Jose, California 95110
Phone 408/572-1300
Facsimile 408/392-9757

3. *Date on which the applicant filed a Plan in compliance with ARS §40-360.02, in which the facilities for which this application is made were described:*

Western Area Power Administration (Western), as the transmission owner and interconnecting utility for NAEP, is undertaking at Applicant's expense a detailed transmission power flow, stability and short circuit analysis (System Impact Study) pursuant to a generation interconnection application dated September 27, 2006 and a System Impact Study Agreement dated December 22, 2006. Western's System Impact Study is a required component of a "Plan" filing pursuant to ARS 40-360.02. The System Impact Study is not expected to be completed by Western, however, for an additional 60-90 days. Consequently, Applicant has been unable to file a complete "Plan" 90 days in advance of filing this Application.

Therefore, an "incomplete Plan" that omits the System Impact Study is being filed concurrently with this Application. Applicant is also concurrently filing a Petition to the Arizona Corporation Commission requesting exercise of its discretion pursuant to ARS 40-360.02(E), for good cause, allowing full consideration of this Application by the Power Plant and Transmission Line Siting Committee notwithstanding the late submission of the Plan information. Applicant is continuing diligent efforts to expedite completion of Western's System Impact Study. Promptly upon its completion, Western's System Impact Study will be filed as a supplement to this Application.

Applicant's preliminary evaluation indicates no transmission system impacts; however, Western's System Impact Study must confirm those conclusions before an interconnection agreement will be offered by Western. If Western concludes that transmission facility modifications will be required as a condition of interconnection of the Project, then Applicant commits that completion of such modifications will be an express condition of the CEC.

4. Project and Facility Description

This Project was originally referred to as the Arroyo Energy Project (Project). It is now known as the Northern Arizona Energy Project (Project or NAEP). This Project was presented to interested agencies, officials and the public in applicant-sponsored open house and Project forums as the Arroyo Energy Project prior to the name change. The project description has not changed since the initiation of public communication regarding the Project. The Northern Arizona Energy Project (Project) is a natural gas fired, simple cycle power plant that will supply power to load-serving entities in Arizona and surrounding regions for the purpose of serving their customers during periods of peak electricity demand. The Project is comprised of four (4), General Electric (GE) LM6000 PC SPRINT NxGen combustion turbine generators (CTG) with inlet air chiller modules. The Project will be designed to produce 175 MW of net electrical output with a heat rate of 9975 Btu/kWh (HHV) based upon the design condition ambient temperature of 90 degrees Fahrenheit (°F). The CTGs are capable of rapid start-up, allowing the Project to respond to fluctuations in electric demand within ten (10) minutes.

Emissions from the CTGs will be controlled by a combination of water injection and selective catalytic reduction (SCR) to reduce nitrogen oxides (NOx) emissions and an oxidation catalyst to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions. After passing through the SCR system, the exhaust gases exit through the attached stack. Each of the four exhaust stacks will be 85 feet in height and 10 feet in diameter. The stacks will be equipped with continuous emissions monitors (CEMS) and test connections for performance monitoring.

The Project will interconnect with the Western 230kV system at the neighboring existing Griffith Switchyard. There will be one generator step-up (GSU) transformer per CTG pair.

Natural gas will be transported to the Project through the existing UNS gas distribution facilities currently serving the I-40 Industrial Corridor.

Water supply for the Project will be obtained from Griffith Owner through a physical interconnection with the Griffith water treatment and recycling systems. Griffith Owner will allocate 450 gpm of its existing contracted 4500 gpm peak flow capacity under its Water Interconnection and Supply Agreement, dated April 26, 1999 (as amended) with Mohave County. Therefore, no additional incremental water supply allocation from the water system currently serving the I-40 Industrial Corridor is required to serve the Project.

Existing infrastructure for the gas, water and electric interconnections as well as site access roads are available to the Project within its property boundary or the adjacent Griffith property. No new laterals or other off-site infrastructure development are required for the Project, thereby minimizing the environmental impacts associated with the Project.

4.1 Location and Local Conditions

4.1.1 Project Location

The Project is located in Mohave County Arizona, just west of Interstate 40, approximately three (3) miles north of the Griffith Interchange. The Project is approximately 110 miles southeast of Las Vegas, Nevada via Arizona Highway 93 and 200 miles to the northwest of Phoenix, Arizona. The Project is within the existing I-40 Industrial Corridor just north of Griffith.

The Project location is shown on **Figure 1, Site Location Map.**

The Project is located on an approximately forty (40) acre parcel of land (Project Property) that is controlled by the Applicant. The Project Property occupies the northern most seven hundred (700) feet of the original 160 acre parcel of land owned by Griffith Owner (Original Griffith Site) with the exception of a one hundred foot (100') corridor along the eastern Project Property boundary retained by Griffith Owner and containing the gas pipeline serving Griffith.

Within the Project Property, approximately eight (8) acres will be utilized to site the Project equipment, stormwater retention basin and interconnection facilities (Project Site).

The Project Property is zoned MX by Mohave County. This zoning designation permits the siting of industrial facilities, including electric generation facilities. No local land use permits such as conditional use permits or special use permits are required by Mohave County, given the MX zoning of the Project Property.

4.1.1.1 Mohave County

Mohave County, located in the northwest corner of the state, is geographically the second largest county in the state covering 13,470 square miles. The primary commercial centers are the cities of Lake Havasu City and Bullhead City along the Colorado River and Kingman, the County seat. The population of Mohave County has grown from 93,497 in 1990 to 187,200 in 2005 and the population growth rate has been six (6%) to seven (7%) percent over the past few years. Statewide Arizona is growing about four percent (4%) annually. Over the next ten (10) years, the population of Mohave County is expected to, at least, double. Residential and commercial development has expanded rapidly, placing pressure on local load serving entities to obtain adequate generation resources to serve the growing electric load demand.

The single biggest driver of recent growth has been the sudden infusion of large-scale residential housing developments as a result of Las Vegas market forces. The Hoover Dam bypass, scheduled to be finished in 2008, will put Las Vegas within an hour's drive of Mohave County. Developers are betting that workers will choose to commute in order to enjoy affordable housing.

The largest developer in the area is Jim Rhodes, a Las Vegas developer who has four master-planned communities approved and a fifth under consideration - almost 130,000 units in all. Another Las Vegas developer, Leonard Mardian, is planning 35,000 homes. Together, the projects will result in more new houses than exist in all of Mohave County today. Other planned developments in the region include two master-planned communities (the Villages at White Hills and The Ranch at White Hills) totaling in excess of 62,000 lots.

Industrial development in Lake Havasu City, Bullhead City and Kingman has also increased over the past ten years, driven in part by industrial parks located in each area. Additionally, the I-40 Industrial Corridor between Kingman and Lake Havasu offers large industrial tracts to accommodate warehouse-distribution and manufacturing firms that require direct highway access, rail access (Burlington Northern & Santa Fe) or natural gas (two transcontinental pipeline corridors). In fact, Wal-Mart has announced plans to build an 880,000-square-foot distribution center facility in the Corridor, which will bring 500-plus jobs to the Mohave County. Nutribiotechnologies, Inc. is another major planned commercial development in the Corridor.

UNS Electric (formerly Citizens Electric) and Mohave Electric Cooperative are the local load serving entities with UNS Electric serving the majority of the Mohave County loads. Since 1999, the UNS Electric's peak demand in Mohave County has increased over sixty six percent (66%) which represents an annual growth rate of nearly nine and one-half percent (9.5%). Peak loads are forecasted to continue to grow at over six and one-half percent (6.5%) per year for the next eight (8) to ten (10) years. In the fifteen (15) year period from 1999 through 2014, the UNS Electric peak load demand will have grown nearly 400 MW.

Currently there are no generation units in operation dedicated to serving the peak demand of the Mohave County loads.

4.1.1.2 Existing Generation Site

Griffith is a 600 MW natural gas-fired, combined cycle power plant located adjacent to and south of the Project. In 1998, Griffith was sited in the I-40 Industrial Corridor. The entire Original Griffith Site was deemed environmentally compatible for generation resources in a 1998 decision of the Arizona Corporation Commission (Decision # 61295). As noted above, approximately 40 acres of the prior Original Griffith Site comprises the Project Property.

The I-40 Industrial Corridor infrastructure that was developed coincident with the development of Griffith will be utilized for the Project. In addition, Griffith Owner will provide certain services to the Project under a Shared Services Agreement as further discussed in section 4.2.6.

The utilization of existing gas, water and electric infrastructure and services provided by the I-40 Industrial Corridor and the Griffith Owner eliminates almost all of the environmental impacts associated with the Project.

4.1.1.3 Site Conditions

The Project will be designed for the following Project Site conditions.

- Site Elevation Above Sea Level — 2475 feet
- Design Ambient Temperature and Humidity — 90°F/38.7%
- Design High Temperature — 113°F
- Design Low Temperature — 25°F
- Seismic — IBC-2003, Class C, I=1.25
- Wind Loads — 90 mph

- Frost Penetration 12 inches
- Annual Rainfall 10.4 inches

4.1.2 Legal Description

The Project is located on a parcel of undeveloped land comprising essentially the North seven hundred (700) feet of the North One-half of the Southwest Quarter of Section 6, Township 19 North, Range 17 West, Gila & Salt River Base & Meridian, Mohave County, Arizona, containing approximately forty (40) acres.

4.1.3 Site Layout and Arrangement

The overall Project Site layout is depicted on **Figure 2, Power Plant and Associated Facilities**, and indicates the location and size of the proposed equipment and improvements, including access roads, the gas pipeline and meter station, the 230kV transmission line, the Griffith Switchyard expansion area, the construction lay down area, and a retention basin for storm water management. A more detailed general arrangement of the Project is shown on **Figure 3, Site Layout of Power Plant**.

Project equipment occupies approximately 8 acres. Surrounding the equipment is a network of roads for fire equipment and maintenance access. The area required for the Griffith Switchyard expansion is one (1) acre. The temporary construction area for contractor facilities, construction parking, and equipment and material lay down (Temporary Construction Area) will be located in two (2) designated areas, one west and one east of the Project Site. If the entire designated Temporary Construction Area is utilized, a total of six (6) acres will be used by the contractors.

The Project equipment and facilities have been arranged for optimum use of the Project Property as well as to ensure operability and maintainability. Conceptual engineering has been conducted to define the specific equipment requirements and to confirm the suitability of the proposed Project Site.

4.1.4 Site Access

Access to the Project Site will be via the Griffith interchange of I-40, which travels north-south near the Project. From the Griffith interchange, access to the Project Site will be west on Griffith Road, then approximately two (2) miles north on South Apache Road, then east on Haul Road to the Project Site entrance. Access to the Project will be controlled through a security gate at the Project Site entrance off of Haul Road located along the north boundary of the Project Property.

A separate entrance from Haul Road will be utilized for construction access to the Temporary Construction Area. A separate gate for construction personnel and equipment/material deliveries will allow access to the Temporary Construction Area during the construction of the Project.

4.1.5 Interior Roads and Fencing

The finish surface on roadways and parking areas located within the Project Site will be gravel. Unpaved ground surfaces in and around the main equipment area will be covered with crushed stone or gravel. An 8-foot tall, metal fabric security fence with barbed wire or razor wire on top will enclose the entire Project Site and Temporary Construction Area.

4.1.6 Grading and Drainage

The Project Property slopes down-gradient from northeast to southwest. The entire Project footprint containing the equipment will be raised to provide adequate drainage away from equipment and buildings to the stormwater retention basin (see **Figure 4, Preliminary Grading Plan**). Raising the Project footprint will also provide adequate cover for the culverts. Excavated material from the stormwater retention basin may be used for structural fill depending on the suitability of the excavated material. Approved soil materials for structural fill will be imported, if required. Additionally, specialized granular material may need to be imported for road base and possible use below foundations.

4.2 Facility Type and Process

The Project will consist of four (4) GE LM6000 PC SPRINT NxGen CTGs with an inlet air chiller system. The Project will be designed to produce 175 MW net electrical output with a heat rate of 9975 Btu/kWh (HHV) based upon the design condition ambient temperature of 90° F.

Auxiliary equipment will include inlet air filters with chiller coils, mechanical chiller with cooling module, circulating water pumps, water treatment equipment, natural gas compressors, generator step-up and auxiliary transformers, and water storage tanks. The technical details of the Project components are described below.

4.2.1 Combustion Turbine Equipment

The LM6000 combustion turbines are two-shaft gas turbine engines derived from the core of the CF6-80C2 engine, which is GE's high thrust, high efficiency aircraft engine. The CF6-80C2 engine has logged more than 30,000,000 flight hours in the Boeing 747 and other wide body aircraft.

The CTGs use state-of-the-art technology to efficiently burn clean natural gas with reduced NOx and CO emissions. Each CTG is equipped with water injection to the combustors for reducing the production of NOx. In addition, SCR systems further reduce NOx and CO with a combination of catalysts and injection of 19 percent aqueous ammonia.

Each CTG will also be provided with a SPRINT (SPRay INTer-cooling) system, which enhances the efficiency and output of the gas turbine engine by spraying micro-droplets of atomized water into the inter-stage air stream between the low pressure and high pressure compressors. The water is atomized to a droplet diameter of less than 20 microns by using inter-stage bleed air and special nozzles. As the droplets evaporate, the air temperature is reduced and the mass flow is increased. This results in greater power output and better fuel efficiency.

The CTGs are housed in a metal enclosure to protect the units from the elements and reduce noise.

4.2.2. Air Intake System

The air intake system provides filtered air to the combustion turbine compressors. Mounted above each combustion turbine, the intake system is equipped with a self-cleaning filter system to clean particulates from the air. The system is provided with access for inspection and maintenance. Inlet air chilling will be used to enhance gas turbine performance during times of high ambient air

temperatures. The inlet chilling system consists of heat exchanger coils located in the inlet air stream. Chilled water from a mechanical chiller flows through the coils to cool the incoming air. This results in increased electrical output and improved fuel efficiency for the units.

4.2.3 Emissions Control Equipment

The combustion gases exit the turbine at approximately 830 °F and then pass through the SCR system for NOx emission control and an oxidization catalyst for control of CO and VOC emissions. The SCR system is used in conjunction with ammonia injection for the control of NOx emissions. A 19 percent aqueous ammonia (NH3) solution is injected into the CTG exhaust gas stream, which passes over a catalyst bed that reduces the oxides of nitrogen to inert nitrogen. Diluted ammonia vapor will be injected into the exhaust gas stream via a grid of nozzles located upstream of the catalyst module. The subsequent chemical reaction on the catalyst will reduce NOx to nitrogen and water. The SCR equipment includes a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors. The ammonia unloading area will consist of a curbed concrete pad and containment vault.

After passing through the SCR system, the exhaust gases exit through the attached stack. Each of the four exhaust stacks will be 85 feet in height and 10 feet in diameter. The stacks will be equipped with CEMS and test connections for performance monitoring.

4.2.4 Instrumentation and Controls

GE will provide their standard digital process control system for each CTG. The balance of plant systems will be controlled by a distributed control system (DCS).

The DCS will interface with the control systems furnished by the CTG supplier to provide supervisory remote control capabilities, as well as data acquisition, annunciation, and historical storage of CTG operating information.

4.2.5 Balance of Plant

The balance of plant equipment and systems for the Project are described in the following paragraphs.

4.2.5.1 Fuel System

High pressure natural gas will be supplied to the Project from the existing UNS gas distribution system located adjacent to the Project. A metering station to serve the Project will be located east of the power block. From the metering station, gas will be piped to the gas conditioning and compressor equipment skids. The gas conditioning skids will filter gas particulates and drop out any moisture contained in the gas.

4.2.5.2 CTG Cooling

The generators are air-cooled. The lube oil for the CTGs is cooled by a closed loop water-glycol system with water-to-air (fin fan) coolers.

4.2.5.3 Inlet Air Chiller

The four (4) CTG units are served by one shared inlet air chiller system providing 6500 nominal refrigeration tons of chilled water. The chiller system is comprised of two chillers arranged in a series configuration. Cooling for the chiller is provided by a cooling module located above the chiller skid. Refrigerant utilized for the chiller will be R-123.

4.2.5.4 Water Treatment

The water treatment facilities consist of leased reverse osmosis (RO) and demineralization trailers to supply demineralized water to the CTGs.

The leased demineralizer trailers will be taken off-site for regeneration, and all waste product contained in the trailer is disposed of at off-site facilities by the vendor, in accordance with applicable regulations.

4.2.6 Interfaces and Shared Services

The Project will be integrated with several existing Griffith systems. A description of the integration between the two facilities is presented in the following paragraphs.

4.2.6.1 Firewater

The existing firewater loop at Griffith consists of an electric firewater pump with a diesel backup firewater pump. The firewater pumps discharge into an underground firewater loop that circles Griffith and provides water to fire hydrants and the fire suppression systems. The existing firewater pumps are capable of supplying up to 1,500 gpm at 100 psig of water to the Griffith firewater loop. Based on National Fire Protection Association (NFPA) standards, the Project firewater requirement is five hundred (500) gpm. This firewater flow requirement is significantly less than the capability of the Griffith firewater system. Therefore, the Project can be connected into the Griffith firewater system by extending the firewater loop around the Project Site. Additional fire pumps and storage tanks are not required for the Project. The NFPA standards do not require protection for coincident events at the Project Site and at Griffith.

4.2.6.2 Supply Water

At the design ambient temperature of 90°F, 345 gpm of raw water is required for process water supply. Process water requirements include makeup water to the chiller cooling module and water supply to the mobile water treatment equipment that will be used to make demineralized water for turbine injection for both NOx control and SPRINT power augmentation.

The Applicant will contract for 450 gpm of process water capacity currently contracted by Griffith Owner. This contract volume (peak flow capacity) represents 450 gpm of the original 4500 gpm contracted by Griffith Owner from Mohave County.

The raw water supply to the Project will be pretreated by Griffith. The process water interconnection will be located near the Griffith cooling tower and will consist of a new pipe connection to existing Griffith water supply piping. The water will be pumped from this location to the Project Site, as shown on **Figure 2, Power Plant and Associated Facilities.**

4.2.6.3 Wastewater

Wastewater from the Project will be piped to the existing Griffith wastewater treatment system to maximize water reuse and minimize the overall amount of wastewater produced. The final wastewater effluent will then be directed to the existing Griffith brine disposal pond, using existing equipment. The Griffith brine disposal pond has sufficient storage and evaporating capacity without modification or expansion of the facility or its existing environmental permits to accommodate both the Project's and Griffith's wastewater over the design life of both projects. The routing of the wastewater piping from the Project to Griffith is shown on **Figure 2, Power Plant and Associated Facilities.**

4.2.6.4 Electrical Systems

The existing grounding system at Griffith and at the Griffith Switchyard is presently electrically interconnected as shown on **Figure 5, Electrical One-line Diagram.** To minimize personnel hazards at the Project, a new buried ground grid in the power block area will be electrically interconnected with the existing Western and Griffith grounding systems.

The electrical interconnection is shown on **Figure 6, Griffith Switchyard Interconnection Electrical One-Line Diagram.**

4.3 Operations and Emissions

4.3.1 Operations Management

The Project will provide electric power to the grid when other base load generation can not meet system demands. This typically occurs during periods of peak system electrical load. As a peaking facility, the Project will have the ability to dispatch any combination of the four independent CTGs in an hourly and/or daily start-stop mode. Unit start times are short, with each CTG typically achieving full load output within ten (10) minutes of a unit start. Each CTG will be independently controlled from approximately 50 to 100 percent of full load.

The Applicant will contract with the Griffith Owner for operations and maintenance (O&M) services. It is anticipated that the existing Griffith O&M personnel will be increased by two (2) to four (4) individuals to support Project operations and maintenance.

Minor Project maintenance will be provided by existing Griffith O&M personnel and major maintenance activities will be supported by contracted labor services or original equipment manufacturers personnel.

The Project will be operated from the existing Griffith control room. The combustion turbines and balance-of-plant systems will incorporate state-of-the-art monitoring and control systems. The Project will be designed to operate independently of the operational status of Griffith, although to optimize operations efficiency, certain Project balance-of-plant equipment (e.g. make-up water/wastewater processes and fire water systems) will be integrated with existing Griffith systems and operations.

4.3.2 Operations

The Project has been designed to supply energy to the customer within ten (10) minutes of a unit start up. Given this quick start capability and the associated operating performance and fuel efficiency of simple cycle technology, the Project will serve the peak load requirements of customers in Mohave County, Arizona loads, and surrounding regional load centers.

The Project design performance is presented as follows.

Condition	Temperature (F)	Relative Humidity (%)	Net Plant Output (MW)	Net Plant Heat Rate (Btu/kWh) (HHV)
Design Basis	90	38.7	175.2	9,975
High Temperature Day	113	16.5	174.3	10,029
Average Ambient Conditions for maximum 5000 annual operating hours	80	40.6	176.7	9,892

The amount of operating hours and startups for any individual simple cycle unit is dependent on (i) the location, (ii) the load profiles of the customer, (iii) fuel prices, and (iv) the general power market supply and demand conditions. A typical operating profile for a simple cycle turbine will be 1500-3000 operating hours and 150-250 start-ups per year. The actual annual operating hours and startups of the Project will be determined by the economic dispatch of each unit as determined by customer needs. In order to present realistic worst case environmental impacts given the simple cycle gas-fired technology proposed for this Project, nominal annual hours of 5000 and 300 starts for each of the four (4) units will be evaluated.

4.3.3 Emissions Profile

The Project is filing an application for an air permit from the Arizona Department of Environmental Quality (ADEQ). The information below is a summary of the information contained in that application.

The proposed emission limits for the Project are as follows:

- NOx 5.0 ppm dry volume (ppmdv) @ 15% O_2
- CO 6.0 ppmdv @ 15% O_2
- VOC 5.0 ppmdv @ 15% O_2
- PM_{10} 2.7 pounds per hour (lb/hr)

As discussed above, the Project will control NOx through water injection into the CTG and through the use of an SCR system. CO and VOC emissions will be controlled through the use of an oxidation catalyst. SO_2 and PM_{10} emissions are controlled through the use of pipeline quality gas.

The Project will comply with annual emission limits prescribed for a minor air emission source. The Project will be subject to the annual emission limits that will be at, or below, the following levels:

- NOx 40 tons per year
- CO 100 tons per year
- VOC 40 tons per year
- SOx 40 tons per year
- PM_{10} 15 tons per year

The Project will be operated within these annual emission limits and the Applicant will seek to maximize operating flexibility with respect to full load, part load operating hours and startup and shutdown emissions within these annual emission limits.

4.3.4 Noise Profile

The primary noise sources anticipated with this Project include the CTG inlet, the CTG compartments, the exhaust ductwork, the stack, gas compressors, and the cooling water module. Secondary noise sources are anticipated to include the GSU transformers and miscellaneous pumps, fans, and compressors. All equipment sound levels were estimated based on available data from the equipment manufacturers. Equipment purchased for the Project will be specified for equivalent "A" weighted sound pressure levels not to exceed 85 dBA at 3-feet. Should the purchased equipment have sound levels that exceed OSHA permissible noise limits (CFR 29, 1910.95), administrative or engineering controls will be utilized, such as personal protective equipment.

The sound level power level (PWL) for each equipment noise source is listed in **Table 4-1, Equipment Sound Power Levels**. These equipment sound level specifications are provided from the vendors based on standard packaged equipment.

A noise analysis was conducted to determine any potential noise impact from the Project. The noise analysis is presented in **Exhibit I**.

4.4 Fuel System

High-pressure natural gas will be supplied to the Project from any combination of the El Paso Natural Gas Company (El Paso), Questar Corporation (Questar), and Transwestern Pipeline Company (Transwestern) natural gas interstate pipelines to the UNS local gas distribution system located adjacent to the Project Site. A new UNS-owned metering station will be constructed adjacent to the existing UNS metering station serving Griffith. From this new metering station, gas will be piped to the gas compressor and conditioning equipment skids. The gas conditioning skids will filter gas particulates and drop out moisture contained in the gas. The natural gas system line pressure is expected to be 600 psig at the Project Site boundary. Gas compressors will increase the natural gas supply pressure for the CTGs to approximately 675 psig. Pressure reduction and control valves are used to feed gas to the CTGs.

4.4.1 Fuel Gas Requirements

The Project will utilize an average of approximately 1,750 Million British Thermal Units (MMBtu) (HHV) of gas per hour; 28,000 MMBtu per 16-hour day, and 42,000 MMBtu per 24-hour day.

Assuming a conservatively high 5,000 annual operating hours for each unit, the Project will utilize 8,750,000 MMBtu of gas per year.

4.4.2 Fuel Supply and Transportation

Natural gas will be delivered via two existing UNS-owned and operated gas pipelines that interconnect with the El Paso, Questar and Transwestern interstate pipelines and transport natural gas to the I-40 Industrial Corridor. Both pipelines terminate at an existing gas regulating/metering station located at the northeast corner of the Original Griffith Property.

The Project will interconnect with both UNS laterals just upstream of the existing UNS gas regulating/metering station. The two pipelines will be tied to a new gas metering station, and will be routed to the Project via an approximate 1,000 foot gas pipeline. Fuel gas compressors will boost the pressure to 675 psig and a fuel gas conditioning system will assure adequate gas quality prior to the gas being fed to the CTGs. The representative natural gas analysis, provided by the El Paso and Transwestern, is shown on **Table 4-2, Project Natural Gas Analysis**. All gas interconnection facilities are contained within the boundaries of the Project Property.

Each UNS pipeline lateral has a gas transportation capacity of a minimum of 6,250 MMBtu per hour or 150,000 MMBtu per day for a total UNS system capacity of over 12,500 MMBtu per hour or 242,000 MMBtu per day.

4.5 Electrical Interconnection

4.5.1 Electrical Systems

The Project is designed to interconnect with the Western 230kV transmission system at the neighboring existing Griffith Switchyard. The overall electrical one-line diagram for the Project is shown on **Figure 5, Electrical One-Line Diagram**.

4.5.1.1 Generator Output

Each CTG will have an associated 13.8kV generator switchgear module. Each switchgear bus will have a generator circuit breaker, an auxiliary circuit breaker, and a direct connection to a three-winding GSU transformer. The Project will have two (2) 230-13.8kV three-winding GSUs, which will each be connected directly to two CTG switchgear buses. The high-voltage side of the GSU transformers will connect to the 230kV Griffith Switchyard via overhead transmission lines.

4.5.1.2 Auxiliary Electric System

A 4160V electrical enclosure will house the 4160V motor control center (MCC) along with two 480V MCCs. The 4160V electrical enclosure will have two associated 13.8-4.16kV unit auxiliary transformers feeding the double-ended 4160V MCC and two associated 4160-480V station service transformers to feed the two 480V MCCs.

A 480V electrical enclosure will house the 480V switchgear DCS, and battery and uninterrupted power supply (UPS) system. The 480V electrical enclosure will have two associated 4160-480V station service transformers to feed the double-ended 480V switchgear.

Power for starting the CTGs will be provided to the 480V level by back-feeding power from the Griffith Switchyard via the Project's GSUs and auxiliary transformers.

4.5.2 Electrical Interconnection Systems

The Project connects to the Western 230kV transmission system at the existing Griffith Switchyard. The Griffith Switchyard is owned and operated by Western. The electrical output of each generator will connect to the low-voltage winding of a generator step-up (GSU) transformer used to convert generator output voltage of 13.8kV to the transmission system voltage of 230kV. The high-voltage side of the GSU transformers is connected to the 230kV Griffith Switchyard via two overhead transmission lines. The electrical one-line diagram of the Griffith Switchyard expansion to accommodate the Project is shown on **Figure 4-6, Griffith Switchyard Interconnection Electrical One-Line Diagram**.

4.5.2.1 Electric Interconnection Arrangement

The entirety of the electric interconnection with the Western system occurs within the Project Property or the Original Griffith Property. The interconnection of the Project requires two new 230kV transmission lines that will be constructed within the Project Property and will connect the high-side of the GSU transformers to the expanded Griffith Switchyard. The Griffith Switchyard consists of twelve 230kV circuit breakers arranged in a breaker-and-a-half configuration. The interconnection of the two new transmission lines associated with the Project requires the addition of a new breaker-and-a-half bay consisting of three new 230kV circuit breakers with associated isolation switches. This expansion of the Griffith Switchyard will require additional property (approximately one (1) acre) to be deeded to Western ownership.

4.5.2.2 Electric Interconnection Facilities

The Project's electric transmission lines, constructed on the Project Property, will be constructed with double circuits on tubular steel poles. The poles will be 100 to 120 feet tall with three arms on each side, approximately 17 feet apart to support the conductors and a smaller arm on each side above the conductor arms to support the overhead ground wires used for lightning protection.

4.6 Water Supply and Use

4.6.1 Water Use Requirements

Water uses include pretreated water for makeup to the chiller cooling module, service water, and demineralized water for NOx control and SPRINT power augmentation.

The Project minimizes water consumption and wastewater generation by integrating with the water treatment and wastewater treatment equipment of Griffith.

One design approach to minimize water use is to capture and recycle the condensate created by the CTG inlet air chillers. Depending on temperature and humidity, the condensate flow available from the inlet coils can be up to 25 gpm.

At design conditions, assuming that no chiller condensate is recovered, the maximum total raw water requirement is 370 gpm, or 355,200 gallons per day (gpd) based upon 16 hours of operation. With

consideration of condensate recovery, the maximum total raw water requirement is 345 gpm or 331,200 gpd based on 16 hours of operation.

The Project water balance is presented in **Figure 7, Water Balance Diagram** and indicates the various process water flow streams for an average operating day. **Table 4-3, Water Use and Wastewater Production** lists the water and wastewater flows for several design conditions.

4.6.2 Source of Water

The existing I-40 Industrial Corridor Water System owned by Mohave County is capable of supplying a minimum of 5,000 gpm of water from the Sacramento Valley aquifer. The system consists of six (6) groundwater wells approximately 1200-1400 feet in depth, a water pipeline collection and distribution system and a 1.3 million gallon storage tank located north of the Project Site.

The Griffith Owner contractual volume (peak flow capacity) under a Water Interconnection and Supply Agreement with Mohave County is 4500 gpm, of which 450 gpm will be allocated to the Project. The expected water use rate for the Project is 345 gpm and the water demand under extreme temperature conditions (113°F) is 380 gpm, thus allowing for a 30 percent water supply capacity margin over expected conditions and nearly a 20 percent margin during extreme temperature conditions. The groundwater allocation from the Sacramento Valley aquifer and the capacity contracted in combination by Griffith Owner and Applicant remain unchanged as a result of the Project.

4.6.3 Water Treatment

4.6.3.1 Inlet Air Chiller Module

The cooling module will provide heat rejection for the centrifugal chiller used to supply chilled water to the air inlet coils. Makeup water will be pre-treated water from Griffith. The circulating water will be continuously treated and controlled in order to achieve approximately 6 cycles of concentration. The 6-cycle limit is determined by the silica concentration of the water.

Makeup water will replace water lost from evaporation, drift, and blowdown. A chemical feed system will supply water-conditioning chemicals to the circulating water to minimize corrosion and control the formation of mineral scale and bio-fouling. Sulfuric acid will be fed into the circulating water system in proportion to makeup water flow for alkalinity reduction to control the scaling tendency of the circulating water. The acid feed equipment will consist of a bulk sulfuric acid storage tank and two full-capacity sulfuric acid metering pumps.

To further inhibit scale formation, an alkaline scale inhibitor solution will be fed into the circulating water system in an amount proportional to the circulating water blowdown flow. The scale inhibitor feed equipment will consist of a chemical solution bulk storage tank and two full-capacity scale inhibitor metering pumps.

To prevent bio-fouling in the circulating water system, a sodium hypochlorite solution will be fed into the system. The hypochlorite feed equipment will consist of a bulk storage tank and two full-

capacity hypochlorite metering pumps. Two full-capacity metering pumps will be provided for feeding either stabilized bromine or sodium bromide as supplemental biocides.

4.6.3.2 Demineralized Water

The water injected into the CTG for NOx control and SPRINT power augmentation must be free of contaminants. Pretreated water from Griffith will be filtered and further treated by RO trailers located on the Project Site. The product water from the RO trailers is sent through demineralizer trailers and then to a demineralized water storage tank. The leased demineralizer trailers are taken off-site for regeneration and all waste product is disposed of off-site by the trailer vendor at licensed commercial facilities in compliance with applicable regulations.

4.7 Wastewater and Stormwater

4.7.1 Process Wastewater

Project process wastewater disposal will be integrated with the Griffith wastewater system. Project wastewater will be routed through the Griffith wastewater recovery and treatment system and process reject wastewater will sent to the existing Griffith brine disposal pond.

There will be process wastewater streams from the Project's RO system and chiller cooling tower. The wastewater will be sent to the Griffith wastewater treatment system where 80 percent of the water is recovered and sent to the Griffith cooling tower. This leaves 20 percent of the stream as the wastewater flow to the brine evaporation pond. As shown in **Table 4-3, Water Use and Wastewater Production**, the maximum flow to the pond while operating is 29,000 gpd (20.1 gpm). However, the average annual flow is 11 gpm based on the conservatively high operating assumptions presented above. The Project will also generate a negligible waste stream from plant drains, consisting of equipment wash-down water and the minor condensation streams from the compressed air and continuous emissions monitoring systems (CEMS). These drains will be directed to the oil/water separator, and then discharged to the Griffith wastewater system. Wastewater generated from CTG compressor washing will be collected in an underground tank before it is trucked off-site for disposal at a licensed facility.

4.7.2 Sanitary Waste

The Project personnel will utilize the existing Griffith sanitary facilities with no increase in design capacity required for the additional personnel. During periodic major maintenance events, portable facilities will be provided to accommodate the additional maintenance workers.

4.7.3 Stormwater Management

On-site stormwater runoff will be routed to the west of the power block by means of swales, ditches and sheet flow. However, where space restriction precludes the use of open ditches and channels, a series of pipes and inlets will be used. Culverts will be used to carry stormwater under on-site traffic areas. Stormwater runoff will discharge by gravity from the power block area to a one (1) acre stormwater retention basin located to the west of the power block to prevent storm water from leaving the Project Site. Offsite runoff will be routed around the Project Site using berms and ditches.

4.8 Plant Auxiliaries

The Project auxiliary systems include fire protection, aqueous ammonia, compressed air, and lighting as described in the following paragraphs.

4.8.1 Fire Protection System

The Project includes an underground firewater loop interfaced with the Griffith firewater system. There will be two connections to two different portions of the Griffith firewater loop. The Project does not require on-site storage of firewater since it will be served from Griffith.

The CTG enclosures are protected by a carbon dioxide (CO_2)-based fire suppression system as supplied by the manufacturer, which includes heat and natural gas detection devices.

The oil-filled transformers are isolated from adjacent equipment and structures using physical separation and/or firewalls. The auxiliary transformers are supplied with dielectric fluids. Each transformer also resides within a concrete containment area that serves to:

- Contain oil spills.
- Retain direct contact stormwater that may potentially come in contact with transformer oil.
- Retain firewater that will come into contact with transformer oil.

The fire protection system will be designed per NFPA standards, utilizing equipment approved by Underwriter's Laboratories/Factory Mutual Research Corp (UL/FM).

4.8.2 Ammonia Receiving and Storage System

The aqueous ammonia system provides for the receipt, storage, and delivery of 19 percent aqueous ammonia to the SCRs to reduce NOx emissions. Aqueous ammonia will be delivered to the Project Site via tanker trucks and deposited in an aboveground 10,000 gallon storage tank. Aqueous ammonia is then pumped to each SCR where it is sprayed into the CTG exhaust flow up stream of the NOx catalyst to reduce plant emissions. The Project's ammonia system will not be integrated with Griffith.

4.8.3 Compressed Air

The compressed air system provides both service air and instrument air throughout the Project. Service air is used primarily for maintenance activities. The instrument air system is used for the operation of control systems, primarily pneumatic valves. Three 50 percent capacity compressors will be provided for the Project. The existing compressed air system at Griffith will not be integrated with the Project.

4.8.4 Lighting Systems

Outdoor area lighting for the Project will consist of permanently mounted fixtures secured to structures, equipment, walls and poles as required providing access lighting for plant operations and maintenance. This lighting will consist of efficient, high-pressure sodium (HPS) fixtures located

throughout the facility, mounted on pendants, poles, stanchions, building columns, or walls. Outdoor lights will be automatically controlled by photocells with manual override capability.

The outdoor lighting system will be designed to provide nighttime lighting levels consistent with the Illuminating Engineering Society (IES) standards to allow basic operator movement throughout the power block. All outdoor lighting shall meet the requirements of the city of Kingman, Arizona Municipal Code Chapters 5 (Buildings, Building Regulations and Codes) Chapter 9 (Utilities); Street Regulations Section 3-9 (Street Lighting); and Zoning Ordinance Section 34 (Outdoor Lighting Code).

4.9 Construction

The Project will be constructed by a primary contractor who will perform the engineering, procurement, and construction (EPC) of the Project. The EPC contractor will typically be responsible for the complete design of the Project, procurement of equipment and permanent materials, construction of all civil works, foundations and structures, and startup and checkout of the generation facility. Up to six (6) acres of the Project Property will be dedicated as the Temporary Construction Area and will serve as space for construction trailers and parking as well as a laydown and storage area for equipment and materials used by the EPC contractor.

The design and construction of the extension of the Griffith Switchyard will be performed by Western. Similarly modifications to the UNS gas distribution system to add a new gas metering facility for the Project will be performed by UNS. No modifications to the I-40 Industrial Corridor Water System will be required.

4.9.1 Project Cost

The cost of the Project is estimated to be in the range of $140 to $160 million. The cost includes the CTGs, gas compressors, transformers, chiller, gas, water and electric transmission interconnection facilities and all ancillary balance of plant equipment as well as all civil works, construction labor, construction materials, and engineering. In addition, the Project cost includes the cost estimates for gas and electric interconnections performed by the interconnecting utilities and Applicant's costs for development, insurance and financing.

4.9.2 Project Schedule

4.9.3 Engineering, Procurement and Construction Schedule

The field construction schedule from site mobilization to commercial operation for a four (4) unit simple cycle project is typically nine (9) to twelve (12) months. Depending on equipment fabrication and delivery durations, detailed engineering and procurement activities are initiated up to twelve (12) months in advance of site mobilization to assure that equipment deliveries occur to support the construction schedule. Market conditions can impact both the equipment lead times and the construction labor availability thus extending EPC schedules.

The key Project schedule milestones are presented in **Table 4-4, Anticipated Project Schedule.**

4.9.3.1 Potential Modified Construction Schedule

Depending on market conditions, the Project may be constructed in a two-phased construction sequence with two (2) units being advanced to construction immediately upon the receipt of environmental approvals and completion of power purchase agreements and the second two (2) units constructed within five (5) years of receipt of environmental approvals.

4.9.4 Transportation

All equipment, permanent materials, and commodities for the Project will be transported to the site via state and interstate highways which are designed for an AASHTO truckload designation of HS_20. The roads and bridges can accommodate the heaviest anticipated equipment component for the Project. Heavy haul trucks with multiple axles will be employed to distribute loads, as required. All equipment and material deliveries will utilize the Project Site access.

4.9.4.1 Equipment and Materials

Truck deliveries of equipment and materials will occur from the initial construction notice to proceed through the entire duration of the Project. Initial truck deliveries will include haul trucks for importing engineered fill materials, as required, followed by concrete trucks for installation of major foundations, and deliveries of reinforcing steel. Piping materials for buried piping will be delivered to Project Site early in the construction period corresponding to approximately the time frame for foundation installation. Deliveries of large major equipment will commence at about midpoint of the construction period.

4.9.4.2 Labor Force

The monthly construction labor force requirements for the Project are presented on **Table 4-5, Construction Workforce Projection**. This projection includes all personnel required to complete construction of the Project including overall Project and site management, laborers, skilled craft, and startup personnel. Skilled craft and laborers will be drawn from the local area with construction management and startup functions provided by relocated personnel from the EPC contracting firm.

5. Jurisdictions:

5.1 Areas of jurisdiction (as defined in ARS §40-360) affected by this site:

The Project is located wholly within Mohave County on private lands within the I-40 Industrial Corridor. The Project Property is zoned MX by Mohave County. This zoning designation permits the siting of industrial facilities, including electric generation facilities. No local land use permits such as conditional use permits or special use permits are required by Mohave County, given the MX zoning of the Project Property. Although not jurisdictional agencies, the Cities of Kingman, Lake Havasu City, and Bullhead City are also being consulted because they are the largest municipalities in the county.

6. Description of the environmental studies the applicant has performed:

The Applicant has engaged several experienced consultants who have conducted field studies and impact evaluation of the Project Property. Under the direction of Western, studies are also being

conducted for the preparation of the Environmental Assessment (EA) to evaluate the interconnection of the Project to their electrical system. This EA will be submitted as supporting documentation for this application when completed. To the extent that the Western environmental process identifies the need for mitigation measures, they will be included as needed to minimize or eliminate impacts.

Evaluation of the existing environment was conducted for land use, air quality, visual resources, soils, biological resources, cultural resources, noise, and socioeconomics. Potential environmental effects of implementation of the Project were also assessed.

Environmental studies of the Project area began with the collection of existing environmental data including literature, maps, and other agency data. Interviews were conducted with appropriate agencies and organizations. Scoping to identify issues was conducted with the public and interested agencies. Field studies on the Project Property were conducted by several resource specialists.

Potential environmental effects were determined by comparing the Project and the existing environment. The results of these studies are included in **Exhibits A through F and I**.

Several individuals and agencies were contacted to solicit input on the Project. These are identified in **Exhibit H** and various agencies and individuals have provided written comments on the Project. Copies of the Public Contact letters are provided in **Exhibit J-1.** Public Response letters are provided in **Exhibit J-2**. **Exhibit J-3** contains copies of the meeting and Public Notices. **Exhibit J-4** has the Project Fact Sheet and Open House Materials. **Exhibit J-5** contains the public comments and issues, as well as the Applicant's preliminary responses to the issues that have been raised.

The analysis of the Northern Arizona Energy Project determined that the following critical elements are not present or will not be affected by the proposed action: wild and scenic rivers, areas of critical environmental concern (ACEC), wetlands or riparian areas, ground or surface water quality, floodplains, and hazardous or solid wastes.

Analysis indicates there will be no significant direct, indirect, or cumulative impacts on land use, cultural resources, wilderness, and biological resources including any species of special concern, socioeconomics, earth resources, air quality, or noise at the Project Property. Analysis and consultation concerning Native American concerns or traditional cultural properties is being conducted as part of the EA. Analysis of environmental justice determined that no low income or minority populations will be disproportionately affected.

TABLE 4-1 EQUIPMENT SOUND POWER LEVELS	
Noise Source	**dBA**
Air Compressor Skid	103
Air Inlet Filter House	94
Ammonia Forwarding Pumps	98
Ammonia Injection Skid	98
Ammonia Vaporizer	98
Auxiliary Skid	103
Auxiliary Transformer	89
Chiller skid	103
Cooling / Purge Air Fans	95
Demineralized Water Pumps	98
Fuel Gas Compressors	109
Fuel Gas Regulator Skid	99
Generator Enclosure Walls	95
Generator Exhaust Silencer, Damper & Exit	94
Generator Vent Fan Motor & Shell Surfaces	88
Rooftop Ventilation Fans	88
Selective Catalytic Reduction Unit	100
Step-Up Transformer	99
Turbine Enclosure Walls	98
Turbine Exhaust Duct Casing	97
Turbine Exhaust Stack	133
Turbine Lube Oil Cooler (fin-fan)	104
Turbine Vent Fan Discharge	93
Turbine Vent Surfaces	96
Wastewater Forwarding Pumps	98

TABLE 4-2 PROJECT NATURAL GAS ANALYSIS	
Higher Heating Value	1,016.0 Btu/scf 22,667 Btu/lb
Lower Heating Value	915.5 Btu/scf 20,425 Btu/lb
Specific Gravity	0.5857
H-C Molar Ratio	3.9449
Inerts-HC Mass Ratio	0.0503
Molecular Weight	16.934
Spec. Heat (Cp), Btu/lb-F	0.5180
Water Vapor, lb/MMscf	< 7
Sulfur (total), grains/100scf	< 5
Hydrocarbon Dew Point, F	< 20
Temperature °F	40 to 120
Chemical Compounds	**Composition, % by Vol**
Methane	96.07
Ethane	1.49
Propane	0.33
Iso Butane	0.06
Norm Butane	0.06
Iso Pentane	0.02
Norm Pentane	0.01
Hexanes plus	0.03
Carbon Dioxide	1.69
Nitrogen	0.24
Hydrogen	0.00
Helium	0.00
Oxygen	0.00

TABLE 4-3 DAILY AND ANNUAL WATER FLOWS [1]					
		Peak Day [2] 1000 gpd	Summer Day [3] 1000 gpd	Expected Year [4] Acre-ft/yr	Max Year [5] Acre-ft/yr
Raw Water Use					
	Cooling Module Makeup	227	145	70	81
	Demineralizer System	389	260	125	250
	Service Water	4	3	1	3
	Recovered Wastewater	(116)	(77)	(37)	(66)
	Net Water Use	**504**	**331**	**159**	**268**
Wastewater Flows					
	Cooling Module Blowdown	44	28	13	17
	RO System Rejects	97	65	31	63
	Plant Drains	4	3	1	3
	Recovered Wastewater	(116)	(77)	(37)	(66)
	Net Wastewater to Pond	**29**	**19**	**8**	**17**

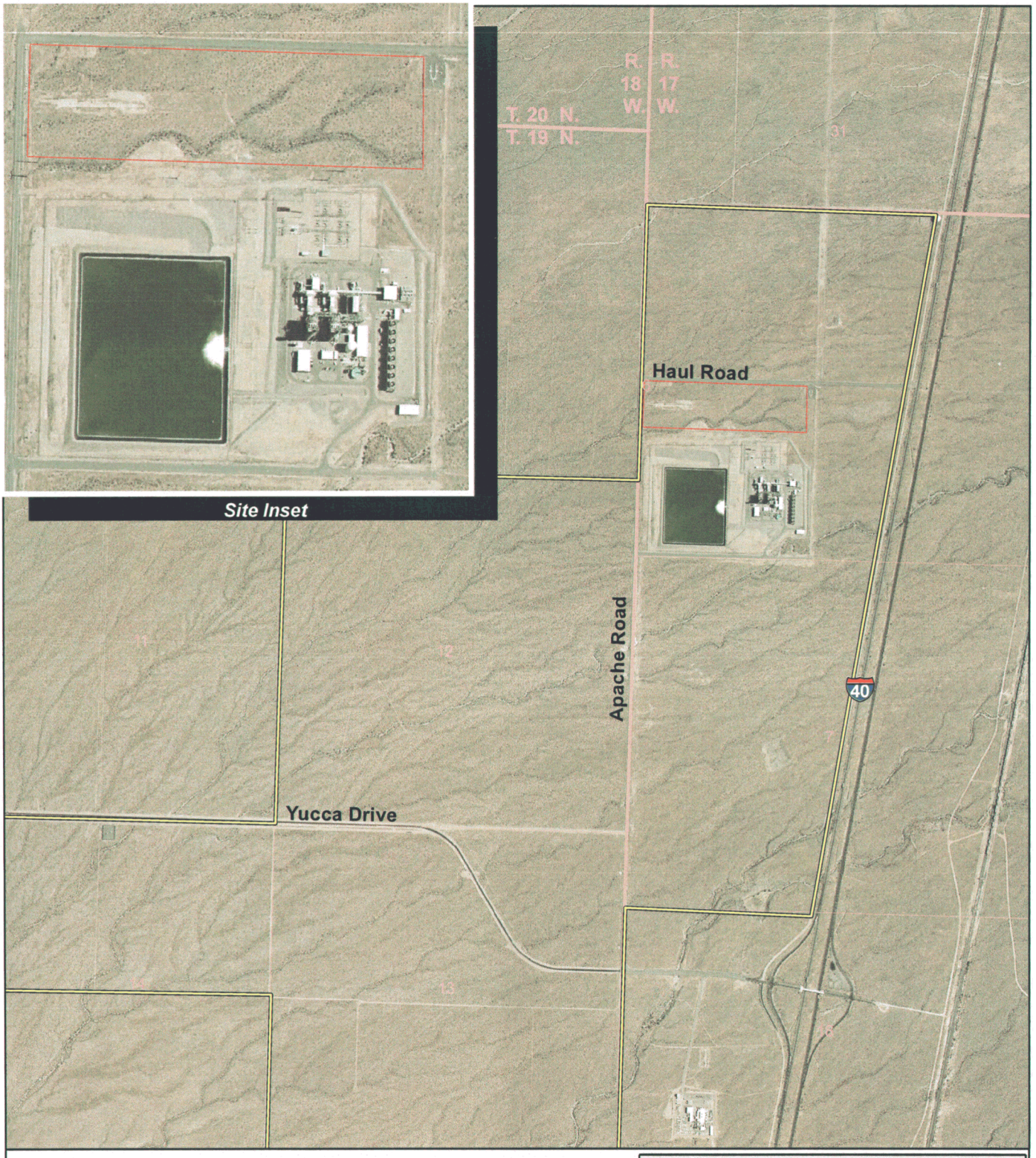
Notes:
1) All flows are for four (4) units operating at base load.
2) Peak Day is 24-hour operation with 12 hours at the peak temperature (113°F) and 12 hours at the design condition temperature (90°F).
3) Summer Day is 16 hours at the design condition temperature (90°F).
4) Expected year is based on 2,500 hours of operation per CTG at the design operating temperature (90°F).
5) Max Year is based on 5,000 hours of operation per CTG at the average operating temperature (80°F).
6) Assuming no chiller condensate recovery, the net water use is 355,200 gpd.

TABLE 4-4 ANTICIPATED PROJECT SCHEDULE	
Action	**Date**
Submit Application for CEC	February 2007
All Permits Complete	October 2007
Onsite Construction Starts (earliest)*	4th Quarter 2007*
Commercial Operation (earliest)*	May 2008*

** Depending on market conditions*

TABLE 4-5 CONSTRUCTION WORKFORCE PROJECTION* Months After Construction Notice to Proceed										
	1	2	3	4	5	6	7	8	9	10
Power Block Workforce	34	80	115	132	138	138	132	115	80	34
Substation Expansion Workforce		10	30	30	10					
Total	**30**	**90**	**145**	**162**	**148**	**138**	**132**	**115**	**80**	**34**

** Includes construction management, laborers, skilled craft, and start-up personnel.*



Legend

Northern Arizona Energy Project Boundary

I 40 Industrial Corridor Boundary

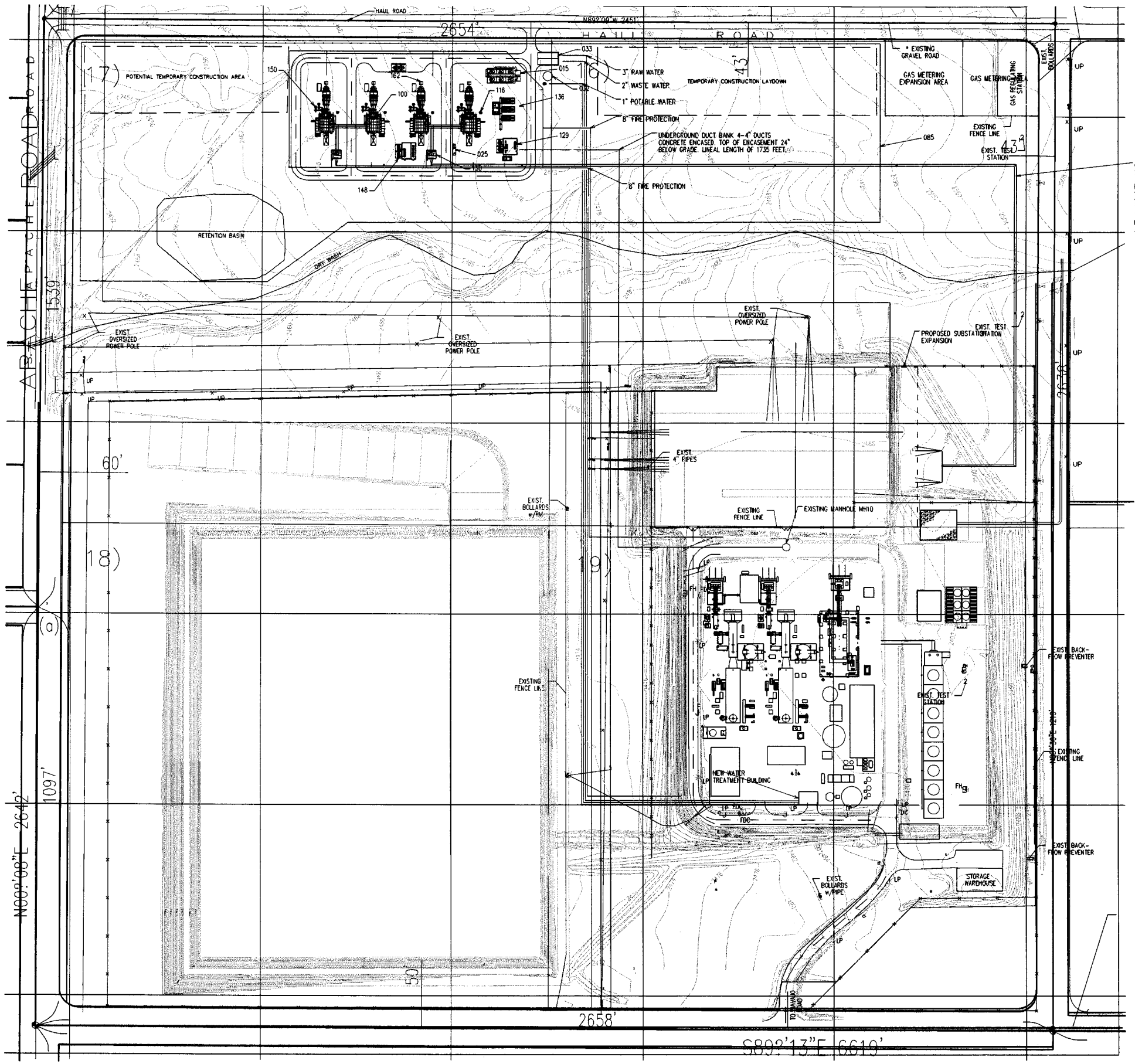
0 250 500 1,000 Meters

0 500 1,000 2,000 3,000 4,000 Feet

NORTHERN ARIZONA ENERGY PROJECT

Figure 1
Site Location Map

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/15/2007	File: 2516/Site.mxd
Created By: JG	Layout: Site.pdf



015 CHILLER WITH COOLING TOWER
025 FUEL GAS FILTER SEPARATOR
032 DEMIN STORAGE TANK
033 DEMIN TRAILER PAD
085 SITE FENCE
100 LM6000 GAS TURBINE/GENERATORS
116 OIL/WATER SEPARATOR
129 4,160V SWITCHGEAR/AUX TRANSFORMER
130 CTG STEP-UP TRANSFORMERS, 3 WINDING
136 GAS COMPRESSORS
148 480V STATION SERVICE TRANSFORMERS
150 HOT SCR AND STACKS
162 CEMS

100 0 100 200
SCALE IN FEET
SCALE: 1" = 100'-0"

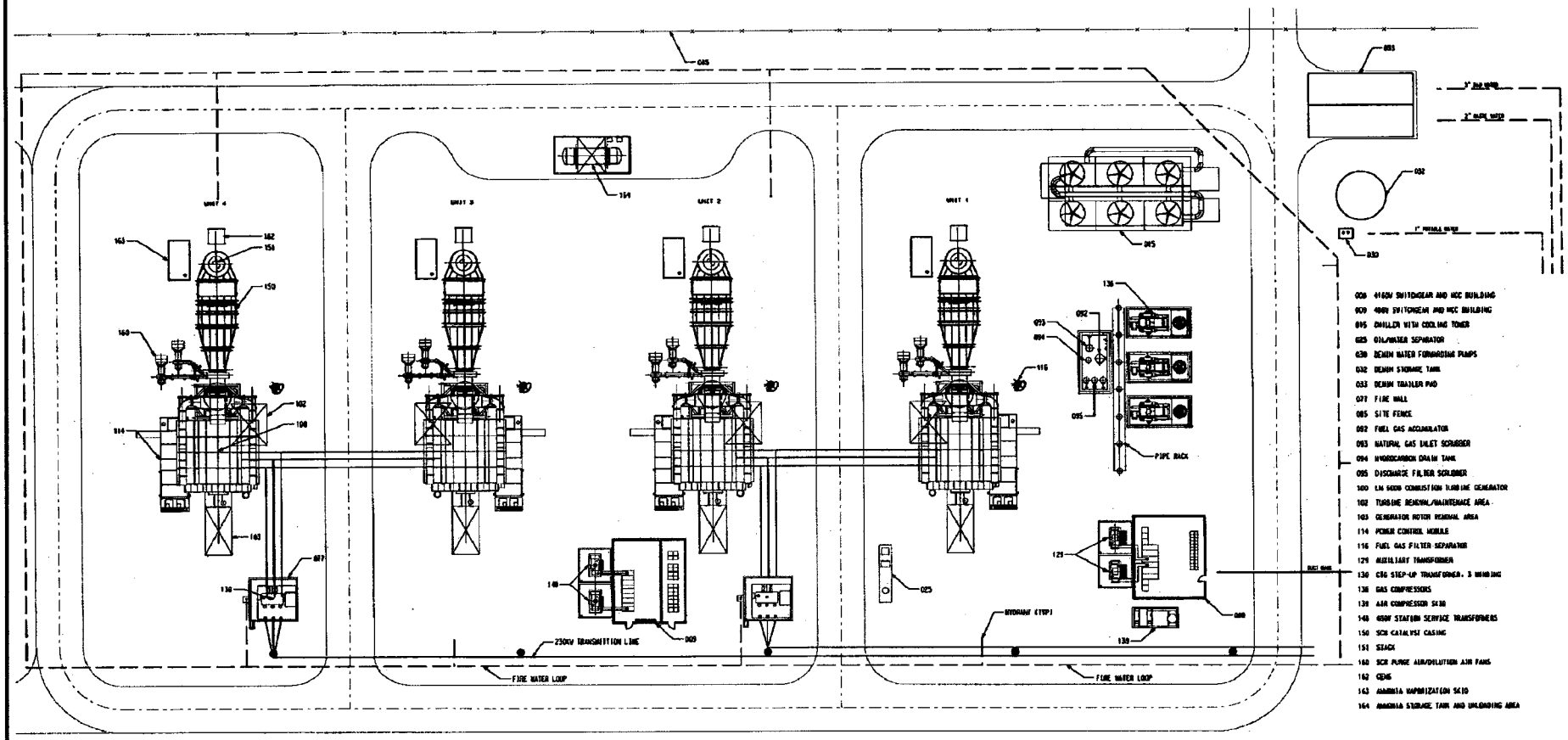
PLANT NORTH

NORTHERN ARIZONA ENERGY PROJECT

Figure 2
Power Plant and Associated Facilities

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/07	File: 2006-053-PP-100Drev0 For CEC 01-18-07.dwg
Drawn By: ETC	Layout: 001

Source: Bibb Engineering

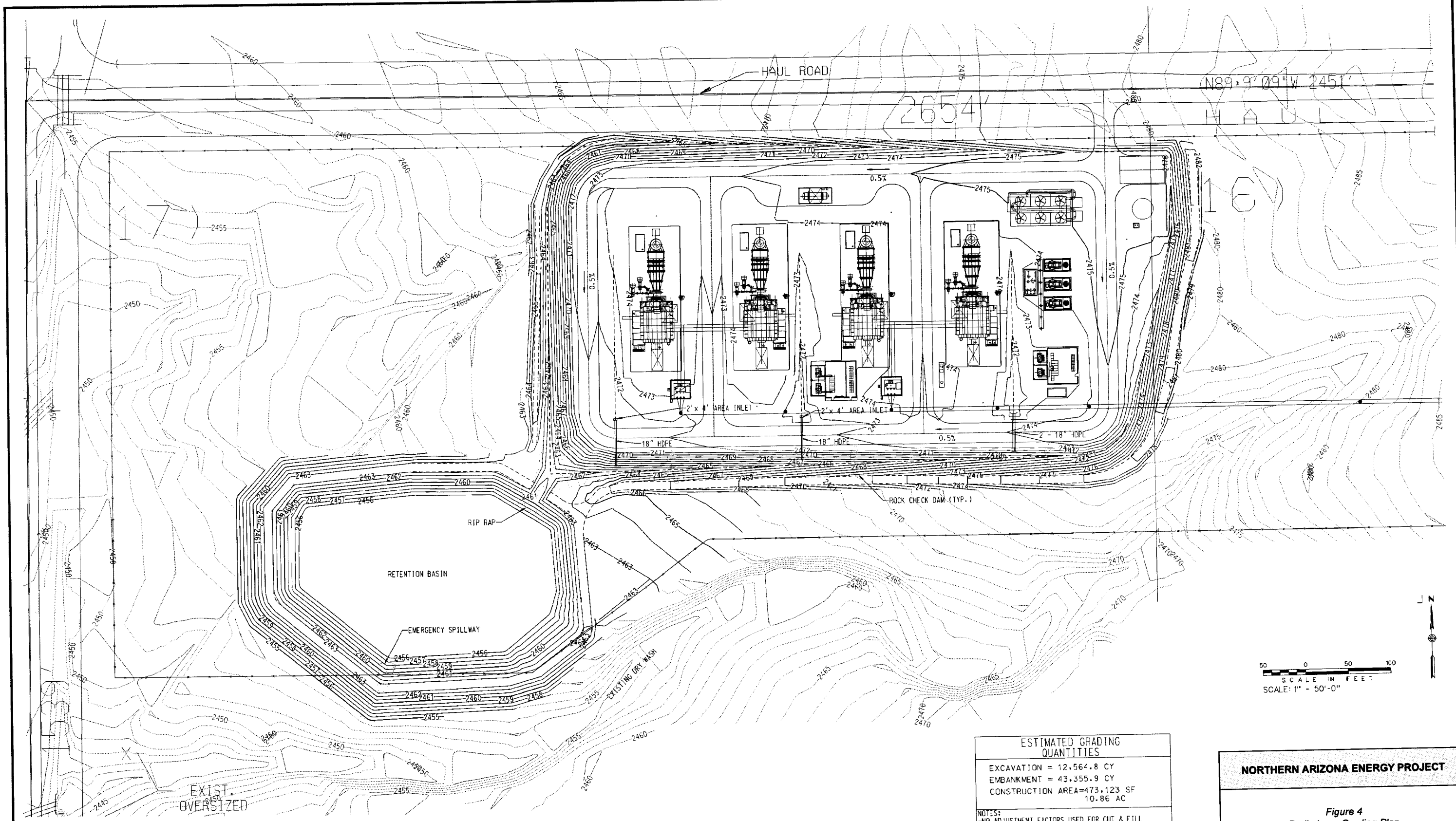


NORTHERN ARIZONA ENERGY PROJECT

Figure 3
Site Layout of Power Plant

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/15/07	File: 2006-053-PP-100Drev0 For CEC 01-18-07.dwg
Drawn By: ETC	Layout: 002

Source: Bibb Engineering



ESTIMATED GRADING QUANTITIES
EXCAVATION = 12,564.8 CY
EMBANKMENT = 43,355.9 CY
CONSTRUCTION AREA=473,123 SF 10.86 AC

NOTES:
-NO ADJUSTMENT FACTORS USED FOR CUT & FILL
-VOLUMES BASED ON PROPOSED SURFACES AS SHOWN IN THIS PLAN.
-QUANTITIES BASED ON SURFACES CREATED IN GEOPAK
REFERENCE: 2006053/CIV/GEOPAK/122006 PROPOSED.GSF
SITE 122006 VS. EXISTING TOPO

EXISTING CONTOURS BASED ON SURVEY PROVIDED BY:

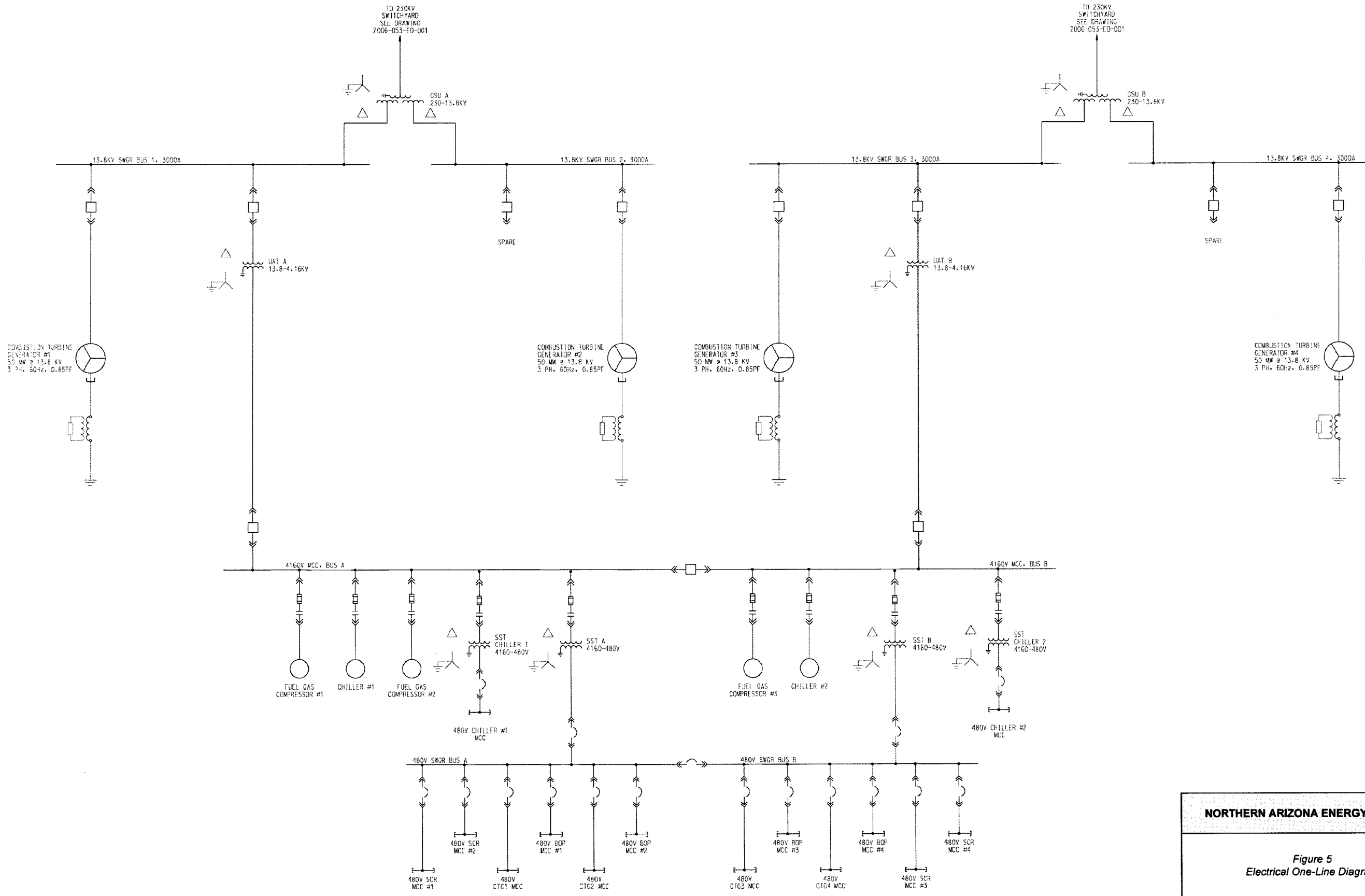
MOHAVE ENGINEERING ASSOCIATES, INC.
2202 STOCKTON HILL ROAD, SUITE A
KINGMAN, AZ 86401
PHONE: 928-753-2627

NORTHERN ARIZONA ENERGY PROJECT

Figure 4
Preliminary Grading Plan

ANALYSIS AREA:MOHAVE COUNTY, ARIZONA	
Date:02/15/07	File: 2006-053-PP-100Drev0 For CEC 01-18-07.dwg
Drawn By: ETC	Layout:003

Source: Bibb Engineering

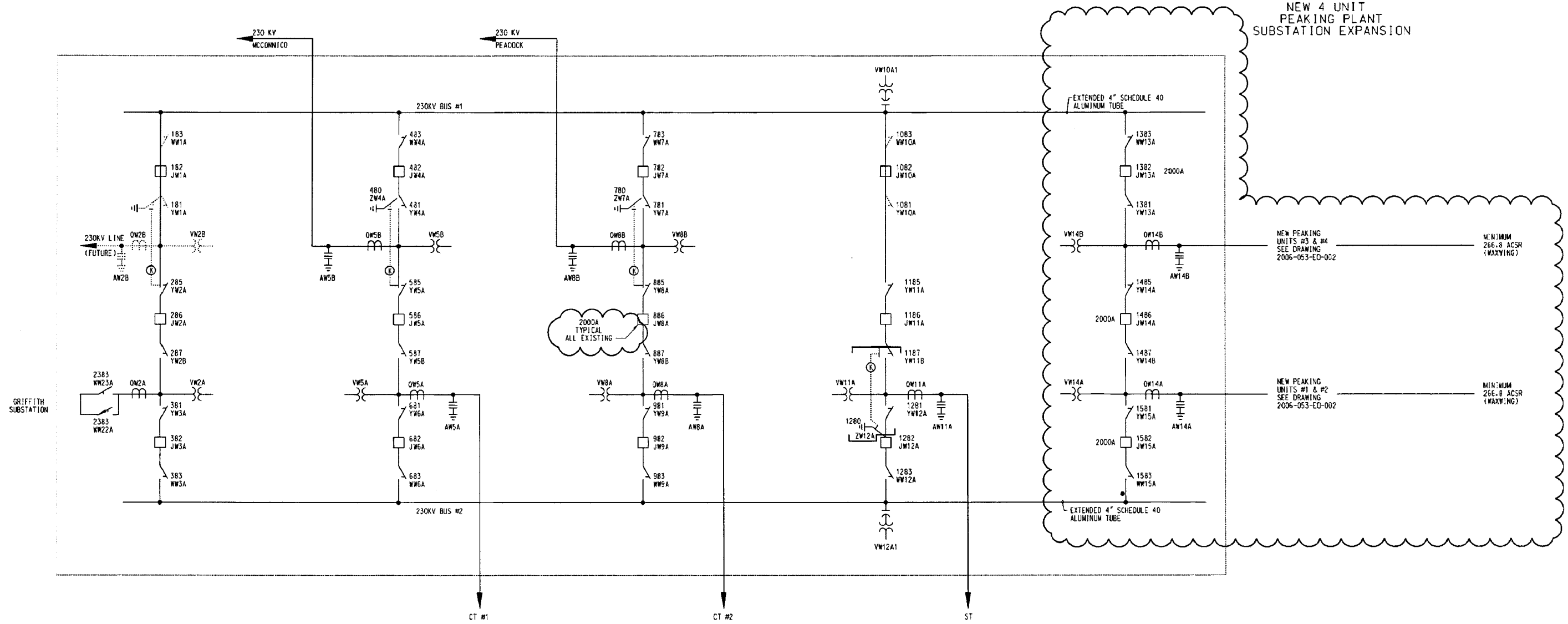


NORTHERN ARIZONA ENERGY PROJECT

Figure 5
Electrical One-Line Diagram

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/15/07	File: 2006-053-PP-100Drev0 For CEC 01-18-07.dwg
Drawn By: ETC	Layout: 006

Source: Bibb Engineering

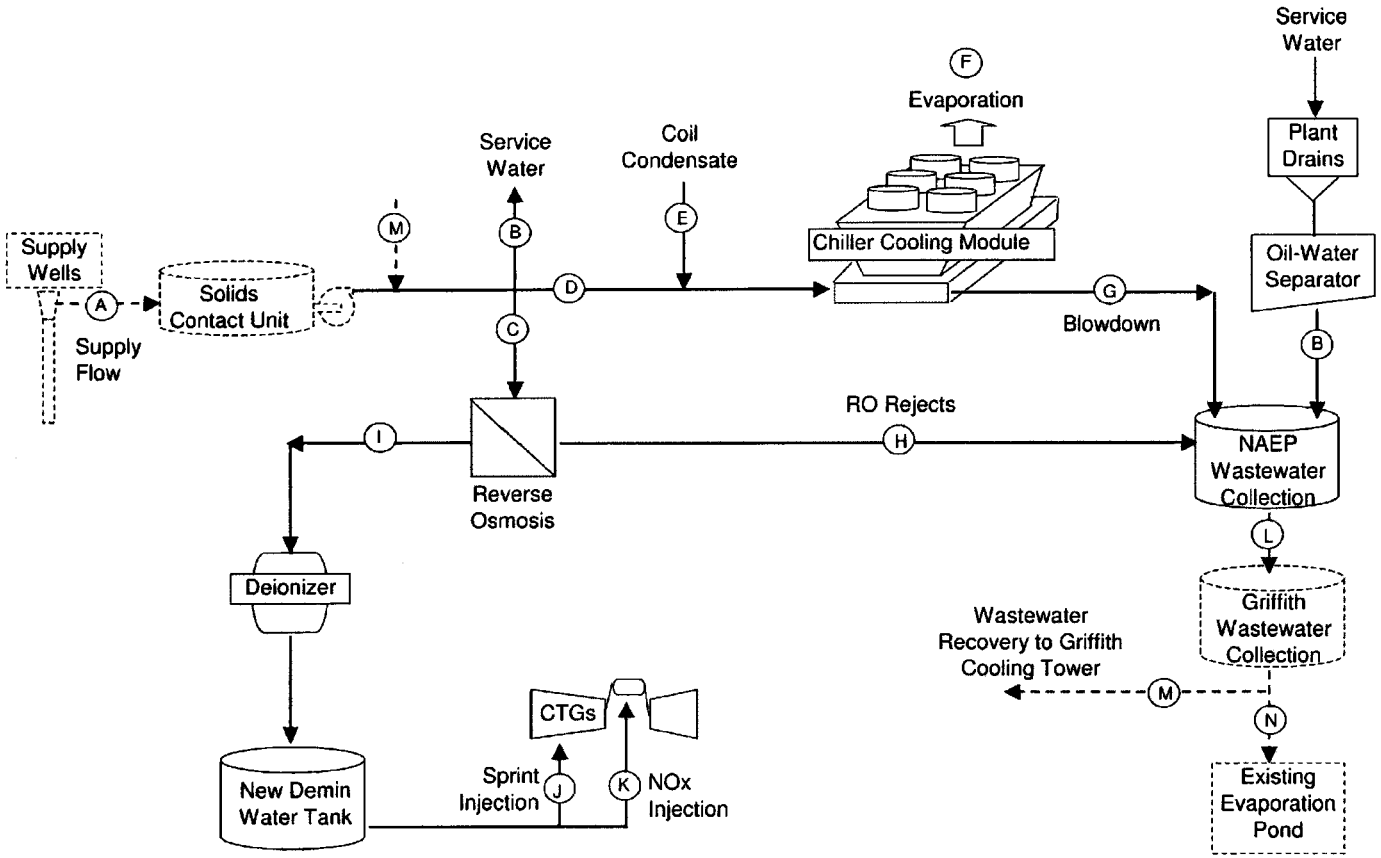


NORTHERN ARIZONA ENERGY PROJECT

Figure 6
Griffith Switchyard Interconnection
Electrical One-Line Diagram

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/15/07	File: 2006-053-PP-100Drev0 For CEC 01-18-07.dwg
Drawn By: ETC	Layout: 005

Source: Bibb Engineering



Notes:

1) Based on 4 x LM6000 PC Sprint
2) Using Griffith service water and Griffith waste water treatment
3) All Flows are displayed in GPM
4) NOx and Sprint Injection flows from GE performance estimates
5) Reverse Osmosis recovery rate 75%
6) Wastewater recovery rate 80%
7) Cooling Tower cycles of conc. 6.0

Temperatures:

Peak	113
Average Summer (Jun-Aug)	90
Average Operating (Apr-Oct)	80
Coldest Temperature	25

Stream	Description	TEMPERATURE, F			
		113	90	80	25
A	Flow from the supply wells	380	345	290	179
B	Service water to NAEP wash-down hoses	3	3	3	3
C	Softened water to NAEP RO Trailer	271	271	271	223
D	Softened water to NAEP cooling module makeup	192	151	88	0
E	Inlet air coil condensate	25	25	25	0
F	NAEP cooling module evaporation	181	147	94	0
G	NAEP cooling module blowdown	36	29	19	0
H	NAEP RO system reject stream	68	68	68	56
I	Demineralizer trailer water flow	203	203	203	167
J	Demin water for SPRINT injection	63	63	63	0
K	Demin water for NOx injection	140	140	140	167
L	Wastewater flow to Griffith	107	100	90	59
M	Wastewater recovered by Griffith HERO ™	86	80	72	47
N	Wastewater flow to evaporation pond	21	20	18	12

NORTHERN ARIZONA ENERGY PROJECT

Figure 7
Water Balance Diagram

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA

Date: 02/15/07	File: 2006-053-PP-100Drev0 For CEC 01-18-07.dwg
Drawn By: ETC	Layout: 004

Source: Bibb Engineering

Northern Arizona Energy, LLC therefore affirms, upon thorough, expert scientific environmental investigation and analysis, that the Northern Arizona Energy Project and its site are environmentally compatible, and respectfully requests the Committee to issue its Certificate of Environmental Compatibility for the Project at the proposed site.

Northern Arizona Energy, LLC

By: _____
Mr. Kevin R. Johnson
Authorized Officer

ORIGINAL and __ copies of the foregoing hand delivered and filed with the Director of Utilities, Arizona Corporation Commission, this _____ day of _____, 2007.

EXHIBIT A LOCATION MAP AND LAND USE INFORMATION

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

1. "Where commercially available, a topographic map, 1:250,000 scale, showing the proposed plant site and the adjacent area within 20 miles thereof.
2. Where commercially available, a topographic map, 1:62,500 scale, for each plant site, showing the area within two miles thereof. The general land use plan within this area shall be shown on the map, which shall also show the area of jurisdiction affected and any boundaries between such areas of jurisdiction. If the general land use plan is uniform throughout the area depicted, it may be described in the legend in lieu of an overlay."

Figure A-1: Proposed Plant Site, Proposed Project Features, Jurisdiction, and Land Status. Figure A-1 shows the extent of the Northern Arizona Energy Project. No transmission lines outside of the Project Property are proposed for the Project. Figure A-1 is provided in the specified scale of 1:250,500.

Figure A-2: Existing Land Use and Zoning. Figure A-2 is an aerial photo that shows the existing land use in the area and around the Project and on the current zoning designation for private lands. If no zoning is designated for a particular section, the reader can assume that the section is State or Federal land.

Figure A-3: Planned Land Use. Figure A-3 shows the planned land uses near the Project.

Figure A-2 and A-3 in this exhibit are provided in the specified scale of 1:62,500.

LAND USE

The Project will be located on an approximately 40-acre parcel of land (Project Property) located just west of Interstate 40, approximately nine (9) miles southwest of the City of Kingman, and three (3) miles north of the Griffith interchange in Mohave County, Arizona. The Project will be constructed on private lands within the County-designated Interstate 40 (I-40) Industrial Corridor just north of the existing Griffith Energy Project as shown on **Figures A-1 and A-2**. The Project Property will occupy essentially the northern-most 700 feet of the original 160 acre parcel of land owned by Griffith (Original Griffith Site) previously found to be environmentally compatible for siting an electric generating facility.

The Project will be accessed by existing roads via the Griffith interchange on I-40, which travels north-south near the Project. From the Griffith interchange, access to the Project Site will be west on Griffith Road, then approximately two (2) miles north on South Apache Road, then east on Haul Road to the Project Site entrance. Public access to the Project will be controlled through a security gate at the Project Site entrance off of Haul Road located along the north boundary of the Project Property.

Current and proposed land management plans applicable to private lands in the vicinity of the Project Property include the original Mohave County General Plan (General Plan), adopted in 1995 and amended in 2003, the 2005 Draft General Plan, the 2002 Golden Valley Area Plan, and the

Mohave County Zoning Regulations (Mohave County 1995, 2002, and 2005a and 2005b). The amended General Plan designated the I-40 Industrial Corridor; however, the Area Plan for the I-40 Industrial Corridor is not yet finalized. The Zoning Regulations establish zoning districts to implement land-use controls for development.

The Project Property is zoned for heavy industrial / manufacturing (MX). Land uses permitted within MX zoning include light and heavy industry, and commercial and industrial uses appropriate to an industrial park, such as manufacturing, and warehouses. Any uses permitted in the Commercial-Manufacturing or General Manufacturing zones are permitted uses in the MX zone without a zoning use permit. The MX zoning district corresponds to the Heavy Industrial land use designation in the adopted General Plan. This zoning designation permits the development of industrial facilities, including electric generation facilities. Existing industrial development in the vicinity of the Project Site includes the adjacent Griffith Energy Project, the Praxair industrial gases and liquids facility about two (2) miles south of the Project Site, existing transmission lines and utilities, Interstate 40 and Route 66, the mainline of the Burlington Northern & Santa Fe Railroad, and two transcontinental natural gas pipeline corridors. In addition, the Arizona State Prison in Kingman, a 1400-bed private correctional facility, is located within the I-40 Industrial Corridor.

Figure A-2 is a recent (2005) aerial photo showing the current land uses for the Project Property and surrounding lands. The current zoning designations are also shown on **Figure A-2**. The properties surrounding the I-40 Industrial Corridor are predominantly undeveloped rural lands which are privately owned and currently zoned for rural uses (primarily ranching), residential subdivisions, commercial centers, and residences and infrastructure (roads, utilities).

Other than the existing Griffith Energy Project adjacent to the south, the lands immediately adjacent to the Project Property are currently undeveloped and are primarily used for livestock grazing and some industrial uses. The nearest residence is approximately 2.5 miles northwest of the Project Property.

BLM lands in the regional area are managed for multiple uses and provide for a variety of uses including grazing and dispersed recreation such as hunting and off-road vehicle (ORV) use. These lands will not be affected by the Project. Recreation resources are discussed in the recreation section of this document.

Future and planned land uses in the vicinity of the Project have been mapped by Mohave County in the General Plan, the 2005 Draft General Plan, and the 2002 Golden Valley Area Plan (a component of the General Plan) as shown in **Figure A-3**. The planned land uses developed by Mohave County serve as a guide to land use development and to encourage land use patterns that are consistent with the goals of the General Plan, residents, and property owners. The planned land use categories in the General Plan include Rural Development Areas, Urban Development Areas, Suburban Development Areas, and Outlying Communities. Detailed land use classes within each development area are described as follows:

> Rural Development Areas - rural residential (lot sizes 5 acres or larger), rural industrial, public parks, public lands, non-residential uses such as neighborhood commercial, commercial recreation, light industrial, heavy industrial and airport industrial.

Suburban Development Areas - suburban estates and suburban residential (lot sizes between 1 and 5 acres), public facilities, public parks, and public lands.

Urban Development Areas - low, medium and high density residential, neighborhood commercial, general commercial, commercial recreation, light industrial, and heavy industrial.

Outlying Communities –development within designated communities in the unincorporated portions of the county may be rural, suburban, or urban.

Based on the General Plan, the planned land use for the Project Property is heavy industrial use within the boundaries of the I-40 Industrial Corridor as shown on **Figure A-3.** The planned land uses within the I-40 Industrial Corridor also include light industry, manufacturing, and commercial. The I-40 Industrial Corridor between Kingman and Lake Havasu offers large industrial tracts to accommodate warehouse-distribution and manufacturing firms that require direct highway access, and/or rail access and/or natural gas. Major planned developments within the I-40 Industrial Corridor include a Wal-Mart 880,000-square-foot distribution center and a Nutribiotechnologies, Inc. facility.

The planned land uses for the lands surrounding the I-40 Industrial Corridor include Rural Development, Suburban Development, and Urban Development Areas as shown on **Figure A-3.** One Urban Development Area designated as General Commercial is located southwest of the City of Kingman along Interstate 40, and a Suburban Development Area is designated between the General Commercial Area and the I-40 Industrial Corridor.

Several areas in the region of the Project Property have been platted for subdivision, including Sacramento Rancheros, Golden Valley South, and Sacramento City. The section of land adjoining the western boundary of the Project Property is subdivided and zoned for the Sacramento Rancheros residential subdivision, but is currently undeveloped. Golden Valley South is a proposed residential development located between Shinarump Road (County Highway 223) on the north and Aquarius Drive on the south, Yuma Road on the east, and Tombstone Trail on the west. The proposed Golden Valley South Area Plan (Rhodes 2005) was prepared as an extension of the previously adopted Golden Valley Area Plan for land development south of Shinarump Road. Sacramento City is the platted section located approximately two miles northwest of the Project Property. There are currently no housing developments on the platted subdivisions in the vicinity of the Project Property as shown on **Figure A-2.**

There are no identified plans for development of recreational facilities in the immediate vicinity of the Project.

Potential Effects

The Project Site will be located on eight (8) acres of the 40 acre Project Property of privately owned land that is an undeveloped portion of the Original Griffith Property (formerly approved for power generation). This Project Property is located within the I-40 Industrial Corridor.

The planned land uses for the lands surrounding the I-40 Industrial Corridor include Rural Development, Suburban Development, and Urban Development Areas as shown on **Figure A-3.** Several areas near the Project Property have been platted for subdivision; however, there are currently no housing developments in the vicinity of the Project Property as shown on **Figure A-2.**

The nearest residence is approximately 2.5 miles northwest of the Project Property. Therefore the Project will not be expected to impact residential areas.

The Project will be in conformance with the Mohave County Zoning Regulations and planned land uses in the vicinity of the Project Property. No local land use permits, such as conditional use or special use permits, will be required by Mohave County, given the MX zoning of the Project Property. Industrial land uses within the I-40 Industrial Corridor will be compatible with Mohave County's previously planned land uses for development as outlined in the amended General Plan. The Project Property is located in the vicinity of existing industrial development, including the existing Griffith Energy Project, a Praxair facility that manufactures specialty gases, and proposed facilities including a Wal-Mart distribution center and a Nutribiotechnologies, Inc. facility.

Within the MX zoning district, facilities between ¼ mile and one mile of any federal highway have a height limit of 150 feet. The Project Property is located within one mile of I-40. The maximum height for any Project component will be the exhaust stacks at85 feet. Therefore, the Project will comply with the industrial performance standards for the MX zone.

The Project will develop approximately eight (8) acres of undeveloped land within the I-40 Industrial Corridor for the life of the Project. The Project will not have any appreciable long-term adverse impacts on the surrounding land uses because of the localized nature of disturbance and because no existing residences or other sensitive land uses were identified in the immediate vicinity. The Project will be fully compatible with the County's Zoning Regulations and planned land uses for the I-40 Industrial Corridor and will comply with the industrial performance standards for the MX zone. Because the Project will be compatible with the current Zoning Regulations and the General Plan's planned land uses for the Project Property, no long-term impacts to planned land uses from the construction and operation of the Project are expected.

Kingman

Northern Arizona Energy Project

Mount Nutt Wilderness

Warm Springs Wilderness

Wabayuma Peak Wilderness

Project Location

Legend

- BLM Wilderness Area
- Municipal Area

Land Owner

- BLM
- Lake Mead N.R.A
- Parks & Recreation
- Private
- State Trust
- Havasu N.W.R.

5 2.5 0 5

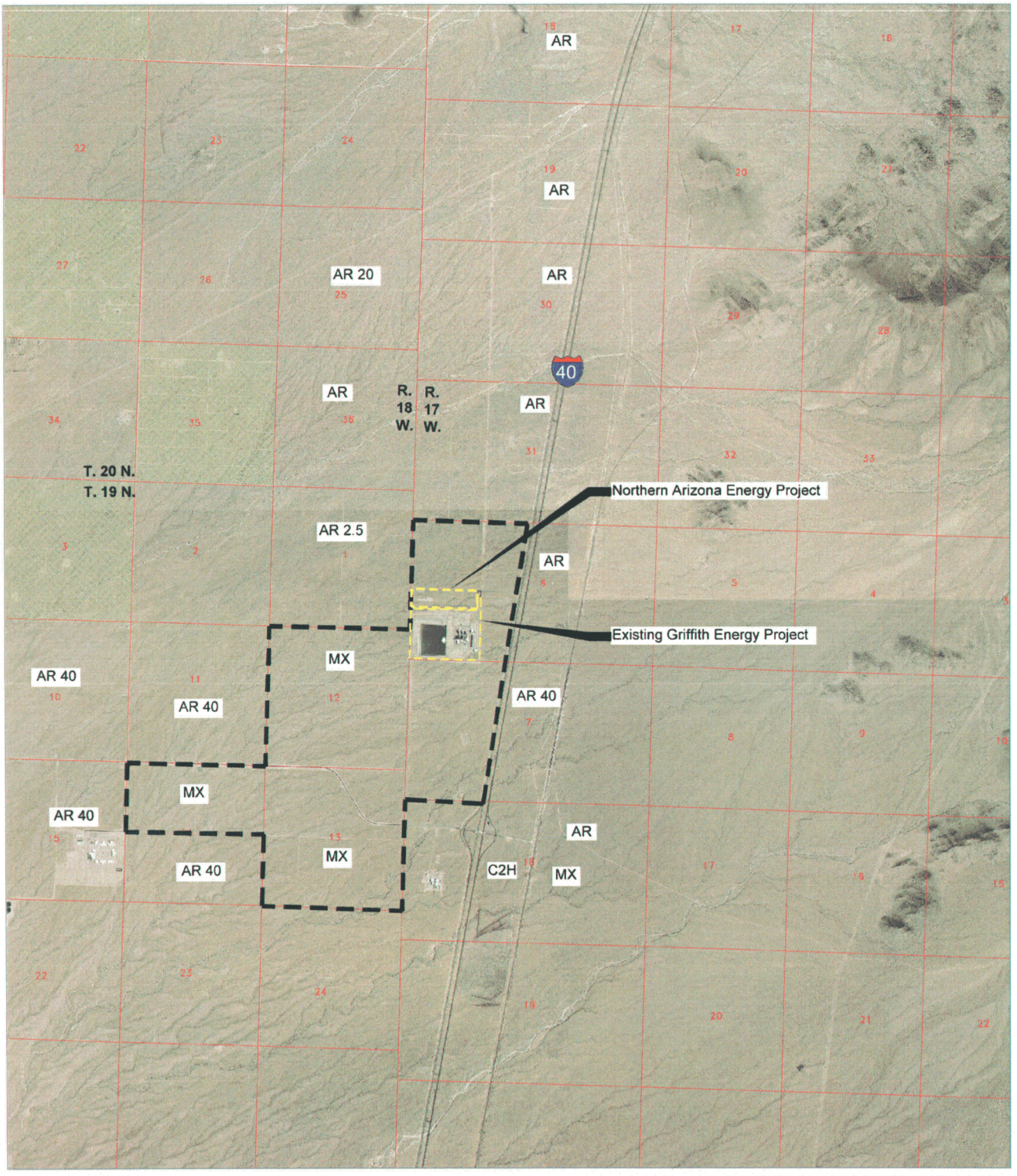
Miles

Sources: Williams, Prescott, Kingman, & Needles 1:250,000 USGS Quadrangles

NORTHERN ARIZONA ENERGY PROJECT

Figure A-1
Project Site, Jurisdiction, and Land Status

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 01/19/2007	File: 2516/Regional .MXD
Created By: JG	Layout: Regional PDF



Legend

- Transitional Area
- Shrub and Brush Rangeland
- I-40 Industrial Corridor Boundary

Zoning Districts

AR	Agricultural Residential
MX	Heavy Manufacturing
C2H	Highway Commercial

N W E S

0 1 2

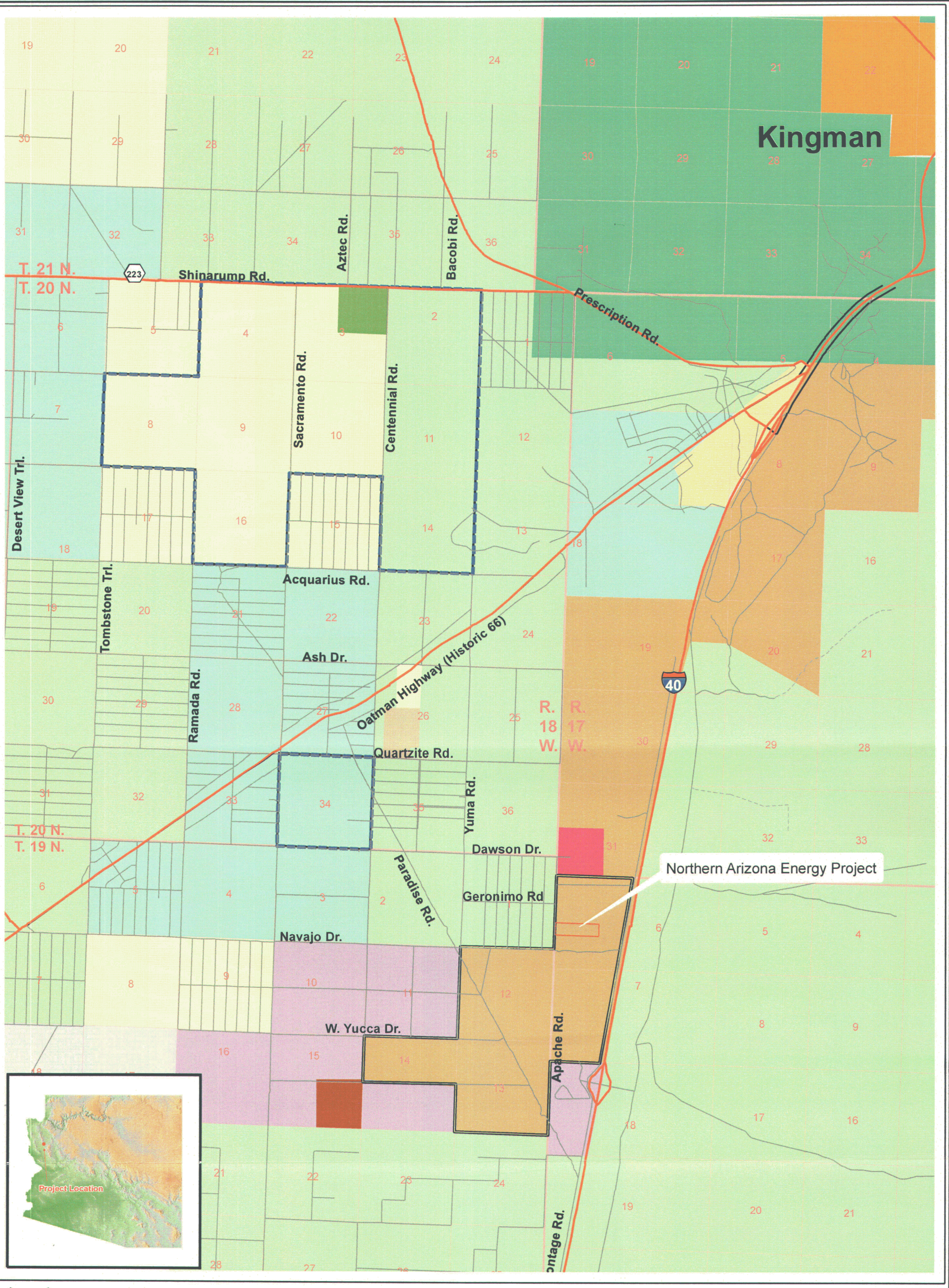
Miles

Source: Griffith CEC

NORTHERN ARIZONA ENERGY PROJECT

Figure A-2
Existing Land Use and Zoning

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/15/07	File: Figure A-2.dwg
Drawn By: ETC	Layout: 001



Legend

- Interstate/Highway
- Major Arterial
- Primitive Road
- Street
- Trail / Alley
- Northern Arizona Energy Property Boundary
- I 40 Industrial Corridor Boundary
- Golden Valley Holdings

LandUse

- Corbat Foothills Recreation Area
- General Commercial
- Griffith
- Heavy Industrial
- High Density Residential
- Kingman Municipal
- Light Industrial
- Low Density Residential
- Medium Density Residential
- Prison
- Public Facilities
- Rural Development Area
- Suburban Development Area
- Urban Development Area

N W E S

1 0.5 0 1

Miles

Transverse Mercator Projection
1983 North American Datum
Zone 12
Meters

NORTHERN ARIZONA ENERGY PROJECT

Figure A-3
Planned Land Use

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/15/2007	File: 2516/LU.MXD
Created By: JG	Layout: LU. PDF

EXHIBIT B ENVIRONMENTAL REPORTS

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"Attach any environmental studies which applicant has made or obtained in connection with the proposed site(s) or route(s). If an environmental report has been prepared for any federal agency or if a federal agency has prepared an environmental statement pursuant to Section 102 of the National Environmental Policy Act, a copy shall be included as part of this exhibit."

An Environmental Assessment (EA) is being prepared by the Applicant to evaluate the proposed interconnection of the Northern Arizona Energy Project to the Western transmission system. When completed, both the Draft and Final EA will be furnished as a supplement to this Application (under separate cover) when available.

In addition to the EA, the Applicant has applied or is preparing applications for other permits needed for the Project. These permits are listed in **Table B-1.**

One of the required permits is the air quality permit from the Arizona Department of Environmental Quality (ADEQ). As part of that process, an initial Air Quality Impact Analysis report was prepared by Sierra Research in 2007 to address potential impacts of the Project. A copy of the report is included as **Exhibit B-1.**

A cultural resources survey for the Original Griffith Site was conducted by Greystone in 1998 to meet or exceed the standards of the Arizona State Museum for cultural resource inventories. The survey contributed to Section 106 consultation by Western during preparation of the Griffith EIS. The Griffith area of disturbance is in the W½SW¼ of Section 6. In addition, reconnaissance was completed on the entire 160 acre Original Griffith Site. The Northern Arizona Energy Project will occupy the northern most 700 feet of the Original Griffith Site previously surveyed for cultural resources.

The results of other site surveys and environmental studies are discussed in subsequent sections of this application. **Exhibit A** describes land use; **Exhibit C** addresses whether there are sensitive biological resources in the Project area; **Exhibit D** discusses other biological resources in the area; **Exhibit E** summarizes the results of the cultural resources survey and discusses the potential effects on the area's scenic quality; **Exhibit I** discusses the noise impacts that are expected.

Table B-1 Northern Arizona Energy Project Environmental Regulatory Requirements			
Authorizing Agency	**Law or Regulation**	**Type of Permit/ Approval/Action/Constraint**	**Purpose of Permit/Regulated Project Component**
Arizona Corporation Commission	— Arizona Revised Statutes	— Certificate of Environmental Compatibility	Siting of power plant.
Arizona Department of Environmental Quality	— Federal Clean Air Act — Arizona Department of Environmental Quality Regulations	— Air Quality Permit	Emissions of regulated pollutants from plant.
		— Fugitive Dust Permit	Construction dust control.
	— Arizona Ambient Air Quality Guidelines	— Toxic Air Pollutants Standards	Emissions of toxic air contaminants.
	— Clean Water Act	— Stormwater Discharge Permit	Separate permits for construction and operation at plant site.
		— Spill Prevention Control and Countermeasure Plan	Separate plans for construction and operation.
	— SARA Title III	— Community Right-to-Know Reporting	Chemical storage and use during operations.
	— Resource Conservation and Recovery Act (RCRA)	— Hazardous Waste and Hazardous Materials Storage and Handling Permits	Chemical storage and use during operations.
	— National Environmental Policy Act of 1969 (NEPA)	— Record of Decision (Western)	Western for transmission line interconnection.
Western Area Power Administration	— National Historic Preservation Act (NHPA) of 1966 as amended	— Cultural Resources Data Recovery Plan — Native American Consultations	Required by NEPA, included in EA.
	— Archaeologic Resources Protection Act (ARPA) of 1979	— Cultural Resources Mitigation Native American Consultations	Required by NEPA, included in EA.
	— Native American Graves Protection and Repatriation Act	— Protection of remains and Funerary objects — Native American Consultations	Required by NEPA, included in EA.
	— Executive Order 11988	— Floodplain management	Required by NEPA, included in EA.
	— Executive Order 11990	— Protection of Wetlands	Required by NEPA, included in EA.
	— Executive Order 12898	— Environmental Justice in Minority Populations and Lower Income Populations	Required by NEPA, included in EA.
	— Executive Order 13007	— Protection of Indian Sacred Sites and their Religious Practices	Required by NEPA, included in EA.

Table B-1 Northern Arizona Energy Project Environmental Regulatory Requirements			
Authorizing Agency	**Law or Regulation**	**Type of Permit/ Approval/Action/Constraint**	**Purpose of Permit/Regulated Project Component**
	— Endangered Species Act	— Biological Assessment and Consultation with USFWS	Required by NEPA, included in EA.
	— Migratory Bird Treaty Act of 1918	— Protection of Migratory Birds	Required by NEPA, included in EA.
	— Clean Water Act	— Section 404 Permit	Nationwide authorization for pipelines and transmission line interconnections.
U.S. Army Corps of Engineers	— Endangered Species Act	— Section 7 Consultation, if necessary (Biological Opinion)	Required by NEPA.
U.S. Fish & Wildlife Service	— Clean Air Act	— Air Quality Permits to Construct and Operate (PSD/Title V)	Review of air permit
U.S. Environmental Protection Agency	— Arizona Revised Statutes	— Certificate of Environmental Compatibility	Siting of power plant.
Arizona Game and Fish Department	— National Historic Preservation Act	— Cultural Resources Consultation with Western and COE	Commentor on EA, approves cultural resource plans and mitigation, if needed.
Arizona State Historic Preservation Office	— Native Plant Law	— Salvage or Removal Permit	Notice of clearing on private lands.
Arizona Department of Agriculture	— County Ordinances	— Specific Use Permit — Septic/Sewage Package Permit — Building Permit — Excavation Permit (pipeline) — Grading Permit	Approvals for power plant and infrastructure.

EXHIBIT B-1 AIR QUALITY IMPACT ANALYSIS

Air Quality

The Project will be located in Mohave County. The Project Property is bounded on the south by Griffith; the western boundary is Apache Road; the northern boundary is Haul Road; and eastern boundary borders open land.

According to data from the Western Regional Climate Center (2007), the climate in the Project vicinity is moderate all year long with mild winter temperatures and cooler summers than other parts of the state. Summer temperatures may go as high as 110 degrees. In the winter, the lows may go down to the low 20's only periodically. The average daily temperature during winter (December thru February) is 46-53°F. The average annual low temperature is 54°F, while the average annual high temperature is 81°F. The average annual precipitation is 7.56 inches per year.

Existing Air Quality

The Clean Air Act (CAA) of 1970, 42 USC 7401 et seq., as amended in 1977 and 1990, and Title 40 of the Code of Federal Regulations (CFR) Parts 50-99 are the basic federal statutes and regulations governing air pollution in the United States. The CAA designates six criteria pollutants for which seven national ambient air quality standards (NAAQS) have been promulgated to protect human health and welfare. The criteria pollutants are:

- Sulfur oxides, measured as sulfur dioxide (SO2);
- Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM10);
- Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers (PM2.5);
- Carbon monoxide (CO);
- Ozone (O3);
- Nitrogen dioxide (NO2); and
- Lead (Pb).

The NAAQS are codified in 40 CFR Part 50 and are summarized in **Table B-1**. The Arizona ambient air quality standards for criteria pollutants are the same as the federal standards.

Based on the NAAQS for each criteria pollutant, the U.S. Environmental Protection Agency (EPA) classifies airsheds throughout country as attainment areas and nonattainment areas. Attainment areas are airsheds that comply with NAAQS, while nonattainment areas are those that do not. A given area can be classified as both attainment and nonattainment since the NAAQS are pollutant specific. Mohave County is currently classified as an attainment area for all criteria pollutants.

TABLE B1-1 National Ambient Air Quality Standards For the Northern Arizona Energy Project			
Pollutant	**Averaging Time**	**Primary Standard µg/m**	**Secondary Standard µg/m^3**
SO_2	Annual[1]	80 (0.030 ppm)	-
	24-Hour[2]	365 (0.14 ppm)	-
	3-Hour[2]	-	1,300 (0.5 ppm)
PM_{10}	Annual[1]		
	24-Hour[2]	150	150
$PM_{2.5}$	Annual[1]	15	15
	24-Hour[2]	35	35
CO	8-Hour	10,000 (9 ppm)	-
	1-Hour[2]	40,000 (35 ppm)	-
Ozone	8- Hour[3]	157 (0.08 ppm)	157 (0.08 ppm)
NO_2	Annual[1]	100 (0.05 ppm)	100 (0.05 ppm)
Lead	Quarter[1]	1.5	-

Key:
µg/m = micrograms per cubic meter
ppm = parts per million
1. Arithmetic mean.
2. Block average.
3. Rolling average.

Arizona Department of Health Services established the Arizona Ambient Air Quality Guideline (AAAQG) values for various toxic air pollutants (TAPs) in 1992. New projects are required to compare modeled emission rates of potential TAPs to demonstrate compliance with the AAAQG values. **Table B-2** lists the potential project TAPs and their respective AAAQG screening values.

TABLE B1-2 Arizona Ambient Air Quality Guideline Screening Values For the Northern Arizona Energy Project			
Pollutant	**1-Hour µg/m**	**24-Hour µg/m**	**Annual µg/m**
Acetaldehyde	2300	1400	0.5
Ammonia	-	140	-
Benzene	630	51	0.14
Ethylbenzene	4500	3500	-
Formaldehyde	20	12	0.08
Hexane	5300	1400	-
Toluene	4700	3000	-
Xylene	5500	3500	-

Key:
µg/m = micrograms per cubic meter

Air Quality Impacts

The regional air quality will not be adversely impacted by the construction or operation of this Project. An air quality permit application will be filed with the Arizona Department of Environmental Quality (ADEQ) in February 2007.

Construction Air Pollutant Emissions

At the Project Site and along service corridors within the Project area, air pollutant emissions that result from the operation of vehicles and generation of fugitive dust during construction activities are expected to be minor and temporary. Vehicular and crankcase emissions from gasoline and diesel engines will comply with applicable EPA mobile source emission regulations (40 CFR Part 85) by using equipment manufactured to meet these specifications. During construction, fugitive dust may be produced at the Project Site and Temporary Construction Area. Dust suppression activities, such as watering, will be used as necessary to minimize these potential impacts.

Air Pollutant Emissions from Operations

The Project includes the following sources of air pollutants:

- Four General Electric (GE) LM6000 PC SPRINT NxGen combustion turbine generators (CTGs); and
- One six-cell, 7,600 gallon per minute (gpm) chiller.

Anticipated emissions levels for the aforementioned equipment are shown in **Table B-3**. The emissions data are based on manufacturer-supplied emission factors and are supplemented, where necessary, with EPA default emission factors obtained from AP-42 (EPA 2001). Emissions from the CTGs will be controlled through the use of an SCR system and an oxidation catalyst. **Figure 3, Site Layout of Power Plant of the Application** shows the positioning of above mentioned equipment on the Project Site.

Air Quality Permitting Requirements

ADEQ is the lead air permitting authority for the Project. ADEQ's air quality regulations are codified in Title 18 of the Arizona Administrative Code (AAC) Chapter 2. They incorporate the federal program requirements listed in 40 CFR Parts 50-99 and establish permit review procedures for all facilities that can emit pollutants to the ambient air. Any new facility or modification to an existing facility is required to obtain an air quality permit prior to initiating construction. Facilities can trigger additional review by EPA if emissions exceed the major source thresholds listed in 40 CFR §52.21(b)(1)(i). While the Project will not exceed any federal significance thresholds; ADEQ has deemed that from a regulatory process perspective, the Project qualifies as a minor modification to an existing major stationary source; however, ADEQ has agreed to issue a separate permit for the Project. EPA will be reviewing the permit application and ADEQ's proposed permit to ensure all federal program requirements are met.

The remainder of this section details various applicable permitting requirements, which the Applicant is addressing in its permit application.

The pre-construction review process for new or modified major sources located in attainment areas is called New Source Review (NSR), which may include a Prevention of Significant Deterioration (PSD) review. This process is intended to keep new air emission sources from causing existing air quality to deteriorate beyond acceptable levels. ADEQ has codified the NSR program and federal PSD requirements in 18 AAC §R18-2-401, et seq. Since the Project emissions will not exceed the significance thresholds for major modification (18 AAC §R18-2-101.106), no additional PSD analysis will be required.

ADEQ has determined that while the Project is a minor source, for evaluation of significance, the emissions generated by Griffith need to be included in determining significance. Griffith is a Class I PSD facility. Therefore the Project will also be classified as a Class I facility.

Other Applicable Requirements

40 CFR Part 60 establishes new source performance standards (NSPS) for specific emission sources. ADEQ incorporates these emission standards by reference in 18 AAC §R18-2-901, et seq. 40 CFR Part 60 Subpart KKKK: Standards of Performance for Stationary Combustion Turbines. Subpart Db lists affected emission sources as stationary combustion turbines with a heat input at peak load equal to or great than 10 MMBTU/hr. Each CTG has a heat input greater than 10 MMBTU/hr, therefore this regulation is applicable.

40 CFR Parts 61 and 63, as incorporated by reference in 18 AAC §R18-2-1101, et seq., are the Federal emission standards that have been developed to address certain individual hazardous air pollutants (HAPs) and HAP emissions from a variety of source categories. The individual HAP rules are found in 40 CFR Part 61 and are typically referred to as the national emission standards for hazardous air pollutants (NESHAPs). The Project will not emit any of the individual HAPs included in the NESHAPs rules.

The source category rules, commonly referred to as the maximum achievable control technology (MACT) standards (40 CFR Part 63), apply to facilities that are classified as major sources of HAPs, and operate affected equipment as listed in each standard. A facility is a major source of HAPs if it emits any individual HAP in excess of 10 tpy or a combination of HAPs in excess of 25 tpy. Because the Project will not be a major source of HAPs, the MACT provisions do not apply.

TABLE B1-3 Air Emission Estimates for the Northern Arizona Energy Project Mohave County, Arizona

	NO_X		CO		SO_X[3]		$PM_{10}/PM_{2.5}$		VOC[4]		HAPs[5]	
Source	**Lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**	**Lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**
Existing Equipment/Activities[1]	0	0	0	0	0	0	0	0	0	0	0	0
New Equipment –CTG's[2,3]	31.60	39.71	23.09	35.90	24.56	32.30	10.80	14.31	11.02	15.54	0.77	4.10
New Equipment – Chiller							0.16	0.68				
Project Annual Emissions [3]		39.71		35.90		32.30		14.99		15.54		4.10
PSD Significance Thresholds		40.00		100.00		40.00		15.00		40.00		NA[6]
Title V Threshold		100.00		100.00		100.00		100.00		100.00		10/25

Notes:

1. No existing equipment, new facility. Emissions from the adjacent Class I Griffith Energy Project are included in the determination of significance, therefore, significance levels based on PSD/major modification thresholds versus new source.
2. Total emissions are based on four (4) GE LM6000 combustion gas turbines operating a combined ~10,500 hours per year.
3. SOx emissions are based on the presence of sulfur in the fuel. A nominal amount of sulfur (5 grains per 100 scf) was assumed to be present.
4. VOC = Volatile Organic Compounds
5. HAP = Hazardous Air Pollutants
6. NA - Not Applicable

EXHIBIT C AREAS OF BIOLOGICAL WEALTH

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"Describe any areas in the vicinity of the proposed site or route which are unique because of biological wealth or because they are habitats for rare and endangered species. Describe the biological wealth or species involved and state effects, if any, the proposed facilities will have thereon."

BIOLOGICAL WEALTH

Threatened, Endangered and Sensitive Plant Species

A number of special status plant species are found in Mohave County. These species include those designated as threatened, endangered, candidates for listing or sensitive by Federal agencies, as well as those of concern to the State of Arizona. **Table C-1** contains information regarding the special status species that have potential habitat in Mohave County. A few species are known to occur in locales near the Project Site. These include white-margined penstemon (Penstemon albomarginatus), three hearts (Tricardia watsonii), and crownless (or Utah) milkweed vine (Cynanchum utahense). Others could possibly occur due to the presence of potential habitat in the vicinity of the Project. The only known population of white-margined penstemon in Arizona is located at Dutch Flat, approximately 15 miles southeast of the Project. This penstemon, a perennial found on sandy washes and alluvial terraces in deep sandy soils, grows in association with creosotebush and cheesebrush (Rutman 1992).

Table C-1 Special Status Plant Species Found in the Project Vicinity

Agency	Designation	Scientific name	Common name	Potential habitat in Project Area
U.S. Fish and Wildlife Service (USFWS)	endangered	*Purshia subintegra*	Arizona cliffrose	none
USFWS	threatened	*Pediocactus sileri*	Siler pincushion cactus	none
USFWS	threatened	*Cycladenia humilis ssp. jonesii*	Jones' cycladenia	none
BLM	sensitive	*Penstemon albomarginatus*	white-margined beardtongue	moderate to high
BLM	sensitive	*Astragalus newberryi* var. *aquarii*	Aquarius (Newberry's) milkvetch	moderate to high
BLM	sensitive	*Purshia glandulosa*	Antelopebush	none
BLM	sensitive	*Cordylanthus nevinii*	Nevin's birdsbeak	moderate to high
BLM	sensitive	*Petalonyx nitidus*	Mohave sandpaper bush	none
BLM	sensitive	*Tetradymia argyraea*	Striped Horsebrush	none
BLM	sensitive	*Fremontodendron californicum*	California flannelbush	moderate to high
BLM	sensitive	*Pediocactus peeblesianus* ssp. *fickeiseniae*	Fickeisen pincushion cactus	none
BLM	sensitive	*Penstemon bicolor* ssp. *roseus*	two-color beard-tongue	moderate to high

Table C-1 Special Status Plant Species Found in the Project Vicinity				
Agency	**Designation**	**Scientific name**	**Common name**	**Potential habitat in Project Area**
BLM	sensitive	*Cynanchum utahense*	crownless (or Utah) milkweed vine	moderate to high
BLM	sensitive	*Tricardia watsonii*	Three hearts	moderate to high
BLM	sensitive	*Phacelia parishii*	Parish phacelia	moderate to high
BLM	sensitive	*Astragalus holmgreniorum*	Paradox milkvetch	none
BLM	sensitive	*Senna armata*	shrubby senna	moderate to high
State of Arizona	salvage restricted	*Mammillaria viridiflora*	varied fishhook cactus	none

Source: Arizona office of the BLM 1998

Threatened, Endangered or Sensitive Wildlife Species

The United States Fish and Wildlife Service (USFWS), the Bureau of Land Management (BLM), and the Arizona Game and Fish Department (AGFD) have identified the threatened, endangered and sensitive wildlife species as occurring or potentially occurring within Mohave County. **Table C-2** contains information regarding the special status wildlife species which could have potential habitat in the proposed Project area. The Federal list includes thirteen threatened and endangered wildlife species: Mojave Desert tortoise (*Gopherus agassizii*), Hualapai Mexican vole (*Microtus mexicanus hualpaiensis*), bonytail chub (*Gila elegans*), humpback chub (*Gila cypha*), razorback sucker (*Xyrauchen texanus*), Virgin River chub (*Gila seminuda*), woundfin (*Plagopterus argentissimus*), American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), California condor (*Gymnops californianus*), Mexican spotted owl (*Strix occidentalis lucida*), southwestern willow flycatcher (*Empidonax traillii extimus*) and the Yuma clapper rail (*Rallus longirostris yumanensis*) (Fowler-Propst, 1998). The BLM has identified five species of special concern: the rosy boa (*Lichanura trivirgata gracia*), mountain plover (*Charadrius montanus*), northern goshawk (*Accipiter gentilis*), the Hualapai Pocket Gopher (*Thomomys umbrinus)* and the Gila monster (*Heloderma suspectum cinctum*). Additionally the AGFD has identified the Sonoran Desert tortoise (*Gopherus agassizii*) and greater western mastiff bat (*Eumops perotis californicus*) as sensitive species that may also occur in the vicinity of the Project.

Table C-2 Special Status Wildlife Species Found in the Vicinity of the Project				
Agency	**Designation**	**Scientific name**	**Common name**	**Occurrence in Project Area**
USFWS	Threatened	*Gopherus agassizii*	Mojave Desert tortoise	unlikely
USFWS	Endangered	*Microtus mexicanus hualpaiensis*	Hualapai Mexican vole	unlikely
USFWS	Endangered	*Gila elegans*	bonytail chub	no
USFWS	Endangered	*Gila cypha*	humpback chub	no
USFWS	Endangered	*Xyrauchen texanus*	razorback sucker	no
USFWS	Endangered	*Gila seminuda*	Virgin River chub	no
USFWS	Endangered	*Plagopterus argentissimus*	woundfin	no
USFWS	Endangered	*Falco peregrinus anatum*	American peregrine falcon	possible
USFWS	Threatened	*Haliaeetus*	bald eagle	possible

Table C-2 Special Status Wildlife Species Found in the Vicinity of the Project				
Agency	Designation	Scientific name	Common name	Occurrence in Project Area
		leucocephalus		
USFWS	Endangered	*Gymnops californianus*	California condor	possible
USFWS	Threatened	*Strix occidentalis lucida*	Mexican spotted owl	possible
USFWS	Endangered	*Empidonax traillii extimus*	southwestern willow flycatcher	possible
USFWS	Endangered	*Rallus longirostris yumanensis*	Yuma rail clapper	possible
BLM	Sensitive	*Lichanura trivirgata gracia*	rosy boa	unlikely
BLM	Sensitive	*Thomomys umbrinus*	Hualapai Pocket Gopher	possible
BLM	Sensitive	*Accipiter gentilis*	Northern Goshawk	possible
BLM	Sensitive	*Charadrius montanus*	mountain plover	possible
BLM	Sensitive	*Heloderma suspectum cinctum*	Gila monster	possible
AGFD	Sensitive	*Gopherus agassizii*	Sonoran Desert tortoise	unlikely
AGFD	Sensitive	*Eumops perotis californicus*	greater western mastiff bat	unlikely

Mojave Desert Tortoise (*Gopherus agassizii*)
The Mojave population of the desert tortoise is found north and west of the Colorado River. It was listed as "threatened" under the California state Endangered Species Act (ESA) in 1989 and the Federal Endangered Species Act in 1990. A separate, genetically distinct population of desert tortoise has been identified east of the Colorado River in Arizona. The primary reasons for listing the Mojave population include deterioration and loss of habitat, collection for pets or other purposes, elevated levels of predation, disease, and the inadequacy of existing regulatory mechanisms to protect desert tortoises and their habitat. The USFWS has designated critical habitat in Arizona for the Mojave tortoise. This habitat is limited to extensive areas of mesas and steep talus slopes in parts of the Black Mountains. The designated critical habitat is more than 50 air miles north of the Project. It is possible, although unlikely, that this species will occur near the Project Site.

Hualapai Mexican Vole (*Microtus mexicanus hualpaiensis)*
This species is endangered and has been steadily disappearing in its habitat for the last fifty years. However, when it is seen it is typically found in Northern Arizona including the Grand Canyon, and the Flagstaff and Williams areas, and from Navajo Mountain in both Arizona and Southern Utah. This species is also found in the Defiance Plateau in Arizona. The Hualapai mountain vole is associated with the ponderosa pine-Gambel oak habitat type. The Hualapai Mexican vole is not anticipated to occur on or near the Project Site because of the lack of suitable habitat.

Bonytail Chub (*Gila elegans*)
The bonytail chub associated with open water areas of large river channels. Based on the lack of aquatic habitat, the bonytail chub do not occur on or near the Project Site.

Humpback Chub (*Gila cypha*)
Humpback chub are associated with deep, swift waters such as those found in canyons. Based on the lack of aquatic habitat, the humpback chub do not occur on or near the Project Site.

Razorback Sucker (*Xyrauchen texanus*)
The razorback sucker occurs in both riverain situations and in impoundments. Based on the lack of aquatic habitat, the razorback sucker does not occur on or near the Project Site.

Virgin River Chub (*Gila seminuda*)
The Virgin River chub occurs within runs and pools over substrates of sand and sediment in physically and chemically unmodified areas of the Virgin River. The proposed Project Site is outside the Virgin River Basin.

Woundfin (*Plagopterus argentissimus*)
The woundfin is found in the Virgin River within Arizona, Nevada and Utah. The proposed Project Site is outside the Virgin River Basin.

Peregrine Falcon (*Falco peregrinus anatum*)
Peregrines occupy a wide variety of habitats. They are associated with open country near rivers, marshes and coasts. Cliffs are the preferred nesting substrate, however, tall man-made structures (i.e., high rise buildings and towers) may be used (Spahr et al., 1991). Peregrines typically prey on birds within 10 miles of the nest, however, 80 percent occurs within a 1-mile radius of the nest (Spahr et al., 1991). Although peregrines may forage over or migrate through the proposed Project area, no peregrine nest sites have been identified within the vicinity of the Project Site.

Bald Eagle (*Haliaeetus leucocephalus*)
Although bald eagles may forage over or migrate through the proposed Project area, no bald eagle nests or wintering roosts are known to occur in the vicinity of the Project Site.

Feeding areas, perches and night roosts are fundamental elements of bald eagle winter range. Though eagles can fly as far as 24 km (15 mi) to and from these elements, they occur primarily where all three elements are available in close proximity (Swisher, 1964). Although eagle presence in winter is not necessarily related to open water (Swisher, 1964), eagles usually occur near large rivers and lakes (Sprunt and Ligas, 1963). Perches are an essential element in the bald eagles selection of foraging areas. Roosts are areas used for sleeping and providing protection from winter storms. It is possible that this species could occur in the vicinity of the Project area but there were no observed perches or roosts on the Project Site. Therefore, no impacts to this species are anticipated.

California Condor (*Gymnops californianus*)
The California condor is the largest bird in North America with a wingspan of up to 9 feet. Currently, 36 condors have been established into the wild at three sites in California and Arizona. Sixteen are located in the Los Padres National Forest in California, fifteen at Vermillion Cliffs, Arizona, and five at Ventana/Big Sur in California. These populations are currently being studied by biologists. Although it is possible they could venture into the vicinity of the Project Site, it is unlikely.

Mexican Spotted Owl (*Strix occidentalis lucida*)
The Mexican spotted owl typically nests and roosts in mixed coniferous forests (Ganey and Balda, 1989) or ponderosa pine-Gamble oak adjacent to riparian habitats or in canyons. Based on the lack of suitable habitat, the Mexican spotted owl is not expected to occur on or near the Project Site.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)
The flycatcher breeds in the United States but winters south of the United States. California, Arizona, and New Mexico comprise the majority of the historic and current range of the flycatcher. Flycatchers typically nest in cottonwood-willow associations along streams, rivers or other wetland areas (Tibbets et al., 1994). Although its presence is possible, the southwestern willow flycatcher is not expected to occur on or near the Project Site, based on the lack of suitable habitat.

Yuma Clapper Rail (*Rallus longirostris yumanensis*)
The Yuma clapper rail inhabits dense cattail marshes along the Colorado River. Marsh habitat losses to river water diversion and damming of the Colorado River, dredging operations, mosquito abatement programs, and erosion control efforts have all reduced nesting habitat. (Monson and Phillips, 1981). The Yuma clapper rail is not expected to occur in the vicinity of the Project Site due to the lack of suitable habitat.

Rosy Boa (*Lichanura trivirgata gracia*)
This snake occurs in rocky brush lands and desert areas. They are attracted to areas of permanent water, but water is not required for this species. The rosy boa feeds on small mammals and birds usually at night (Stebbins, 1966). The rosy boa may occur in the vicinity of the Project Site.

Hualapai Pocket Gopher (Thomomys umbrinus)
This species of pocket gopher is typically found in meadows with loose soils. It plays an important role in aeration of soil. It is considered a sensitive species by the BLM. It is possible that this species could occur in the vicinity of the Project site.

Northern Goshawk (*Accipiter gentilis)*
The Northern Goshawk inhabits forested regions of the Northern Hemisphere. This goshawk prefers coniferous forests, but will also inhabit deciduous and mixed forests from sea level to subalpine areas. It is possible that the Northern Goshawk could transitorily occur in the vicinity of the Project Site but it is unlikely due to the lack of suitable habitat.

Gila Monster (*Heloderma suspectum cinctum*)
The Gila monster inhabits lower slopes of mountains and nearby outwash plains in arid or semiarid areas. They frequently occur in canyon bottoms or arroyos with either permanent or intermittent water and irrigated lands or rocky areas containing scattered brush (Stebbins, 1966). The Gila monster may occur in the vicinity of the Project Site.

Mountain Plover (*Charadrius montanus*)
The mountain plover occurs on the high plains of the semi-desert regions of the West. The mountain plover is one of a limited number of shorebird species that lives mainly away from water. Plovers occur in areas of scattered sagebrush and intermittent patches of bunch grasses and cactus (Armbruster et al., 1983). The mountain plover may occur in the vicinity of the Project Site.

Sonora Desert Tortoise (*Gopherus agassizii*)
The "Sonoran population" of the desert tortoise is defined as those occurring south and east of the Colorado River. This species occupies rocky and alluvial slopes of Mojave desert scrub and the Arizona Upland and Lower Colorado subdivisions of the Sonora Desert (Murray and Dickenson, 1996).

Desert tortoise populations began to decline in the 1970s due to disease, human-related mortality, predation, habitat destruction, degradation and fragmentation (Murray and Dickenson, 1996). As a result of these cumulative impacts, tortoise were extirpated from large portions of their geographic habitat. The three categories of desert tortoise habitat designated by the BLM were established to set goals for the management of desert tortoise and their habitats, based on several criteria. Management of Category I and II areas emphasize maintenance of viable desert tortoise populations in areas where all Category I and most Category II conflicts are resolvable. Category III habitats are generally characterized by lower densities of desert tortoise in areas where habitat has been degraded, or where land ownership patterns are such that effective management is difficult.

The BLM has designated areas of Category II and Category III Desert tortoise habitat in the vicinity of the proposed Project. The designated areas are identified as the Hualapai Foothills (Category II), Rawhide Mountain/Dutch Flats (Category III), McConnico (Category III), and Hualapai North (Category III). These areas are all south and east of I-40 and not close to the Project Site.

Greater Western Mastiff Bat (*Eumops perotis californicus*)
The greater western mastiff bat roosts in crevices and shallow caves on cliffs and rock faces. Roosts typically have large openings below to allow the bats to drop several feet before existing the roost. This species is not expected to occur within the vicinity of the Project Site because of lack of suitable habitat.

Potential Effects
The construction and operation of the Northern Arizona Energy Project is not expected to have any adverse impacts on Federal and/or state listed wildlife and plant species of special concern. Site reconnaissance and subsequent studies revealed no areas of suitable habitat or known locations and occurrences of these species within the Project Site. Several species do have the potential to occur in the vicinity of the Project Site but because of the previous construction and human activity directly adjacent to the Project, it is unlikely that any of the potential species will occur at the Project Site. Any impacts will be short-term during construction and minimal.

Even though there is expected to be no impact, special protocols will be implemented should a species of special concern be found on the Project Site during construction. This includes but is not limited to: additional surveys on the Project site, implementation of education programs, mitigation measures for disturbed habitat, and replacement seeding measure for sensitive plants that are disturbed.

EXHIBIT D BIOLOGICAL RESOURCES

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"List the fish, wildlife, plant life and associated forms of life associated with the vicinity of the proposed sites or route and describe the effects, if any, other proposed facilities will have thereon."

Vegetation

The Project Site is located within a boundary area of five provinces, the Great Basin, Interior, Mohave, Semidesert and Sonoran, each represented by one or more vegetation series. The distribution of these series is driven by biotic responses to precipitation, elevation, topography, exposure, soil type and land use. Information regarding the affected vegetation came from previous soil surveys, site visits, photographs, U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM) and Arizona State agency publications and contacts, and academic/scientific publications. More detailed descriptions of the vegetation found in each of the subareas of the Project area are provided in the following paragraphs after the general discussion of the provinces. **Table D-1** offers a detailed description of the dominant plants and associated species for each series of the provinces.

The Great Basin province is typified by cold-temperate desert vegetation. This province includes series dominated by woodland species of juniper (*Juniperus*) and pinyon pine (*Pinus edulis*), desert scrub species of cold-adapted sagebrush (*Artemisia*), saltbush (*Atriplex)* and winterfat (*Krascheninnikovia)*, as well as warm-adapted species of rabbitbrush (*Chrysothamnus)*, blackbrush (*Coleogyne ramosissima)*, hopsage (*Grayia*) and horsebrush (*Tetradymia)*. Few cacti establish in this province. Those cacti which do are the smaller species such as pricklypear (*Opuntia*) and globe cactus (*Mammillaria*). Species diversity is typically low and the overstory of a community may often be dominated by only one species or by two or more species existing as co-dominants in an even distribution or as intergraded patches of each dominant. Great Basin series are found in the relatively colder, moister sites of the Project area, at higher elevations, on north-facing slopes or in canyons.

The Interior province series are warm-temperate vegetation dominated by relict broadleaf, deciduous trees and shrubs. These communities are established in the canyons and stream valleys of the proposed Project area which receive greater amounts of precipitation. This province is expressed here by communities dominated by tamarisk (*Tamarix)*, mesquite (*Prosopis)* and willow (*Salix*).

Table D-1 Interrelationships and Characters of Vegetation Series in the Local Area				
Biome or province	**Series**	**Vegetative character/ Dominating species**	**Associated Species**	**Habitat Character**
Great Basin	**mixed grass**	perennial bunchgrasses/mixed - sedges and short and midgrasses including gramas, sacaton, needlegrasses, vine mesquite and galleta	scrub species, pinyon and juniper	This series requires less than 300mm of precipitation winter & spring with 125-200 growing days. Found at elevations below 4000 feet in upper slopes with pinyon-juniper stands or Plains grassland above and desert scrub below.
	mixed scrub	deciduous thicket 1-6 m in height/mixed - shrub live oak, mountain mahogany, snowberry, currants, serviceberry, cliffrose and manzanita and other fruit-bearers	pinyon, juniper, Gambel oak, sagebrush, saltbush, winterfat, rabbitbrush	This series requires 380-535 mm of precipitation a year with 100 growing days. Found at 7500 feet to 9000 feet in elevation in foothills and mountains, above the Great Basin conifer woodland or sagebrush steppe and below subalpine conifers.
	pinyon-juniper shrub live oak mixed shrubs	dense to open stands of pinyon and juniper with well developed understory	shrub live oak, understory of short and midgrasses, snakeweed and groundsel, sagebrush, saltbush, winterfat, rabbitbrush	This series requires about 250-300 mm of precipitation in fall & winter; with 210 growing day. It survives cold winters at 5000 to 7500 feet in elevation. It is found on non mesas, plateaus, piedmonts, slopes, ridges with junipers dominating in the deeper soils.
Interior	**riparian/mesquite forest**	deciduous woodland/mesquite, tamarix, willow, shrub live oak	chenopods, saltgrass, acacias, native and exotic annual forbs and grasses, occasional cottonwood, willow, ash or other broadleaf deciduous trees; small stands of shrubs	This series requires precipitation in winter & spring. Mostly consisting of xeroriparian species along ephemeral streams.
	riparian/mixed riparian strand	mesquite, tamarix, willow, shrub live oak	chenopods, saltgrass, acacias, native and exotic annual forbs and grasses	This series requires winter & spring precipitation and usually forms along ephemeral streams.
Mohave	**mixed scrub**	a two-story scrubland with well developed understory/creosotebush, bursage, yucca spp., brittlebush, shadscale are all found here with no clear dominance	Associated spp. of all series include *Atriplex* spp., *Artemisia* spp., blackbrush, winterfat, Fremont dalea, little-leaved ratany, joint fir, creosotebush, bursage, and brittlebush	This series requires 65-190mm of precipitation in winter & summer; with 210 growing days. It survives cold winters and hot summers at an elevation range of 2000 to 4000 feet on level plains with climatic conditions intermediate to those influencing Great Basin and Sonoran biomes
	Co-dominant associations			
	creosotebush - bursage			This series is found on deep, loose, sandy soils, most often on the upper a of alluvial fans at colder temperatures; on well-drained sandy flats below about 4000 feet in elevation.

Table D-1 Interrelationships and Characters of Vegetation Series in the Local Area				
Biome or province	**Series**	**Vegetative character/ Dominating species**	**Associated Species**	**Habitat Character**
	brittlebush - creosotebush			This series is found on deep, loose, sandy soils, most often on the upper a of alluvial fans at warmer temperatures; on well-drained sandy flats below about 400 feet.
	creosotebush - yucca		Although Joshua trees are typically associated with this series, none grow in the Project area	This series is found on soils with well-developed soil pavement and a caliche layer close to the surface.
Semi-desert	**mixed grass**	a warm-temperate scrub-grassland transition zone/Tobosa grass, black grama	grama grasses, bush muhly, three awns, arizona cottontop, curly mesquite grass, tanglehead grass, vine mesquite grass, succulents and forbs, exotic annual grasses	This series requires at least 250-450 mm of precipitation in winter & summer pulses with 210-260 growing day. I flourishes in mild winters, hot summers; and survives strong winds spring & fall at elevations from 3600 -5600 feet and lies above the Sonoran series and below the Plains grasslands.
	mixed scrub	a warm-temperate scrub-grassland transition zone/sotols, beargrasses, agaves, yuccas	cat-claw acacia, mesquites, *Ephedra* spp., sumac, ocotillo, *Opuntia* spp.	This series requires 250-450 mm of precipitation in winter & summer pulses and has 210-260 growing days with mild winters, hot summers. It can be found at an elevation of 3600 -5600 feet and lies above the Sonoran series and below Plains grasslands.
Sonoran (Lower Colorado River Valley subdivision)	**creosotebush-bursage scrub**	open, simple, arboreal appearance; subtropical genera characterized by succulents and cacti/creosote bush and bursage as co-dominants	big galleta, indigo bush, *Atriplex* spp., ocotillo, bursage, brittlebush, woolly plantain, mesquite, ironwood, smoketree, blue palo verde	This series requires warmer winters and very dry conditions to encourage establishment of this biome rather than Mohave scrub series. Bursage dominates in sandier soils, creosotebush in finer soils less than 3500 feet in elevation.

Source: (Brown 1994)

The Semidesert province is warm-temperate community of west central Arizona which occupies the warmer mid-slope sites of foothills and higher mountain slopes in the proposed Project area. Grassland typically establishes in the higher elevations of this zone and scrub on the lower. Plants commonly found in these sites include grama grasses (*Bouteloua spp.)*, three awns (*Aristida spp.*), curly mesquite grass (*Hilaria spp.)*, yucca species (*Yucca spp.*), cat-claw acacia (*Acacia greggii*) and ephedra species (*Ephedra spp.*).

The Mohave province occupies the colder low elevation alluvial fans (bajadas) and well-drained sandy flats. The alluvial fans are hosts to two provinces, with the Mohave occupying the relatively colder, moister sites, the Sonoran the warmer. Mohave habitats are particularly diverse, with established populations of endemic annuals, including *Euphorbia* (spurge) species and six-weeks three-awn (*Stipagrostis pungens*).

The Sonoran province contains tropical-subtropical vegetation typical of Mexican deserts. Several scrub series of this province occupy the warmer low elevation alluvial fans (bajadas) and well-drained sandy flats of the west-facing slope of the Sacramento Valley. Although the species typical of this community are the very large, tree-like cacti/succulents, in the vicinity of the Project Site this province is co-dominated by creosotebush (*Larrea tridentate)* and bursage (*Ambrosia dumosa*). **Table D-2** offers a checklist of plants which may be found in the vicinity of the Project Site.

Table D-2 Checklist of Plants Potentially Occurring Within Vicinity of the Project Site

Semi-Desert Grasslands	
Trees	
one-seed juniper	*Juniperus monosperma*
mesquite	*Prosopis juliflora*
Shrubs	
acacia	*Acacia spp.*
desert hackberry	*Celtis pallida*
hopbush	*Dodonaea viscosa*
joint-fir	*Ephedra spp.*
ocotillo	*Fouquieria splendens*
broom snakeweed	*Guierrezia sarothrae*
creosote bush	*Larrea tridentata*
groundsel	*Senecio spp.*
soaptree yucca	*Yucca elata*
Grasses and Forbs	
poverty three-awn	*Aristida divaricata*
sprucetop grama	*Bouteloua chondrosioides*
sideoats grama	*B. curtipendula*
black grama	*B. eriopoda*
blue grama	*B. gracilis*
hairy grama	*B. hirsuta*
broom grasses	*Bromus spp.*
buffalo grass	*Buchloe dactyloides*
cryptanth	*Cryptantha spp.*
plains lovegrass	*Eragrostis intermedia*
tanglehead	*Heteropogon contortus*
tobosa	*Hilaria mutica*

Table D-2 Checklist of Plants Potentially Occurring Within Vicinity of the Project Site	
lupine	*Lupinus sp.*
wolftail	*Lycurus phleiodes*
bush muhly	*Muhlenbergia porteri*
vine mesquite grass	*Panicum obtussum*
little bluestem	*Schizachyrium scoparium*
bristlegrass	*Setaria sp.*
mallows	*Sphaeralcea spp.*
Wright sacaton	*Sporobolus wrightii*
buffalo grass	*Buchloe dactyloides*
Cactus	
hedgehog cactus	*Echinocereus sp.*
Wright pincushion	*Mammillaria wrightii*
prickly pears/chollas	*Opuntia spp.*
tree cholla	*O. imbricata*
Engelman prickly pear	*O. phaeacantha*
XERORIPARIAN HABITAT	
Trees	
crucifixion thorn	*Canotia holacantha*
blue Paloverde	*Cercidium floridum*
smoketree	*Psorothamnus spinosus*
mesquite	*Prosopis spp.*
Shrubs	
white-thorn acacia	*Acacia consticta*
catclaw	*A. greggii*
desert broom	*Buccharis sarothroides*
anderson thornbush	*Lycium andersonii*
cheesebush or burrobush	*Hymenoclea salsola*
Grasses and Forbs	
sand verbena	*Abronia spp.*
milk vetch	*Astragalus spp.*
spiderling	*Boerhaavia spp.*
bromegrass	*Bromus rubens*
desert senna	*Cassia armata*
spurges	*Euphorbia spp.*
MOHAVE DESERTSCRUB	
Trees	
joshua tree	*Yucca brevifolia*
Shrubs	
saltbush	*Atriplex spp.*
agave	*Agave spp.*
white bursage	*Ambrosia dumosa*
white brittlebush	*Encella farinosa*
joint-fir	*Ephedra funerea*
rough joint-fir	*E. nevadensis*
desert buckwheat	*Eriogonum deserticola*
desert trumpet	*E. inflatum*
hopsage	*Grayia spinosa*
snakeweed	*Gutierrezia microcephala*
burrobush	*Hymenoclea salsola*

Table D-2 Checklist of Plants Potentially Occurring Within Vicinity of the Project Site	
little-leaved ratany	*Krameria parviflora*
creosotebush	*Larrea tridentata*
anderson thornbush	*Lycium andersonnii*
spiny mendora	*Menodora spinescens*
trixis	*Trixis californica*
mohave yucca	*Yucca schidigera*
Cactus	
desert coryphantha	*Coryphantha vivipera var. desertii*
engelman hedgehog	*Echinocereus engelmanii*
mammillaria	*Mammillaria spp.*
chollas, prickly pears	*Opuntia spp.*
buckhorn cholla	*O. acanthocarpa*
silver cholla	*O. echinocarpa*
mohave Prickly Pear	*O. erinacea*
Grasses and Forbs	
Sand verbena	*Abronia spp.*
milk vetch	*Astragalus spp.*
Three awn	*Aristida spp.*
spiderling	*Boerhaavia spp.*
bromegrass	*Bromus rubens*
desert senna	*Cassia armata*
spurges	*Euphorbia spp.*
sixweeks fescue	*Festucca octoflora*
big galleta	*Hilaria rigida*
bush muhly	*Muhlenbergia porteri*

The Project area is within desert scrub community situated on west-facing alluvial fans. The higher locations are occupied by Mohave creosotebush-bursage-mixed scrub on deeper, sandier soils and Mohave creosotebush-yucca on soils richer in carbonates. The warmer, drier, lower locations are occupied by Sonoran creosotebush-bursage.

Wetlands

No wetlands occur on or near the Project Site. Wetlands in this part of Mohave County are limited to relatively rare springs. Riparian crossings in the proposed Project area are dry washes which flow only during storm events. Although the additional soil moisture during these brief periods is enough to allow the growth of drought tolerant species like mesquite, the lack of residual soil moisture, and the scouring of the high energy flow of these intermittent streams and the sediment deposition on existing vegetation as waters recede prohibit the growth of most plants.

Potential Effects

Effects to vegetation will be associated with ground disturbance related to construction of the project on the 8-acre site and the short pipeline and transmission line interconnections. Temporary vegetation loss will occur from trampling and soil compaction during the construction activities listed above. Revegetation with native seed mixes will greatly reduce the loss of biodiversity within the proposed Project area. No long term effects on vegetation beyond the loss of the 8-acre site are anticipated.

Wildlife

Wildlife expected to be present in the vicinity of the Project Site include big game, predators, small mammals, songbirds, raptors and reptiles. Due to the limited amount of permanent water resources within the area, aquatic and amphibian species do not occur. A checklist of wildlife which may in the vicinity of the Project Site is found in **Table D-3**.

A number of big game mammals occur in the area. Mule deer (*Odocoileus hemionus*) are the most widely distributed and popular big game species within Arizona. The Project is within mule deer habitat, however it is not high quality habitat.

Desert bighorn sheep (*Ovis canadensis nelsoni*) inhabit dry, desert mountain ranges within the Great Basin, Mojave, Sonora, and Chihuahuan deserts. Sheep prefer foothills near rocky cliffs and permanent water when seasonally available. Generally, sheep inhabit a summer range, near available water sources and a winter range, that has good browse. Sheep are active during the day with minimal activity during extreme temperatures and inhabit the rough terrain associated with the canyons and cliffs within the Black Mountains west of the Sacramento Valley, over 10 miles from the Project Site.

Within Arizona, antelope (*Antilocapra americana*) occur from the deserts to the grasslands of the high plateaus. They prefer areas of grasses and scattered shrubs with rolling hills and dissected hills and mesas (Hoffmeister, 1986). Antelope are not anticipated to occur near the proposed Project Site.

Predators use habitat types within the proposed Project area. Typical species may include kit fox (*Vulpes macrotis*), hooded skunk (*Mephitis macroura*), bobcat (*Felis rufus*), badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), and coyote (*Canis latrans*). Mountain lions (*Felis concolor*) may also occur in the mountains in areas where mule deer are abundant.

Numerous small mammal species occur in the vicinity including desert shrew (*Notiosorex crawfordi*), California myotis (*Myotis californicus*), Yuma myotis (*Myotis yumanensis*), greater western mastiff bat (*Eumops perotis*), Mexican free-tailed bat (*Tadarida brasiliensis*) antelope jackrabbit (*Lepus alleni*), Harris' antelope squirrel (*Ammospermophilus harrisii*) and mesquite mouse (*Peromyscus merriami*). Within the Mohave habitat type the following species may occur: spotted bat (*Euderma maculata*), Arizona pocket mouse (*Perognathus amplus*), desert kangaroo rat (*Dipodomys deserti*) and desert woodrat (*Neotoma lepida*)(Hall 1998).

Density and diversity of songbirds species within the proposed Project area varies by season. Typical species include rock doves (*Columba livia*), mourning doves (*Zenaida macroura*), lesser nighthawk (*Chordeiles acutipennis*), common poorwill (*Phalaenoptilus nuttallii*), yellow-shafted flicker (*Colaptes auratus*), ash-throated flycatcher (*Myiarchus cinerascens*), western kingbird (*Tyrannus verticalis*), common raven (*Corvus corax*), verdin (*Auriparus flaviceps*), cactus wren (*Campylorhynchus brunneicapillus*), black-tailed gnatcatcher (*Polioptila melanura*), phainopepla (*Phainopepla nitens*) and white-crowned sparrow (*Zonotrichia leucophrys*).

Several raptor species are known to occur seasonally in the vicinity of the Project Site. Species include turkey vulture (*Cathartes aura*), golden eagle (*Aguila chrysactos*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*) and Harris's hawk (*Parabuteo unicinctus*

Reptile species known or expected to occur near the Project Site include desert iguana (*Dispsosaurus dorsali*), zebra-tailed lizard (*Callisaurus draconoides*), desert collared lizard (*Crotaphytus insularis*), western whiptail (*Cnemidophorus tigris*), gopher snake (*Pituophis melanoleucus*), common kingsnake (*Lampropeltis getulus*), speckled rattlesnake (*Crotalus mitchellii*) and Mohave rattlesnake (*Crotalus scutulatus*).

Table D-3 List of Wildlife Which May Occur in the Vicinity of the Project Site

BIRDS	
Eared Grebe	*Podiceps nigricollis*
Turkey Vulture	*Cathartes aura*
Harris' Hawk	*Parabuteo unicinctus*
Red-tailed Hawk	*Buteo jamaicensis*
American Kestrel	*Falco sparverius*
Gambel's Quail	*Callipepla gambelii*
Killdeer	*Charadrius vociferus*
Rock Dove	*Columba livia*
White-winged Dove	*Zenaida asiatica*
Mourning Dove	*Z. macroura*
Inca Dove	*Scardafella inca*
Greater Roadrunner	*Geococcyx californicus*
Barn Owl	*Tyto alba*
Western Screech-owl	*Otus kennicottii*
Great Horned Owl	*Bubo virginianus*
Lesser Nighthawk	*Chordeiles acutipennis*
Common Poorwill	*Phalaenoptilus nuttallii*
White-throated Swift	*Aeronautes saxatilis*
Black-chinned Hummingbird	*Archilochus alexandri*
Anna's Hummingbird	*Calypte anna*
Costa's Hummingbird	*Calypte costae*
Gila Woodpecker	*Melanerpes uropygialis*
Ladder-backed Woodpecker	*Dendrocopos scalaris*
Northern Flicker	*Colaptes cafer*
Gilded Flicker	*C. auratus*
Black Phoebe	*Sayornis nigricans*
Say's Phoebe	*S. saya*
Ash-throated Flycatcher	*Myiarchus cinerascens*
Brown-crested Flycatcher	*M. tyrannulus*
Western Kingbird	*Tyrannus verticalis*
Horned Lark	*Eremophila alpestris*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Common Raven	*Corvus corax*
Verdin	*Auriparus flaviceps*
Cactus Wren	*Campylorhynchus brunneicapillus*
Rock Wren	*Salpinctes obsoletus*
Canyon Wren	*Catherpes mexicanus*
Bewick's Wren	*Troglodytes bewickii*
Ruby-crowned Kinglet	*Regulus calendula*
Black-tailed Gnatcatcher	*Polioptila melanura*
Northern Mockingbird	*Mimus polyglottos*
Curve-billed Thrasher	*Toxostoma curvirostre*
LeConte's Thrasher	*T. lecontei.*

Table D-3 List of Wildlife Which May Occur in the Vicinity of the Project Site	
Phainopepla	*Phainopepla nitens*
Loggerhead Shrike	*Lanius ludovicianus*
European Starling	*Sturnus vulgaris*
Bell's Vireo	*Vireo bellii*
Solitary Vireo	*Vireo solitarius*
Wilson's Warbler	*Wilsonia pusilla*
Northern Cardinal	*Cardinalis cardinalis*
Pyrrhuloxia	*Cardinalis sinuatus*
Green-tailed Towhee	*Pipilo chlorurus*
Canyon Towhee	*Pipilo fuscus*
Brewer's Sparrow	*Spizella breweri*
Black-throated Sparrow	*Aimophila bilineata*
White-crowned Sparrow	*Zonotrichia leucophrys*
Brown-headed Cowbird	*Molothrus ater*
Hooded Oriole	*Icterus cucullatus*
Scott's Oriole	*Icterus parisorum*
House Finch	*Carpodacus mexicanus*
House Sparrow	*Passer domesticus*
MAMMALS	
Desert shrew	*Notiosorex crawfordi*
California Leaf-nosed Bat	*Macrotus californicus*
Lesser Long-nosed Bat	*Leptonycteris curosae yerbabuena*
Yuma Myotis	*Myotis yumanensis*
Cave Myotis	*M. velifer*
California Myotis	*M. californicus*
Western Pipistrelle	*Pipistrellus hesperus*
Big Brown Bat	*Eptesicus fuscus*
Southern Yellow Bat	*Lasiurus ega*
Pallid Bat	*Antrozous pallidus*
American Free-tailed Bat	*Tadarida brasiliensis*
Pocketed Free-tailed Bat	*T. femorosacca*
Desert Cottontail	*Sylvilagus audubonii*
Black-tailed Jack Rabbit	*Lepus californicus*
Harris' Antelope Squirrel	*Ammospermophilus harrisii*
Rock Squirrel	*Spermophilus variegatus*
Round-tailed Ground Squirrel	*S. tereticaudus*
Botta's Pocket Gopher	*Thomomys bottae*
Arizona Pocket Mouse	*Perognathus amplus*
Bailey's Pocket Mouse	*P. baileyi*
Rock Pocket Mouse	*P. intermedius*
Desert Pocket Mouse	*P. penicillatus*
Banner-tailed Kangaroo Rat	*Dipodomys spectabilis*
Merriam's Kangaroo Rat	*D. merriami*
Desert Kangaroo Rat	*D. deserti*
Western Harvest Mouse	*Reithrodontomys megalotis*
Cactus Mouse	*Peromyscus eremicus*
Deer Mouse	*P. maniculatus*
Southern Grasshopper Mouse	*Onychomys torridus*
Arizona Cotton Rat	*Sigmodon arizonae*
White-throated Wood Rat	*Neotoma albigula*

Table D-3 List of Wildlife Which May Occur in the Vicinity of the Project Site	
Desert Wood Rat	*N. lepida*
House Mouse	*Mus musculus*
Coyote	*Canis latrans*
Kit Fox	*Vulpes macrotis*
Gray Fox	*Urocyon cinereoargenteus*
Badger	*Taxidea taxus*
Western Spotted Skunk	*Spilogale gracilis*
Mountain Lion	*Felis concolor*
Bobcat	*F. rufus*
Collared Peccary	*Tayassu tajacu*
Mule Deer	*Odocoileus hemionus*
REPTILES AND AMPHIBIANS	
Toads	
Couch's Spadefoot Toad	*Scaphiopus couchi*
Southern Spadefoot Toad	*S. multipicatus*
Sonoran Desert Toad	*Bufo alvarius*
Great Plains Toad	*B. cognatus*
Sonoran Green Toad	*B. debilis*
Red-spotted Toad	*B. punctatus*
Tortoises/Turtles	
Desert Tortoise	*Gopherus agassizi*
Lizards	
Desert Banded Gecko	*Coleonyx variegatus*
Chuckwalla	*Sauromalus obesus*
Desert Iguana	*Dipsosaurus dorsalis*
Zebra-tailed Lizard	*Callisaurus draconoides*
Long-nosed Leopard Lizard	*Gambelia wislizenii*
Desert Spiny Lizard	*Sceloporus magister*
Side-blotched Lizard	*Uta stansburiana*
Desert Horned Lizard	*Phrynosoma platyrhinos*
Regal Horned Lizard	*P. solare*
Tree Lizard	*Urosaurus ornatus*
Long-tailed Brush Lizard	*U. graciosus*
Collared Lizard	*Crotaphytus collaris*
Western Whiptail	*Cnemidophorus tigris*
Canyon Spotted Whiptail	*C. burti*
Gila Monster	*Heloderma suspectum*
Snakes	
Western Blind Snake	*Leptophlops humilis segregus*
Spotted Leaf-nosed Snake	*Phyllorhynchus decurtatus*
Saddled Leaf-nosed Snake	*P. brownii*
Coachwhip Sonoran Whipsnake	*Masticophis flagellus M. bilineatus*
Desert Patch-nosed Snake	*Salvadora hexalepis*
Glossy Snake	*Arizona elegans*
Gopher Snake	*Pituophis melanoleucus*
Common Kingsnake	*Lampropeltis getulus*
Long-nosed Snake	*Rhinocheilus lecontei marcianus*
Ground Snake	*Sonora semianmulate*
Banded Sand Snake	*Chilomeniscus cinctus*
Western Shovel-nosed Snake	*Chionactis occipitalis*

Table D-3 List of Wildlife Which May Occur in the Vicinity of the Project Site	
Night Snake	*Hypsiglena torquata*
Southwestern Black-headed Snake	*Tantilla hobartsmithii*
Arizona Coral Snake	*Micruroides euryxanthus*
Lyre Snake	*Trimophodon biscutatus*
Western Diamondback Rattlesnake	*Crotalus atrox*
Speckled Rattlesnake	*C. mitchelli*
Mohave Rattlesnake	*C. scutulatus*

Potential Effects

Potential impacts to wildlife associated with the construction of the Project will be minimal because of the limited amount of habitat that will be impacted by the Project. Construction activities associated with the Project will minimally disturb birds, small mammals, reptiles, and big game mammals currently utilizing these habitats. The short-term displacement of animals will be related to the increased activity and noise associated with construction.

These construction effects are expected lessened by the fact that the Project will be built next to Griffith, an existing power generation facility. Operation of the existing facility already generates noise and has associated human activity.

Long-term effects include minimal habitat loss on the 8-acre site. Since all of the habitats encountered on or near the Project Site are widely distributed in the region, loss of a small portion of this habitat will not affect the viability of any species. Riparian and wetland areas, which exhibit the greatest abundance of diversity within the desert communities, will not be impacted, since they are not present on or near the proposed Project Site.

EXHIBIT E SCENIC AREAS, HISTORIC SITES AND STRUCTURES, ARCHAEOLOGICAL SITES

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"Describe any existing scenic areas, historic sites and structures or archaeological sites in the vicinity of the proposed facilities and state the effects, if any, the proposed facilities will have thereon."

SCENIC AREAS/VISUAL RESOURCES

The Project Site is in a transition area between the Basin and Range and the Colorado Plateau physiographic provinces. The landscape of the general area is characterized by mountain ranges trending north and south with long, linear valleys in between the ranges. Geologic formations provide a diverse, scenic terrain. The Project Site lies within the Sacramento Valley, adjacent to the western and northern margins of the Hualapai Mountains. The valley consists of a broad, exposed, flat to undulating terrain sparsely vegetated with low growing desert scrub. Much of the land in the valley outside of Kingman is largely unmodified. These areas include lands under management by the Bureau of Land Management. The Hualapai Mountains to the east and the Black Mountains to the west provide a scenic backdrop to views of the valley.

The Project Site is located on private lands approximately 0.25 miles west of Interstate 40 (I-40). The surrounding landscape, as seen from the highway, consists of sparsely vegetated, flat terrain backdropped by nearby mountains. The affected viewshed contains the project site, the I-40 corridor to the north and south of the site, and surrounding public and private lands that will provide a view of the Project. Distance and intervening landforms to the northeast of the site exclude existing and proposed residential development, and the city of Kingman from the viewshed area. Field reconnaissance verified that the proposed facilities will not be visible from scenic highway corridors (Oatman Road) and existing and proposed residential developments in nearby Golden Valley.

The scenic quality of the landscape within and surrounding the Project Site is low because the site is located within the I-40 Industrial Corridor, which contains existing industrial development. Scenic quality is also low because of the lack of variety and contrast in landform, vegetation, and interesting features, and because the characteristic landforms and desert vegetation is common throughout the affected viewshed and the surrounding desert landscape. The sensitivity level, which is a measure of public concern for quality, is low because the majority of viewers will be traveling at highway speeds on I-40; therefore the Project Site is within the viewshed of motorists for a very brief period of time. In addition, views in the foreground distance zone of any viewing area, including the highway, is dominated by the existing Griffith Energy Project (Griffith), a 600 MW combined cycle electric generating facility located just south of the Project Site. There are no significant scenic resources in the vicinity that will be affected by the Project.

The Mohave County General Plan has developed Scenic Resource Goals to preserve, protect and enhance scenic routes and vistas that characterize the rural beauty of Mohave County. In order to implement the goal, the county has identified key scenic routes throughout the county. The scenic routes closest to the Project site are I-40 north of the intersection of State Route 66 (Oatman Road),

and Oatman Road between Oatman and I- 40. Oatman Road is part of historic Route 66, a National Back Country Byway. The Project Site is not within the viewshed of these key scenic routes. Griffith is also not visible from the scenic routes.

Potential Effects on Scenic Quality

Potential visual effects from the development of the Project will be changes to the physical setting and visual quality of the landscape and views from sensitive viewpoints, including travel routes, residences, and popular use areas. The Project will not change the character of the existing landscape. The Project will repeat the form, line, color, scale, and texture elements of Griffith, which characterizes the existing landscape and is in close proximity to the Project Site.

The Project will be an obvious addition to the existing industrial character of the landscape, as it will be within the viewshed of travelers on the I-40. The geometric, rectangular block forms of the Project will be visible from the highway but will be painted to blend with landscape colors and Griffith, and will result in a low to moderate contrast with the surrounding landscape.

The most visible component of the Project from all viewpoints will be the exhaust stacks. The Project will not include cooling towers, therefore there will be no visual impact from a steam plume emanating from the Project. Each of the four (4) CTGs will have an attached exhaust stack that will be approximately 85 feet in height and 10 feet in diameter. The four (4) exhaust stacks will create new linear and vertical forms that will be obvious to viewers on I-40. However, the Project stacks will be smaller in scale that those existing at Griffith with a height of 130 feet. Because the Project stacks will repeat the existing line and form, but will be smaller in scale than the existing Griffith stacks, they will be difficult to discern when viewed from most viewing areas, depending on the angle of view. The Project will not be visible from existing or proposed residential developments north and west of the Project Site. Viewed from the three wilderness areas in the vicinity, the Project will be difficult to discern from Griffith and the surrounding facilities as viewed from the three wilderness areas.

The Project will be artificially lighted as necessary to enhance the safety of Project personnel. Night-lighting will increase the visibility of the facility to all viewpoints. The light, glare or backscatter illumination visible to sensitive viewpoints will be minimized by the use of directional shielding of lights. The off-site visibility and potential glare of the lighting will be restricted by the screening structures to be placed around the facility's major equipment, specification of non-glare fixtures, and placement of lights to direct illumination into only those areas where it is needed.

The Federal Aviation Administration (FAA) requires that any permanent object that exceeds an overall height of 200 above ground level or exceeds any obstruction standard contained in FAR Part 77 (2000a) be lighted with a flashing lighting system. Because the exhaust stacks are 85 feet in height and more than three nautical miles from the nearest airport (as per FAR Part 77), blinking safety lights will not need to be installed (FAA 2000b).

There will be no effects to visual resources from the construction and operation of infrastructure for gas, water, and electric interconnections as these interconnection facilities will be accessed within the Project Property or the adjacent Griffith property.

SENSITIVE VIEWPOINTS

Sensitive viewpoints consist of locations from which a significant number of people who have a concern for scenic resources will view a landscape, or will be exposed to project activities. Sensitive viewpoints are generally located on transportation routes, residential areas and recreational use areas.

Key Observation Points (KOPs) have been selected that represent sensitive viewpoints located in on nearby transportation routes and residential areas. These KOPs were used to evaluate the impact to visual quality from the construction and operation of the Project. **Figure E-1** provides a map that illustrates where these photos were taken.

The CTGs, exhaust stacks, and associated facilities will be visible from viewpoints along I-40 but will be difficult to discern from the surrounding landscape at more than a one mile distance, depending on the presence of intervening landforms. This is because the Project components will be painted to harmonize with the colors of the surrounding landscape, so that the small scale and colors of the facilities will tend to blur form, line, and textural contrasts at longer distances. In addition, the project components will be very similar in appearance (although significantly smaller in size) to those existing at Griffith.

Eight KOPs were selected to represent views of the Project from I-40 and nearby county roads that cross through undeveloped areas currently designated as a Rural Development Area in the Mohave County General Plan. There are currently no existing or proposed residential developments for these lands; however, there is potential for residential development in the future. The KOPs were selected to best represent a significant number of people with a concern for visual quality that will view the Project.

KOP 1 is located 0.3 mile northeast of the northeast corner of the Project Site on southbound I-40. The view faces southeast toward Haul Road, the northeast corner of the Project Site and Griffith. Haul Road is at the north boundary of the Project Property. **Figure E-2** provides a photo that illustrates the appearance of the existing landscape and a simulation of the Northern Arizona Energy Project.

KOP 2 is located on the southeast corner of Haul Road and the north terminating end of Apache Road about 0.2 miles from the northwest corner of the Project Site. The view faces southeast toward the west side of the Project Site and the northwest side Griffith. **Figure E-3** provides a photo that illustrates the appearance of the existing landscape and a simulation of the Northern Arizona Energy Project.

KOP 3 is located on Apache Road about 0.85 mile from the southwest corner of the Project Site. The view faces northeast, providing a view of Griffith. **Figure E-4** provides a photo that illustrates the appearance of the existing landscape and a simulation of the Project to the north of Griffith.

KOP 4 is located on Apache Road about 0.64 mile from the northwest corner of the Project Site. The view faces southeast, providing a view of Griffith. **Figure E-5** provides a photo that illustrates the appearance of the existing landscape and a simulation of the Northern Arizona Energy Project.

KOP 5 is located on southeast corner of Shinarump Road and Sacramento Road about 7.5 miles from the northwest corner of the Project Site. This KOP is located in an area where future residential development may occur. The view faces southeast toward the location of Project and Griffith. **Figure E-6** provides a photo of this view that illustrates that the Project and Griffith are not visible from this location.

KOP 6 is located on southeast corner of Aquarius Road and Yuma Road about 3.8 miles from the northwest corner of the Project Site. This KOP is also located in an area where future residential development may occur. The view faces southeast toward the Project Site. **Figure E-7** provides a photo of this view that illustrates that the Project and Griffith are not visible from this location.

KOP 7 is located on southeast corner of Oatman Highway (Historic Route 66) and Quartzite Road about 3.5 miles from the northwest corner of the Project Site. This KOP is also located on the historic highway and near an area where future residential development may occur. The view faces southeast toward the location of the Project Site. **Figure E-8** provides a photo of this view that illustrates that the Project and Griffith are not visible from this location.

KOP 8 is located midway between Dawson Drive and Quartzite Road on Centennial Road about 2.4 miles from the northwest corner of the Project Site. This KOP is located in an area where future residential development may occur. The view faces southeast and **Figure E-9** provides a photo that illustrates that the Project is difficult to see next to Griffith because of the small scale of the Project at this distance.

CULTURAL RESOURCES

Based on current inventories, archaeological and historical overviews, and previous surveys on this site, the proposed Project area is expected to contain few, if any prehistoric or historic cultural resources.

Cultural resources in the open basin of the Sacramento Valley are generally widely distributed at low density and occur as either spatially narrow and linear or small and point-focused entities. Historic cultural resources are likely to be more common east of the Project area along the historic corridors of Route 66 and the AT&SF railroad, and in the foothills of the Hualapai Mountains. Review of AZSITE records, and site cards and other records at the Arizona State Museum (ASM), and BLM Kingman office identified four previous cultural resource studies and two formally recorded prehistoric or historic cultural resource sites within one mile of the Project area. Three of the previous cultural resource investigations were for the existing Griffith and associated utility corridors (Ezzo and Späth 1998; Becker and Huber 2001; Becker et al. 2001).

Previous environmental analyses that included areas within or near the project (BLM 1996; Western and BLM 1999) indicated a very low probability of cultural resources in the Project area. Potential resources identified in nearby settings, such as the foothills of the Hualapai Mountains, included, prehistoric rock rings, prehistoric and historic trails, and historic roads, railroads, and utility lines. Prehistoric and historic resources in the general region, principally in nearby mountain ranges, include rockshelters, prehistoric and historic artifacts scatters, rock rings and cleared circles, trails, rock art, hearths and roasting pits, roads, railroads, cairns, and mining prospects. Cultural resources most likely to occur in a setting like the Project area are foot trail segments and gravel prospects.

The Project area was within the survey completed for Griffith (Ezzo and Späth 1998). The survey identified no cultural resources and no areas of Holocene deposition that might contain buried cultural materials or features. No surface or subsurface cultural resources exist within the Project area. Construction, operation, and maintenance of the Project will not adversely impact any significant historic properties. Cultural resource clearance is recommended for the Project. If unanticipated cultural materials or unmarked human remains are discovered during construction, the contractor will be required to cease work in the immediate vicinity of the discovery and take appropriate measures to protect the remains from further inadvertent or intentional disturbance. An archaeological contractor will be contacted immediately to identify and evaluate the remains, and State Historic Preservation Office (SHPO) will be notified within 24 hours of the discovery and preliminary assessment.

Kingman

T. 21 N.
T. 20 N.

223

Shinarump Rd.

Aztec Rd.

Bacobi Rd.

Prescription Rd.

Garnet Rd.

Desert View Trl.

Sacramento Rd.

Centennial Rd.

5

6

Acquarius Rd.

Tombstone Trl.

Ash Dr.

Ramada Rd.

Oatman Highway (Historic 66)

40

R. 18 W.

R. 17 W.

7

8

Quartzite Rd.

Yuma Rd.

T. 20 N.
T. 19 N.

Dawson Dr.

Paradise Rd.

4

2

1

Geronimo Rd

Navajo Dr.

3

W. Yucca Dr.

Apache Rd.

Frontage Rd.

Northern Arizona Energy Project

Project Location

Legend

- I 40 Industrial Corridor Boundary
- Golden Valley Holdings
- Northern Arizona Energy Property Boundary
- Key Observation Point

N
W E
S

1 0.5 0 1

Miles

Transverse Mercator Projection
1983 North American Datum
Zone 12
Meters

NORTHERN ARIZONA ENERGY PROJECT

Figure E-1
KOP Locations

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/15/2007	File: 2516/KOP.MXD
Created By: JG	Layout: KOP PDF

Existing Condition
Looking southwesterly from Interstate 40 down Haul Road at existing Griffith Energy Project.

Photo Simulation
Simulation of Northern Arizona Energy Project from Interstate 40 looking down Haul Road.

NORTHERN ARIZONA ENERGY PROJECT	
Figure E-2 *Photo Simulation*	
ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516/-KOP-1 .MXD
Drawn By: EC	Layout: Figure E-2 PDF

Existing Condition
Looking southeast from intersection of Haul Road and Apache Road at existing Griffith Energy Project.

Photo Simulation
Simulation of Northern Arizona Energy Project from the intersection of Haul Road and Apache Road looking southeast.

NORTHERN ARIZONA ENERGY PROJECT

Figure E-3
Photo Simulation

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516/-KOP-2 .MXD
Drawn By: EC	Layout: Figure E-3 PDF

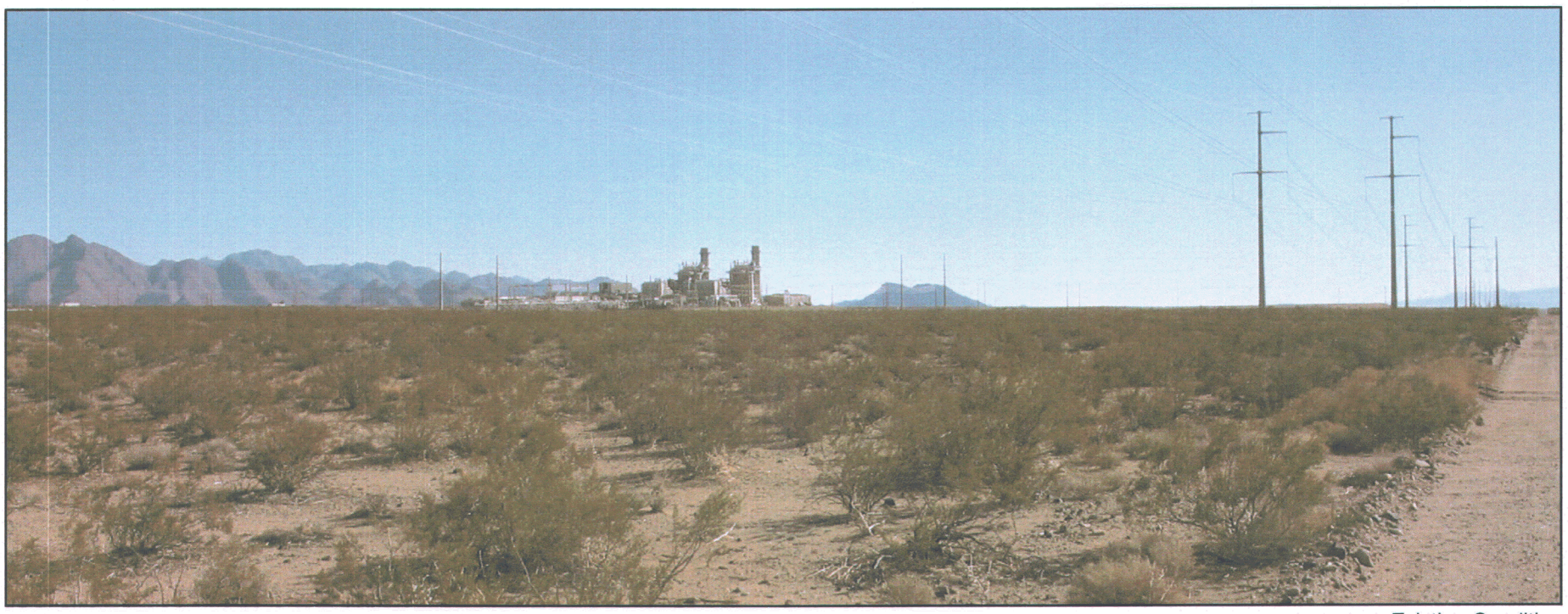
Existing Condition
Looking northeast from Apache Road at existing Griffith Energy Project.

Photo Simulation
Simulation of Northern Arizona Energy Project from Apache Road.

NORTHERN ARIZONA ENERGY PROJECT

Figure E-4
Photo Simulation

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516/-KOP-3 .MXD
Drawn By: EC	Layout: Figure E-4 PDF



Existing Condition
Looking southeast down Apache Road near Dawson Drive at existing Griffith Energy Project.

Photo Simulation
Simulation of Northern Arizona Energy Project down Apache Road near Dawson Drive.

NORTHERN ARIZONA ENERGY PROJECT

Figure E-5
Photo Simulation

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516/-KOP-4 .MXD
Drawn By: EC	Layout: Figure E-5 PDF

Existing Condition

Looking southeast from the corner of Shinarump Road and Sacramento Road facing Golden Valley Holdings about 7.5 miles from the northwest corner of the Project site. The Northern Arizona Energy Project and existing Griffith Energy Project are not visible from this location.

NORTHERN ARIZONA ENERGY PROJECT

Figure E-6
Key Observation Point 5

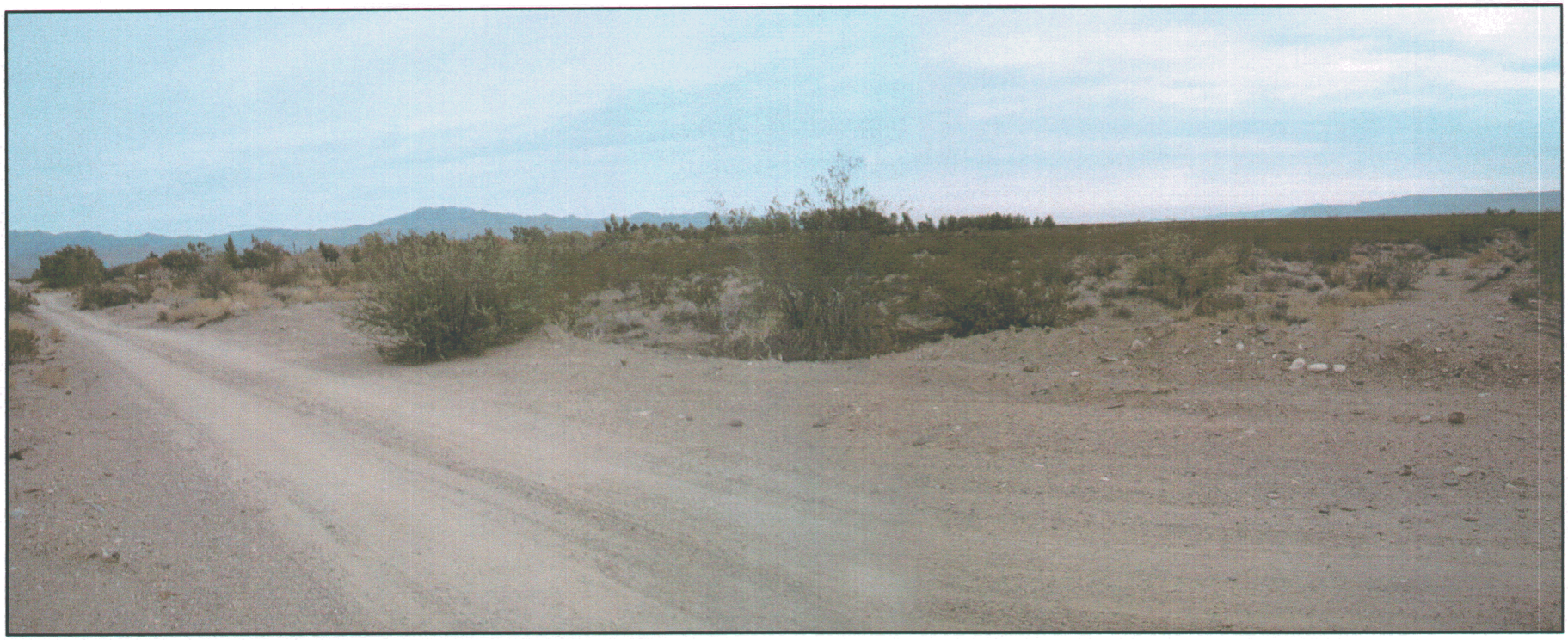
ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516\-KOP-5.MXD
Drawn By: EC	Layout: Figure E-6 PDF

Existing Condition
Looking southeast from the corner of Aquarius Road and Yuma Road about 3.8 miles from the northwest corner of the Project site.
The Northern Arizona Energy Project and existing Griffith Energy Project are not visible from this location.

NORTHERN ARIZONA ENERGY PROJECT

Figure E-7
Key Observation Point 6

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516\-KOP-6.MXD
Drawn By: EC	Layout: Figure E-7 PDF



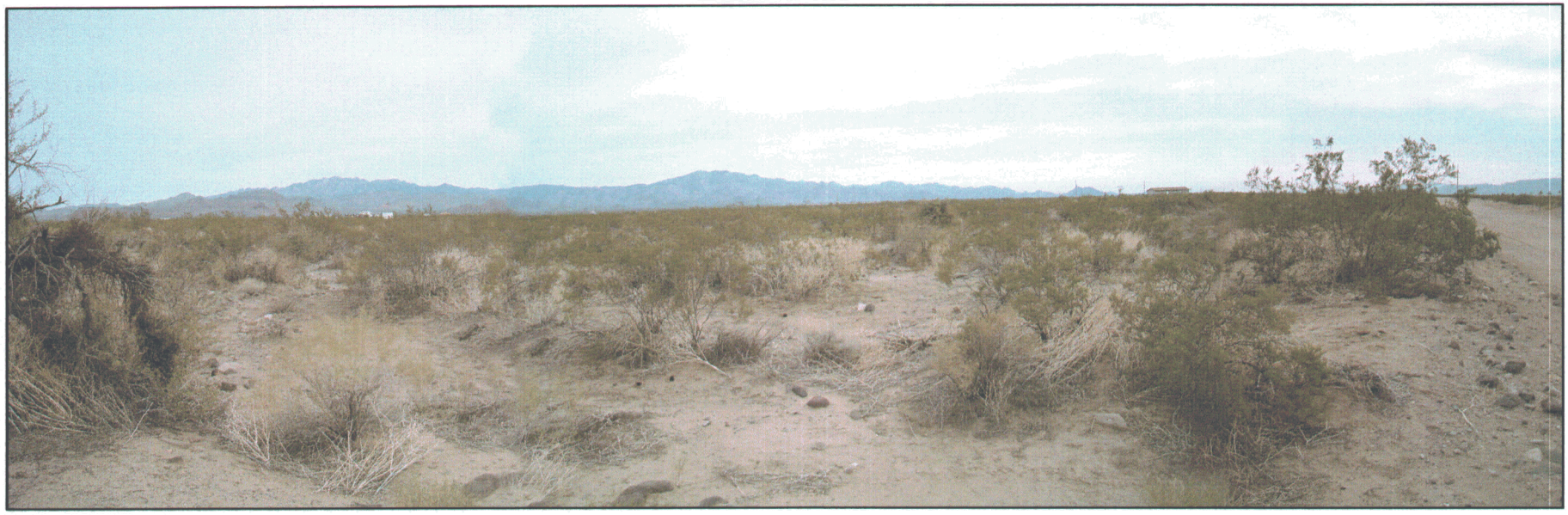
Existing Condition

Looking southeast from the corner of Oatman Highway (Historic Route 66) and Quartzite Road about 3.5 miles from the northwest corner of the Project site. The Northern Arizona Energy Project and existing Griffith Energy Project are not visible from this location.

NORTHERN ARIZONA ENERGY PROJECT

Figure E-8
Key Observation Point 7

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516\-KOP-7.MXD
Drawn By: EC	Layout: Figure E-8 PDF



Existing Condition

Located midway between Dawson Drive and Quartzite Road on Centennial Road about 2.4 miles from the northwest corner of the Project site. The view faces southeast, the existing Griffith Energy Project is small relative to the surrounding landscape, and is difficult to see for the casual observer. The Northern Arizona Energy Project is difficult to see next to the existing Griffith Energy Project because of the small scale of the facilities at the 2.4 mile distance.

NORTHERN ARIZONA ENERGY PROJECT

Figure E-9
Key Observation Point 8

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516\-KOP-8.MXD
Drawn By: EC	Layout: Figure E-9 PDF

EXHIBIT F RECREATIONAL PURPOSES AND ASPECTS

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"State the extent, if any, the proposed site or route will be available to the public for recreational purposes, consistent with safety considerations and regulations, and attach any plans the applicant may have concerning the development of the recreational aspects of the proposed site or route."

RECREATIONAL PURPOSES AND ASPECTS

Neither the applicant nor jurisdictional agencies have proposed any plans for the development of recreational facilities associated with the Project. The construction, operation and maintenance of Project will be consistent with safety considerations and not open to public access.

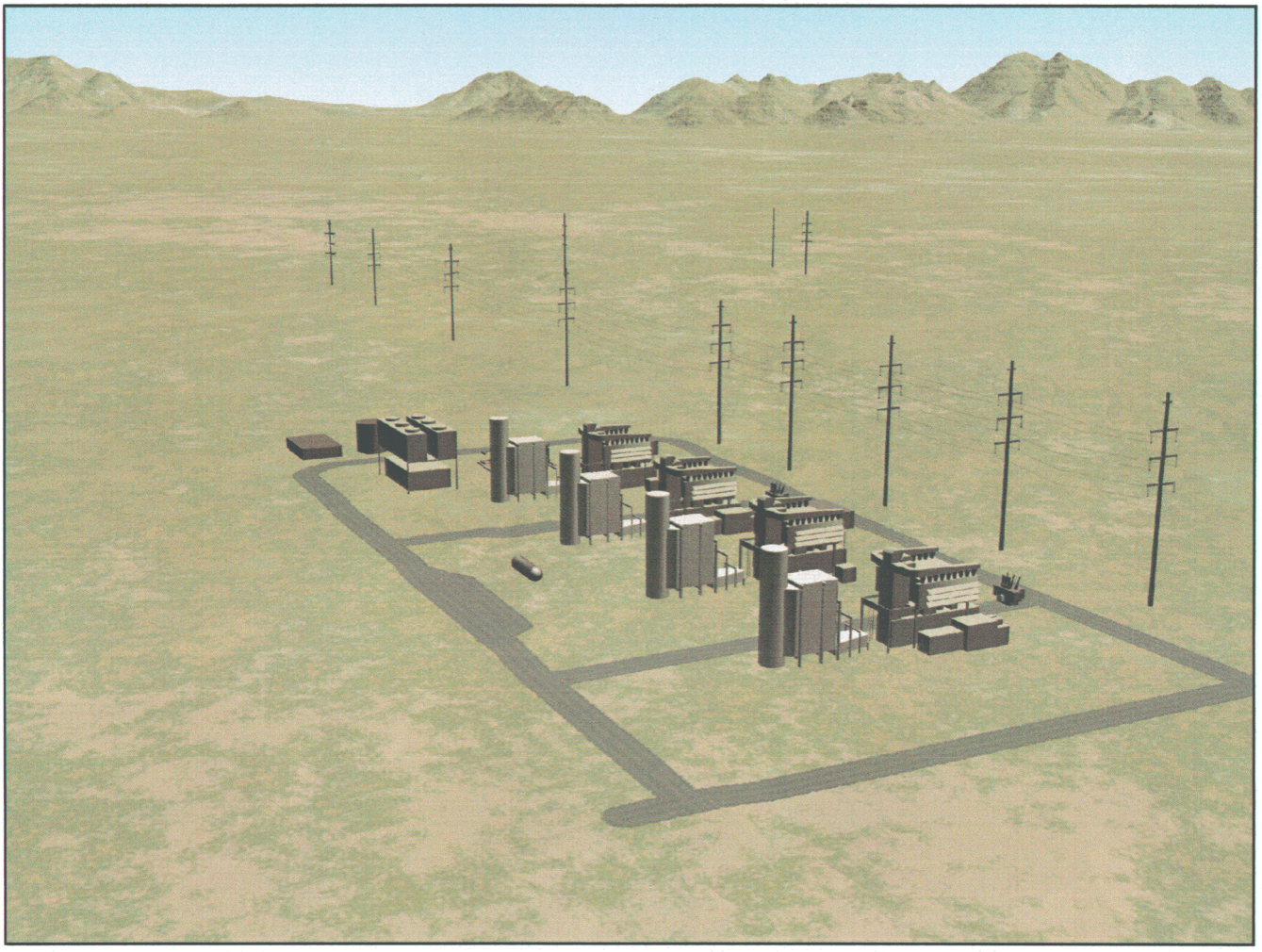
There is currently no developed recreation near the Project area. No significant recreation occurs on or around the Project Site. Dispersed activities such as hunting and off-road vehicle (ORV) uses do occur on public lands in the general area.

EXHIBIT G CONCEPTS OF TYPICAL FACILITIES

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"Attach any artist's or architect's conception of the proposed plant or transmission line structures and switchyards which applicant believes may be informative to the committee."

Figure G-1 contains a rendering of the Northern Arizona Energy Project.



NORTHERN ARIZONA ENERGY PROJECT

Figure G-1
Artists Rendition of Power Plant

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/15/2007	File: 2518/Rendering..MXD
Drawn By: EC	Layout: Figure G-1 PDF

EXHIBIT H EXISTING PLANS

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"To the extent applicant is able to determine, state the existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site or route."

Existing and planned land uses in the area are described in **Exhibit A. Figures A-1, A-2, and A-3** show the existing and future land uses within the Project study area. The planned land uses for the lands surrounding the I-40 Industrial Corridor include Rural Development, Suburban Development, and Urban Development Areas as shown on **Figure A-3**. Several areas near the Project Property have been platted for subdivision; however, there are currently no housing developments on the platted subdivisions in the vicinity of the Project Property as shown on **Figure A-2**.

The Project will be fully compatible with the County's Zoning Regulations and planned land uses for the I-40 Industrial Corridor and will comply with the industrial performance standards for the MX zone. No existing or planned developments of government or private entities at or near the Project Site were identified that will conflict with the Northern Arizona Energy Project.

AGENCY AND PUBLIC COORDINATION

The Applicant conducted a public outreach program to inform the public about the Project and to solicit input from the community. In addition, as part of the EA process, a public involvement program is being advanced by Western for this Project to provide information to federal, state, and local government agencies and private entities, to solicit information, to obtain comments, and to identify issues pertinent to this Project. A summary of the agency meetings, public meetings, and Native American consultations, public contact letters, public response comments and public notices, and a fact sheet are presented in **Exhibit J**.

Table H-1 identifies the individuals and entities that have been contacted to obtain their input on the Project.

Table H-1 Property Owners Within 5 Miles Of Project	
OWNER NAME	**PARCEL**
A/M GAS N GO INC 50	215-15-155A
ADAMS ROSEMARY	209-05-107
ALANIZ ANDREW D	209-27-013
ALLEN KELLY	215-15-090A
APACHE TRUST	215-02-113
APPLEBY JOHN ETAL JT	215-12-087E
APSK REALTY I	215-23-003
ARELLANO ARACELI E	215-12-166D
ARNOLD BRUCE JR & SARA T TRUSTEES	215-22-009
ARNOLD CLINT JASON	215-08-024E
ARNOLD RALPH & BARBARA JT	215-03-075
AVERETT SANDRA	209-07-214
AVERETT SANDRA	209-07-218A
AVILA DANIEL S & ELKE K JT	215-02-099
AWBF INC	215-03-012
BAIER GARY L CPWRS 50	215-02-053
BAKER DONNA L	209-02-031
BANUELOS GEORGE & MONICA CPWRS	209-04-022
BARNES MARIAM	209-05-007
BARNETT KEITH & MARJORIE TRUSTEES	215-11-056
BASSETT EARL L	209-04-173
BAYARD SHEILA M ETAL	215-03-109A
BEDOW SHIRLEY SURVIVING TRUSTEE	209-05-041
BEEZER TIM & CAROL JT	215-02-242
BEKOLAY CHARLOTTE S	209-07-127
BEKOLAY PAUL W	209-19-041
BENIGAR JAMES & TREVA JT	215-05-243
BENNETT GEOFF & MAUREEN	215-13-067B
BERNATZKE FREDRICK GEORGE	215-04-010
BEVIS JOHN & SHARON JT	215-15-088A
BIRDSELL RONALD & ROBERTA JT	209-13-055
BLACKSTOCK TWILA	209-03-053
BLAIR MICHAEL E & BARBARA A JT	209-03-129
BLAKE CORRIGAN & BLAKE INVESTMENTS LLC	209-03-224
BLANCO ANNA B	209-07-012
BOARDMAN ERWIN J & RUTH L TRUSTEES	215-02-185
BOCK THOMAS R	215-14-038
BOMARETO GEORGE	215-11-196
BONE RICHARD & GLENDA JT	209-12-055
BOROS JOHN & MARY JT	215-04-097
BOSZE ALEX JT 34	215-02-056
BOTTOMS BILL & AMANDA JT	215-15-058B
BOWERS WILLIAM	209-33-006
BOYLES JAMES & CYNTHIA JT	209-06-095B

Table H-1 Property Owners Within 5 Miles Of Project	
OWNER NAME	**PARCEL**
BREMERMAN WILLIAM & JOAN JT	215-03-066
BRESNAHAN CAROLYN	209-03-199
BREWER JESS D & DIXIE L JT	215-11-118
BRITTON ALAN D	209-09-143
BROWN KAREN L	215-23-011
BROWNELL DANIEL H & LUCILLE J CPWRS	209-04-086
BRUCE DAVID	215-14-086A
BRUCE DAVID R	215-14-087
BRUNELLE LEON F	215-04-035
BRYANT ROY D JR & LINDA D JT	209-20-038
BTP#1-05	215-06-023
BUCHANS JEANNE TRUSTEE	209-22-012A
BURCH JENNIFER BROWN	215-15-095D
BURCH STEVEN & KATHY CPWRS	215-15-097
CABAN ARMANDO J & GAYLYNN E JT	215-02-164
CALDWELL DANIEL E	209-02-197
CALVERT GENE T & MARJORIE Y JT	209-07-047
CAMERON JOHN & NANCY JT	209-07-178
CAMUS FRANK ETAL	215-11-038
CANO RAUL R	209-19-070
CAREY DAVID R	215-15-117A
CARLSON WENDY	209-02-065
CARLTON ROY & ELIZABETH JT	208-29-126B
CARRER DORIS	215-04-008E
CEJ LLC	215-07-017B
CHAMBERS JUSTIN	215-08-039A
CHANDLER LINDA R	209-06-069
CITY OF KINGMAN	215-01-017
CLARK COUNTY LAND DEVELOPMENT	215-07-103B
CLARK NANCY	215-15-073A
CLOOS THOMAS L ETAL JT	209-02-154
COBB VAN D & SONIA JT	215-22-007A
CONNORS TERRY IN TRUST FORO	215-15-069A
COOK ROY D & PEGGY J JT	209-05-013
COPPIE PAUL JT 50	215-06-068
CORRAL EULOGIO	209-06-175
CORRIGAN ROBERT	209-03-074
COX MICHAEL G & NICOLE LEANDA JT	209-07-096
COX WILLIAM GUY & BETTY	215-11-136
CRAIN ROY E & NISSA A	215-19-023
CRISCIONE LOUIE	215-06-246
CULLINANE THERESA L JT 50	215-11-202
CUMMISKEY LOIS TRUSTEE	209-14-001
CUNNINGHAM EUGENE TRUSTEE	215-14-197B
CURTIS WILLIAM AUGUST	209-26-016

Table H-1 Property Owners Within 5 Miles Of Project	
OWNER NAME	**PARCEL**
CYRUS JASON A	215-08-041C
DA LYNN CHERIE	209-17-008
DAMMERICH STEVE	209-05-077
DANKO RONALD G DBA	209-28-013
DAVENPORT LOIS	215-13-094A
DAY JEAN	215-11-272A
DE CHENNE DENNIS & JUDITH	209-14-005
DEAN JEFFREY M & CUIYAN LIU JT	215-11-155
DELGADO JOSE FRANCISCO	215-11-046
DESPAIN LINDA-MARIE	215-05-151
DILLOW MELISSA	215-11-171
DILLOW MELISSA R	215-11-212
DODANE MARGORIE L	215-07-119B
DONDANVILLE HAROLD	209-03-094
DONIHOO CAROL A	215-02-177
DOVE JAMES & KAREN JT	215-08-227B
DUNCAN PATRICIA A JT 50	215-11-200
DURON ANTHONY JR	208-29-002S
DURST SCOT A JT*	209-02-106
DWYER MICHAEL H ETAL	208-28-021
EDWARDS ED	209-05-002
ELDEAN JOHN D	215-19-028
EQUATORIAL MINERAL PARK INC	215-01-069
FALCONE DANIEL G	215-14-034
FATCO TR 5757	215-02-151
FATCO TR 5757	215-02-244
FERGUSON DOUGLAS & JEAN	215-02-004A
FERGUSON DOUGLAS H & JEAN E JT	215-02-004B
FERNANDEZ SALVADOR S	215-14-209
FILLET RONALD C & JEANIE J JT	209-25-004
FLYING R INVESTMENTS	209-07-263
FRESCHAUF ROBERT J SR	215-13-025B
GARNER WILLIAM	215-11-246
GEOFFRION EDWARD J	215-04-062
GIBSON HARVEY S	215-06-233
GIGLIO BONNIE	215-15-199A
GILBERT HENRY	215-07-119A
GIST AUBRAY J	209-05-072
GIST JOHN	209-05-030
GLOTKOWSKI JEWEL	215-11-019
GLOTKOWSKI ROD ETAL JT	209-13-031
GLUSCHENKO SHARON TRUSTEE	209-04-129
GOLDBERG WILLIAM & TINA JT	209-28-009C
GOLDEN VALLEY FIRE DEPARTMENT	215-04-061
GOSS EUGENE R & GAIL E JT	209-13-043

Table H-1 Property Owners Within 5 Miles Of Project	
OWNER NAME	**PARCEL**
GRANT GREGORY A	215-05-081
GRAYBEHL WILLIAM TRUSTEE	215-05-064
GRIESINGER GERHARD & SHERYL JT	215-05-248
GROTZ ROY J 50	209-05-067
GUSMAN FRANK J SR & DOLORES TRUSTEES	215-11-250
HALL JOHN G & MONICA F JT	209-11-035
HALVORSON ROBERT	215-02-069
HAMMOND GEORGE M & PEGGY L CPWRS	209-13-054
HAMMOND MAUREEN	215-07-114B
HARPER HAROLD & BETTY J	209-07-218B
HARRISON DONALD	215-11-263
HARRISON DONALD JAMES	215-11-274
HARRISON WILLIAM M JR	215-11-264
HART PAUL EUGENE JT 50	209-05-004
HECKER JAMES J	215-11-050
HEYTMAN DAVID A & HAZELDELL TRUSTEES	215-14-039
HIGLEY STEPHEN & JOANN	215-12-247B
HILLENBRAND LAURENCE & MARY A	215-14-279
HINDT MAX & ARLENE 34	215-14-259
HIRSCHFELD JEANNIE ETAL JT	215-15-172B
HOEFT CHRISTE E	215-13-068B
HOFFMAN ANDREW JT 50	215-03-009
HOFFMEIR RICHARD H	209-07-034
HOFSTADTER MICHAEL & CANDACE CPWRS	215-05-150A
HOGSTEN RICHARD & SHARON JT	215-04-119
HOLLAND JON D & SUSAN E JT	209-07-292
HOLYOAK TRAVIS L	209-07-049
HOUSKA GERALD & TERESA CPWRS	215-04-017
HOWARD FRED & TAKAKO CPWRS	209-23-012A
HOWETH MICHAEL & GEORGIA C JT	215-14-065
HUDDLESTON TIMOTHY	215-15-146B
HUFFINE GARY & PATSY JT	209-07-171
HUGHES DENZIL L & ANNE M JT	209-09-163
HUSBANDS BRIAN	208-29-153
HUTCHINSON LARRY SR	215-11-138
ILES STEVEN T & KAY L CPWRS	209-11-086
IOZZO JOHN & MARY JT	215-02-076
JACKSON BRIAN E 50	209-01-013
JACKSON JANET ANN	209-19-105
JACKSON LAURA MARIE	215-11-245B
JACOBS KARL & BARBY CPWRS	215-11-115A
JAEGER DENNIS F	209-09-165
JAMES CALVIN LLC	215-02-137
JOHNSON ERIN L	215-13-168A
JOHNSON MICHAEL J ETAL JT 50	215-10-004

Table H-1 Property Owners Within 5 Miles Of Project	
OWNER NAME	**PARCEL**
JOHNSTON TIMOTHY & TARA JT	215-05-162
JOLICOEUR DENNIS & RENEE CPWRS	215-11-272B
JONES LUTHER B & EVA M JT	215-07-251B
JORDAN DESERT LAND LLC	209-07-063
JOSEPH JUSTIN LAURENT	209-03-192
JUAREZ LEO & LOIS CPWRS	215-03-080
KALTZ KENNETH & THERESA CPWRS	215-15-023A
KAMPETER RONALD L	215-08-027C
KANELOS JAMES	215-11-190
KEITH CHARMAYNE	215-08-238A
KEITH CHARMAYNE JT 50	215-08-197D
KEITH CHARMAYNE M	215-07-240B
KEMP EARL	215-12-114A
KEMP EARL TERRY	215-11-127
KERR GARRET	215-14-011
KIMBROUGH KENNETH	215-11-059
KING JAY E ETAL JT	215-14-222A
KING SHEILA JT 50	215-05-240
KINGMAN PRESBYTERIAN CHURCH	209-03-238
KINGMAN UNIFIED SCHOOL DISTRICT #20	215-05-008
KINGSLAND GLADYS E TRUSTEE	209-25-002
KLIMENT BEULAH K	215-14-118A
KREUGER EDWIN	215-14-223B
KUNZE EDWARD A ETAL JT	209-26-015
LACOSS HARRISON A	209-11-247
LEASK DAVID	215-15-028A
LEE IRA M & MARGUERITE V TRUSTEES	215-02-039
LEE MARGUERITE V TRUSTEE	215-02-142
LEONARD OWEN JR	215-03-072
LIBY GERALD V	209-20-019
LIGHTWINE DORIS TRUSTEE	209-07-155
LO SIU WO	215-06-082
LONG GARY G	215-13-093B
LONG GLEN R 50	209-21-017
LONG WILLIAM D & WILMA M*	209-05-076
LOWE LINDA D	215-23-015
LOWREY JACQUELYNN MARY JT 50	209-19-086
M & M 2000 LLC	209-06-201
M DE TORO	215-04-146
MABERRY JAMES A	209-05-045
MAC NEIL CHUCK P	215-02-016A
MANSFIELD RORY & SANDRA JT	215-06-204
MARTIN BOBBY E & SHIRLEY J	215-11-273
MARTIN CHRISTOPHER B JT 50	215-15-049B
MASON WILLIAM & MARYANN CPWRS	215-08-240A

Table H-1 Property Owners Within 5 Miles Of Project	
OWNER NAME	**PARCEL**
MC BRAYER ERVIN L TRUSTEE EST OF	209-05-039
MC CAFFERTY JASON H	215-02-012
MC CLELLAN ANGELA S	215-02-006
MC COY BRAD L	215-12-165A
MC DANIEL RON & MARTI JT	215-12-090B
MC ELVAIN ELDON & JULIE CPWRS	215-04-099
MC KELLAR ROBERT A & JEANETTE TRUSTEES	215-06-086
MCLEAN JAMES E & DELIA F CPWRS	209-19-017
MCNAB FRANCIS JAMES & KAREN M JT	215-04-005
MILLER ALVIN & JUDY JT	209-11-139A
MILLER CAROL L	209-03-002
MITCHELL LARRY JT 50	215-14-199
MITCHEM SAM M	215-12-247A
MITTELSTAEDT MANUELA B JT 50	215-14-015
MJB INVESTMENT GROUP LLC	206-23-017
MOHAVE COUNTY	215-08-122B
MOHAVE COUNTY ECONOMIC DEV	215-09-020C
MONGELLI JOSEPH A 25 ETAL	209-03-188
MONTGOMERY MICHAEL & ROSA JT	209-04-083
MOORE JESSE R JT 50	209-11-111
MOORE ROBERT M	215-05-016
MULKEY FRED & ANN E	215-15-035B
NAVARRO RODOLFO & CASSANDRA JT 50	215-18-007A
NELSON DONALD L	209-18-003
NEWMAN JOHN & MARGARET JT	215-11-188
NORDBY JAMES ETAL JT	215-07-106B
NORRIS JAMIE T	215-06-222
NORRIS JOHN C	209-03-213
NORRIS PEGGY A TRUSTEE	215-11-245A
NORTH COAST VILLAGE LLC	209-02-193
NOVOSEL CAROL*	215-14-157F
NUTT TIMOTHY W & CHRISTIANNE R TR 34	206-23-016
ODLE ROBERT L & SHARON JT	215-04-164B
ORMEN LAUNITA JT 50	209-05-053
OSBORN JEANETTE W TRUSTEE	215-02-193
O'SULLIVAN RUTH	209-17-011
OTT JOE & CAROL CPWRS	215-23-013
OVERSON GARY & LINDA TRUSTEES	206-03-031
PARKER CHARLES &	209-07-225
PARR ELMER D & MURIEL TRUSTEES	215-09-007B
PATTERSON ROY & MARY JT	209-04-110
PAUL SHIRLEY J	215-15-037A
PAULSTEINER FRANK R & MARIA A CPWRS	215-05-161
PEDI MARTIN S	209-05-036
PENTLAND MAE S JT 50	209-07-051

Table H-1 Property Owners Within 5 Miles Of Project	
OWNER NAME	**PARCEL**
PETITT ROBERT & LINDA ETAL JT	209-26-009
PETRIGALA MICHAEL	209-20-045
PHANTOM FARMS TRUST	215-02-060
PIERCE KEN	215-12-214A
PIERCE KEN R	215-11-206
PIGSLEY PATRICIA	209-03-012
PITT ANNETTE L	215-13-096E
POLI-GOLD LLC	209-01-122
POOL JOHN J & HEIDI JT	215-02-059
POOTS KELLY & CAROLYNN JT*	209-03-088
PRATT JULIUS J & DOROTHY L JT 50	215-04-167
QUADE RONALD & BILLIE D	209-08-002
QUEZADA FIDEL C & THEODORA JT	215-02-219
RANCHO MOHAVE PROPERTIES	215-07-012B
RANDKLEV WARREN & BONNIE JT	215-02-080
RANDKLEV WARREN D & BONNIE L JT	215-02-079A
REIDY KIMBERLY	215-02-024
REILLY MICHAEL W	215-15-243A
REINKE KURT R	209-25-016
RF PROPERTIES	215-25-006
RHODES HOMES ARIZONA LLC	215-17-006
RHOTEN DAVID R	215-11-061
RICE RELMOND & JOANNE CPWRS	209-05-038
RICHARD WILLIAM F & HULDAH	209-03-087
RICHTER VICTOR J	209-04-059
RIEDEL REX	215-11-166
RIEDEL REX B 50	215-11-150
RJJR 2005 LLC	208-29-058
ROBERTSON JOSH JT 50	208-29-093
ROBINSON DAVID & DEBORAH D CPWRS	215-11-123
RODRIGUEZ STEVE ADOLFO	215-15-222E
ROE JAMES & KANDY TRUSTEES	209-08-009
ROMER CHARLES JOHN TRUSTEE	206-03-036
ROSSO DOMINIC A ETAL TRUSTEE	209-11-044
ROWLAND MILLIE S TRUSTEE	215-22-002
RUNYAN JACK E & NAVIS L	209-02-177
RUSSO JAMES & DARLEEN JT	215-25-001A
RYAN SHIRLEY MAE TRUSTEE	208-29-044
SABACH MARGARET M	215-13-037A
SABLE JOHN	215-07-196B
SABRA JAMAL A JT 50	215-06-108
SAMPSON JOHN E & MIKKI CPWRS	215-10-015A
SANCHEZ MARIO	215-02-089
SANDOVAL KAREN S	215-11-252
SCHAFFER BART R 50	215-02-192

Table H-1 Property Owners Within 5 Miles Of Project	
OWNER NAME	**PARCEL**
SCHERZER SUSAN E	215-14-221D
SCHULTE ERIC	215-06-205
SCHWAB VERNA A	215-15-151A
SCULLY JOHN H & ELEANOR JT	215-03-244
SHANE GERALD G TRUSTEE	215-06-121
SHANE GERLAD G TRUSTEE	209-06-114
SHARP TRACY	215-02-008
SHAW HENRY C	215-11-124
SHIPLEY HERB TRUSTEE	209-09-034
SHORT/BOWERS INVESTMENTS LLC	209-33-012
SIDELL JOE & JAY JT	209-05-088
SIEKER DOUGLAS & DANA JT	209-09-239
SILVAS VALERIE	209-19-055
SMALLER JAMES & MARGIE JT	215-13-040A
SMITH ALLEN & LILLIAN C TRUSTEES	209-02-052
SMITH LILLIAN E	209-04-123
SMITH PERRY E & FRANCES E	215-13-218B
SMITH RODERIC M & SYBILLE H TRUSTEES	215-14-182
SMITH STUART & MARY ANN JT	209-02-044
SMITH WILLIE E	209-03-013
SOLBES JOHN P & SHERYL A JT	215-02-019
SOLE RANDALL & SHARI*	215-15-003E
SOMERS EDWARD T & LOIS A	215-05-023
SORENSEN PEER & ELEANOR JT	209-06-157
SPARGO DAVID M	215-02-115
SPECIALTY SALES OF MISSISSIPPI	215-25-004B
SPILLERS JAMES & CAROL	209-06-018
SPRINGBORN PAUL W	215-04-056
STALLINGS JOHN C & NANCY K	209-07-060
STARR ORGANIZATION	215-14-122
STATON LUTHER	208-29-064
STEEN JUSTIN R	215-08-063C
STEINKE WOLFGANG W	209-20-036
STEVENSON VIRGINIA I	215-02-014
STODDARD LOREN JEFFREY	209-05-109
STONE MICHAEL A & ELIZABETH C JT	209-04-008
STRONG MARK D	215-02-236
SUMMITT WILLIAM & CHRISTINE TRUSTEES	209-02-016
SUTTLES EDWARD & EFFIE JT 50	215-02-103B
TANNER RUBIN	209-06-229
TAYLOR KEITH SR CPWRS 50	215-21-001C
TERPENING CINDY	215-04-012
THOLKE DAWN C ETAL JT	215-02-061
THOMPSON KENNETH E & LYNDA M TRUSTEES	215-13-029B
TOBAR YOLANDA	215-02-052

Table H-1 Property Owners Within 5 Miles Of Project	
OWNER NAME	**PARCEL**
TOOLEY DAN E & JANICE G	215-04-094
TORRES-HUERTA VICTORIA	209-02-067
TRESTEN MARIA	215-11-262
TRI STATE LASER BRITE LLC	209-13-023
TRI-STATE UNDERWRITERS INC	215-11-223
TRUSSELL THOMAS J & MARGUERITE	215-11-115B
TUCKER MORTON W & LORRAINE J TRUSTEES	215-14-026
TYLER GERALD & KATHRYN	215-02-119
UNITED STATES OF AMERICA	209-01-019
UNITED WAY OF LAKE HAVASU	209-11-026
US FINANCIAL PROPERTIES LLC	215-07-098C
VAN HORN RICHARD A & GRACE JT	215-07-255
VGI LLC	215-13-124A
W A W INVESTMENTS TRUST	209-06-034
WALL STANLEY	209-17-001
WALL STANLEY H	209-08-014
WALLACE STANLEY ROBERT	215-05-235
WALNUT CREEK WATER CO INC	215-19-024
WARNER TERENCE	215-14-224
WARREN LISA	215-05-216
WATSON MICHAEL & DOLORES JT	215-14-157G
WEIGEL RICHARD C	215-14-198
WELCH DAVID R	215-12-006A
WESTPHAL STEPHEN	215-03-015A
WHITE ELIZABETH J TRUSTEE	209-13-033
WIGGINS JOHN	209-11-101
WILDE TROY & GRETCHEN CPWRS	215-02-182
WILEY FINANCES COMPANY LLC	215-04-122
WILKS MATTHEW CALEB	215-04-001
WILLIAMS AUDREY	215-05-149
WILLIAMS FRED & GLORIA P TRUSTEES	209-17-010
WILLIAMS SHAWN & RAINA CPWRS	215-08-244B
WILLIS LLOYD A & MARGARET T JT	215-11-222
WILSON ALEX E & CYNTHIA A CPWRS 50	215-06-057
WILSON CEDRIC	215-02-025
WIYSEL GARRISON & AMY JT	209-07-179
YARBROUGH SAM & LINDA TRUSTEES	215-22-001
YARNELL WILLIAM E & DOROTHY L JT	215-18-007B
YOUNG CATHLENE L	209-03-089
ZILFI JOSEPH	209-33-027
ZIMMERMAN JEFF L	209-33-015

Federal Agencies

U.S. Fish & Wildlife Service, Ecological Services
Department of the Army, Corps of Engineers
Field Director, Intermountain Area, National Park Service
Bureau of Indian Affairs
Advisory Council on Historic Preservation
Superintendent, Glen Canyon National Recreation Area
Robert Arnberger, Superintendent, Grand Canyon National Park
Carlos R. Renteria, Community Planning and Development, U.S. Department of Housing and Urban Development
Julia Anna Cirillo, Federal Highway Administration, Region 9, U.S. Department of Transportation
Karl Kanbergs, Region 9, U.S. Environmental Protection Agency
Ginger Vagenas, U.S. Environmental Protection Agency
Tom Stehly, U.S.D.A. Soil Conservation Service

Native American Tribes

Daniel Eddy Jr., Chairman, Colorado River Indian Tribes
Patricia Madueno, Chairman, Fort Mojave Tribal Council
Stan Rice Jr., President, Yavapai-Prescott Indian Comm.
Levi Esquerra, Chairman, Chemehuevi Indian Tribe
Earl Havatone, Chairman, Hualapai Tribal Council
Grant Holyoak, Zuni Trust
Mr. Ernest Crooke, Tribal Chairman, Havasupai Tribal Council
The Hopi Tribe
Navajo Nation Historic Preservation Office

State Entities

The Honorable Jane Dee Hull, Governor of Arizona
Maria Baier, Policy Advisor, Office of the Governor
Arizona Dept. of Game & Fish, Region III
Nancy Gilbertson, Manager, Bill Williams Wildlife Refuge
William Dowdle, AZ State Land Dept., Environmental Resources
Arizona Department of Environmental Quality, Air Quality Planning Section
Prabhat Bhargava, P.E., Air Quality Division, Arizona Department of Environmental Quality
Arizona State Parks Department
Dee Goodwin, ADOT
Leroy Brady, ADOT, Roadside Development
State Historic Preservation Officer
Jim Garrison, Arizona State Historic Preservation Officer, Arizona State Parks
Steven M. Olea, Chief, Engineering, Utilities Division

City and County Entities

Comm. Dev. Dir., City of Kingman
Mohave County Board of Supervisors
Mohave Co. Planning & Zoning
Mohave Co. Public Works

Sandy Duke, Public Land Use Comm., Mohave Co. Board of Supervisors
Kingman Public Library
Bullhead City Public Library
LaPaz Co. Board of Supervisors
Rob Gumbles, Cooperative Extension Service
Jim Wilkinson, Kingman Airport Authority
Beverly Liles, Kingman Area Chamber of Commerce
Ron Walker, Mohave County Manager
Pat Forrest, City of Lake Havasu City
Mohave Co. Parks Department

EXHIBIT I ANTICIPATED NOISE/INTERFERENCE WITH COMMUNICATION SIGNALS

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"Describe the anticipated noise emission levels and any interference with communication signals which will emanate from the proposed facilities."

INTRODUCTION

The Project will generate noise; however, no interference with communication signals is anticipated.

Discussions of ambient sound levels do not focus on pure tones. Commonly heard sounds have complex frequency and pressure characteristics. Correction factors for adjusting actual sound pressure levels to correspond with human hearing have been determined experimentally. For measuring sound levels in ordinary environments, A-weighted (dBA) correction factors are employed. The A-weighted scale is used in most sound level (noise) ordinances and standards.

The level of a sound from a source is measured using a Sound Level Meter (SLM) that includes an electrical filter corresponding to the A-weighted curve. The filter de-emphasizes the very low and very high frequencies of sound in a manner similar to the response of the human ear. The SLM performs calculations to determine the average sound level that is recorded at intervals (i.e. 1-minute) in the SLM's memory.

Environmental sound levels are generally described and evaluated in the following ways:

- The equivalent sound pressure level (Leq) is defined as the average sound level, on an energy basis, for a stated period of time (e.g. hourly) at a given location.
- The Ldn is the day/night sound level that was adopted by the Environmental Protection Agency (EPA) as a measure of community sound level exposure (Crocker 1982). EPA defines Ldn as the average A-weighted sound level for a 24-hour period. Nighttime sound levels (10:00 PM. to 7:00 AM.) are increased by a 10 dB weighting factor, to account for the public's sensitivity to nighttime sound levels when most people are sleeping. The daytime (7:00 AM to 10:00 PM) energy average sound level is added to a weighted (+10 dB) mean nighttime level. The Ldn meets the EPA requirements for a description of cumulative sound level exposure, in particular the requirement that it be easily measured with simple, relatively inexpensive equipment.
- The EPA has established sound levels that are identified as protective of public health and welfare. EPA identified Ldn of 55 dB for residential areas as an outdoor sound level above which the public health and welfare will be affected (EPA 1974).
- Typical day-night sound levels in urban areas range from 68 to 90 dB; suburban areas average 50 dB; and rural range from 40 dB to 50 dB depending on the type of rural area. **Table I-1** lists the day-night average sound level of various sources as defined by EPA.

Table I-1 Examples of Outdoor Day-Night Average Sound Levels in dB Measured at Various Locations	
Source	**L_{dn} Sound Level (dB)**
Apartment next to a freeway	87.5
Urban high density apartment	78
Urban row housing on major avenue	68
Wooded residential	51
Agricultural crop land	44
Rural residential	39
Wilderness ambient	35

Source: EPA 1974

EXISTING SOUND LEVELS

The ambient noise in the vicinity of the Project Site is dominated by the traffic noise from I-40 and trains on the BNSF Railroad Line. In addition, the ambient conditions also include the Griffith Energy Project (Griffith).

The nearest noise receptor (residence) to the Project will be approximately 2.5 miles to the northwest in a semi-rural area. Rural areas of this type often have background levels from 40 to 50 dBA.

Vehicle traffic

In the noise analysis included in the Griffith CEC application (Docket # L-00000H-98-0090, Decision # 61295}, the average noise level from the traffic on I-40 was calculated using the Federal Highway Administration STAMINA Traffic Noise Prediction Model, version 2.0, and average daily traffic (ADT) in the Project area for 1996. A review of recent ADT values for 2005 show that there has been little change in the local traffic volume, therefore these estimates are still valid.

The STAMINA model was run using these traffic parameters and an average speed of 70 mph. The calculated noise levels at various distances from the Interstate are shown on **Table I-2**. The noise from the Interstate traffic was also calculated at a residence that is closest to Griffith.

Table I-2 Noise Levels from I-40 Traffic	
Location	**Noise (dBA)**
400 feet from I-40	62
1000 feet from I-40	57
2000 feet from I-40	52
Griffith proposed west property line (Apache Road)	57
Residence 2.5 miles northwest of Griffith	20

Trains

The precise noise levels from trains is a complex calculation that considers the train speed, the train length, the conditions of the wheels, and the condition of the track (Harris 1991). Noise from trains has been measured (Harris 1991) to range from 87 to 96 dBA at 100 feet from a track. To estimate the noise from trains on the BNSF Railroad Line, a noise level of 92 dBA at 100 feet from the track was used. The noise level from a train, a line source of noise, can be estimated using the following relationship:

$L_2 = L_1 - 10 * LOG (R_2/R_1.)$

Where: L_2 is the noise (dBA) at a distance R_2 from the source
L_1 is the noise measured at a distance R_1 from the source.

Applying the preceding equation and using a train source noise of 92 dBA measured at 100 feet from the track yields the following noise levels shown on **Table I-3** at the locations and distances from the BNSF Railroad Line in the vicinity of the proposed Project.

Table I-3 Noise Levels from trains on the Burlington Northern Santa Fe Railroad Line

Location	Distance from Track (feet)	Noise (dBA)
I-40	2,400	78
Griffith east property line	5,000	75
Griffith west property line (Apache Road)	5,800	74
400 feet west of Griffith west property line	6,400	74
Residence 2.5 miles northwest of Griffith	15,000	60

Transmission Lines and Interconnections

The electrical effects of transmission lines are those associated with electric field, magnetic field and corona. Electric and magnetic fields result in induced voltage on objects near the transmission line. Corona effects are manifested in audible noise, radio interference, and television interference. Noise and interference from the existing transmission lines in the area is not noticeable or is mostly minimal where residential and commercial development has occurred adjacent to the existing transmission lines. No new transmission lines will be constructed off the Project Property.

Griffith Energy Project

A typical gas-fired power plant has a characteristic noise level of under 75 dBA at 400 feet from the buildings. This noise level varies somewhat depending on which side of the power plant the receptor is located. A receptor in a direct line from a switch yard or cooling towers will experience somewhat higher noise levels at 400 feet than on the other sides of the plant.

PROPOSED PROJECT

Construction

Noise generated during the construction phase would result from the operation of construction equipment and vehicles. **Table I-4** presents typical noise levels for construction equipment at a distance of 15 meters (45 feet) (Crocker 1982). These values assume the equipment is operating at full power.

Table I-4 Typical Construction Noise Levels	
Equipment Category	**Noise Level at 45 ft (dBA)**
Dump Truck	88
Portable Rock Drill	88
Concrete Mixer Truck	85
Pneumatic tool	85
Grader	85
Front-End Loader	84
Mobile Crane	83
Excavator	82
Backhoe	81
Dozer	78
Generator	78

The typical noise 45 feet from a construction site would be 85 dBA because the construction equipment can be spread throughout a construction site and may not be operating concurrently. This value and the data presented above indicate that there will be a temporary increase in ambient noise that will be limited to the construction phase of the project. The propagation of noise depends on many factors including atmospheric conditions, ground cover, and the present of any natural or man-made barriers. As a general rule, noise decreases by approximately 6 dBA with every doubling of the distance from the source (Bell 1982). Therefore, noise levels at various distances from the construction site can be predicted and are shown in **Table I-5**.

Table I-5 Predicted Noise Near Construction Activities	
Distance from construction site (feet)	**Predicted Noise Level (dBA)**
45	85
90	79
180	73
360	67
720	61
1440	55

Construction noise generated by the Project would be intermittent in nature and would be temporary as the construction period is estimated to be nine (9) to twelve (12) months. Up to six (6) months of the construction period will involve performance testing of the Project equipment. During this start-up and testing period, noise levels will be consistent with noise levels during operation.

The nearest noise receptor (residence) to the Project is approximately 2.5 miles to the northwest. At this distance, the construction noise from the plant will be significantly less than discussed above and probably near the background levels that range from 45 to 50 dBA. The actual noise level at distance will vary with wind direction and velocity.

It is expected that most construction would occur during daylight hours. Some deliveries and continuous construction activities such as foundation pours or peak construction work forces will be required during non-daylight hours. During start-up and testing, performance testing will also require some continuous work but, as stated above, the noise profile associated with these activities will be consistent with operational levels. Impacts to noise are expected to be minor and short in duration.

Operations

The primary noise sources anticipated with the Project during operation include the CTG inlet, the CTG compartments, the exhaust ductwork, the stack, gas compressors, and the chiller module. Secondary noise sources are anticipated to include the GSU transformers and miscellaneous pumps, fans, and compressors. The CTGs are housed in a metal enclosure to protect the units from the elements and for noise reduction. All equipment sound levels were estimated based on available data from the equipment manufacturers. As described in Section 4.3.4 (Operations and Emissions-Noise Profile), equipment purchased for the Project will be specified for equivalent "A" weighted sound power levels not to exceed 85 dBA. Should the purchased equipment have sound levels that exceed OSHA permissible noise limits (CFR 29, 1910.95) administrative or engineering controls will be utilized, such as personal protective equipment. These sound levels are applicable to all operating modes.

Table I-6 shows the noise levels expected to be generated from operation of the Project. Noise propagating to the east, south and north toward and parallel to I-40 will generally be masked by I-40 traffic and the occasional train passing by east of the Interstate. Noise propagating toward the west will be at levels slightly above the background noise of the Interstate and train noise. The noise at the closest residence, 2.5 miles to the northwest of the Project, will be dominated by the noise produced from the existing Griffith facility.

Table I-6 Noise Levels Expected From Operation of the Project vs. Noise Levels from I-40

Location	Noise (dBA)			
	Northern Arizona Project		Existing Griffith Generation	Interstate 40 Traffic
	L_{eq}	L_{dn}		
400 Feet from Source	49	56	75	62
1,000 Feet from Source	41	48	67	57
2,000 Feet from Source	34	41	61	52
1 Mile from Source	26	32	53	41
2 Miles from Source	20	26	47	30
2.5 Miles from Source (nearest residence)	18	24	45	20

Note: I-40 radiates noise as a line source while the Project will radiate noise as a point source. Therefore, road noise diminishes less with distance.

At the northern boundary of the Project Property (along Haul Road) the Project will have an estimated L_{eq} of 55 dBA and an L_{dn} of 62 dBA. Apache Road is approximately 600 feet to the west of the Project Site and 1,000 feet west of the Griffith sources. Although the Northern Arizona Project is closer to this location (western boundary at Apache Road), it is estimated to have a lower impact at this location than the existing Griffith Project given the dominant noise profile of the Griffith Project (Table I-6).

CONCLUSIONS

The Project is expected to have operational sound levels that are below existing background sound levels. Sound levels from construction may be elevated above existing background levels but are temporary and, therefore, impacts are limited.

EXHIBIT J SPECIAL FACTORS

As stated in Arizona Corporation Commission Rules of Practice and Procedure R14-3-219:

"Describe any special factors not previously covered herein, which applicant believes to be relevant to an informed decision on its application."

PUBLIC INVOLVEMENT IN THE ENVIRONMENTAL STUDY AND SITING PROCESS

The public involvement program for the Project includes contacts with individuals and Federal, State, and local agencies by mail, public notices, the mailing of fact sheets, and agency and public meetings. **Exhibit H** lists all contacts to whom mailings were sent. Contact letters, public response comments, meeting and public notices, and the fact sheet are provided in **Exhibits J-1, J-2, J-3, and J-4**, respectively. **Exhibit J-5** summarizes the issues that have been raised relative to the Project as of the Application filing date.

This Project was originally referred to as the Arroyo Energy Project (Project). It is now known as the Northern Arizona Energy Project (Project or NAEP). This Project was presented to agencies and the public in applicant-sponsored forums as the Arroyo Energy Project prior to the name change. The project description has not changed since the initiation of public communication regarding the Project. .

AGENCY and PUBLIC MEETINGS

The following meetings were held for agency personnel and for the public to discuss and collect comments on the potential power plant EA:

- An informational open-house meeting for the public, hosted by the Applicant, was held on February 5, 2007 in Golden Valley from 4:00pm to 7:00pm. This open house meeting was advertised in local papers and four hundred (400) direct mailing announcements were sent to all property owners within five (5) miles of the Project Site.
- A Project Forum was held in Lake Havasu, Arizona on February 5, 2007 from 12:00pm to 2:00pm with key community leaders and elected officials.
- Public scoping for the EA developed by Western included the mailing of a scoping letter to interested parties and announcements in the local paper.

EXHIBIT J-1 PUBLIC CONTACT LETTERS

You're invited to a public open house

Monday, February 5, 4:00-7:00pm
Black Mountain Elementary School - Gymnasium
3404 N. Santa Maria Road, Golden Valley, 928-565-9111

Come learn about a unique power plant proposed to help meet the region's energy needs. Residents may arrive anytime between 4:00pm and 7:00pm. The format is informal, emphasizing one-on-one exchanges of information so individuals can learn about the Project.

Arroyo Energy

Project Update – February 2007

LS Power proposes to build a clean, natural gas-fired power plant to address the growing energy needs of Mohave County and the rest of Arizona.

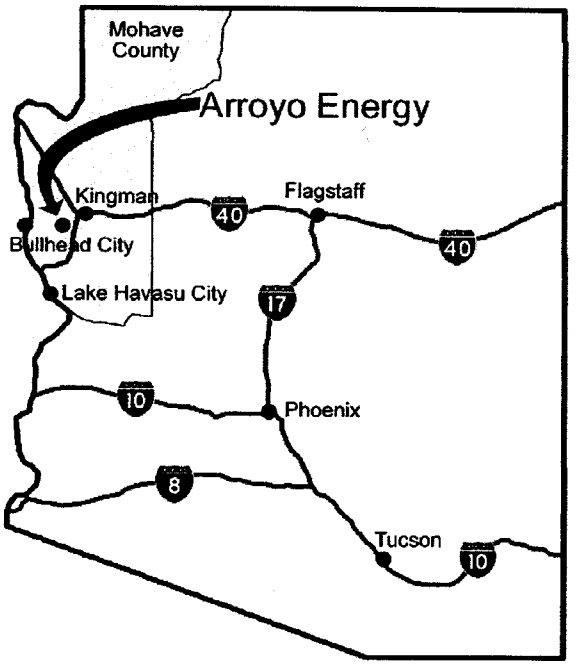
The proposed project will be comprised of four (4) combustion turbine generators designed to meet summer peak demand. The electric production capability of all four (4) units is 175 MW and is the project site is located just north of the existing Griffith Energy project (600 MW).

The Arroyo Energy project will efficiently use the existing I-40 Industrial Corridor infrastructure for gas, electricity and water.

In addition, the new power generation project will use the water recycling facilities of the Griffith Energy project to minimize water use.

During the development process, the community will have many opportunities to learn about the proposed project and participate in the review process conducted by the Arizona Corporation Commission, its Siting Committee and other agencies – including the Arizona Department of Environmental Quality and the Western Area Power Administration – as they consider granting permits for the construction and operation of Arroyo Energy.

Project Location



Arroyo Energy is located southwest of Kingman, Arizona off of I-40 in the Industrial Corridor.

For more information about the Arroyo Energy project, contact David Hicks, Public Affairs, LS Power Generation, 619-498-5389, dhicks@lspower.com.

Arroyo Energy
3033 N. Central Ave., Suite 900
Phoenix, AZ 85012

Postage

«OWNER_NAME1» «OWNER_NAME2»
«CARE_OF»
«ADDRESS»
«CITY», «ST» «ZIP»

You're invited to a public open house
Monday, February 5, 4:00pm-7:00pm
Black Mountain Elementary School
Golden Valley, AZ

Arroyo Energy

Project Facts:

- Helps meet growing demand for peaking power (energy delivered within 10 minutes of request);
- Responds to regional energy needs, growing by 25 megawatts per year in Mohave County alone;
- Brings incremental $150 million investment to Mohave County and contributes to development of the I-40 Industrial Corridor;
- Generates local revenue to support schools, police, fire, libraries and the Mohave County general fund;
- Utilizes existing infrastructure, including water allotments;
- Minimizes emissions by using clean natural gas and modern control systems;
- Requires no additional off-site right of way, roadways, transmission lines or pipelines.

EXHIBIT J-2 PUBLIC RESPONSE LETTERS

EXHIBIT J-3 MEETING AND PUBLIC NOTICES

ANNOUNCEMENT

You're invited to a

Public Open House

for

Arroyo Energy

Monday, February 5, 4:00-7:00pm

Black Mountain Elementary School - Gymnasium

3404 N. Santa Maria Road, Golden Valley

Come learn about a small power plant proposed for the I-40 Industrial Corridor to help meet the region's energy needs at times of peak demand. Residents may arrive anytime between 4:00pm and 7:00pm. The format is informal, emphasizing one-on-one exchanges of information so individuals can learn about the project.

For more information about the Arroyo Energy project, contact David Hicks, Public Affairs,LS Power Generation, 619-498-5389, dhicks@lspower.com.

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EXHIBIT J-4 FACT SHEET/OPEN HOUSE MATERIALS

ARROYO ENERGY

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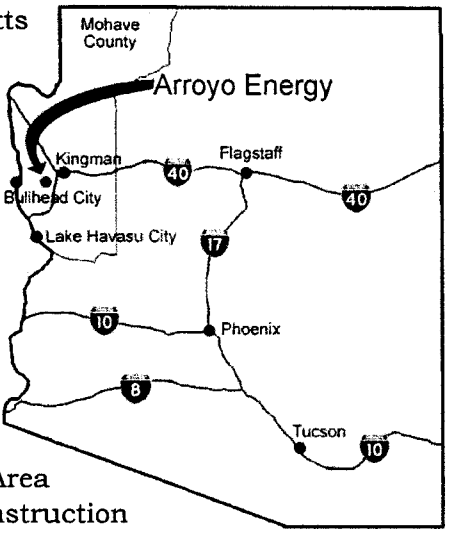

The Arroyo Energy project will efficiently use the existing I-40 Industrial Corridor infrastructure for gas, electricity and water. In addition, the new plant will use the water recycling facilities of the Griffith Energy project to minimize water use.

During the development process, the community will have many opportunities to learn about the proposed project and participate in the review process conducted by the Arizona Corporation Commission, its Siting Committee and other agencies – including the Arizona Department of Environmental Quality and the Western Area Power Administration – as they consider granting permits for the construction and operation of Arroyo Energy.

Project Facts

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- Utilizes existing infrastructure, including water allotments;
- Minimizes emissions by using clean natural gas and modern control systems;
- Requires no additional off-site right-of-way, roadways, transmission lines or pipelines.

Schedule

File Permits.....1st Qtr 2007
Receipt of Permits.....3rd Qtr 2007
Secure Power Purchase Agreement(s).....3rd Qtr 2007
Commercial Operations Date.....Summer 2008/2009*
*based on customer needs

Contact David Hicks, Public Affairs, LS Power Generation, 619-498-5389, dhicks@lspower.com

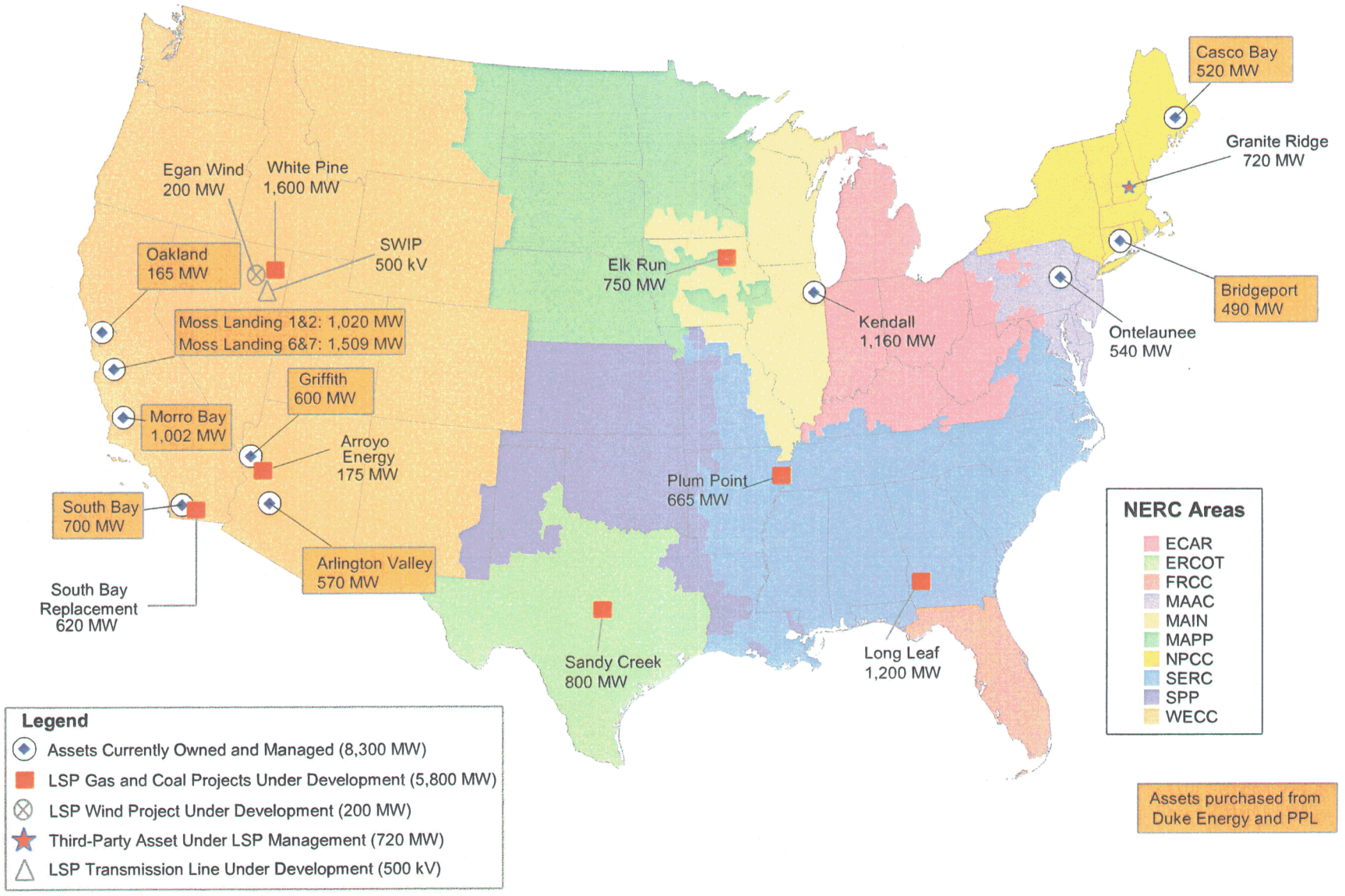
Photo of the Griffith Energy Project site looking southwest from I-40

Same photo showing a graphical representation of the proposed Arroyo Energy project

Arroyo Energy Project

January 2007

LS Power Generation Portfolio



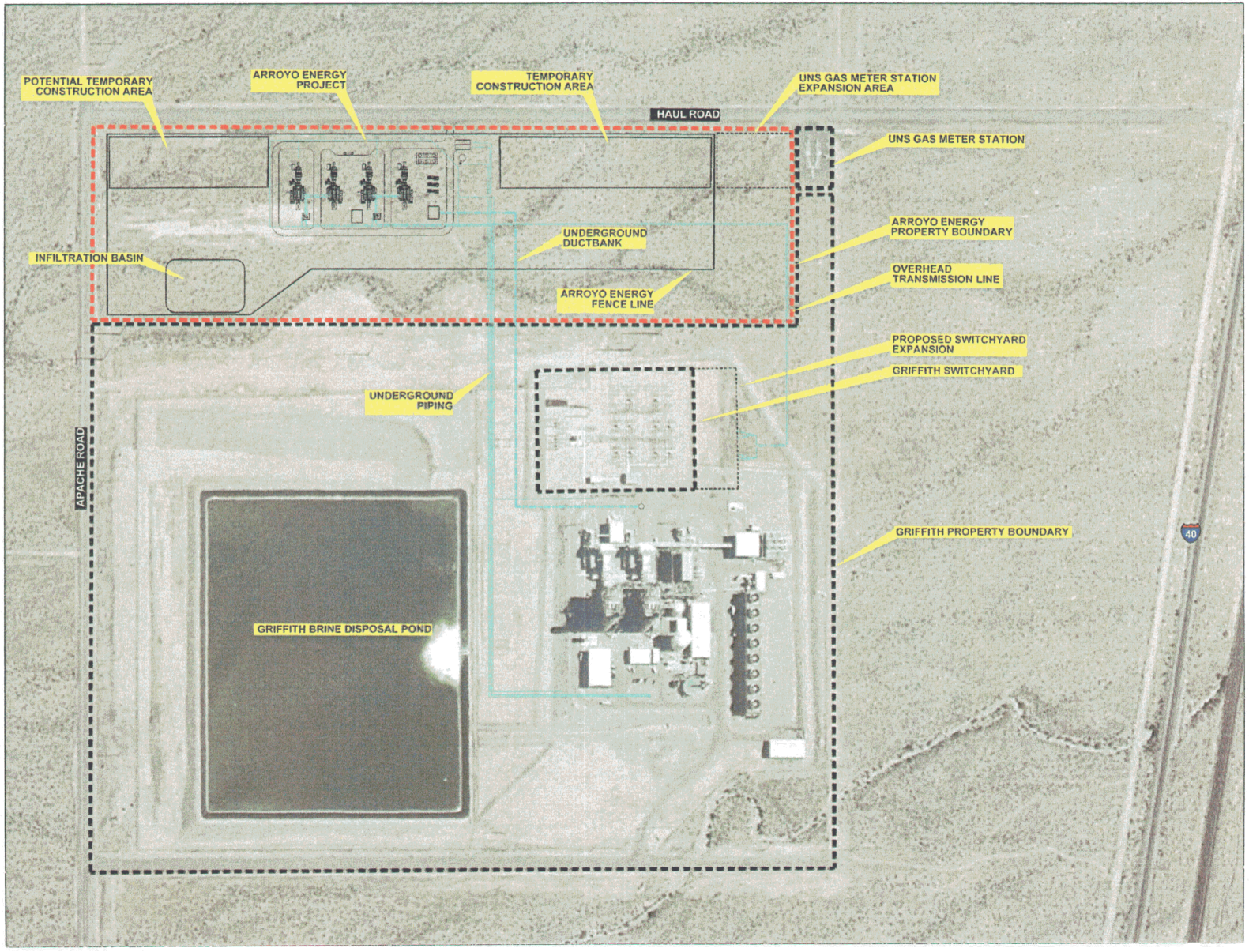
LS Power Facts

- LS Power develops, owns, and operates power plants in the US (8,000 MW)
- LS Power and Dynegy have agreed to combine assets (20,000 MW total)
- LS Power has agreed to purchase Mirant merchant assets (3,500 MW)
- LS Power owns and operates the Arlington Valley and Griffith Energy (1,240 MW)
- **Seeking to develop peaking generation resources near existing power plant facilities in Mohave County or Maricopa County**

The Arroyo Energy Project

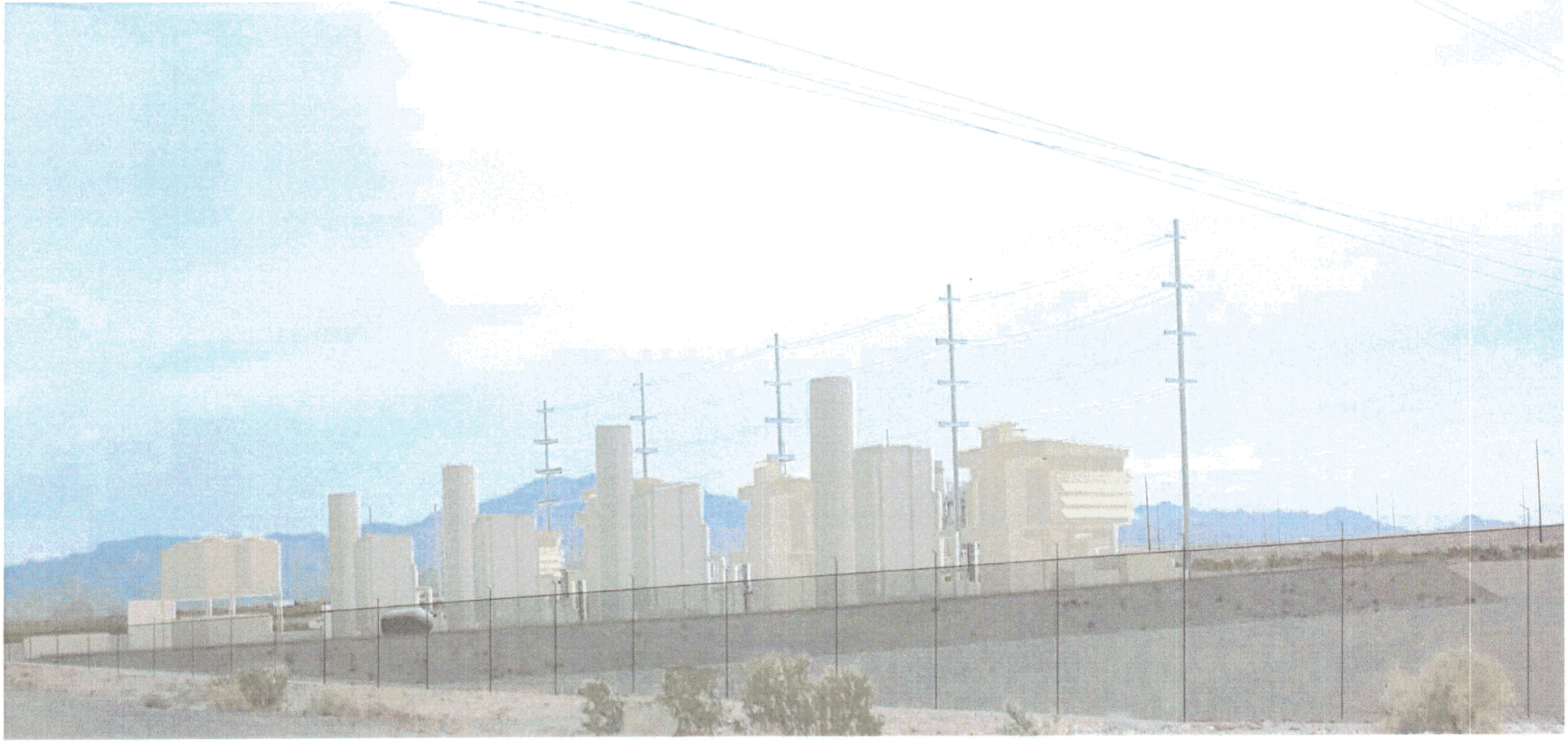
- 175 MW – serve peak load equivalent to 175,000 new households
- Natural gas-fired combustion turbines
  - Quick start capability (10 minutes) to respond to demand needs
  - High efficiency combustion turbines
  - Emission controls to minimize air emissions (SCR and Oxidation Catalyst)
  - Efficient water use – only 160 acre-ft per year at expected operating hours
    - Equivalent to annual water use for irrigation of 30-40 acres of alfalfa
- Increases utilization of the I-40 Corridor infrastructure and Griffith Energy infrastructure: land, water, electrical interconnection, gas interconnection, operations and maintenance
- Incremental investment in Mohave County and I-40 Industrial Corridor
  - Preliminary capital cost estimates in the range of $150 to $160 million

Project Site and Interconnections



Visual Simulation

Proposed Arroyo Energy Project viewed from the intersection of Haul Road and Apache Road looking southeast



Visual Simulation

Visual simulation of proposed Arroyo Energy Project viewed from Interstate 40

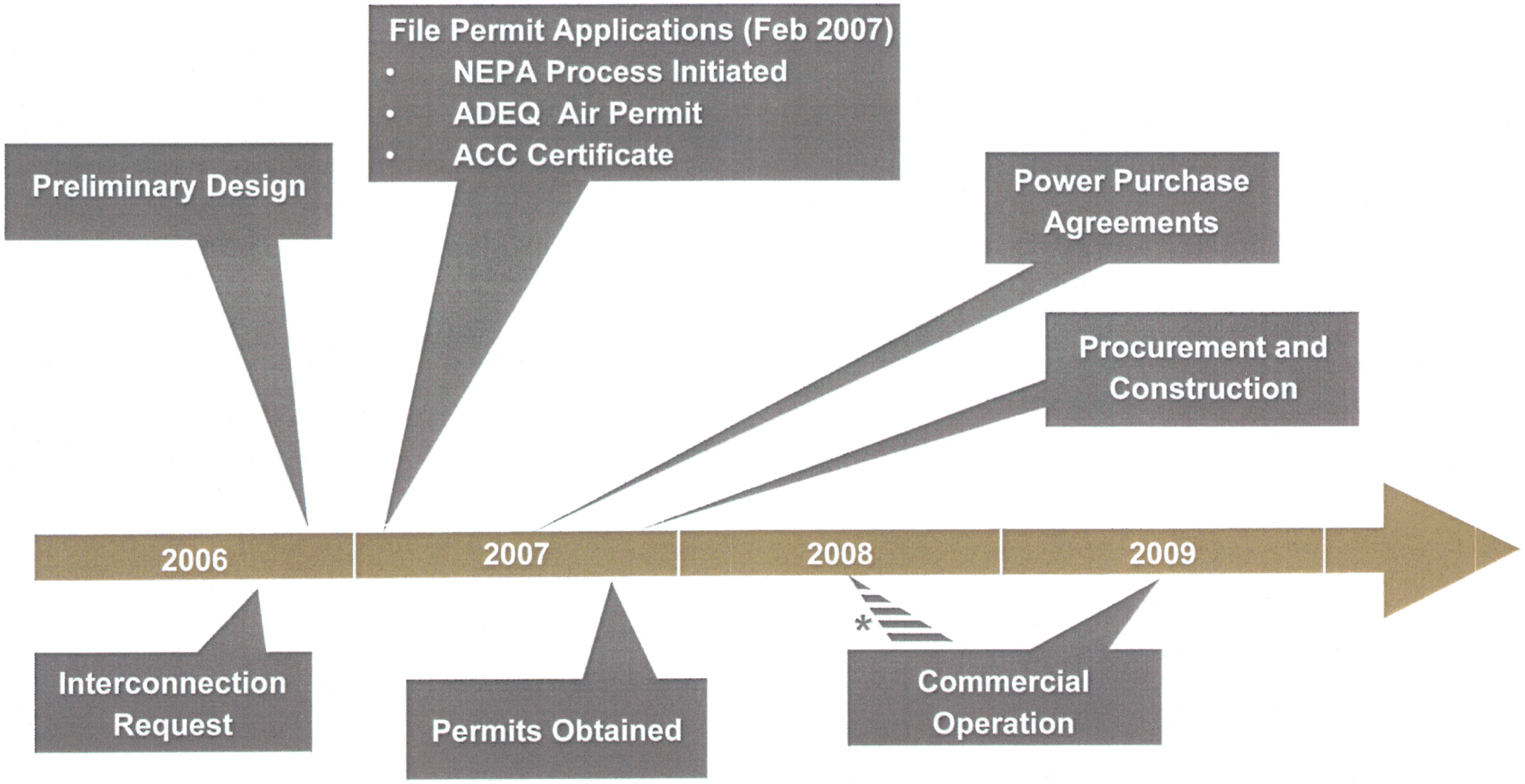
The Need

- Extreme historical and forecasted peak load growth in Mohave County and Arizona
- Mohave County load growth is projected at 25-30 MW per year
- Arizona utilities seeking new peaking generation resources
- No existing simple cycle units in Mohave County to serve peak load profile

The Benefit

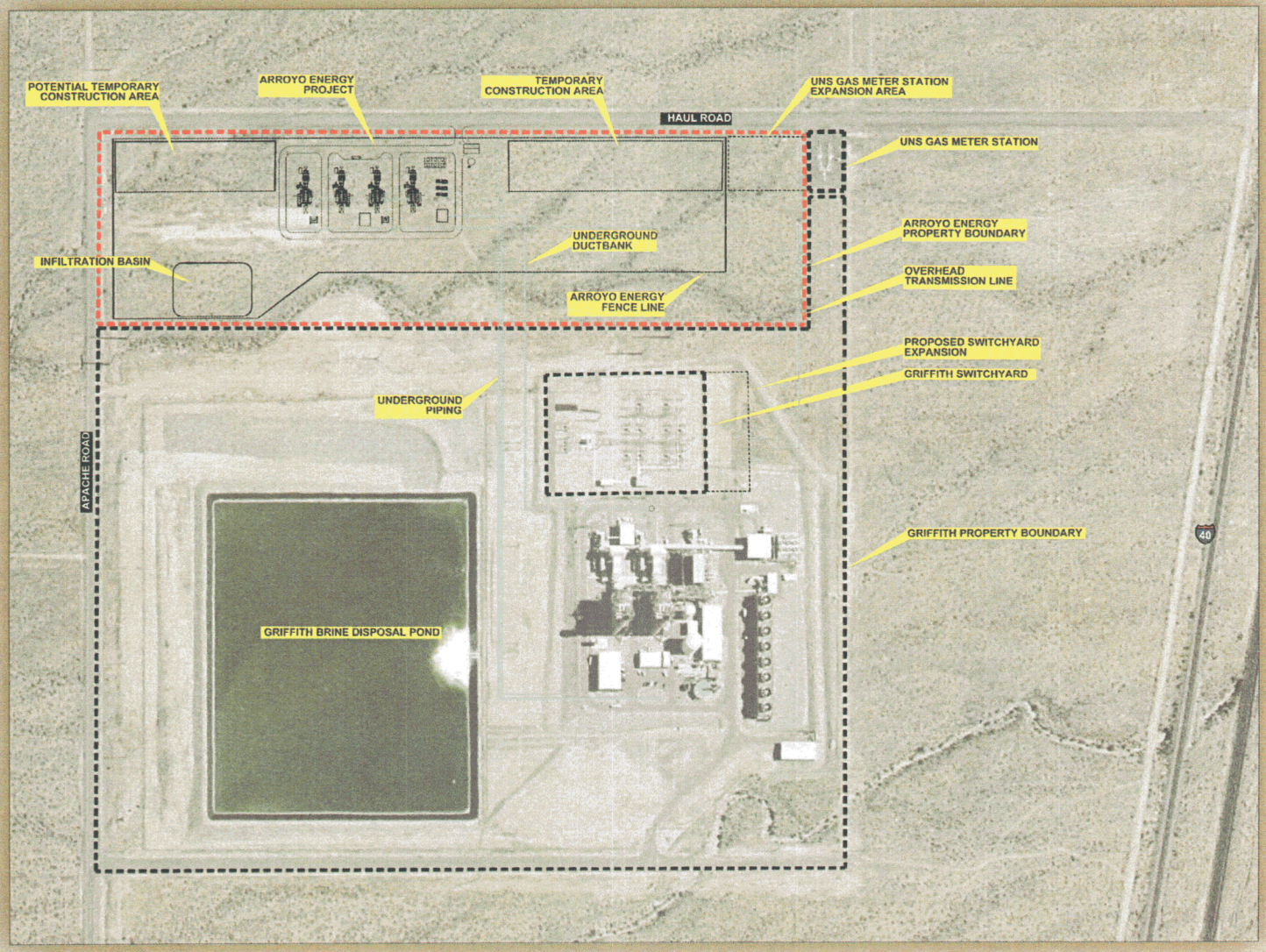
- Selected Project Site limits environmental impacts
  - Utilization of existing I-40 Industrial Corridor and Griffith infrastructure within the existing property boundaries
  - No off-site infrastructure development or laterals required for electric transmission, gas transportation or water transportation/supply
    - UNS Gas – existing gas transportation capacity and meter station at northeast property boundary
    - Western Area Power Administration 230 kV switchyard located between the Project and Griffith Energy Project wit
    - Golden Valley Water District #2 water system
- Incremental property tax revenue to Mohave County general fund, schools, fire district and other tax revenue recipients

Arroyo Energy Project Schedule



* *based on customer needs*

Project Site and Interconnections

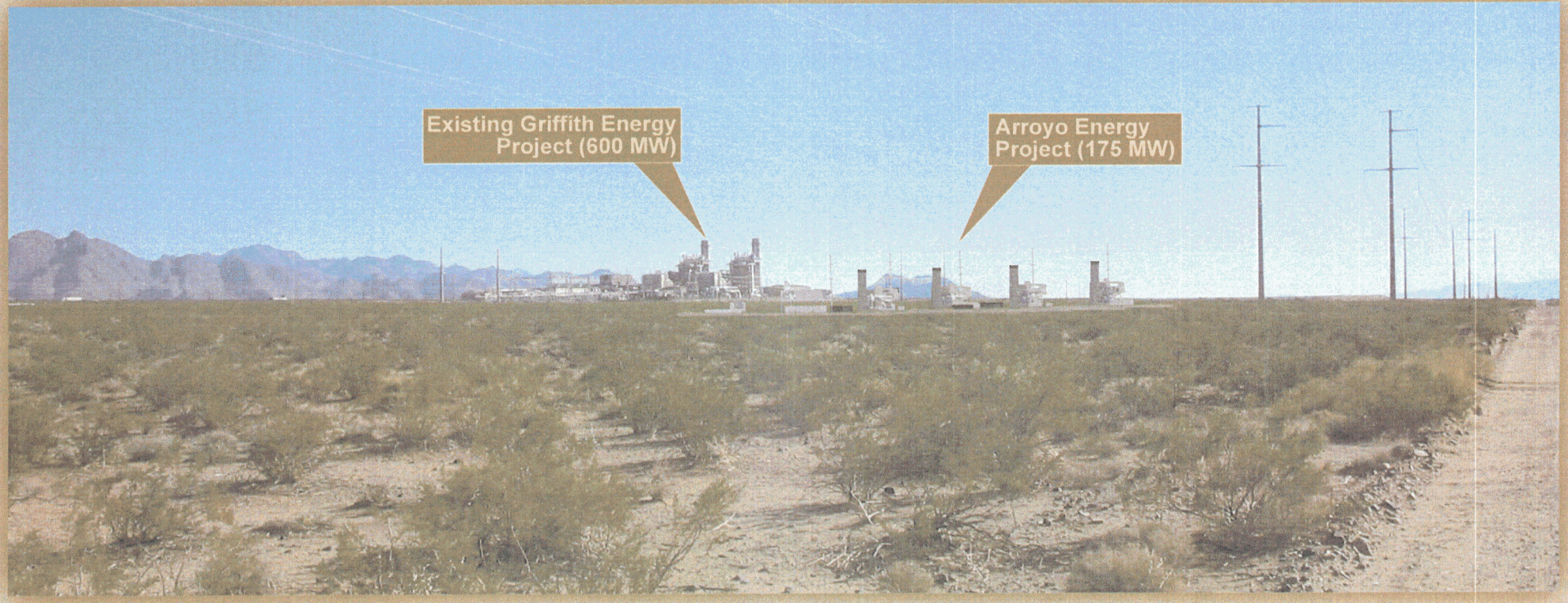


Visual Simulation

Proposed Arroyo Energy Project viewed from Interstate 40

Visual Simulation

Proposed Arroyo Energy Project looking southeast down Apache Road near Dawson Drive



Need and Benefit

- Arizona utilities seeking new peaking generation resources
- No existing simple cycle units in Mohave County to serve peak load profile
- Extreme historical and forecasted peak load growth in Mohave County and Arizona
- Mohave County load growth is projected at 25 MW per year

Arizona Population Projections 2006 - 2015

Summary Table

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Arizona	6,239,482	6,432,007	6,622,885	6,812,137	6,999,810	7,186,070	7,370,993	7,554,429	7,736,022	7,915,629
		3.1%	3.0%	2.9%	2.8%	2.7%	2.6%	2.5%	2.4%	2.3%
Apache	74,691	75,597	76,486	77,361	78,229	79,091	79,957	80,815	81,656	82,496
Cochise	134,789	137,708	140,560	143,346	146,037	148,672	151,258	153,784	156,247	158,650
Coconino	132,826	135,070	137,261	139,388	141,457	143,494	145,494	147,431	149,327	151,150
Gila	55,102	55,769	56,427	57,092	57,766	58,420	59,091	59,768	60,454	61,128
Graham	35,873	36,271	36,666	37,054	37,441	37,814	38,180	38,557	38,936	39,307
Greenlee	8,281	8,259	8,238	8,220	8,209	8,191	8,181	8,182	8,184	8,188
La Paz	21,489	21,779	22,062	22,347	22,632	22,923	23,213	23,501	23,783	24,070
Maricopa	3,764,446	3,879,150	3,992,887	4,105,623	4,217,427	4,328,379	4,438,459	4,547,590	4,655,640	4,762,473
Mohave	194,920	201,693	208,372	214,949	221,443	227,858	234,196	240,453	246,627	252,706
		3.5%	3.3%	3.2%	3.0%	2.9%	2.8%	2.7%	2.6%	2.5%
Navajo	112,672	115,331	117,971	120,591	123,172	125,732	128,275	130,790	133,254	135,671
Pima	980,977	1,003,918	1,026,506	1,048,796	1,070,723	1,092,369	1,113,749	1,134,853	1,155,599	1,175,967
Pinal	269,892	293,312	316,899	340,660	364,587	388,674	412,925	437,304	461,787	486,363
Santa Cruz	45,303	46,545	47,777	48,998	50,210	51,418	52,607	53,800	54,973	56,144
Yavapai	212,722	220,170	227,468	234,626	241,667	248,570	255,356	262,042	268,600	275,056
Yuma	195,499	201,435	207,305	213,086	218,810	224,465	230,052	235,559	240,955	246,260

Selected Project Site minimizes environmental impacts

- Utilization of existing I-40 Industrial Corridor and Griffith infrastructure within the existing property boundaries
- No new infrastructure required for electric transmission, gas or water transportation
  - UNS Gas – existing gas transportation capacity and meter station at northeast property boundary
  - Western Area Power Administration 230 kV switchyard located between the Arroyo Energy Project and Griffith Energy Project
  - Golden Valley Water District #2 water system

Incremental property tax revenue to Mohave County general fund, schools, fire district, and other tax recipients

Project Facts

- 4 General Electric LM6000 combustion turbine generators (175 MW)
- Helps meet growing demand for peaking power (energy delivered within 10 minutes of request)
- Response to regional energy needs, growing by 25 megawatts per year in Mohave County alone
- Brings $150 million new capital investment to Mohave County
- Generates local revenue to support schools, police, fire, libraries and the Mohave County general fund
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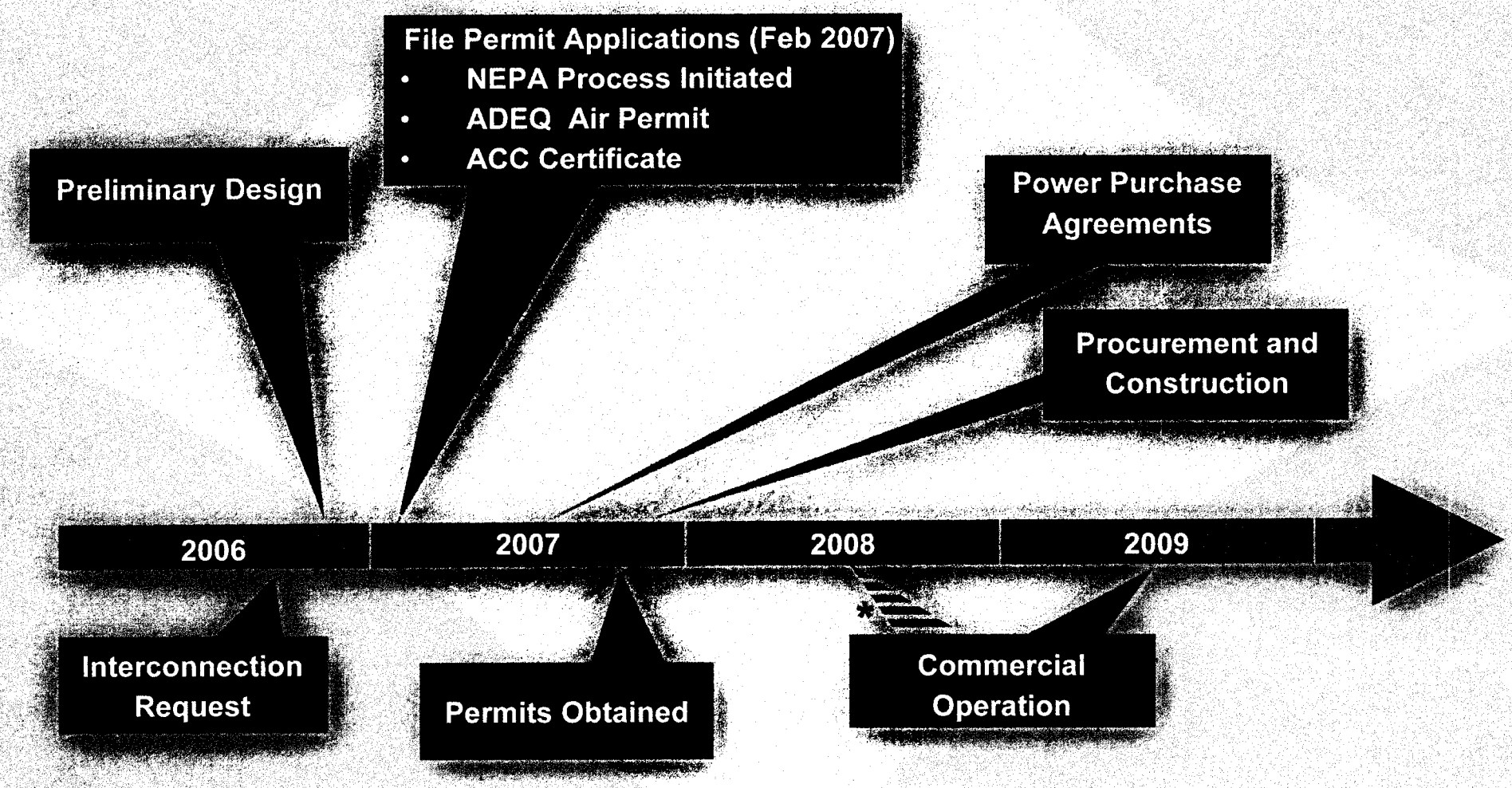
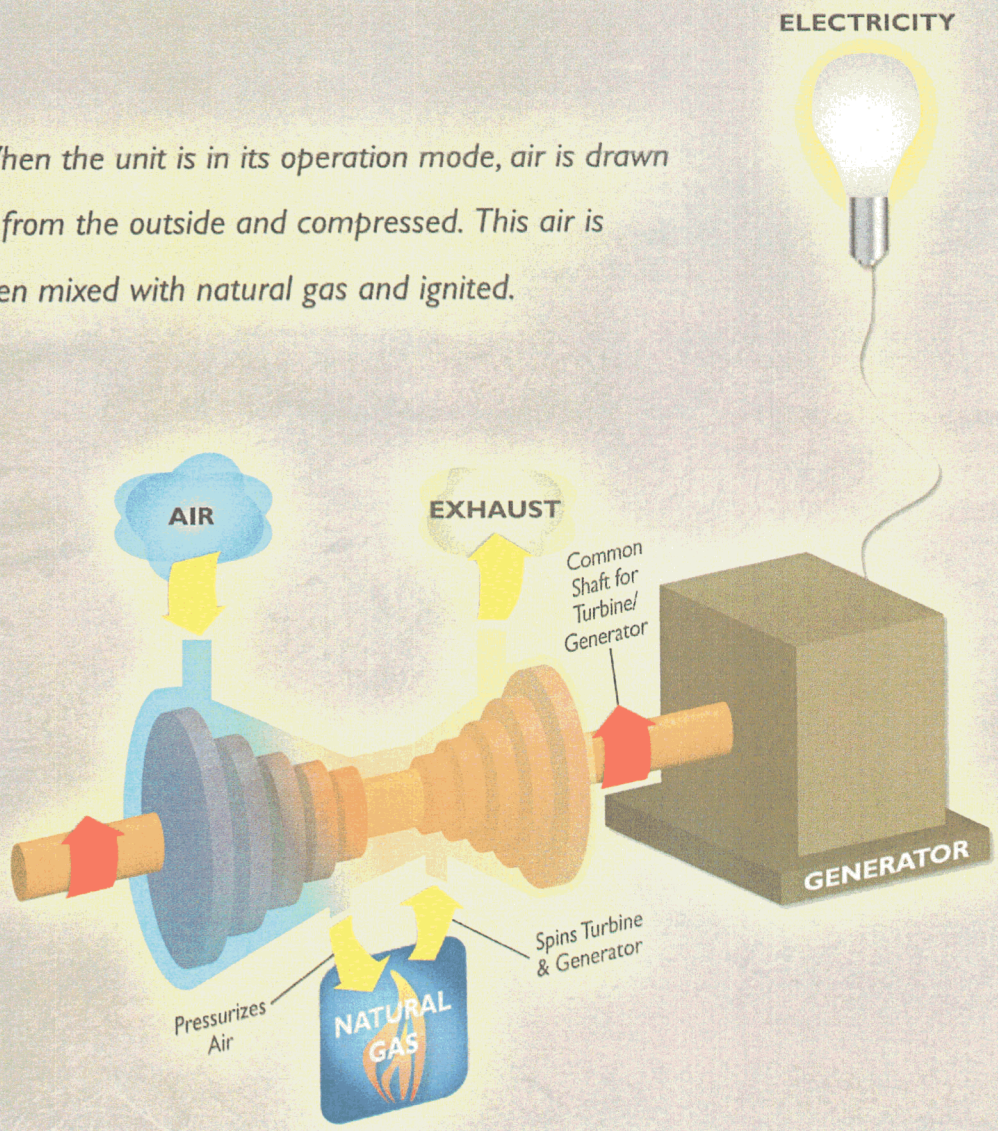
Project Schedule



* *based on customer needs*

How Does a Gas Turbine Unit Generate Energy?

When the unit is in its operation mode, air is drawn in from the outside and compressed. This air is then mixed with natural gas and ignited.



The expanding gas turns the turbine the same way steam does in a steam-electric station. The turbine then turns the electric generator.

Water Facts

- NO ADDITIONAL WATER capacity needed – the Arroyo Energy Project will utilize existing water allotments of Griffith Energy
- Annual water use equivalent to irrigating 25-30 acres of alfalfa (160 acre-feet for 2500 annual operating hours)
- Simple cycle plants use 66% less water per megawatt hour (MWh) than conventional combined cycle generation facilities
- Water is used to reduce air emissions and maximize energy output on high temperature days when power is critically needed by consumers
- Utilizing existing Griffith Energy water treatment and recycling facilities will make optimal re-use of water supply
- Project will not require any improvements to the Golden Valley Water Improvement District #2 water supply system

EXHIBIT J-5 PUBLIC COMMENTS AND ISSUES AND PRELIMINARY RESPONSES

-----Original Message-----
From: Kevin Davidson [mailto:Kevin.Davidson@co.mohave.az.us]
Sent: Tuesday, January 30, 2007 5:30 PM
To: David Hicks
Subject: Arroyo Energy proposal in Mohave County

David:

Thank you for distributing a flyer announcing the upcoming public meeting in Golden Valley next Monday. As a point of correction, the Black Mountain Elementary School actually fronts on Highway 68 and is west of Sonic. You may have an older address. The same thing happened to me once.

Can you give me a little more information on the site's legal description. For example, in which Township, Range and Section is the power plant to be located? Your surveyor and/or engineer should have this information if I seem to be speaking in a foreign language.

Can you explain a little about the power plant's design and operational characteristics? Will it be wet-cooled, dry-cooled or of hybrid design?
The Caithness proposal in the Big Sandy Valley was a hybrid design.
Will this plant be in operation 24/7 or is it designed as a peaking plant? It is good to see that you have contacted the ACC.

I look forward to seeing you at the meeting on Monday afternoon.

Kevin Davidson
Planner II
Mohave County Planning & Zoning Department

-----Original Message-----
From: David Hicks [mailto:DHicks@LSPower.com]
Sent: Friday, February 02, 2007 8:05 AM
To: Kevin Davidson
Cc: Ian Calkins
Subject: RE: Arroyo Energy proposal in Mohave County

Hi Kevin --

See attached for answers to your questions.

And hopefully I will get a chance to meet you on Monday.

Thanks a lot,

David

David Hicks
Western Region Public Affairs Manager
LS Power Generation, LLC
619-498-5389 (office)
619-410-3246 (cell)

Questions from Kevin Davidson, County Planner

Can you give me a little more information on the site's legal description. For example, in which Township, Range and Section is the power plant to be located?

Answer 1:

The Project is located on a parcel of undeveloped land comprising the North seven hundred (700) feet of the North One-half of the Southwest Quarter of Section 6, Township 19 North, Range 17 West, Gila & Salt River Base & Meridian, Mohave County, Arizona, containing approximately forty (40) acres.

Can you explain a little about the power plant's design and operational characteristics?

Answer 2:
The Project is comprised of four (4), General Electric (GE) LM6000 PC SPRINT NxGen combustion turbine generators (CTGs) with inlet air chiller modules. The Project will be designed to produce 175 MW of net electrical output with a heat rate of 9975 Btu/kWh (HHV) based upon the design condition ambient temperature of 90 degrees Fahrenheit (°F). The CTGs are capable of rapid start-up, allowing the Project to respond to fluctuations in electric demand within ten (10) minutes.
Emissions from the CTGs will be controlled by a combination of water injection and selective catalytic reduction (SCR) to reduce nitrogen oxides (NOx) emissions and an oxidation catalyst to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions. After passing through the SCR system, the exhaust gases exit through the attached stack. Each of the four exhaust stacks will be 85 feet in height and 10 feet in diameter. The stacks will be equipped with continuous emissions monitors (CEMS) and test connections for performance monitoring.

Will it be wet-cooled, dry-cooled or of hybrid design?

As a simple cycle gas turbine, there is no "cooling" in same context as a combined cycle generating facility such as the Griffith Energy project or as was proposed for Big Sandy since there is the absence of any steam cycle.

Answer 3:
Water uses include pretreated water for makeup to the chiller cooling module, service water, and demineralized water for NOx control and SPRINT power augmentation. The Project minimizes water consumption and wastewater generation by integrating with the water treatment and wastewater treatment equipment of Griffith.
One design approach to minimize water use is to capture and recycle the condensate created by the CTG inlet air chillers. Depending on temperature and humidity, the condensate flow available from the inlet coils can be up to 25 gpm.
At design conditions, assuming that no chiller condensate is recovered, the maximum total raw water requirement is 370 gpm, or 355,200 gallons per day (gpd), based upon 16 hours of operation. With consideration of condensate recovery, the maximum total raw water requirement is 345 gpm or 331,200 gpd.

Will this plant be in operation 24/7 or is it designed as a peaking plant?

Answer 4:

The Project has been designed to supply energy to the customer within ten (10) minutes of a unit start up. Given this quick start capability and the associated operating performance and fuel efficiency of simple cycle technology, the Project will serve the peak load requirements of customers in Mohave County, the broader state of Arizona load, and surrounding regional load centers.

The amount of operating hours and startups for any individual simple cycle unit is dependent on (i) the location, (ii) the load profiles of the customer, (iii) fuel prices, and (iv) the general power market supply and demand conditions. A typical operating profile for a simple cycle turbine will be 1500-3000 operating hours and 150-250 start-ups per year. The actual annual operating hours and startups of the Project will be determined by the economic dispatch of each unit as determined by customer needs. The operating hours for each of the CTGs is predicted at 2500 hours per year and will primarily operate during the months of May through September when high temperatures drive peak loads.

From: Barby Jacobs [mailto:bjacobs@imail.mohave.edu]
Sent: Wednesday, January 31, 2007 6:55 AM
To: David Hicks
Subject: acquisition of Griffith energy plant

I received your project update and notice of public open house in Golden Valley, Arizona.

I do not believe that the desert will sustain the growth expected and see the area as crowded with lights, cars, people, crime and pollution as Las Vegas from which many wish to escape.

For your part I would appreciate a major effort in using down facing, amber lighting in all areas of your project. We are slowly losing the nighttime star viewing. Thank you for any effort you can manage in this area.

Barby Jacobs

From: David Hicks [mailto:DHicks@LSPower.com]
Sent: Wednesday, January 31, 2007 10:10 AM
To: bjacobs@mohave.edu
Subject: RE: acquisition of Griffith energy plant

Hi Barby –

Thanks for your note. I will forward it to the project's technical people so they are aware of your concerns.

Please feel free to contact me again if you have any other issues you want to discuss.

Thanks again,
David

-----Original Message-----
From: David Hicks [mailto:DHicks@LSPower.com]
Sent: Wednesday, February 07, 2007 4:00 PM
To: MICA WILSON
Subject: RE: Arroyo Energy project

Hi Mica -

Thanks for your note. By way of an answer -- it's too soon in the process to know who a potential construction contractor might be. We need to get permits to build the plant first. We also will most likely want to reach an agreement with a buyer for some or all of the energy that will be generated at Arroyo before we actually begin construction.

I will keep your name on file. When the time comes, I will try to get back to you on this issue. Keep my name as well, and if you see something in the paper about the permits and/or a power purchase agreement, send me another note.

Thanks a lot, and if you have any other questions feel free to contact me.

David

David Hicks
Western Region Public Affairs Manager
LS Power Generation, LLC
619-498-5389 (office)
619-410-3246 (cell)

-----Original Message-----
From: MICA WILSON [mailto:herhighness_23@hotmail.com]
Sent: Wednesday, February 07, 2007 2:47 PM
To: David Hicks
Subject: Arroyo Energy project

Mr. Hicks,
I am researching to find out who will be the contractor on the Arroyo Energy
project. We live in Lake Havasu City and my husband is a combo welder/pipefitter. He is currently in Pascagoula, MS working at one of Chevron's refinerys. It is my understanding that construction jobs will be
created during this project. Is there any information you can give me regarding this so that he may contact them regarding possible employment?
Thank you for you help. I really appreciate it.

Mica Wilson
Western Truss and Components
Truss Technician Assistant

From: David Hicks [mailto:DHicks@LSPower.com]
Sent: Wednesday, February 07, 2007 4:29 PM
To: Gary Blanton
Subject: RE: Arroyo Power Plant

Hello Mr. Blanton.

Thank you very much for your note.

To answer your questions: During the construction phase of the project, we will employ an average of about 100 workers over the course of approximately 10 months. Once the plant is finished, it will require three or four full-time employees to operate. I am not sure if additional families will be moving to Kingman to fill those jobs – although, if they do, it will of course be a relatively small number of people.

In terms of company relationships with local schools, we do not at this time have any on-going partnerships. The Griffith Energy plant – which LS Power bought from Duke Energy and PPL last year – has an ongoing charitable donations program. And I believe it has given some donations to local schools in the past. In addition, as you know, Kingman Unified receives a large share of the tax dollars paid each year by Griiffith. The same will be true of Arroyo. (We expect to invest at least $150 million to construct Arroyo Energy.)

All that said, if you have some ideas in mind for partnerships with the schools, we would be very interested in sitting down with you to discuss them. Perhaps we can come by to see you sometime soon to talk about those possibilities, as well as the details of the proposal.

For some general background info, I have attached our fact sheet – which has some basics about the equipment, schedule, etc.

It's a pleasure to hear from you. If you have any other questions please don't hesitate to contact me.

Thanks again,

[redacted]avid

David Hicks
Western Region Public Affairs Manager
LS Power Generation, LLC
619-498-5389 (office)
619-410-3246 (cell)

From: Gary Blanton [mailto:gblanton@kusd.org]
Sent: Tuesday, February 06, 2007 5:11 AM
To: David Hicks
Subject: Arroyo Power Plant

Good Morning Mr. Hicks,

I was unable to attend your informational meeting last night at Black Mountain Elementary School. I was hoping you could send me some information about the operation and plant. I have several questions.
Is how many employees does the power plant anticipate on having?
Will additional families be moving to Kingman for employment at the plant?
Does the company partnership with elementary schools and in particular, specific programs in high schools?

I look forward to hearing from you and Welcome to our Community.

Gary E. Blanton
Director of Facilities
[redacted]ngman Unified School District #20

Arroyo Energy / Sign-In Sheet

Event: Community Forum, Mohave County Library at Lake Havasu, AZ
Date: February 5, 2007, 1:00-2:00pm

Name	Address	Phone	Email
Richard Creager	3545 Bali Dr LHC		
Brenda Grame	731 Scout Dr. LHC 86406		
Dixie Williams	Bcm		
Nancy Iannone	365. S. Lake Havasu Ave.	453-2111	
Mich Richmond	1625 S. Bellp Corona CA 92882	cell 951 675-4675 951 737-2441 Hm	m.rich@sbcglobal.net
Judy Thomas	1791 FIREFLY LHC AZ 86404	453-5935	
Robin Schilling	2515 Angler Dr LHC 86404	854-9118	
Bill Goodell	2635 Walapai Kingman, AZ	715-7807	kingmanproyects@citlink.net
HARRY BRENNER	2045 MISSOURI Ave #102	928-208-8761	bdcnt1467@NPGCABLE.com
NATE HURT	3775 HIAWATHA DR	928-854-244	HURTNHJR@NPG CABLE.COM

Arroyo Energy / Sign-In Sheet

Event: Community Forum, Mohave County Library at Lake Havasu, AZ
Date: February 5, 2007, 1:00-2:00pm

Name	Address	Phone	Email
DELORES PUR'N TUR	PO 1542 Topock	928 768 4827	
Gladys May	PO Box 182 Topock	928 768-5920	
Stella McWhirter	P.O. Box 1216 Topock	928-768-8349	
Don McWhirter	" "	" " "	
Rosalee Sundra		854-7305	
Carol Reutter	LHC [illegible] FOL	680-6924	
Myrtle Mejia FOL	LHC 2965 Blue Water Rd	453-[illegible]9657	
Dorcia Mejia	"	"	
ERIC COWAN	630 Plaza Drive Highlands Ranch CO 80129	303-471-3400	
CHIEF Dick Tuppman	3061 CHEMEHUEVI PL LH 86406	928 854 2145	
TONY RAMP	2225 W. ACOMA	453-4237 x 236	

Arroyo Energy / Sign-In Sheet

Event: Community Forum, Mohave County Library at Lake Havasu, AZ
Date: February 5, 2007, 1:00-2:00pm

Name	Address	Phone	Email
Michael Dwyer	2157 Rudolph Dr L.H.C.	505-2576	
James Gray	433 Silver King Dr	486 6303	
Kathy Hodel	2460 Demaret Dr	855 7475	
Donald VanBrunt	2484 S. Hwy 66 Kingman AZ 86401	928 279 5143	
Peter Foyl	1916 Montana Vista	612-308-9338	
Sally M. Davis	2045 Mesquite Ave 102	928-208-8560	
Mark Peak	1901 J. St. Sacramento, CA 95814	916-444-6666	
William Miller	3176 McCulloch	928 680-6060	wtm@citlink.net
Michelle Burke	3311 Tolteca Dr. Lhc AZ 86406	928-505-3607	

Arroyo Energy / Sign-In Sheet

Event: Community Forum, Mohave County Library at Lake Havasu, AZ
Date: February 5, 2007, 1:00-2:00pm

Name	Address	Phone	Email
DEAN VACKMAN	P.O Box 713 Topock	788-1745	
William Siegel	Box 969	Topock	
Dottie Heagel	Box 965 Topock	768-7803	
ELISEO O. MARIANA	P.O. BOX 296 LHC.	680-0061	
Robert H. BELLIVEAU	LHC 86403 221 COMANCHE LANE	680-0708	
JAY MOYES	1850 N. Central Phx Az 55004	602-664-2106	
DANA DILLER	"	480 664 8154	
Conrad Blevins	PO Box 2355, LHC AZ 86405	928-453-8852	
Jackie Watson	3840 Breakwater Dr - 86406		
Barb Rowe	1698 Diamond Dr. 86403		
Lynda French	1435 Franklin Dr. Kingman Az	86401 602-206-7486	lyndaf@azcommerce.com

Arroyo Energy / Sign-In Sheet

Event: Community Forum, Mohave County Library at Lake Havasu, AZ
Date: February 5, 2007, 1:00-2:00pm

Name	Address	Phone	Email
Gary Kellogg	314 London Bridge Rd. LHC, AZ 86403	928-505-7333	gkellogg@lakehavasu.org
Marlene Leiser	3234 Medicine Bow Dr LHC AZ 86406		
Dennis Schilling	2515 Angler Dr LHC 86406		
Patricia Duncan	4014 Window Road RD LHC 86406	928-855-4730	PADUNCAN@citlink.net
Connie Campbell	770 McCulloch	928-566-8752	
Bobbi & Don Holmes	2579 Arco LHC	680 4081	don@vobeth.com
Buster Johnson	2001 College Dr LHC 86403	435 0724	johnsbd@frontiernet.net
Thomas Jenner	2536 Avocado Ln LHC 86406.	855-6122	

Arroyo Energy / Sign-In Sheet

Event: Community Forum, Mohave County Library at Lake Havasu, AZ
Date: February 5, 2007, 1:00-2:00pm

Name	Address	Phone	Email
Carol Stone	3973 Chickasaw Plaza		
Sue Donahue	1966 Thrasher LHC	928-764-1760	SDONAHUE@NPGCABLE.COM
Carl Sparks	Topock AZ	928 899-3776	
Holly Wolfe	Topock AZ	928 768 2293	
Jon Barber	Topock AZ	768-9027	
Melvin Zeck	Topock AZ	788 2739	
Peggy Zeeke	Topock AZ	—	
arthur adams	Topock AZ	768-4452	
Joyce Parker	Topock AZ	768-9340	
Ellie Preciano	Topock AZ	768-5484	
Polly Bare	Topoc AZ	768 4827	

Arroyo Energy / Sign-In Sheet

Event: Community Forum, Mohave County Library at Lake Havasu, AZ
Date: February 5, 2007, 1:00-2:00pm

Name	Address	Phone	Email
Bruce Blizzard	PO Box 945 Topock	928-768-3666	fierobruce@hotmail.com
John Kendig	34 Nolina Ln	" 855-9060	fuzjohn@citlink.net
ALLAN STURTEVANT	53 NOLINA LN	680-1092	BARNEY1516@FRONTIERNET.NET
John P. Stacy Sr	5775 Mission Blvd	855-3807	JSTACY@HEIC2004KEYS.COM
MARDEL Mitchell	1011 INCA WAY, LHC	855-6424	mardelmitchell@landam.com
RANDY MITCHELL	"	"	"
Pat Landry	3787 Bluegrass	855-9721	patlandry@rcaltor.com
Gene Wynkoop	2780 Daytona Ave	855-3933	

Arroyo Energy / Sign-In Sheet

Event: Community Forum, Mohave County Library at Lake Havasu, AZ
Date: February 5, 2007, 1:00-2:00pm

Name	Address	Phone	Email
Al Fuller	P.O. Box 841 Topock AZ	928 768 4671	
Diana Heagle	3080 Erwin Lane LHC	928-764-2455	
Bill DeJulio	3498 Airway Ave Kingman	928-681-8902	
Richard Karl	336 Acoma Blvd. S. LHC, AZ 86406	928-706-3931	
Linda Elder	PO Box 21661 LHC 86405	928-680-1081	

Arroyo Energy / Sign-In Sheet

Event: Community Forum, Mohave County Library at Lake Havasu, AZ
Date: February 5, 2007, 1:00-2:00pm

Name	Address	Phone	Email
Dolores George	2298 Palo Verde Blvd. N LHC 86404	928 680-0607	DGeorge678@AOL.com
Michael Gilbertson	2498 Highway Ave	928-681-8923	mgilbertson@uesaz.com

Arroyo Energy / Sign-In Sheet

Event: Public Open House, Black Mountain Elementary School, Golden Valley, AZ
Date: February 5, 2007, 4:00-7:00pm

Name	Address	Phone	Email
FREDERICK D WILLIAMS	8331 W OATMAN HWY GOLDEN VALLEY AZ 86413	928-565-4981	FREGLO@CITLINK.NET
Richard Bone	6600 W Outman Rd		
Glenda Bone	" "	565-5165	
Dian Roe	3256 S. Tennessee Rd Golden Valley, AZ 86413		
[illegible] ERI K JACKSON	3535 N HASSAYAMPA GOLDEN VALLEY		
Jeannie Mills	P.O. Box 20501 Bullhead City, AZ	928-716-0519	
HAROLD DONDANVILLE	3565 N SANTA MARIA Rd GOLDEN VALLEY 86413	928 8976703	LAND4YOU@frontiernet.net.
JIM McDONALD	4258 N. CONCHO RD	928-565-5989	
Sheila Welter	7313 BOLSADR GV	565-4952	
Kevin Davis	P.O. Box 7000	(928) 757-0903	Kevin.Davis@co.mohave.az.us
Tom Sockwell	1130 Hancock	(928) 758-0713	TOM.Sockwell@co.mohave.az.us

Arroyo Energy / Sign-In Sheet

Event: Public Open House, Black Mountain Elementary School, Golden Valley, AZ
Date: February 5, 2007, 4:00-7:00pm

Name	Address	Phone	Email
James Johnson	528 Golden Valley Santa Maria RD	565-5940	
Ro O'Sullivan	Ed's Camp Route 66	565-3108	
Brian Henderson	4366 Box T. Dr.	692-6778	
Gladys E. Kingsland	4124 Sunrise Drive GV	715-1849	
Bill Lovejoy	Mohave Community College	692-7095	
Jack Ehrhardt	4105 N. Adams St Kingman AZ 86409		
James Kanelos	4402 Oatman Rd GV. AZ.		
Ronald Wayne Brand	2484 S. King 66 Kingman 86401	928 279-5143	

Arroyo Energy / Sign-In Sheet

Event: Public Open House, Black Mountain Elementary School, Golden Valley, AZ
Date: February 5, 2007, 4:00-7:00pm

Name	Address	Phone	Email
IRV Lubin	5647 Bolsa G.V.	565-2843	IRV_LUBIN@YAHOO.COM
PATRICIA AUSTIN	979 S. SANTA MARIA RD	565-5502	pgAUSTIN@FRONTIERNET.NET
ROBERT K HOLSINGER	5505 Hwy 68	565-3100	
Penny Gale	3235 Ames Ave Kingman	(928) 692-9190	azure3@citlink.net
Scott+Shaun Stewart	PO BOX 3339 Kingman, AZ 86402	(602)497-3976	
Verna Schwab	4195 Hwy 68-C PMB 239 G.Valley Az		landbroker@citlink.net
Chris Mousley	PO Box 62771 Kingman AZ 86402	753-7125	
ALLAN ROE	3256 S. Tennessee Rd. Golden Valley, Az.	565-4762	

Arroyo Energy / Sign-In Sheet

Event: Public Open House, Black Mountain Elementary School, Golden Valley, AZ
Date: February 5, 2007, 4:00-7:00pm

Name	Address	Phone	Email
GLORIA WILLIAMS	8331 OATMAN HWY G.V.	928-565-4881	FREGLO@CITLINK.NET
SUSAN Bayer	7656 W. ALONGO DR GV	928-565-9192	
TIM NUTT	4019 MUSTANG SPRING CIRCLE	928-530-8086	
Joyce Pietal	3485 Ranch G.V	565-2764	—
Bruce Mitchell	2419 Lillie Ave Kingman	(928)753-5622	monam@citlink.net
Lorraine Feeney	3817 N. ARABY RD	928 565-3341	rgfeeney@citlink.net

Arroyo Energy
Comment Card

Name: Carol Stone Date: 2/5/07

Address: 3973 Chickasaw Plaza

City: Lake Havasu City State: AZ Zip: 86406

Phone: 505-2865

Email: cjstone@citlink.net

Comments (use back if necessary): Thanks for information. It promotes good will. Nice job from speakers. I look forward to your beginning building and operation.

Would you like someone with Arroyo Energy to follow-up with you? Yes No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? Yes No

Arroyo Energy
Comment Card

Name: REX LAMEW Date: 2-5-07

Address: 2970 COCONINO DR

City: LHC State: AZ Zip: 86406

Phone: 928-727-4739

Email: _____

Comments (use back if necessary): _____

THIS WOULD BE ANOTHER GREAT PROJECT FOR

THE I-40 CORRIDOR - JOBS - TAXES

Would you like someone with Arroyo Energy to follow-up with you? (Yes) No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? (Yes) No

Arroyo Energy
Comment Card

Name: Mardel Mitchell Co. Mngr Date: 2/5/07
c/o Transnation Title
Address: 1011 Inca Way
City: Lake Havasu City State: AZ Zip: 86403
Phone: 928-855-4196
Email: mardelmitchell@lavdam.com
Comments (use back if necessary): Happy to see new infastructure to serve Mohave County & also be profitable to you than sales of water thru other contracts

Would you like someone with Arroyo Energy to follow-up with you? (Yes) No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? (Yes) No

Arroyo Energy
Comment Card

Name: RANDALL MITCHELL Date: 2-5-07

Address: 1011 INCA WAY

City: LAKE HAVASU CITY State: AZ Zip: 86406

Phone: 928-855-6424

Email: randall.mitchell@gmacm.com

Comments (use back if necessary): LOOK LIKE A GOOD THING FOR THE UPCOMING ~~POWER~~ GROWTH OF MOHAVE CO.

Would you like someone with Arroyo Energy to follow-up with you? Yes (No)

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? (Yes) No

Arroyo Energy
Comment Card

Name: Buster Johnson Date: 2-5-07

Address: 2001 Willow DR

City: LHC State: AZ Zip: 86403

Phone: 928-453-0724

Email: _____

Comments (use back if necessary): much needed TO meet Demands of AZ. - GOOD COMPANY TO Locate in Mohave County

Would you like someone with Arroyo Energy to follow-up with you? Yes No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? Yes No

Arroyo Energy
Comment Card

Name: Betty Loyd Date: 2-5-07

Address: 1916 Montana Vista

City: Hfc State: AZ Zip: 86403

Phone: 612-308-9338

Email: _____

Comments (use back if necessary): Local short start up peak demand capacity is very valuable. Also, using existing plant infrastructure is a great economy of scale.

Would you like someone with Arroyo Energy to follow-up with you? Yes No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? Yes No

Arroyo Energy
Comment Card

Name: Ro O'Sullivan Date: 2-5-06

Address: 8500 W. Route 66

City: Kingman State: Az Zip: 86413

Phone: _____

Email: YASHTI@HOTMAIL

Comments (use back if necessary): Who benefits from this - who Receives the power? Did you Receive a similar deal Like Griffith? If Griffith is working at a third why do we need another plant? Are you Receiving a tax cut?

Would you like someone with Arroyo Energy to follow-up with you? (Yes) No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? (Yes) No

Was this originally planned when Griffith was built?

Arroyo Energy
Comment Card

Name: TIM NUTT Date: 2-5-07

Address: 4019 MUSTANG SPRINGS CIR

City: KINGMAN State: AZ Zip: 86401

Phone: 928-530-8086

Email:

Comments (use back if necessary): WILL YOU BE USING ALL OF THE REMAINING WATER ALLOTMENTS FOR THIS WATER SERVICE AREA

Would you like someone with Arroyo Energy to follow-up with you? Yes No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? (Yes) No

Arroyo Energy
Comment Card

Name: GLADYS E. KINGSLAND Date: 2-5-07

Address: 4124 SUNRISE DRIVE

City: GOLDEN VALLEY, AZ State: AZ Zip: 86413-8321

Phone: 928-715-1844

Email: ———

Comments (use back if necessary):

WHY ARE YOU FURTHER DRAWING OUR AQUIFER? WHEN DO WE SEE AN END TO IT? HOW MUCH POWER WILL BE USEABLE LOCALLY OR WILL IT BE SENT OUT OF STATE LIKE GRIFFITH? WILL YOU BE PAYING TAXES OR LOOKING FOR A FREE RIDE, TOO?

Would you like someone with Arroyo Energy to follow-up with you? Yes No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? (Yes) No

Arroyo Energy
Comment Card

Name: FREDERICK D WILLIAMS Date: 2-5-07

Address: 8331 N OATMAN HWY

City: GOLDEN VALLEY State: AZ Zip: 86413

Phone: (928) 565-4881

Email: fredglo@citlink.net

Comments (use back if necessary): WITH THE LONG LASTING DROUGHT WE ARE IN AND THE PROVEN LACK OF WATER NOW AND IN THE FORSEEABLE FUTURE I HOPE YOU ARE GOING TO USE THE DRY-COOL METHOD

Would you like someone with Arroyo Energy to follow-up with you? Yes No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? Yes No

Arroyo Energy
Comment Card

Name: Ted Lubin Date: 2-5-43

Address: 5647 Bolsa Dr.

City: Golden Valley State: AZ Zip: 86413

Phone: 928-565-2843

Email: _____

Comments (use back if necessary): Nothing in this plant for us. Just using our water & polluting our air.

Would you like someone with Arroyo Energy to follow-up with you? Yes No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? (Yes) No

Arroyo Energy
Comment Card

Name: Kevin A Davidson Date: 2-5-2007

Address: 3162 Courtney Ave

City: Kingman State: AZ Zip: 86401

Phone: (928) 753-1742

Email: _____

Comments (use back if necessary): Prefer powerplant be dry-cooled* in light of Recent Paul Mavros Hydrological Study indicating stress to the aquifer

* hybrid cooling may also be considered give summer time temperatures

Would you like someone with Arroyo Energy to follow-up with you? (Yes) No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? (Yes) No

Arroyo Energy
Comment Card

Name: JACK Ehrhardt Date: Today

Address: 4105 N. Adams St

City: Kingman State: AZ Zip: 86409

Phone: 928 7574202

Email:

Comments (use back if necessary): go Dry cooled — only no more water — why not renewable partnering with this,

Would you like someone with Arroyo Energy to follow-up with you? Yes No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? Yes No

Arroyo Energy
Comment Card

Name: James Kanelos Date: 2-6-07

Address: 4402 Oatman Rd

City: Golden Valley State: AZ Zip: 86413

Phone: _____

Email: _____

Comments (use back if necessary): Thank you for having this open meeting!

Would you like someone with Arroyo Energy to follow-up with you? (Yes) No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? (Yes) No

Arroyo Energy
Comment Card

Name: DENNIS COFFEE Date: 2/5/07

Address: 1809 E. SCARLET PLUME ST.

City: KINGMAN State: AZ Zip: 86409

Phone: 928-681-3149

Email: dennscoffee@hotmail.com

Comments (use back if necessary): HOW MANY MEGAWATTS HAVE BEEN SOLD TO MOHAVE COUNTY (ANY ENTITY) SINCE THE COMPETION OF GRIFFITH POWER?

Would you like someone with Arroyo Energy to follow-up with you? Yes No

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy? Yes No

Arroyo Energy
Comment Card

Name: GLORIA WILLIAMS Date: 2-5-07

Address: 8331 OATMAN HWY

City: GOLDEN VALLEY State: AZ Zip: 86413

Phone: 928-565-4881

Email: fregjo@CITLINK.NET

Comments (use back if necessary): why are we building another energy plant when Griffith is only working at 1/3 capacity? Who will get the power? Will you come under the sweetheart deal that Griffith has about the water? Are you a subsidiary of

Would you like someone with Arroyo Energy to follow-up with you? (Yes) No OVER

Can we add you to our mailing list for future announcements or meetings about Arroyo Energy (Yes) No

Griffith - or vice-versa? Must be a tie in somewhere for you to be able to use Griffith facilities.
Do you get a sweet tax deal from the County like Griffith?
Can't we use the I-40 Industrial Corridor more efficiently than building another energy plant?
You are going to be a 'peaker plant' according to the Miner Griffith tried to tell us we had outages in the summer thats why we needed the plant. We checked and the only outages we had were caused by storms, not shortages of power. If Griffith isn't working at full power why do we need you to augment it?
Are you going to look for an alternative source of water instead of draining the aquifer?

As a result of public notices and meetings, 16 written responses have been received by Northern Arizona Energy, and are presented in **Exhibit J**. A summary of the comments and issues from those responses is presented below:

Type of Respondent:

Federal Agency	–
State Agency	–
Indian Communities	–
Local Agency	–
Residential Development Co.	–
Businesses	–
Organizations	–
Citizens	16

Issues Raised in Comments:

Air quality	1
Alternative locations	–
Cultural resources	–
Economic benefits	2
Effects of transmission lines	–
Future expansions	–
General support	6
General interest	–
Grazing rights	–
Land use in and near ROW	–
Need for the electricity	5
Oversight of plant owners	–
Permitting	–
Renewable energy	1
Taxes	3
Visuals	–
Water consumption/recirculation	7
Wildlife	–

Preliminary Responses to Issues Raised:

The following highlights the key issues that have been raised and how they have been responded to by the Northern Arizona Energy Project.

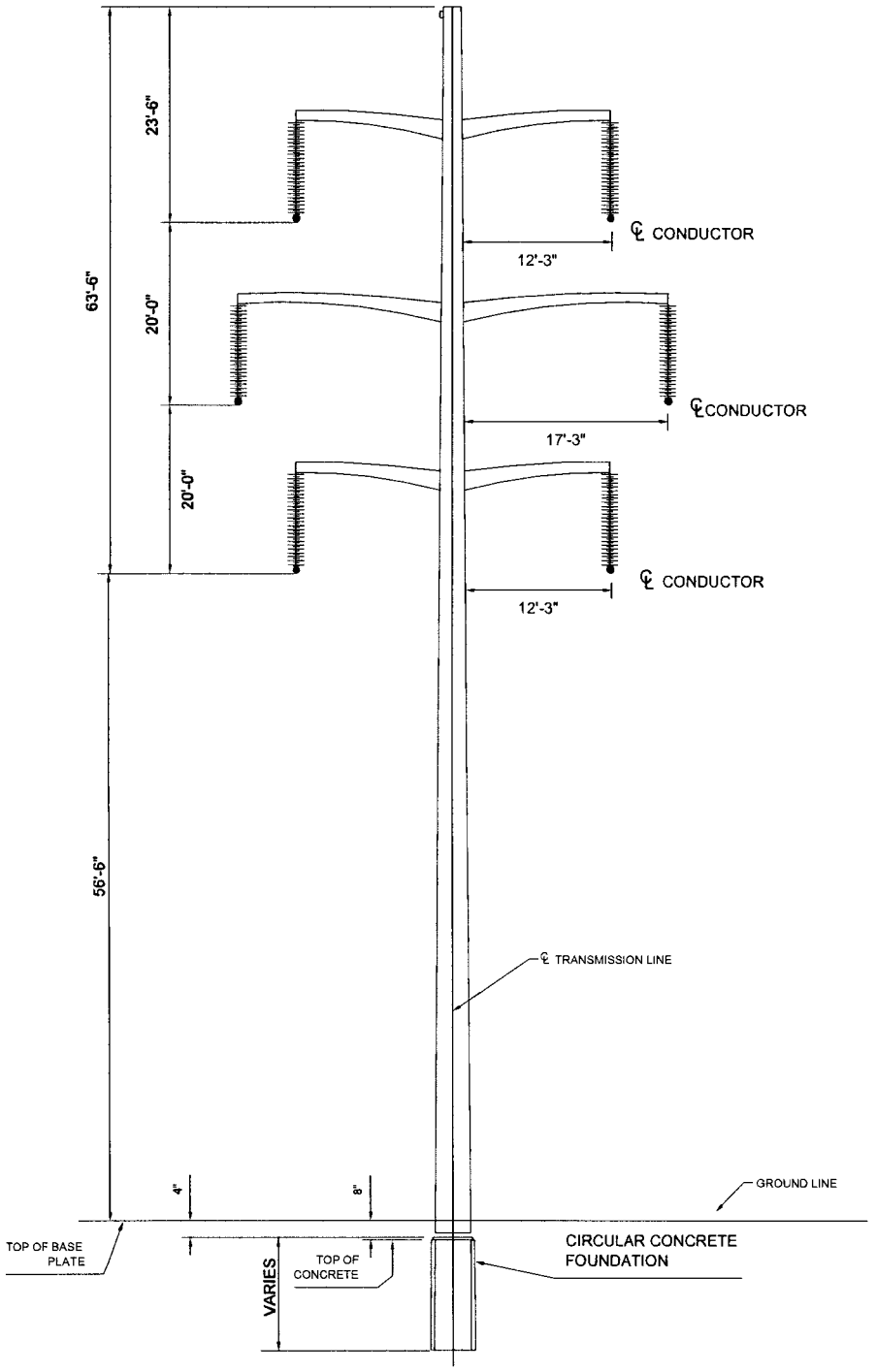
EXHIBIT K TRANSMISSION INTERCONNECTION DESCRIPTION

The Northern Arizona Energy Project will interconnect with the electrical grid at the existing Western 230kV Griffith Switchyard. The entirety of the electric interconnection with the Western system occurs within the Project Property or the adjacent Griffith Property. The interconnection of the Project requires two new very short 230kV transmission lines that will be constructed within the Project Property and will connect the high-side of the GSU transformers to the nearly-adjacent expanded Griffith Switchyard.

The Griffith Switchyard consists of twelve 230kV circuit breakers arranged in a breaker-and-a-half configuration. The interconnection of the two new transmission lines associated with the Project requires the addition of a new breaker-and-a-half bay consisting of three new 230kV circuit breakers with associated isolation switches. This expansion of the Griffith Switchyard will require additional property (approximately one (1) acre) to be deeded to Western ownership.

The Project's electric transmission lines, constructed on the Project Property, will be constructed with double circuits on tubular steel poles. The poles will be 100 to 120 feet tall with three arms on each side, approximately 17 feet apart to support the conductors and a smaller arm on each side above the conductor arms to support the overhead ground wires used for lightning protection. **Figure K-1** shows a schematic of the proposed transmission structure. A visual rendering of the proposed structures is included in the project rendering in **Figure G-1**.

The line between the Project GSU transformers and the Griffith Switchyard will be approximately 2657 feet long and will require approximately 12 structures.



NORTHERN ARIZONA ENERGY PROJECT

Figure K-1
Proposed Transmission Structure

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/19/07	File: Figure K-1.dwg
Drawn By:ETC	Layout: 001

Source: Griffith CEC

REFERENCES CITED IN APPLICATION

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AZ CORP COMMISSION
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ARIZONA DEPARTMENT OF WATER RESOURCES
3550 N. Central Avenue, Phoenix, AZ 85012
Telephone 602 771-8426
Fax 602 771-8681

Janet Napolitano
Governor

Herbert R. Guenther
Director

June 4, 1007

The Honorable Kristin K. Mayes
The Honorable William Mundell
The Honorable Mike Gleason
The Honorable Jeff Hatch-Miller
The Honorable Gary Pierce
Arizona Corporation Commission
Commissioners Wing
1200 West Washington Street
Phoenix, AZ 85007-2996

Docket No. L-00000FF-07-0134-00133

EXHIBIT
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A-10
admitted

Dear Commissioners:

I am writing regarding the Arizona Corporation Commission's role in approving new power plants within the state. Pursuant to A.R.S. § 40-360.03, a person planning to construct a new power plant with a rating of 100 megawatts or more must apply to the Commission for a Certificate of Environmental Compatibility (CEC). Upon receipt of an application for a CEC, the Commission must refer the application to the Power Plant and Transmission Line Siting Committee (Committee) for review and decision. After the Committee issues a decision on the application, the decision goes to the Commission for further consideration.

Under A.R.S. § 45-360.13, if a proposed power plant is within the service area of a city or town in an Active Management Area, the Committee must consider, as a criterion for issuing a CEC, "the availability of groundwater and the impact of the proposed use of groundwater on the management plan established under title 45, chapter 2, article 9 for the active management area." Although the statutes do not expressly mandate similar consideration for power plants in areas of the state outside of Active Management Areas, for the past few years, the Commission has chosen to consider as a criterion for issuing a CEC in any area of the state, the impact of the proposed power plant on the water supplies in the area. I certainly applaud that policy. I would like to also offer the following for your consideration with respect to the siting of new power plants in the state.

As you know, Arizona is experiencing a persistent drought such as we have not seen in hundreds of years. Climate experts suggest this long-term drought may be Arizona's new water reality. Add to this our increasing population growth, and we find ourselves facing a new frontier of sorts here in the Southwest, one where drought and diminished water supplies frame our ongoing efforts to provide a sustainable water supply for the next generations who will live here. As we explore where our future water supplies will come from, we are reminded daily that the best future water supply is the one we don't use today; that is, every gallon of water we save through conservation is one we have for tomorrow.

The Active Management Areas have developed a series of water conservation best practices for large power plants that we believe would be beneficial if enacted statewide. There are six main categories of practices:

- Reusing or recycling water
- Avoiding single-pass cooling unless the water is reused
- Use of low-flow plumbing fixtures
- Use of low water-use landscaping with efficient irrigation systems
- Developing site-specific water conservation plans for large facilities

The major consumptive use of water at large power plants is evaporation of water from cooling towers. Because of the large volume of water used in towers, conservation practices focus on achieving a high level of efficiency in cooling tower operations. The main conservation practice required is the design of new power plants to achieve an annual average of 15 or more cycles of concentration, of cooling tower water.[1]

Partial or total use of effluent in cooling towers is encouraged as an alternative to only using groundwater. The feasibility of this use depends on a number of factors, including the availability of effluent, the volume and timing of water demand at the towers, water quality considerations, etc.

Facilities may apply to use other conservation technologies in place of achieving 15 cycles of concentration if the use of the proposed technologies will result in equal or greater water savings.

I encourage you to consider these best practices for water conservation at large power plants, proven to work in the Active Management Areas, as you deliberate appropriate requirements for new large power plants sited in Arizona.

Sincerely,

Herbert R. Guenther
Director

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ATTY GEN'L'S OFFICE

[1] "Cycles of concentration" achieved in a cooling tower is an indicator of water efficiency. Cooling towers consistently operated at higher cycles of concentration consume less water than towers consistently operated at lower cycles of concentration. Cycles of concentration can be determined by dividing the concentration of a constituent in the blowdown water by the same concentration of the constituent in the make-up water. Total dissolved solids (TDS) content is commonly used for calculating cycles of concentration. For example, if the TDS concentration in blowdown water is 1,500 miligrams per liter (mg/L) and the TDS in the make-up water is 300 mg/L, the tower is operating at 5 cycles of concentration.

You're invited to a public open house

Monday, February 5, 4:00-7:00pm
Black Mountain Elementary School - Gymnasium
3404 N. Santa Maria Road, Golden Valley, 928-565-9111
(One mile north of Sonic, off of Hwy 68)

Come learn about a unique power plant proposed to help meet the region's energy needs. Residents may arrive anytime between 4:00pm and 7:00pm. The format is informal, emphasizing one-on-one exchanges of information so individuals can learn about the Project.

Arroyo Energy

Changed Name To Northern AZ. Energy.

Project Update – February 2007

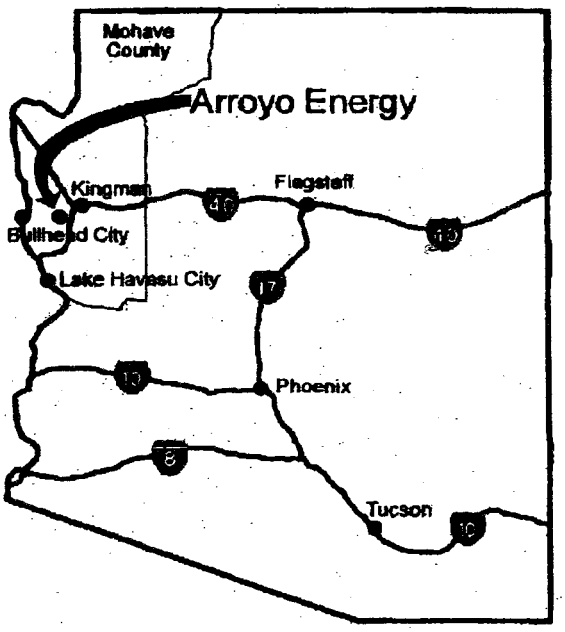
LS Power proposes to build a clean, natural gas-fired power plant to address the growing energy needs of Mohave County and the rest of Arizona.

The proposed project will be comprised of four (4) combustion turbine generators designed to meet summer peak demand. The electric production capability of all four (4) units is 175 MW and is the project site is located just north of the existing Griffith Energy project (600 MW).

The Arroyo Energy project will efficiently use the existing I-40 Industrial Corridor infrastructure for gas, electricity and water.

In addition, the new power generation project will use the water recycling facilities of the Griffith Energy project to minimize water use.

Project Location



Arroyo Energy is located southwest of Kingman, AZ off of I-40 in the Industrial Corridor.

During the development process, the community will have many opportunities to learn about the proposed project and participate in the review process conducted by the Arizona Corporation Commission, its Siting Committee and other agencies – including the Arizona Department of Environmental Quality and the Western Area Power Administration – as they consider granting permits for the construction and operation of Arroyo Energy.

For more information about the Arroyo Energy project, contact David Hicks, Public Affairs, LS Power Generation, 619-498-5389, dhicks@lspower.com.

THE KINGMAN
DAILY MINER
KINGMAN'S ONLY DAILY NEWSPAPER

Power plant expansion eyed

'Peaker' designed to augment output during summer months

By Jennifer Bartlett
Miner Staff Writer

KINGMAN – LS Power has planned a public meeting Monday to exchange information and inform the community of its upcoming Arroyo Energy project.

According to LS Power spokesman David Hicks, the Arroyo Energy project is a "peaker" plant to be added to the existing Griffith Energy project. The project will consist of four combustion turbine generators designed to meet summer peak demand.

The project, located just north of the existing Griffith Energy project, will be able to generate 175 megawatts of energy to augment Griffith's 600 mw. While Griffith does not currently operate at full, about a third of its potential capacity, this addition will help meet growing needs during hot summer months.

"LS Power proposes to build a clean, natural gas-fired power plant to address the growing energy needs of Mohave County and the rest of Arizona," Hicks said.

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Friday
February 2, 2007
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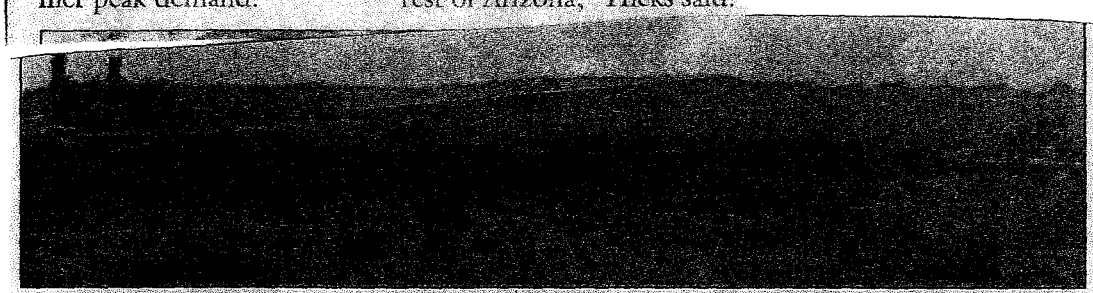


Courtesy

The existing Griffith Energy facility is to the left. At right (lightened in a circle) is a graphic representation of what the Arroyo Energy project will look like when completed. The Arroyo project will assist the Griffith Energy facility during peak season.

Energy needs are growing around the state, he said – 25 megawatts per year in Mohave County alone.

The peaking plant is designed to power up quickly, Hicks said. The four combustion turbines can be up and running within 10 minutes. It will also use the water recycling facilities of the Griffith Energy project to minimize water use.

Griffith Energy uses water in its cooling system, which is then recycled into a treatment plant to be used over and over again until the mineral deposits are too built up for use, Hicks said.

See PLANT, 5A

Plant

Continued from 1A

The water is then transported to an on-site water evaporation pond. The Arroyo Energy project would use the same recycling process and facilities.

Hicks said the project would utilize existing infrastructure and water allotments, as well as minimizing emissions by using clean natural gas and modern control systems. At maximum capacity, the project would utilize approximately 160 acre-feet of water per year. He also said the project requires no additional off-site right-of-way, roadways, transmission lines or pipelines.

The Arroyo project will bring $150 million in new capital investment into Mohave County and will contribute to the development of the Interstate 40 industrial corridor. During the construction process, Hicks said the project would employ, on average, 100 people over a 10-month period. There would be about three or four permanent positions once the facility was up and running.

Hicks said they are currently applying for necessary permits, the most important being the Certificate of Environmental Compatibility, which is granted by the Arizona Corporation Commission. They envision being up and running by the end of 2008 or the beginning of 2009.

LS Power acquired the Griffith Energy project in 2006. The first half, owned by Duke Energy, was acquired in May, while the second half, owned by PPO Corporation was purchased at the end of June, Hicks said.

"During the development process, the community will have many opportunities to learn about the proposed project and participate in the review process conducted by the Arizona Corporation Commission, its sitting committee and other agencies – including the Arizona Department of Environmental Quality and the Western Area Power Administration – as they consider granting permits for the construction and operation of Arroyo Energy," Hicks said.

The public meeting will be held from 4 to 7 p.m. Monday at the Black Mountain Elementary School at 3404 N. Santa Maria Road in Golden Valley.

programming on the air to aid people with vision loss, severe dyslexia and other conditions affecting their ability to read.

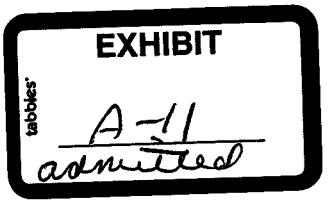
Volunteers now speak to service clubs, church groups, low vision support groups and other community groups about vision loss. If your group would like to host a speaker, contact Sharon Tewksbury, outreach coordinator, at (928) 779-1775.

In addition, Sun Sounds is now accessible to residents in Kingman, Cottonwood, Payson and Downtown Prescott. The radio station is broadcast on a sub carrier of KNAU, which means you

You also may print an application for service from the Web site at sunsounds.org.

ARIZONA DEPARTMENT OF WATER RESOURCES

HYDROLOGY DIVISION



MEMORANDUM

TO: Arizona Power Plant and Transmission Line Siting Committee

THRU: Frank Putman, Chief Hydrologist

FROM: Dale Mason, Hydrologist, Water Resources Section

DATE: July 18, 2007

RE: Hydrologic Review of the Northern Arizona Energy Project's Power Plant Application, Docket Number L-00000FF-07-0134-00133.

Summary

On April 26, 2007, the Arizona Corporation Commission Utilities Division Staff requested that the Arizona Department of Water Resources (ADWR) address the following subjects regarding the Northern Arizona Energy Project (NAEP) application. Those subjects are: 1) will the project have a detrimental impact upon water supplies in Mohave County, and 2) will the project have any impact on water supplies for existing or known planned developments in Mohave County.

The answer to the first question, will the NAEP have a detrimental impact upon water supplies in Mohave County, is no. A comparison of the expected annual volume of water used by the NAEP to the estimated annual recharge for the Sacramento Valley Groundwater basin indicates that the NAEP may potentially have a small impact on the annual water budget for the basin. A second comparison of the estimated total water use over the life expectancy of the NAEP to estimates of groundwater in storage in the basin indicates that any impacts to overall water supplies in the basin will be insignificant.

The answer to the second question, will the NAEP have an impact on water supplies for existing or known developments, is that the NAEP will probably have an insignificant impact on any such developments. A well impact analysis of NAEP pumpage predicts a maximum drawdown of 15 feet at the pumping well after 40 years of pumping at the maximum projected annual withdrawal rate of 270 acre-feet per year (Figure 1). A drawdown of 4 feet is expected to occur at approximately three-quarters of a mile from the pumping well, and a drawdown of 1 foot is expected at approximately 6.7 miles from the pumping well after 40 years (Figure 1). Wells for the Golden Valley – Phase 1 development can expect additional drawdowns of between 1 to 2 feet after 40 years due to the NAEP. Proposed wells for the planned Golden Valley - Phase 2 development may experience additional drawdowns of 1 to 4 feet (Figure 1).

In all cases, the impacts from the NAEP would by considered insignificant. A detailed discussion of the potential impacts from NAEP is included below.

Impact to Water Resources

Estimates of the annual ground-water outflow from the Sacramento Valley basin have ranged from less than 500 ac-ft per year to as much as 10,000 ac-ft per year (Gillespie, J.B. and Bentley, C.B., 1971; Freethey, G.W. and Anderson, T.W., 1986; Owens-Joyce, 1987; Rascona, S.J., 1991; ADWR, 1997). Groundwater in Sacramento Valley generally flows to the south, paralleling Sacramento Wash, before turning east and flowing out of the basin near Topock, Arizona. In 1997, the ADWR estimated ground-water outflow from the Sacramento Valley basin to be 1,200 ac-ft per year (ADWR, 1997). This estimate was based on water level data, aquifer test results, and a geologic cross-section across Sacramento Valley's ground-water outflow point near Topock, Arizona. Water levels in wells in the southern part of the Sacramento Valley basin have generally been steady over the past 20 to 30 years indicating that the basin's ground-water outflow probably has not been greatly affected by pumpage in the central part of the valley. Therefore, the basin's outflow is probably equal to the annual aquifer recharge.

The NAEP is a peaking plant that will be used to supply electrical power during times of peak demand and is expected to run an average 2,500 hours per year and use 160 acre-feet of water per year. A worst case scenario of the NAEP running for 5,000 hours per year would result in a water use of 270 acre-feet per year. The range of water use by the NAEP represents from 13 to 22 percent of the estimated annual recharge for the Sacramento Valley basin. However, the expected NAEP annual water use probably falls within the range of uncertainty of the ADWR recharge estimate.

Current water use in Sacramento Valley is estimated at about 2,900 ac-ft per year (Tadayon, 2004, Southwest Groundwater, 2007). Water uses consist of about 1,500 ac-ft for municipal/domestic use and about 1,400 ac-ft of industrial pumpage. The majority of the industrial pumpage, about 1,200 ac-ft per year, is for the Griffith Power Plant. Annual historic water use estimates have ranged from less than 500 ac-ft per year to as much as 6,000 ac-ft per year during the late 1960s and the 1970s (Rascona, 1991; Tadayon, 2004). The high water use during the 1960s and 1970s was due to withdrawals for mineral extraction and processing by the Cyprus Metals Company (Rascona, 1991). In 1989 the mine was placed on stand-by and withdrawals for mining have decreased to about 300 ac-ft per year. Future pumpage in Sacramento Valley may exceed 30,000 ac-ft per year if the planned developments reach full build out, the mine becomes active again, and the Mohave County water system reaches its maximum capacity of 4,800 gallons per minute (7,260 ac-ft per year).

Estimates of the volume of groundwater in storage above 1,200 feet below land surface and available for withdrawal in Sacramento Valley basin ranges from 2.3 to 13 million acre-feet (Gillespie, J.B. and Bentley, C.B., 1971; Freethey, G.W. and Anderson, T.W., 1986; ADWR, 1994). Total water use by the NAEP over its 40 year life expectancy would be between 6,400 and 10,800 acre-feet, which represents much less than one percent of the total groundwater available in storage.

Impact to Future Developments

A well impact analysis of NAEP pumpage assigned to a single well in the existing Mohave County Well field produced a maximum drawdown of 15 feet at the well after 40 years of pumping the maximum projected annual withdrawals of 270 acre-feet per year (Figure 1). A drawdown of 4 feet is expected to occur at approximately three-quarters (0.75) of a mile from the well, and a drawdown

of 1 foot is expected at approximately 6.7 miles from the well after 40 years (Figure 1).

The well impact analysis indicates that the existing Mohave County well field, which supplies water to the county industrial park, will be most affected by withdrawals for the NAEP (Figure 1). After 40 years the existing county wells can expect additional drawdowns of between 3 and 15 feet. Wells supplying two major proposed developments may also be slightly affected by withdrawals for the NAEP. Water supply wells for the permitted Golden Valley development can expect additional drawdowns of between 1 and 2 feet after 40 years due to NAEP pumpage (Figure 1). Wells for the proposed Golden Valley Phase 2 development, which is under review by the ADWR, may experience additional drawdowns of 1 to 4 feet after 40 years at its proposed well sites (Figure 1). Drawdowns of such small amounts will probably have an insignificant impact on the water supplies for these developments.

Attachments:

Figure 1). Maps showing NAEP well impact analysis and locations of existing and future developments, Sacramento Valley

References:

Arizona Department of Water Resources, 1994, Arizona water resources assessment, Volume II, Hydrologic summary: Arizona Department of Water Resources, 236 p.

Arizona Department of Water Resources, 1997, Technical memo from Frank Corkhill to Karen Modesto on groundwater flux from Sacramento Valley, 4 p.

Freethey, G.W. and Anderson, T.W., 1986, Predevelopment hydrologic conditions in the alluvial basins of Arizona and adjacent parts of California and New Mexico: U.S. Geologic Survey Hydrologic Investigations Atlas HA-664.

Gillespie, J.B. and Bentley, C.B., 1971, Geohydrology of Hualapai and Sacramento Valleys, Mohave County, Arizona: U.S. Geological Survey Water-Supply Paper 1899-H, H1-H37, 2 sheets.

Owens-Joyce, Sandra, 1987, Estimates of annual average tributary inflow to the lower Colorado River, Hoover Dam to Mexico: U.S. Geological Survey Water-Resources Investigation Report87-4078, 1 sheet.

Rascona, S.J., 1991, Maps showing groundwater conditions in the Sacramento Valley Basin, Mohave County, Arizona - 1991: Arizona Department of Water Resources Hydrologic Maps Series Report Number 21, 1 sheet.

Southwest Ground-water Consultants, Inc, 2007, Evaluation of pumping impacts of the Northern Arizona Energy Project (NAEP) on the Mohave County water system well field and the Sacramento Valley Aquifer. Mohave County, Arizona.

Tadayon, Saeid, 2004, Water withdrawals for irrigation, municipal, mining, thermoelectric-power, and drainage uses in Arizona outside of Active Management Areas, 1991-2000: U.S. Geological Survey, Scientific Investigation Report 2004-5293, 28 p.

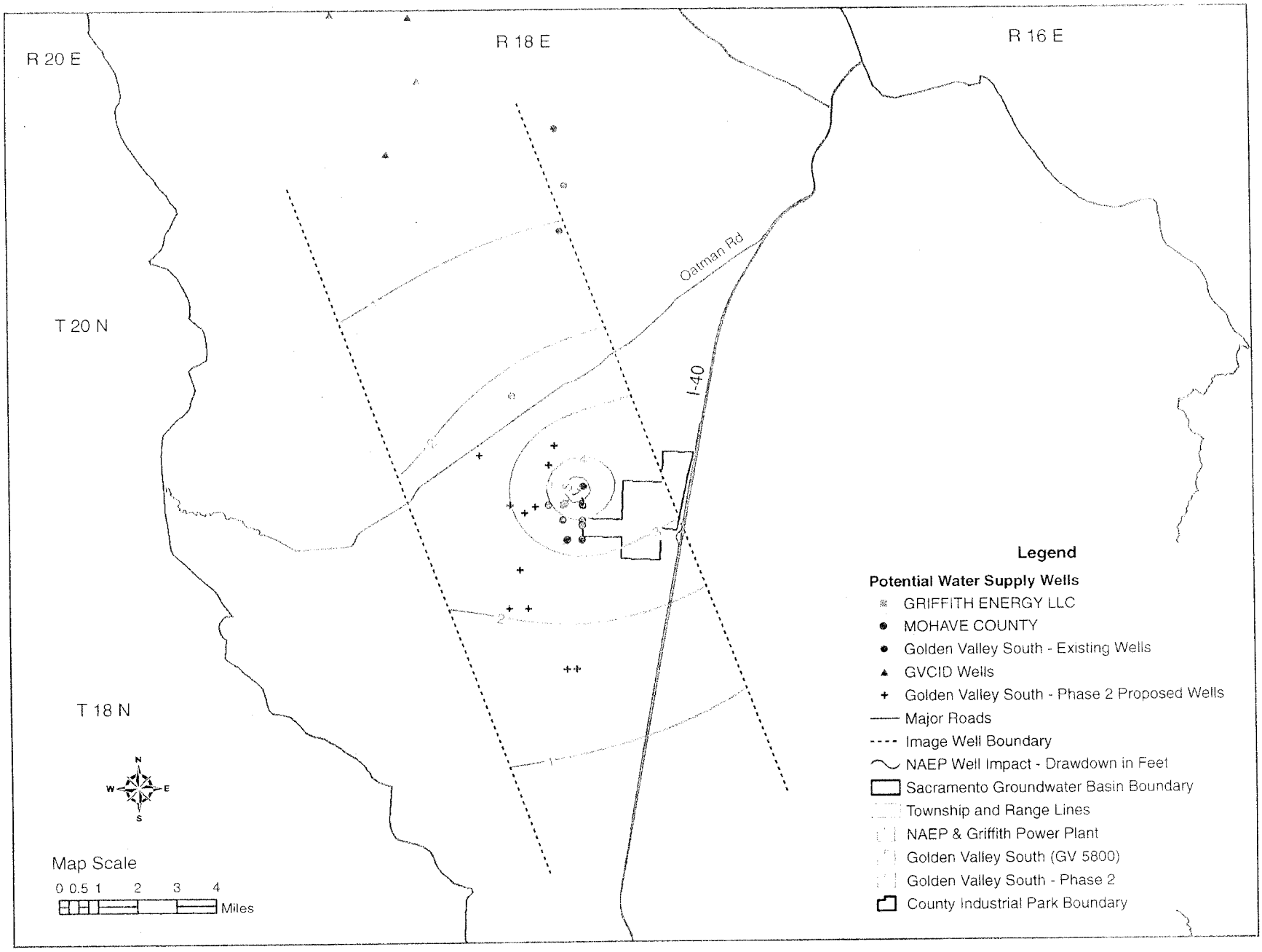
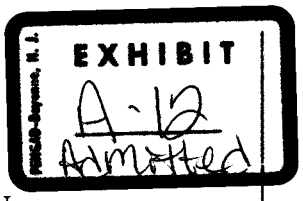


Figure 1. Map showing NAEP impact analysis and existing and planned developments, Sacramento Valley.



BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS
MIKE GLEASON, Chairman
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
KRISTIN K. MAYES
GARY PIERCE

IN THE MATTER OF THE APPLICATION OF NORTHERN ARIZONA ENERGY, LLC, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES 40-360.03 AND 40-360.06, FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING CONSTRUCTION OF A 175 MW NATURAL GAS-FIRED, SIMPLE CYCLE GENERATING FACILITY AND ASSOCIATED TRANSMISSION LINE INTERCONNECTING THE GENERATING FACILITY TO THE ADJACENT WESTERN AREA POWER ADMINISTRATION GRIFFITH SWITCHYARD, ALL LOCATED IN MOHAVE COUNTY APPROXIMATELY 9 MILES SOUTHWEST OF KINGMAN, ARIZONA.	DOCKET NO. L-00000FF-07-0134-00133 **NOTICE OF FILING APPLICANT'S SUPPLEMENTAL INFORMATION**

Applicant, Northern Arizona Energy, LLC, hereby provides notice that it is filing herewith Supplemental Information to Application for a Certificate of Environmental Compatibility for the Northern Arizona Energy Project.

RESPECTFULLY SUBMITTED this 22nd day of June, 2007.

MOYES STOREY, LTD.

Jay I. Moyes
1850 N. Central Avenue, Suite 1100
Phoenix, Arizona 85004
(602) 604-2141

Original and Twenty-Eight (28) copies of the foregoing filed this 22nd day of June 2007 with:

Docket Control
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Copy of the foregoing hand-delivered this 22nd day of June 2007 to:

Laurie Woodall, Chairman
Arizona Power Plant & Transmission
Line Siting Committee
1275 West Washington
Phoenix, Arizona 85007
Laurie.Woodall@azag.gov

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Arizona Corporation Commission
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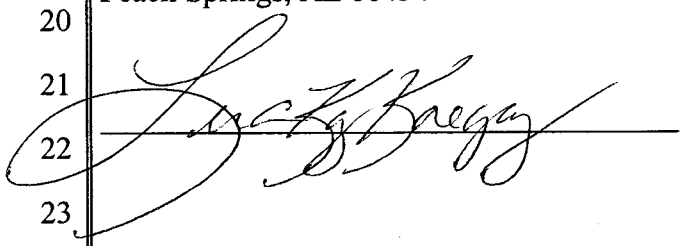


Supplemental Information to Application for a Certificate of Environmental Compatibility

Northern Arizona Energy Project

Prepared for:

State of Arizona Power Plant and Transmission Line Siting Committee

Submitted by:

Northern Arizona Energy, LLC

Date: _____

Case No. L-OOOOOFF-07-0134-00133

BEFORE THE ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

In the matter of the Application of Northern Arizona Energy, LLC, in conformance with the requirements of Arizona Revised Statutes 40-360.03 and 40-360.06, for a Certificate of Environmental Compatibility authorizing construction of a 175 MW natural gas-fired, simple cycle generating facility and associated transmission line interconnecting the generating facility to the adjacent Western Area Power Administration Griffith Switchyard, all located in Mohave County approximately 9 miles southwest of Kingman, Arizona.	Case No. L-OOOOOFF-07-0134-00133

SUPPLEMENTAL INFORMATION TO APPLICATION FOR CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

INDEX

A. Supplemental Information Package Responsive to Committee Requests and Questions at May 1-2, 2007, hearing.

1. Attachment 1: Supplemental Insert to Section 4 of Application

2. Attachment 2: Property Tax Revenue Forecast: Mohave County

3. Attachment 3: Source Documents for Data Presented in Market Need Testimony of Joe Gorberg

a. Western Electricity Coordinating Council, 10-Year Coordinated Plan Summary

b. Pinnacle West Credit Suisse 2007 Energy Summit, February 6, 2007

c. Arizona's Rapid Growth and Development: Natural Resources and Infrastructure, Arizona Town Hall, April 9-12, 2006

4. Attachment 4: Griffith CEC Compliance Filings

B. Evaluation of the Pumping Impact of the Northern Arizona Energy Project (NAEP) on the Mohave County Water System Well Field and the Sacramento Valley Aquifer, Mohave County, AZ, prepared by Southwest Ground-water Consultants, Inc. (Submitted under separate binding)

C. Draft Air Quality Class 1 Permit No. 43801 and Technical Support Document for Northern Arizona Energy, LLC prepared by Arizona Department of Environmental Quality to be issued for public comment on June 22, 2007.

Northern Arizona Energy Project
Case No. 00133

Supplemental Information Package

Applicant's Responses to Questions and Requests from the Arizona Power Plant and Transmission Line Siting Committee and/or the Arizona Corporation Commission Staff at the May 1-2, 2007 Public Hearing in Kingman, Arizona

1. Post the Applicant's Power Point slide presentation on the Applicant Project Website at www.northernarizonaenergy.com

   Response 1
   Completed

2. Post future hearing notices and key public process dates for both the CEC process and the NEPA process on the Applicant Project Website at www.northernarizonaenergy.com

   Response 2
   On-Going

3. Resubmit information related to the transmission line contained in Section K of the Application in a format addressing sequentially the series of questions in R14-3-219.4.b.

   Response 3

   Supplement Attachment 1 provides supplemental pages to insert at the beginning of Section 4 of the Application, "Description of the Project", providing in concise text format the basic information responsive to R 14-3-219 (4) with respect to (a) the proposed generating facility and (b) the proposed interconnecting transmission line, respectively, in the same sequence as provided in R14-3-219. Additionally, Applicant has provided, in this Response 3 and the following Response 4, cross reference tables identifying that information as and where it appears in the original Application.

Supplement Table 3.0

Statute Section (R14-3-219.4b.)	Information Requested	Information Provided in Application	Application Reference (page and Figures)
i (a)	Nominal voltage for with the line as designed;	230 kV	K-1, para. 1

i (b)	Description of the proposed structures and switchyards or substations associated therewith;	The **Griffith Switchyard** consists of twelve 230kV circuit breakers arranged in a breaker-and-a-half configuration. The **interconnection of the two new transmission lines associated with the Project requires the addition of a new breaker-and-a-half bay consisting of three new 230kV circuit breakers with associated isolation switches.** This expansion of the Griffith Switchyard will require additional property (approximately one (1) acre) to be deeded to Western ownership. The Project's electric transmission lines, constructed on the Project Property, will be constructed with double circuits on tubular steel poles. The poles will be 100 to 120 feet tall with three arms on each side, approximately 17 feet apart to support the conductors and a smaller arm on each side above the conductor arms to support the overhead ground wires used for lightning protection. **Figure K-1** shows a schematic of the proposed transmission structure.	K-1, para 2, 3
i (c)	Purpose for constructing said transmission line	The **interconnection of the Project** requires two new very short 230kV transmission lines that will be constructed within the Project Property and will connect the high-side of the GSU transformers **to the nearly-adjacent expanded Griffith Switchyard**.	K-1, para. 1
ii (a)	Description of geographical points between which the transmission line will run,	The interconnection of the Project requires two new very short 230kV transmission lines that will be constructed within the Project Property and will connect the **high-side of the GSU transformers to the nearly-adjacent expanded Griffith Switchyard**.	K-1, para. 1 Also see Figure 2 "Power Plant and Associated Facilities
ii (b)	the straight line distance between such points and the length of the transmission line for each alternate route for which application is made	The line between the Project GSU transformers and the Griffith Switchyard will be approximately 2657 feet long and will require approximately 12 structures. (No alternate routes are proposed.)	K-1, para. 4
iii (a)	Nominal width of right-of-way required;	Nominal width of approximately 150 feet, all located within Property owned by Applicant or affiliate of Applicant; no third party right-of-way required.	
iii (b)	Nominal length of spans;	The poles will be 100 to 120 feet tall, with three arms on each side, vertically separated 17-20	K-1, para. 3

		feet, to support the conductors, and a smaller arm on each side above the conductor arms to support the overhead ground wires used for lightning protection	
iii (c)	Maximum height of supporting structures;	The poles will be 100 to **120 feet tall** with three arms on each side	K-1, para. 3
iii (d)	Minimum height of conductor above ground	56"6" at the lowest arm of the poles.	Figure K-1 Proposed Transmission Structure
iv	To the extent available, estimated costs of proposed transmission line and route	Cost estimates for the specified transmission lines were **not available at the time the Application was filed.**	
v	Description of proposed route and switchyard locations	Text of **Exhibit K.**	Figure 2 "Power Plant and Associated Facilities" for proposed route
vi	Ownership percentages of land traversed by the entire route (federal, state, Indian, private)	100% private lands owned by Applicant or its affiliate. Page 13 Section 4.5.2.1 "The entirety of the electric interconnection with the Western system occurs within the Project Property and or the Original Griffith Property"	Page 13 Section 4.5.2.1, Figure 2 "Power Plant and Associated Facilities"

4. Provide a cross reference of the information items required by R14-3-219 (for power plants) with the relevant section(s) in the Application containing such information.

Response 4

See explanation to Response 3, above, and Supplement Table 4.0 below

Supplement Table 4.0

Statute Section (R14-3-219.4a.)	Information Requested	Information Provided in Application	Application Reference (Page and Figures)
i	Type of generating facility	....**175 MW natural gas-fired, simple cycle** generating facility and associated transmission line interconnecting the.... The Project is comprised of four (4), General Electric (GE) LM6000 PC SPRINT NxGen combustion turbine generators (CTG) with inlet air chillers. The Project will be designed to produce 175 MW of net electrical output with a heat rate of	Caption of CEC Application Executive Summary

		9,975 Btu/kWh (HHV) based upon the design condition ambient temperature of 90 degrees Fahrenheit (°F). The CTGs are capable of rapid start-up, allowing the Project to respond to fluctuations in electric demand within ten (10) minutes. The Northern Arizona Energy Project (Project) is a natural gas fired, simple cycle power plant that will supply power to load-serving entities in Arizona and surrounding regions for the purpose of serving their customers during periods of peak electricity demand. The Project is comprised of four (4), General Electric (GE) LM6000 PC SPRINT NxGen combustion turbine generators (CTG) with inlet air chiller modules. The Project will be designed to produce 175 MW of net electrical output with a heat rate of 9975 Btu/kWh (HHV) based upon the design condition ambient temperature of 90 degrees Fahrenheit (°F). The CTGs are capable of rapid start-up, allowing the Project to respond to fluctuations in electric demand within ten (10) minutes.	Section 4, Page 2
ii	Number and size of proposed units	The **Project is comprised of four (4),** General Electric (GE) LM6000 PC SPRINT NxGen combustion turbine **generators** (CTG) with inlet air chiller modules. The **Project will be designed to produce 175 MW of net electrical output**	Section 4, Page 2
iii	The source and type of fuel to be utilized, including proximate analysis of fossil fuels	High-pressure **natural gas** will be supplied to the Project from any combination of the El Paso Natural Gas Company (El Paso), Questar Corporation (Questar), and Transwestern Pipeline Company (Transwestern) natural gas interstate pipelines to the **UNS local gas distribution system located adjacent to the Project Site.** Table 4-2 Project Natural Gas Analysis	Section 4.4, page 11 Page 21
iv	Amount of fuel to be used daily, monthly, and yearly.	The Project will utilize an average of approximately 1,750 Million British Thermal Units (MMBtu) (HHV) of gas per hour; 28,000 MMBtu per 16-hour day, and 42,000 MMBtu per 24-hour day. Assuming a conservatively high 5,000 annual operating hours for each unit, the Project will utilize 8,750,000 MMBtu of gas per year. *(Note: monthly fuel usage is based on economic dispatch; at maximum monthly hours of 744 for*	Section 4.4.1, page 11

		31 day month, fuel usage is 1,302,000 MMBtu)	
v (a)	Type of cooling to be utilized and....	*4.2.5.2 CTG Cooling* The generators are air-cooled. The lube oil for the CTGs is cooled by a closed loop water-glycol system with water-to-air (fin fan) coolers. *4.2.5.3 Inlet Air Chiller* The four (4) CTG units are served by one shared inlet air chiller system providing 6500 nominal refrigeration tons of chilled water. The chiller system is comprised of two chillers arranged in a series configuration. Cooling for the chiller is provided by a cooling module located above the chiller skid. Refrigerant utilized for the chiller will be R-123	Page 7, 8
v (b)	source of water to be utilized	4.6.2 Source of Water The existing I-40 Industrial Corridor Water System owned by Mohave County is capable of supplying a minimum of 5,000 gpm of water from the **Sacramento Valley aquifer**. The system consists of six (6) groundwater wells approximately 1200-1400 feet in depth, a water pipeline collection and distribution system and a 1.3 million gallon storage tank located north of the Project Site. The Griffith Owner contractual volume (peak flow capacity) under a Water Interconnection and Supply Agreement with Mohave County is 4500 gpm, of which 450 gpm will be allocated to the Project. The expected water use rate for the Project is 345 gpm and the water demand under extreme temperature conditions (113ºF) is 380 gpm, thus allowing for a 30 percent water supply capacity margin over expected conditions and nearly a 20 percent margin during extreme temperature conditions. The groundwater allocation from the Sacramento Valley aquifer and the capacity contracted in combination by Griffith Owner and Applicant remain unchanged as a result of the Project.	Page 14
vi	Proposed height of stacks and number of stacks	Each of the **four exhaust stacks** will **be 85 feet in height** and 10 feet in diameter	Page 2

vii	Dates for scheduled startup and firm operation of each unit and date construction must commence in order to meet schedules	4.9.3 Engineering, Procurement and Construction Schedule The field construction schedule from site mobilization to commercial operation for a four (4) unit simple cycle project is typically nine (9) to twelve (12) months. Depending on equipment fabrication and delivery durations, detailed engineering and procurement activities are initiated up to twelve (12) months in advance of site mobilization to assure that equipment deliveries occur to support the construction schedule. Market conditions can impact both the equipment lead times and the construction labor availability thus extending EPC schedules. The key Project schedule milestones are presented in **Table 4-4, Anticipated Project Schedule**. 4.9.3.1 Potential Modified *Construction Schedule* Depending on market conditions, the Project may be constructed in a two-phased construction sequence with two (2) units being advanced to construction immediately upon the receipt of environmental approvals and completion of power purchase agreements and the second two (2) units constructed within five (5) years of receipt of environmental approvals.	Page 17-18
viii	To the extent available, the estimated costs of the proposed facilities and site, stated separately	4.9.1 Project Cost The cost of the Project is estimated to be in the range of $140 to $160 million. The cost includes the CTGs, gas compressors, transformers, chiller, gas, water and electric transmission interconnection facilities and all ancillary balance of plant equipment as well as all civil works, construction labor, construction materials, and engineering. In addition, the Project cost includes the cost estimates for gas and electric interconnections performed by the interconnecting utilities and Applicant's costs for development, insurance and financing. *The cost of acquiring site from current owner, Applicant's affiliate, is not available yet..*	Page 17

ix	Legal description of proposed site	4.1.2 Legal Description The Project is located on a parcel of undeveloped land comprising essentially the **North seven hundred (700) feet of the North One-half of the Southwest Quarter of Section 6, Township 19 North, Range 17 West, Gila & Salt River Base & Meridian, Mohave County, Arizona, containing approximately forty (40) acres.**	Page 5

5. Provide information related to those Unisource subsidiaries operating in Mohave County and their relationship to Tucson Electric Power.

Response 5

Unisource and the Applicant are not affiliated. Unisource represents only a potential customer for the capacity and energy of the Northern Arizona Energy Project. Therefore, Applicant cannot provide any direct testimony as to organization of the Unisource Energy Corporation operating subsidiaries. Publicly available information is provided below.

The Unisource Energy Corporate website is: www.uns.com

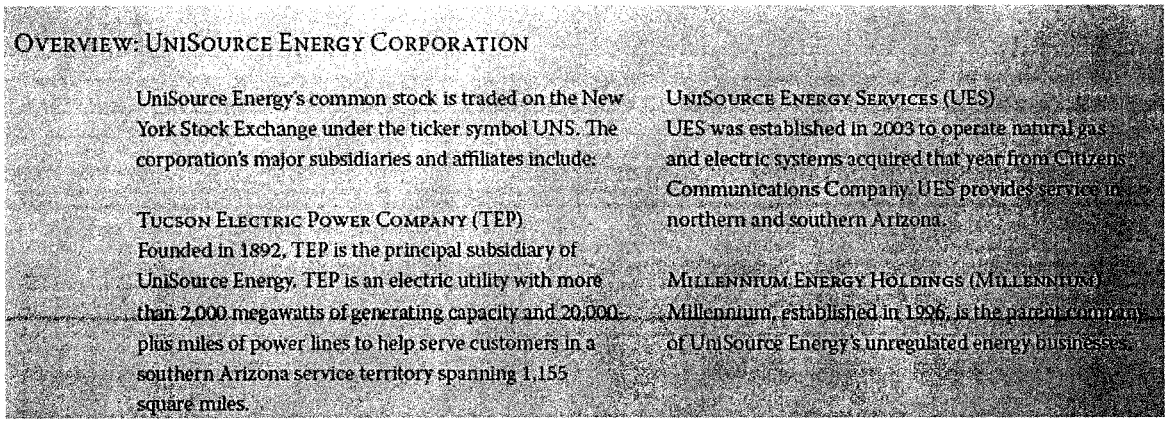
The following information on the operating companies was presented on the website:

"UniSource Energy's primary subsidiaries include ***Tucson Electric Power*** (TEP), which serves more than 385,000 customers in southern Arizona; and ***UniSource Energy Services*** (UES), a utility that delivers natural gas and electric service to more than 224,000 customers across Arizona.

TEP, the second largest investor-owned electric utility in Arizona, is the principal operating subsidiary of UniSource Energy. Over 80 percent of TEP's energy needs are supplied by low-cost, coal-fired generating plants. TEP's retail customer base, which includes the Tucson metropolitan area, grows at over 2 percent annually; more than double the national average.

UES' operating companies, ***UNS Gas*** and ***UNS Electric***, are distribution companies that provide gas and electric service to over 30 communities in some of the fastest growing areas in Arizona, with customer bases expanding by approximately 4 percent a year. Both utilities have incorporated these dynamic growth rates into their planning to ensure that their systems are ready to serve customers' needs both today and tomorrow. " (***emphasis added***)

The following is an excerpt from the Unisource Energy Corporation 2006 Annual Report.



OVERVIEW: UNISOURCE ENERGY CORPORATION

UniSource Energy's common stock is traded on the New York Stock Exchange under the ticker symbol UNS. The corporation's major subsidiaries and affiliates include:

TUCSON ELECTRIC POWER COMPANY (TEP)
Founded in 1892, TEP is the principal subsidiary of UniSource Energy. TEP is an electric utility with more than 2,000 megawatts of generating capacity and 20,000-plus miles of power lines to help serve customers in a southern Arizona service territory spanning 1,155 square miles.

UNISOURCE ENERGY SERVICES (UES)
UES was established in 2003 to operate natural gas and electric systems acquired that year from Citizens Communications Company. UES provides service in northern and southern Arizona.

MILLENNIUM ENERGY HOLDINGS (MILLENNIUM)
Millennium, established in 1996, is the parent company of UniSource Energy's unregulated energy businesses.

6. Provide a property tax revenue forecast to Mohave County tax recipients. Provide other local tax benefits forecasted for the Project, if constructed and operated.

Response 6

Based on various assumptions including a personal property tax base of approximately $100 MM, and a tax in-service date of 7/1/09, NAE estimates that annual property taxes payable by the project are as shown on Attachment 2. Attachment 2 also presents the allocation of such payments among the various taxing authorities, based on the allocation factors in effect for 2006. In addition to property tax revenue, Mohave County will benefit from a portion of the Transaction Privilege Tax (i.e. sales tax) during construction.
See **Attachment 2, Property Tax Revenue Estimated Forecast: Mohave County**

7. List the viable vendors that would supply demineralizer trailer service to NAEP; and provide location of regeneration sites and amount of water used in the regeneration process

Response 7

See Supplement Table 7.0 below for candidate vendors.

Supplement Table 7.0

Vendor Name	Authorized Facility for Trailer Regeneration (City, State)	Water Consumption for Regeneration (gallons per trailer)
Ecolochem	Phoenix, AZ	12,600*
PureTech	Oxnard, CA	12,600*
Siemens Water Technologies	Los Angeles, CA	12,600*

* One trailer (containing 360 cubic feet of resin) is depleted in approximately 18 days of maximum NAEP water use.

The demineralizer vendor will be selected prior to Commercial Operation of the NAEP. (Applicant does not guarantee that the selected vendor will be one of the currently identified candidates.)

8. Describe any Notice of Violations (NOV) from the Arizona Department of Environmental Quality under the Griffith Energy Title V Air Quality Permit No. 1000940 since the inception of the project. Provide a witness that can discuss any such violation.

Response 8

An NOV was issued to Griffith in 2003 due to a fiberglass water return line breaking at the main cooling water tower. The water pipe break allowed water to leave the Griffith Energy site. The break was repaired to compliance standards.

9. Provide the air quality permit threshold that would trigger requirement of an amendment to the air permit.

Response 9

The air quality permit issued by ADEQ will establish tons per year limits for the entire Project (all four combustion turbine generators). The Project will operate within the annual tons per year emission limits. Any combination of full load and part load operating hours during various ambient conditions, plus startups and shutdowns, could contribute to this annual emissions profile for the Project. For simplicity, we have provided one scenario in the Class I Air Permit Application (Table 3.1 in Application).

Supplement Table 9.0

	NOx	CO	SO_2	VOC	PM_{10}
Expected Permit Limits (tons/year) [1]	39.0	90.0	36.0	36.0	14.5
Regulatory Annual Emission Limits for NAEP (tons/year) [2]	**40.0**	**100.0**	**40.0**	**40.0**	**15.0**
Annual Emission Limits for a Separate Minor Source Facility (tons/year) [3]	250.0	250.0	250.0	250.0	250.0

[1] Based on 10,600 hrs total operation (aggregate of four units) including startup/shutdown
[2] Annual limits established by regulations for any minor modification to a major source
[3] Annual emission limits if NAEP were deemed an individual minor source project (*i.e.*, if NAEP were separate from any existing major source unit, *e.g.*, Griffith.)

10. Reflect any easements from Griffith required for the transmission line.

Response 10

In support of the electric interconnection, NAEP will obtain from Griffith Energy, LLC, a right of way or easement, approximately 150 feet in width and 530 feet in length from the Southeastern corner of the NAEP Project Property to the Eastern edge of the Griffith Switchyard (as modified), all within the existing Griffith Energy Project property.

11. Provide the distance from the Project Site to the City of Kingman boundary.

Response 11
9 miles (also provided in testimony on May 2, 2007)

12. Provide any public complaints for noise or other general nuisances complaints against the Griffith Energy Project since inception of operation in 2002.

Response 12
None

13. Discuss liquefied natural gas (LNG) as a potential secondary source of gas supply for the Project.

Response 13
TransCanada, through its subsidiary North Baja, LLC, is advancing an expansion of the North Baja pipeline from the Mexican border (near Yuma, Arizona,) to an interconnection point with the El Paso Natural Gas Pipeline near Ehrenberg, Arizona, as well as an interconnection point with the Southern California Gas Company pipeline system in Blythe, California. This expansion will not only increase pipeline capacity between Mexico and the US, but the expansion project will result in a reversal of predominate flows from the existing North-South (gas exports to Mexico) to South-North (imports from Mexico) to support the import of LNG to the US market. The expected completion date of the Phase 1 expansion of the North Baja pipeline is the fourth quarter of 2008. This will introduce a new gas supply alternative for the Project through its interconnection with the El Paso Natural Gas Company interstate pipeline.

14. Provide the startup times for a combined cycle generating facility.

Response 14

Supplement Table 14.0 has been provided from the operating experience of the Griffith Energy Project, which is representative of the combined cycle class of generation facilities. This Response is presented to correct the impromptu testimony of Mr. Joe Otahal responsive to Committee questions during the May 2nd hearing.

Supplement Table 14.0

Type of Start	"Start" Defined by Off-line Time	Start Duration (hours)
Cold-Cold	Unit has been off-line for more than 5 days	~ 4 hours
Cold	Unit has been off-line for 3 to 5 days	~ 4 hours
Warm	Unit has been off-line for 48 to 72 hours	~ 2 hours
Hot	Unit has been off-line for less than 48 hours	~ 1 hour

15. Post the Power Point Slide presentation of Mr. David Swanson on the Applicant Project website at www.northernarizonaenergy.com.

Response 15
Completed

16. Post the Application for a Certificate of Environmental Compatibility on the Applicant Project website at www.northernarizonaenergy.com.

Response 16
Completed

17. Provide the source documents for the testimony of Mr. Joe Gorberg.

Response 17
See **Supplement Attachment 3, Source Documents for Market Need Testimony**

18. Provide the capacity factor for the Griffith Energy Project over the prior twelve months.

Response 18
During May 2006 through July 2006, the Griffith Energy Project was unavailable due to mechanical issues related to the steam turbine.

The monthly Capacity Factors for August 2006 through April 2007 were as follows:

Month	Capacity Factor
Aug 06	73.7%
Sept 06	67.7%
Oct 06	65.2%
Nov 06	45.1%
Dec 06	39.3%
Jan 07	27.2%
Feb 07	13.5%
Mar 07	0%
April 07	0%

19. Discuss the noise level at the western property boundary adjacent to parcels that have been platted for residential development.

Response 19

The noise levels at the adjacent parcels that have been platted for residential development is predicted at 41 L_{eq} and 48 L_{dn}. These parcels were platted for subdivision on January 4, 1960 and no development activity has been conducted in the ensuing 47 years.

20. Provide the historical filings with respect to the Griffith CEC Conditions, namely CEC Condition Numbers 2, 3, 4 and 5.

Response 20
See **Supplement Attachment 4, Griffith Energy CEC Compliance Filings**

21. Submit any prior studies upon which Greystone/Arcadis relied in their environmental studies with respect to the Project.

Response 21
When the CEC Application was prepared, it was assumed that the source of water for the Northern Arizona Energy Project (NAEP) would be a portion of the water that had been already allocated and evaluated for the Griffith Energy Project. Therefore, with respect to the water analysis for the NAEP, the CEC application relied on the conclusions of previous hydrology studies conducted for the Griffith Energy Project indicating that the planned use of water from the Sacramento Valley aquifer would not cause significant negative impacts to the aquifer or existing water users. These prior studies have been incorporated by reference Southwest Ground-water Consultants, Inc Report included with this Supplemental Information Package (separate binding). No other prior studies were relied upon in lieu of conducting the necessary new studies to address the environmental impacts as discussed in the Application; however, the Environmental Assessment published for the Griffith Energy Project was reviewed along with other such environmental analyses materials as reference materials for the studies conducted by Greystond/Arcadis for the NAEP.

22. Discuss the impact to the performance of the Project (output/fuel efficiency) if the inlet air chiller module was replaced by an air heat exchanger mechanical chiller.

Response 22

The substitution of a dry cooled chiller has the net effect of reducing plant generating capability and decreasing efficiency (increasing Heat Rate). This effect is exaggerated during high ambient temperature conditions, and these are typically the conditions during peak electricity demand periods when NAEP will be called upon to meet system needs. On a high temperature day, the generation output will decrease by 5.8 MW and the heat rate (efficiency loss) will increase 4.2%.

23. Discuss the fire loop expansion and why a coincident fire event is acceptable.

Response 23
The National Fire Protection Association (NFPA) provides guidance on the design and operation of fire protection systems. The NFPA, stipulates standards for fire water storage,

pump and delivery systems requirements. The extension of the existing Griffith fire system to serve the Project complies with the National Fire Protection Association (NFPA) standards.

24. Compare the annual emissions profile of Griffith Energy with the NAEP emissions profile.

Response 24

Supplement Table 24

Comparison of Key Air Emission Rates[a]					
	Concentration Limits (ppm)[b]				
	VOC	CO	NOx	SOx	PM_{10}
NAEP[c]	5	6	5	2.8	N/A
Griffith Energy[d]	--	10-20	3	--	N/A
Sundance[e]	--	7.5 - 15	5	--	N/A
Black Mountain[f]	--	--	75	--	N/A
	Maximum Annual Mass Emission Rates(tons per year)				
	VOC	CO	NOx	SOx	PM_{10}
NAEP[c]	16	36	40	32	15
Griffith Energy[d]	310	872	266	50	280
Sundance[e]	189	356	459	41	315
Black Mountain[f]	7	245	246	12	26

Notes:

a. NAEP (175 MW), Sundance (540 MW) and Black Mountain (96 MW) are all simple cycle plants using LM6000 combustion turbines. Griffith Energy is a 650 MW combined cycle plant using 7FA combustion turbines.
b. Concentrations are expressed as parts per million, by volume, dry basis, corrected to 15% oxygen.
c. NAEP data from April 2, 2007 application to ADEQ.
d. Griffith data from August 31, 1999 ADEQ permit. CO limit varies depending on duct firing.
e. Sundance Energy data from July 25, 2001 ADEQ permit. CO concentration limit varies with ambient temperature.
f. Black Mountain data from April 16, 2007 draft permit proposed for issuance by ADEQ.

25. How was the Black Mountain project proposed by Unisource incorporated into the impacts modeling for NAEP?

Response 25

Cumulative modeling only included Griffith Energy and NAEP as described in the ADEQ-approved Air Dispersion Modeling Protocol for this minor modification to a major source permit application. No PSD modeling was conducted for NAEP given the annual emission limits established.

This attachment should be deemed inserted into the Application at Page 2a immediately after the heading on Section 4, as a supplement to, not a replacement for, the balance of Section 4 in the Application.

Supplement Attachment 1

Information called for by R-14-3-219 (4):

(a) with respect to an electric generating plant:

i. Type of generating facility:

Natural gas-fired, simple cycle combustion turbines

ii. Number and size of proposed units:

Four; nominal 45 MW each

iii. The source and type of fuel to be utilized:

Natural gas, from local utility, UNS Gas, distribution line adjacent to Project site; accessing supplies from El Paso, Transwestern and Questar pipelines and associated regional gas fields and markets.

iv. Amount of fuel to be utilized daily, monthly and yearly:

Estimated fuel use, depending upon dispatch hours:
Daily (16 hour dispatch): 28,000 MMBtu
Daily (24 hour dispatch): 42,000 MMBtu
Monthly (if 744 hours dispatch): 1,302,000 MMBtu
Yearly (if 5,000 hours dispatch): 8,750,000 MMBtu

v. Type of cooling to be utilized and source of any water to be utilized:

The generators are air cooled. Inlet air to combustion turbines is chilled by two chillers with evaporative cooling tower modules, which will require makeup water. The source of the water is groundwater from the Sacramento Valley aquifer.

vi. Proposed height of stacks and number of stacks, if any:

Four stacks, 85 feet in height

vii. Dates for scheduled start-up and firm operation of each unit and date construction must commence in order to meet schedules:

Schedule contingent upon securing power supply agreements with

purchasing utilities, followed by estimated 9-12 month detailed engineering/procurement period, followed by 9-12 month construction and start-up schedule.

viii. **To the extent available, the estimated costs of the proposed facilities and site, stated separately**:

$140-160 Million for Project Facilities. Cost of acquiring site from Applicant's affiliate not known at this time.

ix. **Legal description of proposed site**:

The North 700 feet of the North ½ of the Southwest Quarter, Section 6, Township 19 North, Range 17 West, G&SRB&M, comprising approximately 40 acres.

(b) With respect to a proposed transmission line:

i. **Nominal voltage for which the line is designed; description of the proposed structures and switchyards or substation associated therewith; and purpose for constructing said transmission line**:

Voltage: 230 kV
Structures: Approximately 12 single-pole steel towers, 100-120 feet tall, double circuit, with three arms per side.
Substation: Expansion of adjacent existing WAPA Griffith Substation, adding a new breaker-and-a-half bay with 3 new 230kV circuit breakers and associated equipment.
Purpose: Interconnection of the Project generators with existing WAPA 230kV transmission system at existing Griffith Substation.

ii. **Description of geographical points between which the transmission line will run, the straight-line distance between such points and the length of the transmission line for each alternative route for which application is made:**

The straight-line distance from the location of the proposed generators to the existing Griffith Substation (both of which are located in the North ½ of the Southwest Quarter of Section 6, Township 19 North, Range 17 West) is approximately 1800 feet. The proposed route, all within the Project Property and the Griffith property boundaries, will run due East from the generators to near the Eastern edge of the Property, then due South to the East side of the Griffith Switchyard, then West into

the Switchyard, a combined total distance of approximately 2657 feet for the entire line.

iii. **Nominal width of right-of-way required, nominal length of spans, maximum height of supporting structures and minimum height of conductor above ground**:

Nominal right-of-way width will be 150 feet; however, none will be required from third parties, as the entire route lies wholly within the Project Property and the Griffith property.

Nominal length of spans will vary, not to exceed approximately 250 feet.
Conductor height at the lowest arms on the tower structures will be approximately 56 feet, with typical sag between poles to no lower than 25' in compliance with National Electric Safety Code.

iv. **To the extent available, the estimated costs of proposed transmission line and route, stated separately**:

Estimated cost of transmission line is not available at this time. Cost of route (approximately 600 foot length of right-of-way easement from affiliate, Griffith Energy, LLC) not yet determined, but will be nominal.

v. **Description of proposed route and switchyard locations**:

See response to ii above, and Figure 2. (All within existing Griffith property boundary)

vi. **For each alternative route for which application is made, list the ownership percentages of land traversed by the entire route (federal, state, Indian, private, etc.)**:

100% privately owned by Griffith Energy, LLC, and within Griffith property Boundary.

Attachment 2, Tax Revenue Forecast: Mohave County

Year	Kingman Unified School District #20	Mohave County General Fund	Mohave Community College	School District #20 Class A Bonds	Mohave County Library District	Fire District Asst Fund	Mohave County TV District	Mohave County Flood Control		TOTAL - ALL AUTHORITIES (1)
Allocation %	49.5%	23.9%	12.8%	6.3%	4.6%	1.4%	1.2%	0.3%		**100.0%**
Year of In Service (YOS)										
YOS + 1	396,000	191,200	102,400	50,640	36,800	11,360	9,840	2,000		**800,000**
YOS + 2	544,500	262,900	140,800	69,630	50,600	15,620	13,530	2,750		**1,100,000**
YOS + 3	693,000	334,600	179,200	88,620	64,400	19,880	17,220	3,500		**1,400,000**
YOS + 4	792,000	382,400	204,800	101,280	73,600	22,720	19,680	4,000		**1,600,000**
YOS + 5	841,500	406,300	217,600	107,610	78,200	24,140	20,910	4,250		**1,700,000**
YOS + 6	792,000	382,400	204,800	101,280	73,600	22,720	19,680	4,000		**1,600,000**
YOS + 7	792,000	382,400	204,800	101,280	73,600	22,720	19,680	4,000		**1,600,000**
YOS + 8	742,500	358,500	192,000	94,950	69,000	21,300	18,450	3,750		**1,500,000**
YOS + 9	693,000	334,600	179,200	88,620	64,400	19,880	17,220	3,500		**1,400,000**
YOS + 10	693,000	334,600	179,200	88,620	64,400	19,880	17,220	3,500		**1,400,000**
YOS + 11	643,500	310,700	166,400	82,290	59,800	18,460	15,990	3,250		**1,300,000**
YOS + 12	643,500	310,700	166,400	82,290	59,800	18,460	15,990	3,250		**1,300,000**
YOS + 13	594,000	286,800	153,600	75,960	55,200	17,040	14,760	3,000		**1,200,000**
YOS + 14	544,500	262,900	140,800	69,630	50,600	15,620	13,530	2,750		**1,100,000**
YOS + 15	495,000	239,000	128,000	63,300	46,000	14,200	12,300	2,500		**1,000,000**
YOS + 16	445,500	215,100	115,200	56,970	41,400	12,780	11,070	2,250		**900,000**
YOS + 17	445,500	215,100	115,200	56,970	41,400	12,780	11,070	2,250		**900,000**
YOS + 18	396,000	191,200	102,400	50,640	36,800	11,360	9,840	2,000		**800,000**
YOS + 19	346,500	167,300	89,600	44,310	32,200	9,940	8,610	1,750		**700,000**
YOS + 20	297,000	143,400	76,800	37,980	27,600	8,520	7,380	1,500		**600,000**
YOS + 21	247,500	119,500	64,000	31,650	23,000	7,100	6,150	1,250		**500,000**
YOS + 22	198,000	95,600	51,200	25,320	18,400	5,680	4,920	1,000		**400,000**
YOS + 23	148,500	71,700	38,400	18,990	13,800	4,260	3,690	750		**300,000**
YOS + 24	99,000	47,800	25,600	12,660	9,200	2,840	2,460	500		**200,000**
TOTAL										**25,300,000**

Notes:

(1) Based on estimated personal property tax base of $100 million

a

Only the following portions of this document were relied upon as Source Documents for Joe Gorberg testimony at the May 1-2, 2007 hearing. Copies of the balance of this document will be furnished upon request, but were not copied to reduce the volume of paper in this supplement.

Western Electricity Coordinating Council

10-Year Coordinated Plan Summary

10-Year Coordinated Plan Summary

Planning and Operation for Electric System Reliability

June 2005

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WECC Region

Reporting Areas

I Northwest Power Pool Area (NWPP)
II Rocky Mountain Power Area (RMPA)
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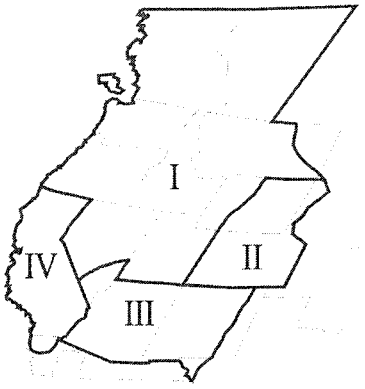
IV California-Mexico Power Area (CA/MX)



Independent Power Producers/Qualified Facilities, and Marketers

AES Corporation, The	AES
Allegheny Energy Supply Company, LLC	AESC
American Wind Energy Association Company, LLC	AWEA
Automated Power Exchange, Inc.	APX
Bonneville Power Administration - PBL	BPAP
California British Columbia Transmission	CBC
Calpine Corporation	CALP
Cargill Power Markets, LLC	CRGL
CE Obsidian Energy	CEOE
Cinergy Services, Inc.	CINE
Constellation Energy Commodities Group, Inc.	CCG
Duke Energy North America, LLC	DENA
Duke Energy Trading and Marketing, LLC	DETM
Dynegy Power Corp.	DYN
Economic Insight	ECON
Edison Mission Marketing & Trading	EMMT
Energy Northwest	ENW
ENMAX Corporation	ENMX
EPCOR Merchant and Capital (US) Inc.	EMCU
EPCOR Merchant and Capital L.P.	EMC
FPL Energy LLC	FPLE
Geo-Energy Partners-1983 Ltd.	GEO
Gila Bend Power Partners, LLC	GBPP
Harquahala Generating Company, LLC	HGC
Hunt Power, L.P.	HPLP
IGI Resources, Inc.	IGI
Merryll Lynch Commodities, Inc.	MLCI
Mirant meritas, Inc.	MIR
Montana Alberta Tie Ltd.	MATL
National Energy & Gas Transmission, Inc.	NEGT
National Renewable Energy Laboratory	NREL
North American Power Group, Ltd.	NAPG
NRG Power Marketing, Inc.	NRG
Oak Creek Energy Systems, Inc.	OCES
PacifiCorp - Merchant Function	PACM
Panda Energy International, Inc.	PAND
Panda Gila River, L.P.	PGR
Peabody Energy Corporation	PBEC
Pinnacle West Energy Corporation	PWEC
Powerex	PWX
PPL EnergyPlus, LLC	PPLE
PPL Montana, LLC	PPLM
PPM Energy, Inc.	PPM
Reliant Energy, Incorporated	REI
RES-North America	RES
Saracen Merchant Energy L.P.	SME
Sempra Energy Resources	SER
Sempra Energy Trading Corp.	SETC
Shell Trading	STGP
Southwestern Power Group II, LLC	SWPG
SUEZ Energy Marketing NA, Inc.	SUEZ
Tenaska	TNSK
TransCanada Energy Ltd.	TCP
Wellhead Electric Company, Inc.	WECI
Williams Power Company, Inc.	WEMT

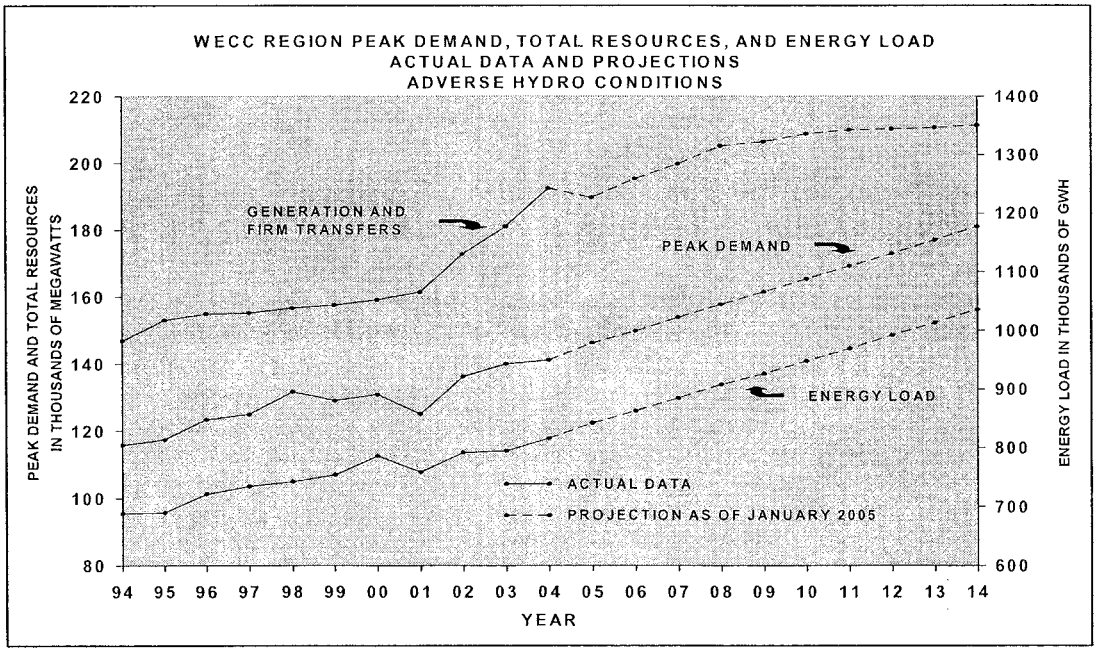


Figure 1

Table 3 - WECC Actual Loads and Resources for 2004

PEAK DEMAND – MW		JAN	FEB	MAR	APR	MAY	JUN
Loads -	Firm	120781	112684	111808	117162	120641	126691
	Interruptible & Load Mgt	1663	1691	1518	1736	1105	1874
	Total	122444	114375	113326	118898	121746	128565
	Forecast Deviation - %	-0.1	-2.7	0.5	5.3	-2.2	-2.9
Generation -	Hydro	62903	62983	62651	62801	63669	64882
	Thermal	119875	119758	119690	119715	119758	120358
	Other	6554	6557	6565	6566	6581	6572
	Total	189332	189298	188906	189082	190008	191812
Total Unavailable Generation *		16005	17845	21934	23275	18386	10098
Net Firm Transfers - MRO		19	33	55	124	194	173
	SPP **	-587	-622	-489	-622	-622	-572
	Total Net Firm Transfers	-568	-589	-434	-498	-428	-399
Net Generation & Firm Transfers		173895	172042	167406	166305	172050	182113
Margin Over Firm Loads - MW		53114	59358	55598	49143	51409	55422
Margin Over Firm Loads - Percent		44.0	52.7	49.7	41.9	42.6	43.7
ENERGY - GWH							
Total Load		69644	63334	65117	61342	66017	68856
	Forecast Deviation - %	-2.4	-2.3	-2.7	-3.4	-1.5	-0.5

PEAK DEMAND – MW		JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Loads -	Firm	139169	138542	132224	112810	117845	120142	
	Interruptible & Load Mgt	1931	2314	1896	1672	1686	1687	
	Total	141100	140856	134120	114482	119531	121829	
	Forecast Deviation - %	1.1	0.5	2.9	-6.1	3.0	-1.0	
Generation -	Hydro	64741	64292	64048	63555	63108	62881	
	Thermal	120684	120648	121044	122160	123044	123117	
	Other	6595	6586	6575	6574	6557	6609	
	Total	192020	191526	191667	192289	192709	192607	
Total Unavailable Generation *		12896	10838	13974	19357	17838	19269	
Net Firm Transfers - MRO **		143	148	174	140	9	-7	
	SPP **	-622	-622	-622	-422	-572	-622	
	Total Net Firm Transfers	-479	-474	-448	-282	-563	-629	
Net Generation & Firm Transfers		179603	181162	178141	173214	175434	173967	
Margin Over Firm Loads - MW		40434	42620	45917	60404	57589	53825	
Margin Over Firm Loads - Percent		29.1	30.8	34.7	53.5	48.9	44.8	
ENERGY - GWH								
Total Load		76178	74856	68485	65124	65566	71560	816079
	Forecast Deviation - %	2.6	-1.7	0.2	-2.1	-0.6	2.2	-1.0

* Includes Maintenance, Forced Outages, and Inoperable Capability.
** Minus (-) indicates transfer into WECC Region.

Table 4 - Projected Peak Demand Average Annual Compound Growth Rates - Percent (Adverse Hydro Conditions)

	1994 - 2004	1995 - 2005	1996 - 2006	1997 - 2007	1998 - 2008	1999 - 2009	2000 - 2010	2001 - 2011	2002 - 2012	2003 - 2013	2004 - 2014
WECC – Total	1.8	1.6	1.4	1.6	1.5	2.1	2.2	2.5	1.9	2.0	2.5
Northwest Power Pool Area	1.7	1.2	1.6	1.9	1.1	2.1	2.0	2.5	2.5	1.1	1.7
Rocky Mountain Power Area	1.9	1.7	2.0	2.0	2.2	2.7	2.0	2.3	1.7	2.0	2.6
Arizona-New Mexico-So. Nevada Power Area*	1.8	1.9	2.2	2.9	2.5	3.6	3.3	3.1	3.0	3.0	3.2
California-Mexico Power Area*	1.7	1.4	1.3	0.9	1.3	1.8	2.6	2.4	2.1	2.2	2.5

*The 1994-2004 through 1996-2006 projected peak demand growth rate percentages include the Southern Nevada reporting area data in the California-Mexico Power Area data.

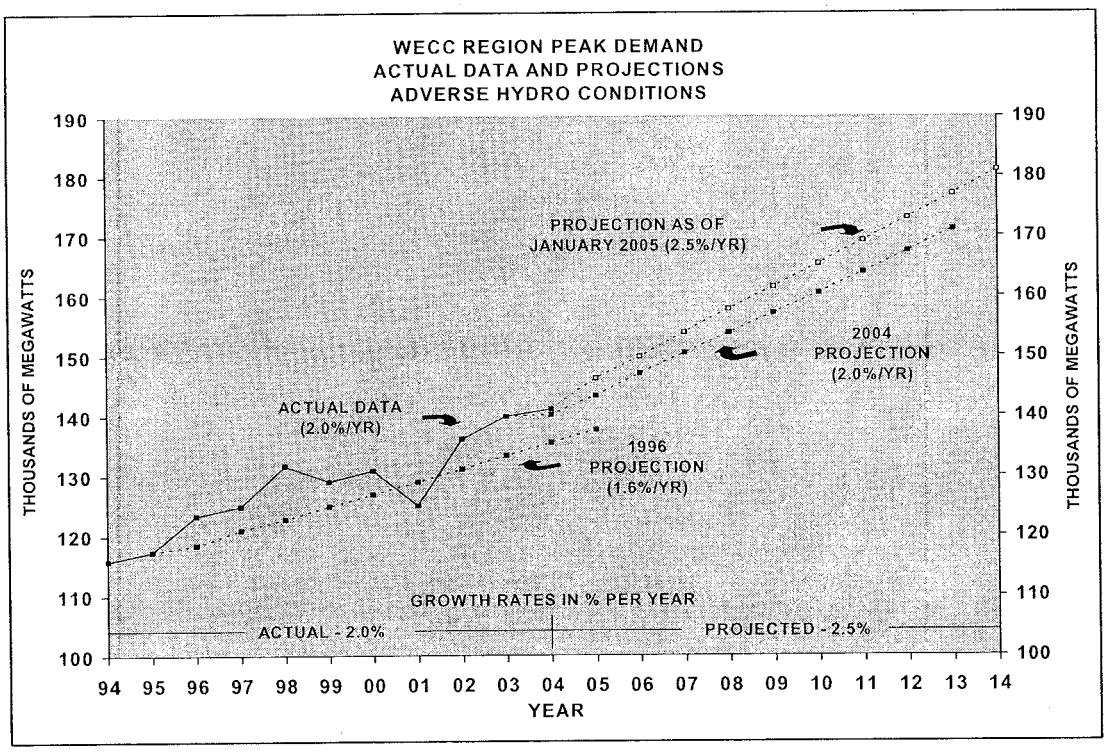


Figure 2

Table 5 – Actual Peak Demand Growth Rates – Percent (Actual Hydro Conditions)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
WECC – Total	4.4	1.3	5.1	1.3	5.4	-2.0	1.4	-4.5	8.9	2.8	0.8
Northwest Power Pool Area	2.0	8.7	-2.5	-0.4	8.4	-6.6	2.1	-8.1	-0.4	13.5	0.5
Rocky Mountain Power Area	3.4	4.5	1.9	7.1	0.6	-4.2	12.4	8.6	6.0	6.0	-0.8
Arizona-New Mexico-So. Nevada Power Area*	7.3	4.4	4.5	1.8	7.4	-2.3	8.9	7.5	3.7	5.5	0.3
California-Mexico Power Area*	5.9	-0.7	4.2	3.8	4.2	-4.1	-3.6	-5.6	8.0	1.6	5.4

*The 1994 through 1996 projected peak demand growth rate percentages include the Southern Nevada reporting area data in the California-Mexico Power Area data.

Table 6 – Actual Energy Load Growth Rates – Percent (Actual Hydro Conditions)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
WECC – Total	2.8	0.3	4.6	1.8	1.1	1.6	4.2	-3.5	4.4	0.4	2.6
Northwest Power Pool Area	1.1	0.6	5.0	-0.7	3.3	1.8	1.6	-8.6	5.7	-0.6	2.0
Rocky Mountain Power Area	3.7	3.3	1.2	7.2	2.1	-3.7	11.2	5.8	3.0	1.3	0.7
Arizona-New Mexico-So. Nevada Power Area*	7.1	1.9	8.0	4.0	-1.2	-0.4	7.7	6.6	3.9	4.2	2.0
California-Mexico Power Area*	3.4	-1.3	3.4	3.3	-0.9	3.0	5.1	-2.4	3.2	-0.2	4.1

*The 1994 through 1996 projected peak demand growth rate percentages include the Southern Nevada reporting area data in the California-Mexico Power Area data.

Table 7– WECC Estimated Peak Demands, Resources, and Reserves 2005 - 2014

	SUMMER PEAK							Adverse Hydro Conditions		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Month	JUL	JUL	JUL	JUL	JUL	JUL	JUL	JUL	JUL	JUL
Loads – Firms	143786	147411	151445	155326	159034	162893	166732	170515	174522	178548
Int. & Load Mgt	2460	2436	2450	2462	2471	2470	2471	2472	2474	2475
Total - MW	146246	149847	153895	157788	161505	165363	169203	172987	176996	181023
Growth from Previous Yr. - %	3.6	2.5	2.7	2.5	2.4	2.4	2.3	2.2	2.3	2.3
Generation ± Transfers - MW	189699	195378	199779	205166	206427	208796	209947	210256	210636	211354
Maint./Inoperable Cap. - MW	4106	4108	3566	3648	3648	3817	3649	3648	3566	3551
Reserve Capability MW	41807	43859	44768	46192	43745	42086	39566	36093	32548	29255
Percent of Firm Peak Demand	29.1	29.8	29.6	29.7	27.5	25.8	23.7	21.2	18.6	16.4

	WINTER PEAK							Adverse Hydro Conditions		
	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15
Month	DEC	DEC	DEC	DEC	DEC	DEC	DEC	DEC	DEC	DEC
Loads – Firms	125496	128484	131225	134257	136988	140018	143161	146129	149166	151782
Int. & Load Mgt	1886	1861	1850	1865	1872	1871	1872	1873	1875	1876
Total - MW	127382	130345	133075	136122	138860	141889	145033	148002	151041	153658
Growth from Previous Yr. - %	3.0	2.3	2.1	2.3	2.0	2.2	2.2	2.0	2.1	1.7
Generation ± Transfers - MW	191498	196498	201356	204550	205477	208230	208879	209043	210091	210279
Maint./Inoperable Cap. - MW	13491	12305	11327	11898	11727	12285	12262	11928	11674	12024
Reserve Capability MW	52511	55709	58804	58395	56762	55927	53456	50986	49251	46473
Percent of Firm Peak Demand	41.8	43.4	44.8	43.5	41.4	39.9	37.3	34.9	33.0	30.6

Table 8 - Projected Peak Demand Growth Rates - Percent (Adverse Hydro Conditions)

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Average Annual Compound Growth Rate 2004-2014
WECC - Total	Summer	3.6	2.5	2.7	2.5	2.4	2.4	2.3	2.2	2.3	2.3	2.5
	Winter	3.0	2.3	2.1	2.3	2.0	2.2	2.2	2.0	2.1	1.7	2.3
Northwest Power Pool Area	Summer	-0.8	2.1	2.7	2.2	1.8	1.9	1.9	1.8	2.0	1.9	1.7
	Winter	2.1	2.3	1.8	1.4	1.5	1.7	1.4	1.6	1.5	1.6	1.8
Rocky Mountain Power Area	Summer	4.4	2.7	2.6	2.5	2.4	2.3	2.3	2.4	2.3	2.6	2.6
	Winter	3.6	2.3	2.5	2.2	2.2	2.1	2.1	2.3	2.2	2.3	2.4
Arizona-New Mexico-So. Nevada Power Area	Summer	5.2	3.4	3.2	3.2	3.2	3.2	2.8	2.5	2.7	2.5	3.2
	Winter	2.9	2.9	2.8	3.0	3.0	2.7	2.4	2.4	2.4	2.3	3.0
California-Mexico Power Area	Summer	4.0	1.8	2.3	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.5
	Winter	2.5	2.1	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4

Table 9 - Summary of Projected Energy Loads - GWh
(Adverse Hydro Conditions)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
WECC – Total	841871	862828	884684	907449	925982	947228	969095	992139	1013297	1035747
Northwest Power Pool Area	354198	361653	369594	378145	383060	389443	396748	405095	411605	418745
Rocky Mountain Power Area	61858	63235	64819	66340	67720	69246	70776	72401	73917	75745
Arizona-New Mexico-So. Nevada Power Area	125270	129514	133797	138211	142078	146743	150943	154980	158919	162907
California-Mexico Power Area	300545	308426	316474	324753	333124	341796	350628	359663	368856	378350

Table 10 - Projected Energy Load Growth Rates - Percent
(Adverse Hydro Conditions)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Average Annual Compound Growth Rate 2004-2014
WECC – Total	3.2	2.5	2.5	2.6	2.0	2.3	2.3	2.4	2.1	2.2	2.4
Northwest Power Pool Area	2.0	2.1	2.2	2.3	1.3	1.7	1.9	2.1	1.6	1.7	1.9
Rocky Mountain Power Area	8.1	2.2	2.5	2.4	2.1	2.3	2.2	2.3	2.1	2.5	2.8
Arizona-New Mexico-So. Nevada Power Area	1.9	3.4	3.3	3.3	2.8	3.3	2.9	2.7	2.5	2.5	2.9
California-Mexico Power Area	4.1	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.7

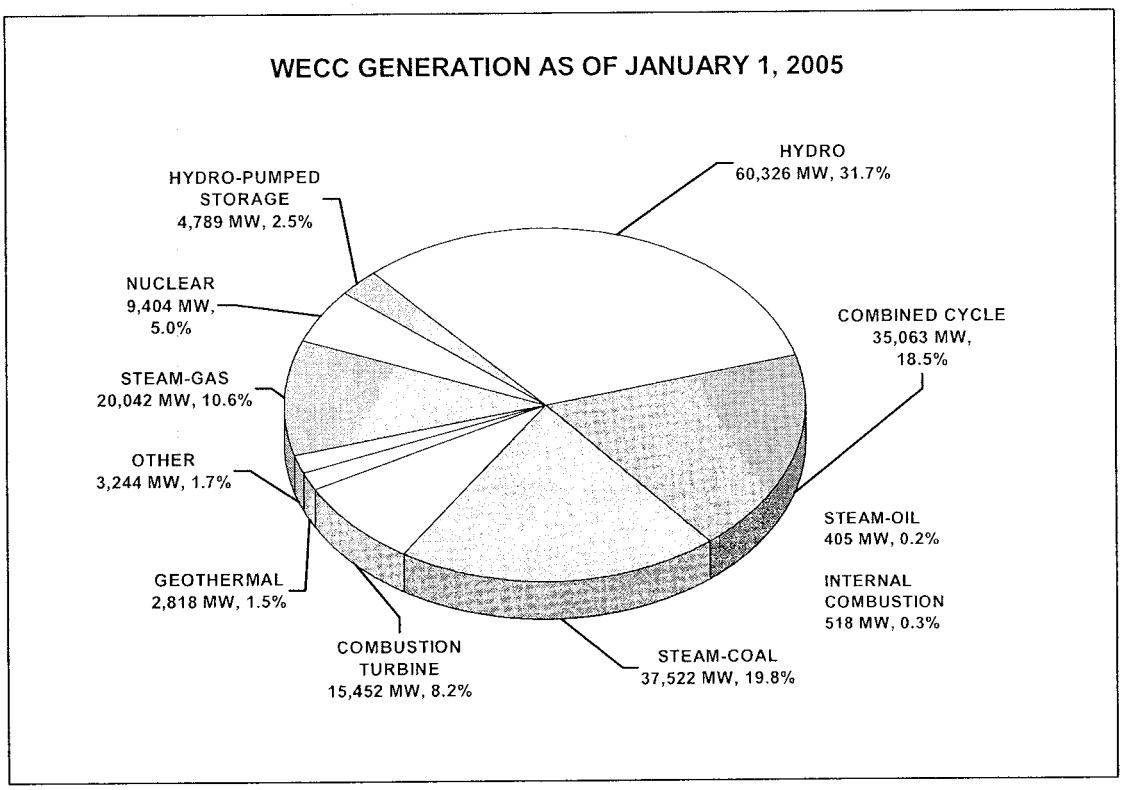


Figure 3

Table 11 - Existing Generating Capability as of January 1, 2005 (Summer Capability - MW)

Generation Type	Northwest Power Pool Area	Rocky Mountain Power Area	Arizona New Mexico So. Nevada Power Area	California Mexico Power Area	WECC Total	% of Total
Hydro - Conventional	47568	902	3795	8061	60326	31.7
Hydro - Pumped Storage	240	410	245	3894	4789	2.5
Steam - Coal	17657	6241	9863	3761	37522	19.8
Steam - Oil	0	1	128	276	405	0.2
Steam - Gas	2601	235	2249	14957	20042	10.6
Nuclear	1150	0	3804	4450	9404	5.0
Combustion Turbine	3709	1927	2979	6837	15452	8.2
Combined Cycle	7396	2598	13275	11794	35063	18.5
Geothermal	130	0	450	2238	2818	1.5
Internal Combustion	215	263	4	36	518	0.3
Other	1014	24	125	2081	3244	1.7
Total	81680	12601	36917	58385	189583	100.0
Percent of WECC Total	43.1	6.6	19.5	30.8	100.0	

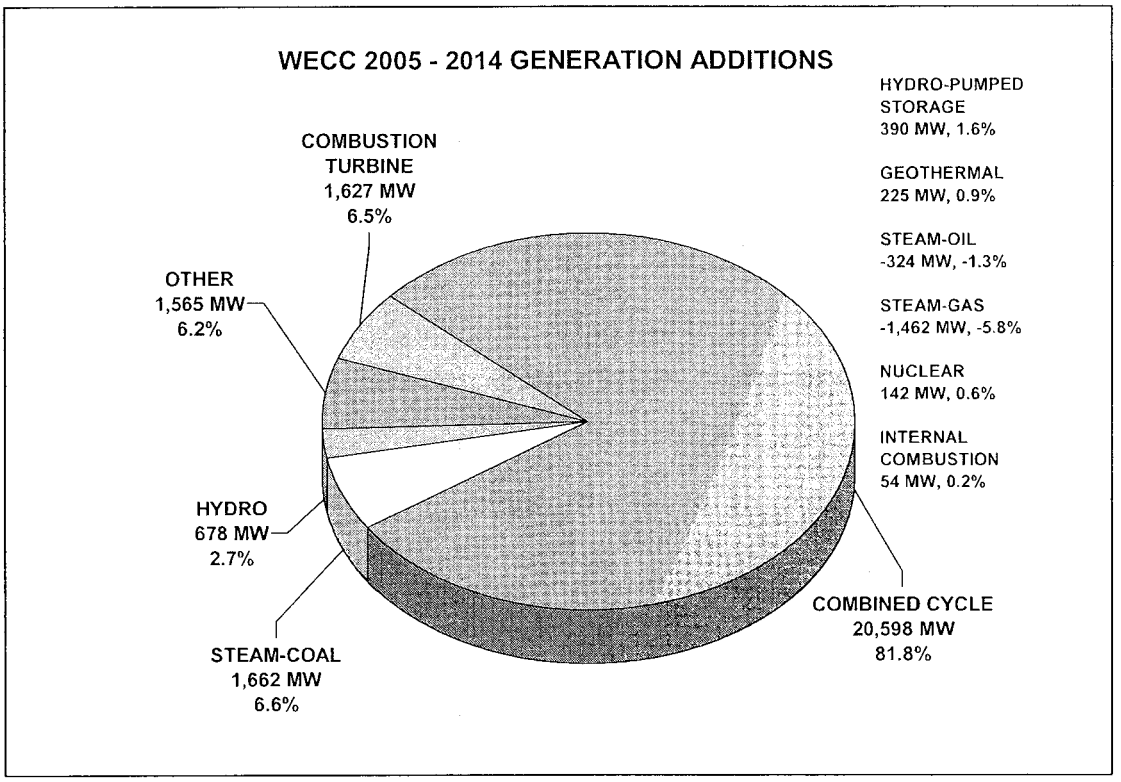


Figure 4

Table 12 - Summary of Generation Additions 2005 - 2014 (Summer Capability - MW)

Generation Type	Northwest Power Pool Area	Rocky Mountain Power Area	Arizona New Mexico So. Nevada Power Area	California Mexico Power Area	WECC Total	% of Total
Hydro - Conventional	662	0	-4	20	678	2.7
Hydro - Pumped Storage	0	0	0	390	390	1.6
Steam - Coal	2092	750	400	-1580	1662	6.6
Steam - Oil	0	0	-48	-276	-324	-1.3
Steam - Gas	0	0	-259	-1203	-1462	-5.8
Nuclear	0	0	142	0	142	0.6
Combustion Turbine	335	0	600	692	1627	6.5
Combined Cycle	6598	0	5305	8695	20598	81.8
Geothermal	30	0	195	0	225	0.9
Internal Combustion	54	0	0	0	54	0.2
Other	1506	0	14	45	1565	6.2
Total	11277	750	6345	6783	25155	100.0
Percent of WECC Total	44.8	3.0	25.2	27.0	100.0	

Table 13 - WECC Summary of Generation Additions
(Summer Capability - MW)

Generation Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10 Yr. Period	% of Total
Hydro - Conventional	61	123	4	-10	0	500	0	0	0	0	678	2.7
Hydro - Pumped Storage	0	0	0	0	0	0	0	0	0	390	390	1.6
Steam - Coal	-25	-1143	25	712	268	1250	575	0	0	0	1662	6.6
Steam - Oil	0	-48	-69	-69	0	0	0	-138	0	0	-324	-1.3
Steam - Gas	-82	-163	-600	-48	-48	0	-82	0	0	-439	-1462	-5.8
Nuclear	0	71	71	0	0	0	0	0	0	0	142	0.6
Combustion Turbine	1072	-203	282	70	114	10	44	44	264	-70	1627	6.5
Combined Cycle	4918	5354	4901	2193	613	1043	253	255	780	288	20598	81.8
Geothermal	0	30	195	0	0	0	0	0	0	0	225	0.9
Internal Combustion	54	0	0	0	0	0	0	0	0	0	54	0.2
Other	258	1016	9	275	2	1	2	2	0	0	1565	6.2
Total	6256	5037	4818	3123	949	2804	792	163	1044	169	25155	100.0

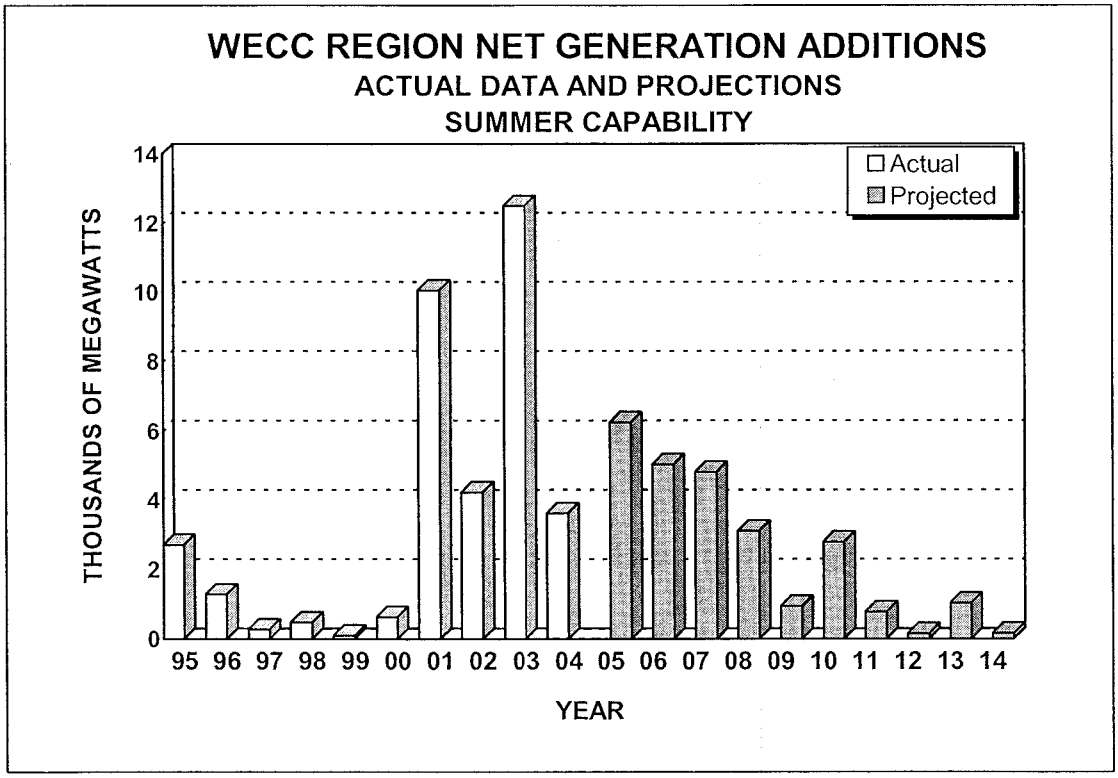


Figure 5

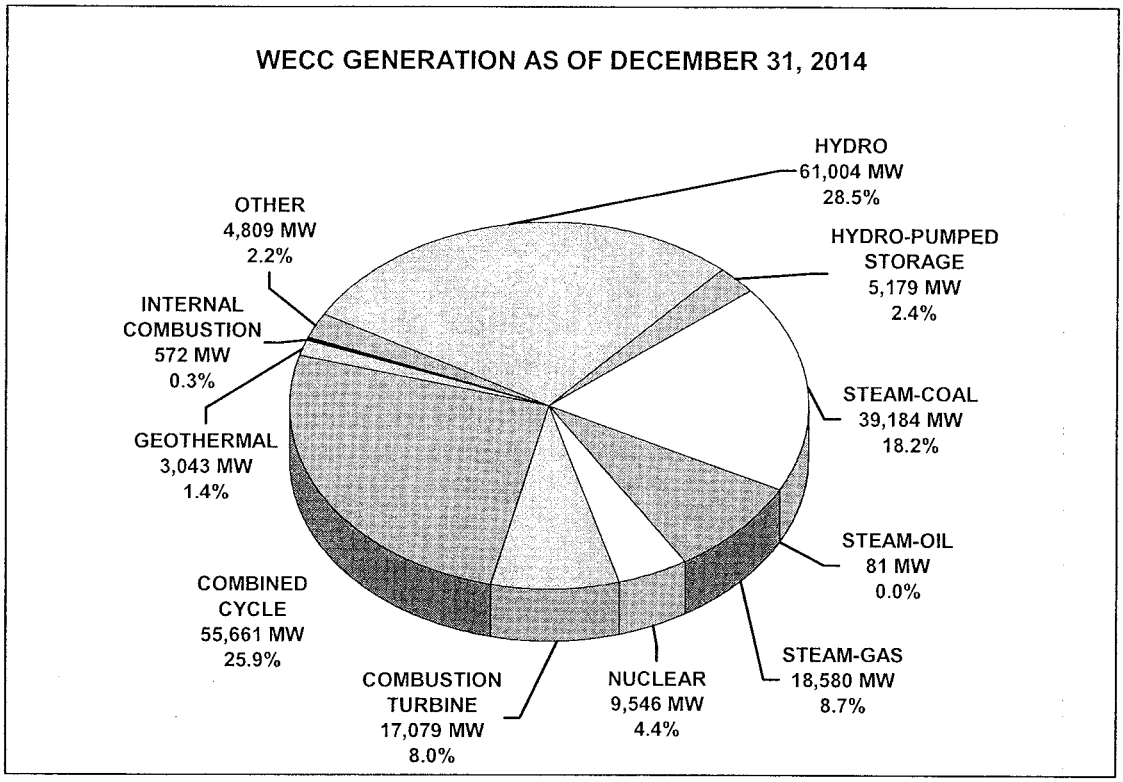
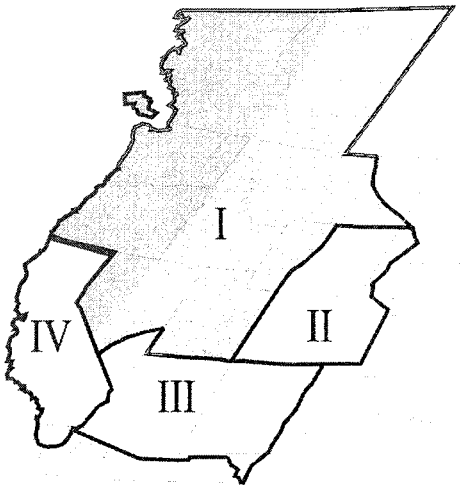


Figure 6

Table 14 - Generating Capability as of December 31, 2014 (Summer Capability - MW)

Generation Type	Northwest Power Pool Area	Rocky Mountain Power Area	Arizona New Mexico So. Nevada Power Area	California Mexico Power Area	WECC Total	% of Total
Hydro - Conventional	48230	902	3791	8081	61004	28.5
Hydro - Pumped Storage	240	410	245	4284	5179	2.4
Steam - Coal	19749	6991	10263	2181	39184	18.2
Steam - Oil	0	1	80	0	81	0.0
Steam - Gas	2601	235	1990	13754	18580	8.7
Nuclear	1150	0	3946	4450	9546	4.4
Combustion Turbine	4044	1927	3579	7529	17079	8.0
Combined Cycle	13994	2598	18580	20489	55661	25.9
Geothermal	160	0	645	2238	3043	1.4
Internal Combustion	269	263	4	36	572	0.3
Other	2520	24	139	2126	4809	2.2
Total	92957	13351	43262	65168	214738	100.0
Percent of WECC Total	43.4	6.2	20.1	30.3	100.0	

Northwest Power Pool Area (NWPP)



U.S. Systems

Avista Corp.	AVA
Bonneville Power Administration - TBL	BPAT
Chelan County PUD No. 1	CHPD
Deseret Generation & Transmission Co-operative	DGT
Douglas County PUD No. 1	DOPD
Eugene Water & Electric Board	EWEB
Grant County PUD No. 2	GCPD
Idaho Power Company	IPC
New Transmission Development Company (A TransElect Company)	NTD
NorthWestern Energy	NWMT
PacifiCorp	PAC
Pend Oreille County PUD No. 1	POPD
Portland General Electric Company	PGE
Puget Sound Energy	PSE
Seattle Department of Lighting (Seattle City Light)	SCL
Sierra Pacific Resources Transmission	SPR
Snohomish County PUD No. 1	SNPD
Tacoma Power	TPWR
U.S.B.R. Pacific Northwest Region	USPN
U.S.B.R. Upper Colorado Region	USUC
U.S. Army Corps of Engineers (North Pacific Division)	USCE
Utah Associated Municipal Power Systems	UAMP
Utah Municipal Power Agency	UMPA
Western Area Power Administration - Billings Area	WAUW

Canadian Systems

Alberta Electric System Operator	AESO
AltaLink L.P	ALTA
ATCO Electric Ltd.	ATCO
British Columbia Hydro and Power Authority	BCHA
British Columbia Transmission Corporation	BCTC
Fortis BC	FBC
Sea Breeze Pacific Regional Transmission Systems, Inc.	SBP
TransAlta Utilities Corporation	TAUC

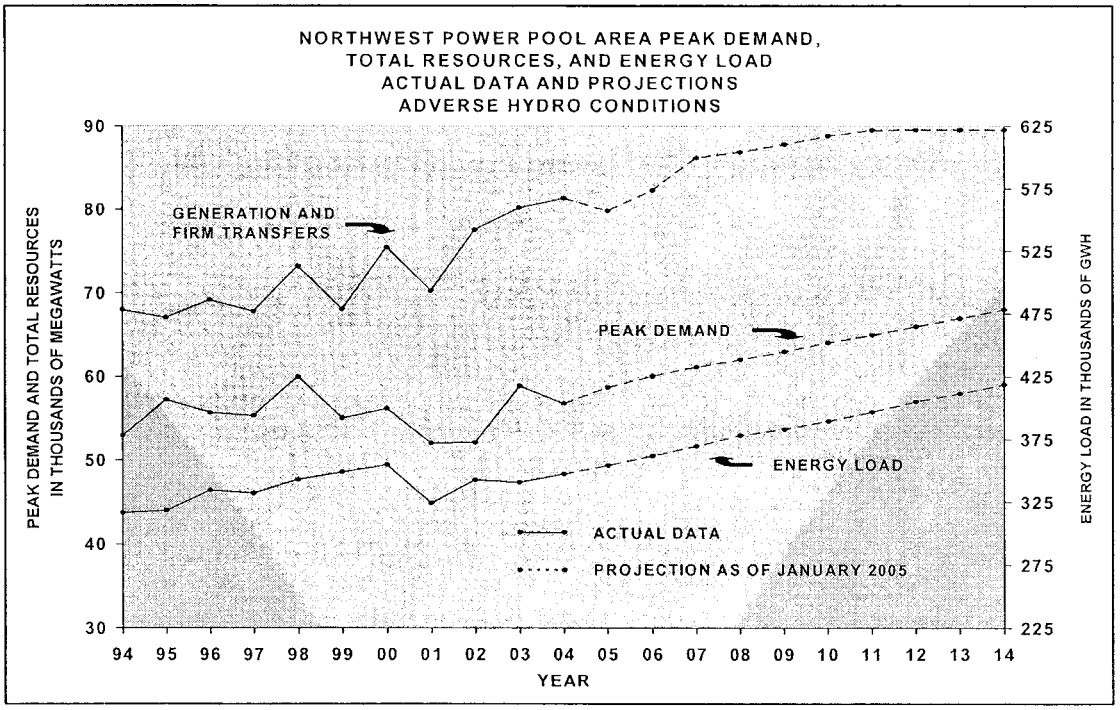


Figure 7

Table 15 - Northwest Power Pool Area Actual Loads and Resources for 2004

PEAK DEMAND – MW		JAN	FEB	MAR	APR	MAY	JUN
Loads -	Firm	58727	52023	48770	45396	43481	48324
	Interruptible & Load Mgt	160	160	160	160	160	166
	Total	58887	52183	48930	45556	43641	48490
	Forecast Deviation - %	3.1	-4.0	-3.4	-4.2	-5.9	1.3
Generation -	Hydro	45252	45349	45007	45014	45842	47066
	Thermal	32102	32077	32075	31910	31851	31865
	Other	1113	1116	1121	1122	1133	1122
	Total	78467	78542	78203	78046	78826	80053
Total Unavailable Generation *		2581	2774	3047	4325	4376	3950
Net Firm Transfers - MRO		136	138	171	177	181	174
	RMPA **	-453	-453	-458	-434	-347	-354
	AZ-NM-SNV **	-1359	-1359	-879	-778	-298	-298
	CA-MX **	-77	-77	223	189	189	622
	Total Net Firm Transfers	-1753	-1751	-943	-846	-275	144
Net Generation & Firm Transfers		77639	77519	76099	74567	74725	75959
Margin Over Firm Loads - MW		18912	25496	27329	29171	31244	27635
Margin Over Firm Loads - Percent		32.2	49.0	56.0	64.3	71.9	57.2
ENERGY - GWH							
Total Load		32741	29131	28750	26278	26908	27669
	Forecast Deviation - %	1.2	-2.1	-3.2	-3.7	-1.1	1.1

PEAK DEMAND – MW		JUL	AUG	SEP	OCT	NOV	DEC	
Loads -	Firm	50903	50415	45690	46921	53727	54240	
	Interruptible & Load Mgt	166	165	160	160	160	160	
	Total	51069	50580	45850	47081	53887	54400	
	Forecast Deviation - %	2.9	2.8	-0.9	-2.3	1.7	-3.8	
Generation -	Hydro	46917	46474	46257	45879	45466	45227	
	Thermal	31879	31874	32165	32481	33134	33157	
	Other	1145	1136	1129	1128	1111	1147	
	Total	79941	79484	79551	79488	79711	79531	
Total Unavailable Generation *		4792	4165	4643	5447	4364	3334	
Net Firm Transfers - MRO		153	168	187	155	125	114	
	RMPA **	-354	-356	-359	-373	-459	-458	
	AZ-NM-SNV **	-298	-298	-298	-1359	-1359	-1359	
	CA-MX **	622	625	625	223	-106	-106	
	Total Net Firm Transfers	123	139	155	-1354	-1799	-1809	
Net Generation & Firm Transfers		75026	75180	74753	75395	77146	78006	
Margin Over Firm Loads - MW		24123	24765	29063	28474	23419	23766	
Margin Over Firm Loads - Percent		47.4	49.1	63.6	60.7	43.6	43.8	
ENERGY - GWH								TOTAL
Total Load		29759	29291	26665	28109	29590	32422	347313
	Forecast Deviation - %	1.8	1.4	-0.6	0.8	0.9	0.7	-0.2

* Includes Maintenance, Forced Outages, and Inoperable Capability.
** Minus (-) indicates transfer into WECC Region.

Table 16 - Northwest Power Pool Area Estimated Peaks Demands, Resources, and Reserves 2005 - 2014

	SUMMER PEAK							Adverse Hydro Conditions		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Month	JUL	JUL	JUL	JUL	JUL	JUL	JUL	JUL	JUL	JUL
Loads – Firms	50451	51489	52870	54047	55018	56052	57128	58181	59338	60463
Int. & Load Mgt	215	226	237	248	248	248	248	248	248	248
Total - MW	50666	51715	53107	54295	55266	56300	57376	58429	59586	60711
Growth from Previous Yr. - %	-0.8	2.1	2.7	2.2	1.8	1.9	1.9	1.8	2.0	1.9
Generation ± Transfers - MW	76502	78721	81461	85291	86080	86739	87952	87994	88123	88131
Maint./Inoperable Cap. - MW	2303	2517	1975	2057	2057	2226	2058	2057	1975	1960
Reserve Capability MW	23748	24715	26616	29187	29005	28461	28766	27756	26810	25708
Percent of Firm Peak Demand	47.1	48.0	50.3	54.0	52.7	50.8	50.4	47.7	45.2	42.5

Projected Average Annual Summer Compound Growth Rate (2004-2014) - 1.7%

	WINTER PEAK							Adverse Hydro Conditions		
	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15
Month	JAN	JAN	JAN	JAN	JAN	JAN	JAN	JAN	JAN	JAN
Loads – Firms	58545	59902	60991	61853	62800	63893	64763	65799	66808	67870
Int. & Load Mgt	161	161	161	161	161	161	161	161	161	161
Total - MW	58706	60063	61152	62014	62961	64054	64924	65960	66969	68031
Growth from Previous Yr. - %	2.1	2.3	1.8	1.4	1.5	1.7	1.4	1.6	1.5	1.6
Generation ± Transfers - MW	79835	82306	86198	86901	87822	88813	89534	89549	89553	89553
Maint./Inoperable Cap. - MW	1171	730	730	730	721	721	624	633	624	624
Reserve Capability MW	20119	21674	24477	24318	24301	24199	24147	23117	22121	21059
Percent of Firm Peak Demand	34.4	36.2	40.1	39.3	38.7	37.9	37.3	35.1	33.1	31.0

Projected Average Annual Winter Compound Growth Rate (2004/05-2014/2015) - 1.8%

Table 17 - Northwest Power Pool Area Summary of Generation Additions (Summer Capability - MW)

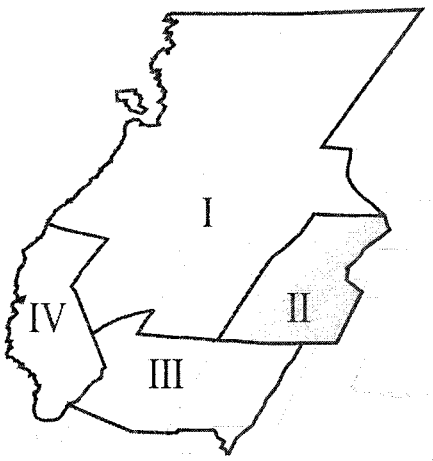
Generation Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10 Yr. Period	% of Total
Hydro - Conventional	45	123	4	-10	0	500	0	0	0	0	662	5.9
Hydro - Pumped Storage	0	0	0	0	0	0	0	0	0	0	0	0.0
Steam - Coal	-25	37	25	712	268	500	575	0	0	0	2092	18.6
Steam - Oil	0	0	0	0	0	0	0	0	0	0	0	0.0
Steam - Gas	0	0	0	0	0	0	0	0	0	0	0	0.0
Nuclear	0	0	0	0	0	0	0	0	0	0	0	0.0
Combustion Turbine	445	-280	170	0	0	0	0	0	0	0	335	3.0
Combined Cycle	813	1531	3641	0	613	0	0	0	0	0	6598	58.3
Geothermal	0	30	0	0	0	0	0	0	0	0	30	0.3
Internal Combustion	54	0	0	0	0	0	0	0	0	0	54	0.5
Other	254	970	8	274	0	0	0	0	0	0	1506	13.4
Total	1586	2411	3848	976	881	1000	575	0	0	0	11277	100.0

Table 18 - Northwest Power Pool Area Summary of Significant Generation Additions (Summer Capability)

AREA	PLANT NAME / UNIT NO.	LOCATION	UNIT TYPE	NET CAPABILITY MW SUMMER	NET CAPABILITY MW WINTER	FUEL TYPE	IN-SERVICE DATES	ST A T	C o r U	COMMENTS
NWMT	Milltown 1-5	Clark Fork River	HY	-5	-5	WAT	1-2005	RT	C	Plant to be retired 1-1-2005
NWMT	Thompson River 1	Thompson Falls	OT	12	12	OTH	1-2005	TS	C	Fuel Biomass-Waste Wood & Coal
PACE	Shute Creek CC1	Lincoln Cnty WY	GT	0	0	NG	1-2005	TS	C	Self-generation plant 110 MW
IPC	Fossil Gulch 1-7	Hagerman ID	WT	2	3	WND	2-2005	V	C	Seven 1.5 MW units
IPC	Bennett Mtn 1	Mountain Home ID	GT	165	178	NG	4-2005	V	C	
NWMT	Ranch Pit Wind 28	Great Falls	WT	0	0	WND	4-2005	U	C	Six 1.5 MW turbines
PACE	Currant Creek GT 1-2	Juab Cnty UT	GT	280	280	NG	6-2005	U	C	Owner: PacifiCorp
BPA	Frederickson CC1	Tacoma WA	CC	20	20	NG	7-2005	A	C	Increased duct-firing
NWMT	Rocky Mtn Hardin 1	Hardin MT	ST	109	109	BIT	8-2005	U	C	Developer: Centennial Power
BPA	Klondike II 1	Wasco OR	WT	24	24	WND	12-2005	T	U	Output to PGE, nameplate 75 MW
BPA	Summit/Westward CC1	Clatskanie	CC	503	503	NG	12-2005	P	U	Developer: Westward Energy
BPA	Frederickson CC2	Tacoma WA	CC	290	290	NG	12-2005	P	U	Developer: EPCOR
BPA	CEP Arlington 1	OR	WT	67	67	WND	12-2005	T	U	Columbia Energy Part. 200 MW
BPA	Leaning Juniper 1	OR	WT	67	67	WND	12-2005	T	U	AKA PPM Arlington 200 MW
BPA	Big Horn Wind 1	WA	WT	67	67	WND	12-2005	P	U	Developer: PPM Energy 200 MW
NWMT	Basin Creek 1-9	Butte MT	IC	54	54	NG	12-2005	T	U	Peaking plant
NWMT	Wind Park Sol. 1	Judith Gap MT	WT	15	15	WND	12-2005	T	U	Nameplate = 150 MW
IPC	Emmett Facility 1	Emmett ID	OT	7	7	WDS	1-2006	U	C	Wood-fired steam turbine
PACE	Currant Creek GT 1-2	Juab Cnty UT	GT	-280	-280	NG	5-2006	RP	C	Conversion to CC operation
PACE	Currant Creek CC1	Juab Cnty UT	CC	513	540	NG	5-2006	U	C	Conversion to CC operation
BPA	Hopkins Ridge (83)	Dayton WA	WT	0	0	WND	6-2006	T	U	Output sold to PSE 150 MW
BPA	Wild Horse 130	Ellensburg WA	WT	0	0	WND	6-2006	P	U	Output sold to PSE 220 MW
BPA	Cherry Point CC1	Whatcom Co WA	CC	738	738	NG	6-2006	P	U	Developer: TransCanada
IPC	Raft River GEO 1 1	Malta ID	GE	10	10	GEO	6-2006	U	C	
SPP	Galena 1	Steamboat NV	GE	20	20	GEO	6-2006	T	U	
NWMT	Colstrip 4	Colstrip MT	ST	25	25	BIT	7-2006	A	C	Turbine upgrade
NWMT	MT First MW 1	Great Falls MT	CC	280	280	NG	8-2006	L	U	
NWMT	Colstrip 1	Colstrip MT	ST	12	12	BIT	11-2006	A	C	Turbine upgrade
BPA	Columbia 1	WA	WT	26	26	WND	12-2006	P	U	Developer: Cielo Wind Power
BPA	Roosevelt 1	WA	WT	33	33	WND	12-2006	P	U	
BPA	Orion Wind 1	OR	WT	200	200	WND	12-2006	P	U	
BPA	Combine Hills II 1	OR	WT	35	35	WND	12-2006	T	U	Developer: Eurus
BPA	Seven Mile Hill 1	OR	WT	17	17	WND	12-2006	P	U	
BPA	Shepard's Flat 1-2	OR	WT	333	333	WND	12-2006	P	U	
BPA	Willow Creek 1	WA	WT	60	60	WND	12-2006	P	U	
BPA	Columbia Hills 1	WA	WT	42	42	WND	12-2006	P	U	
BPA	Klondike Phase 3 1	OR	WT	100	100	WND	12-2006	P	U	
BPA	Windtricity 1	WA	WT	50	50	WND	12-2006	T	U	
BPA	White Creek 1	WA	WT	67	67	WND	12-2006	P	U	
PGE	Port Westward CC1	Clatskanie OR	CC	356	425	NG	5-2007	U	C	
PACE	Summit-Lake Side CC1	Vineyard	CC	540	580	NG	6-2007	T	U	Devel: Summit Vineyard LLC
NWMT	Colstrip 3	Colstrip MT	ST	25	25	BIT	7-2007	A	C	Turbine upgrade
BPA	Wanapa CC1	Umatilla Cnty OR	CC	630	630	NG	9-2007	P	U	Umatilla Confederated Tribes
BPA	Wanapa CC2	Umatilla Cnty OR	CC	630	630	NG	9-2007	P	U	Umatilla Confederated Tribes
BPA	Plymouth CC1	Plymouth WA	CC	335	335	NG	9-2007	P	U	Developer: Plymouth Energy
BPA	COB EF CC1	Klamath Cnty OR	CC	575	575	NG	9-2007	L	U	Developer: Peoples Energy
BPA	COB EF CC2	Klamath Cnty OR	CC	575	575	NG	9-2007	L	U	Developer: Peoples Energy
NWMT	N. Alt. Energy 1	Whitehall MT	WT	8	8	WND	12-2007	P	U	Nameplate = 75 MW
NWMT	Bull Mountain 1	Broadview MT	ST	700	700	LIG	3-2008	P	U	
PACE	Two Elk 1	Campbell Cnty WY	OT	274	282	WC	4-2008	P	U	Owner: North Amer. Power Group
NWMT	Colstrip 2	Colstrip MT	ST	12	12	BIT	7-2008	A	C	Turbine upgrade
PACW	Condit 1-2	Klickitat County	HY	-14	-14	WAT	10-2008	RT	C	
NWMT	Southern MT Elec. 1	Great Falls	ST	268	268	LIG	3-2009	P	U	
PACE	Wasatch Front CC2	Vineyard UT	CC	513	540	NG	4-2009	P	U	Developer: PacifiCorp
NWMT	MT Lignite 1	Colstrip MT	ST	500	500	LIG	4-2010	P	U	
PACE	Hunter 4	Emery Cnty UT	ST	575	575	BIT	6-2011	P	U	Developer: PacifiCorp
		CANADIAN SYSTEMS - ALBERTA								
AESO	Wabamun 1-2	Wabamun AB	ST	-134	-134	SUB	1-2005	RT	C	Planned retirement
AESO	Kettles Hill WF 1	Pincher Creek	WT	0	0	WND	12-2005	P	U	Benign Energy phase 1 = 9MW
AESO	P Springs 1-60	AB	WT	0	0	WND	12-2005	P	U	Shell/Enmax nameplate = 80MW
AESO	Summerview WF 2	Pincher Creek	WT	0	0	WND	4-2006	P	U	Vision Quest, phase 2 = 60MW
AESO	Blue Trail WF 1-40	AB	WT	0	0	WND	6-2006	U	C	Vision Quest, nameplate = 60MW
AESO	Kettles Hill WF 2	Pincher Creek	WT	0	0	WND	7-2006	P	U	Benign Energy phase 2 = 54MW
AESO	Long Lake 1-2	Ft. McMurray AB	GT	170	170	NG	1-2007	U	C	
AESO	Syncrude UE1 11-12	Ft. McMurray	CC	100	100	NG	9-2009	P	U	
		CANADIAN SYSTEMS - BRITISH COLUMBIA								
BCHA	Upper Mamquam 1	Squamish BC	HY	25	3	WAT	6-2005	V	C	Dev: Canadian Hydro
BCHA	Waneta 4	Pend Oreille R BC	HY	25	25	WAT	10-2005	A	C	Turbine upgrade/life extension
BCHA	Brilliant Exp 1	Kootenay R BC	HY	120	120	WAT	8-2006	U	C	
BCHA	L Bonnington 3	Kootenay R BC	HY	3	3	WAT	10-2006	A	C	Turbine upgrade/life extension
BCHA	S Slocan 1	Kootenay River BC	HY	2	2	WAT	6-2007	A	C	Turbine upgrade/life extension
BCHA	Corra Linn 1	Kootenay River BC	HY	2	2	WAT	12-2007	A	C	Turbine upgrade/life extension
BCHA	S Slocan 3	Kootenay River BC	HY	2	2	WAT	5-2008	A	C	Turbine upgrade/life extension
BCHA	Corra Linn 2	Kootenay River BC	HY	2	2	WAT	12-2008	A	C	Turbine upgrade/life extension
BCHA	Revelstoke 5	Columbia River BC	HY	500	500	WAT	10-2010	P	U	

See the appendix for a description of the unit type codes, status codes, and the committed/uncommitted codes.

Rocky Mountain Power Area (RMPA)



Aquila Networks – WPC	WPE
Arkansas River Power Authority	ARPA
Basin Electric Power Cooperative	BEPC
Black Hills Power	BHP
Colorado Springs Utilities	CSU
Municipal Energy Agency of Nebraska	MEAN
Platte River Power Authority	PRPA
Public Service Company of Colorado	PSC
Tri-State Generation & Transmission Association, Inc.	TSGT
U.S.B.R. Great Plains Region	USGP
U.S.B.R. Upper Colorado Region	USUC
Western Area Power Administration -	
Golden Colorado Area	WAHQ
Loveland Area	WACM

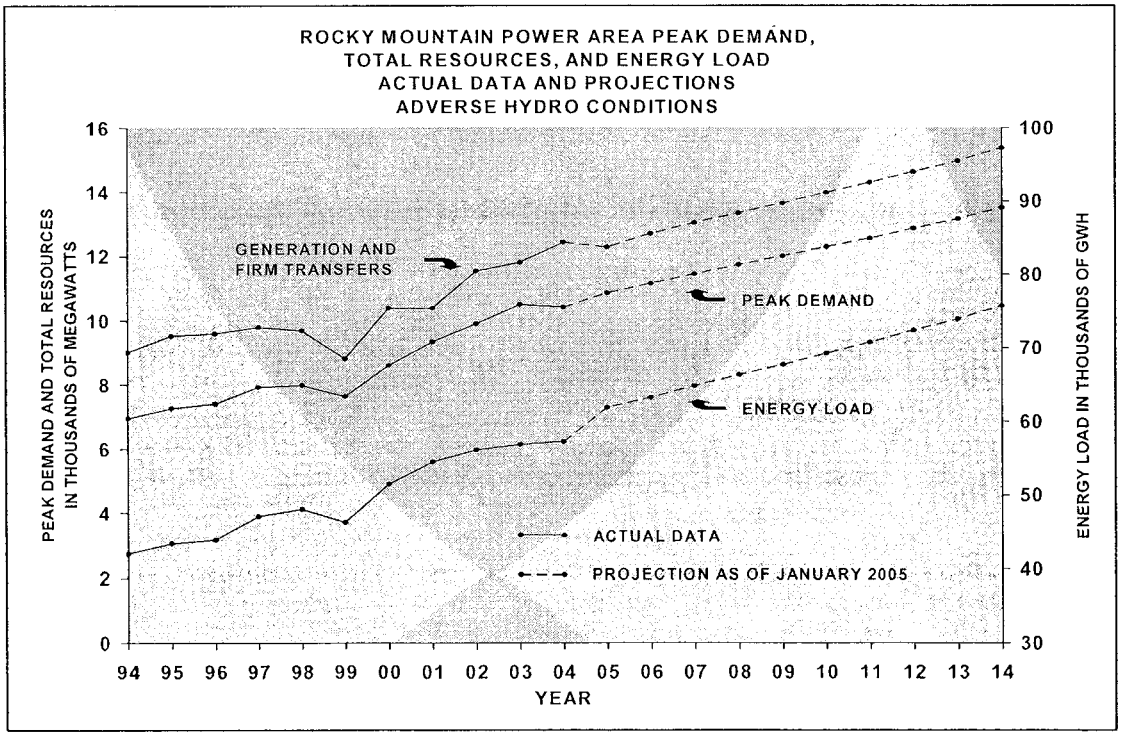


Figure 8

Table 19 - Rocky Mountain Power Area Actual Loads and Resources for 2004

PEAK DEMAND – MW		JAN	FEB	MAR	APR	MAY	JUN
Loads -	Firm	8751	8332	7561	7035	7778	9408
	Interruptible & Load Mgt	135	155	134	183	185	149
	Total	8886	8487	7695	7218	7963	9557
	Forecast Deviation - %	5.8	2.4	-4.0	-2.6	-3.9	2.8
Generation -	Hydro	1273	1273	1273	1303	1303	1303
	Thermal	10986	10986	10986	10806	10609	11259
	Other	22	22	22	22	22	22
	Total	12281	12281	12281	12131	11934	12584
Total Unavailable Generation *		676	240	287	1165	1294	455
Net Firm Transfers - MRO **		-117	-105	-116	-53	13	-1
	NWPP	364	279	414	348	257	283
	AZ-NM-SNV **	-204	-204	-204	-161	-161	-161
	Total Net Firm Transfers	43	-30	94	134	109	121
Net Generation & Firm Transfers		11562	12071	11900	10832	10531	12008
Margin Over Firm Loads - MW		2811	3739	4339	3797	2753	2600
Margin Over Firm Loads - Percent		32.1	44.9	57.4	54.0	35.4	27.6
ENERGY - GWH							
Total Load		4997	4600	4579	4382	4658	4669
	Forecast Deviation - %	1.9	1.9	0.7	3.1	10.1	5.4

PEAK DEMAND – MW		JUL	AUG	SEP	OCT	NOV	DEC	
Loads -	Firm	10222	9448	8528	7139	8553	8846	
	Interruptible & Load Mgt	178	198	158	104	125	125	
	Total	10400	9646	8686	7243	8678	8971	
	Forecast Deviation - %	1.3	-2.6	-2.7	-8.6	3.5	1.6	
Generation -	Hydro	1303	1303	1303	1273	1273	1273	
	Thermal	11251	11251	11259	11652	11652	11652	
	Other	22	22	22	22	22	22	
	Total	12576	12576	12584	12947	12947	12947	
Total Unavailable Generation *		201	514	514	1968	543	282	
Net Firm Transfers - MRO **		-10	-20	-13	-15	-116	-121	
	NWPP	317	248	267	285	391	206	
	AZ-NM-SNV **	-161	-161	-161	-204	-204	-204	
	Total Net Firm Transfers	146	67	93	66	71	-119	
Net Generation & Firm Transfers		12229	11995	11977	10913	12333	12784	
Margin Over Firm Loads - MW		2007	2547	3449	3774	3780	3938	
Margin Over Firm Loads - Percent		19.6	27.0	40.4	52.9	44.2	44.5	
ENERGY - GWH								TOTAL
Total Load		5324	5113	4599	4484	4674	5135	57214
	Forecast Deviation - %	3.9	-0.2	-1.8	2.2	5.8	4.6	3.1

* Includes Maintenance, Forced Outages, and Inoperable Capability.
** Minus (-) indicates transfer into WECC Region.

b

Only the following portions of this document were relied upon as Source Documents for Joe Gorberg testimony at the May 1-2, 2007 hearing. Copies of the balance of this document will be furnished upon request, but were not copied to reduce the volume of paper in this supplement.

Credit Suisse
2007 Energy Summit
February 6, 2007

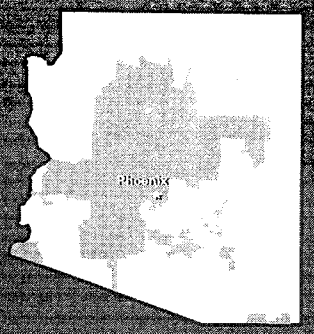
PINNACLE WEST
CAPITAL CORPORATION

Forward-Looking Statements

This presentation contains forward-looking statements. Neither the Company nor APS assumes any obligation to update these statements or make any further statements on any of these issues, except as required by applicable law. These forward-looking statements are often identified by words such as "estimate," "predict," "hope," "may," "believe," "anticipate," "plan," "expect," "require," "intend," "assume" and similar words. Because actual results may differ materially from expectations, we caution readers not to place undue reliance on these statements. A number of factors could cause future results to differ materially from historical results, or from results or outcomes currently expected or sought by Pinnacle West or APS. In addition to the Risk Factors described in Item 1A of the Pinnacle West/APS Annual Report on Form 10-K for the fiscal year ended December 31, 2005, these factors include, but are not limited to, state and federal regulatory and legislative decisions and actions, including the outcome and timing of APS' retail rate proceedings pending before the ACC; the timely recovery of PSA deferrals, including such deferrals in 2005 and 2006 associated with unplanned Palo Verde outages and reduced power operations that are the subject of ACC prudence reviews; the ongoing restructuring of the electric industry, including the introduction of retail electric competition in Arizona and decisions impacting wholesale competition; the outcome of regulatory, legislative and judicial proceedings, both current and future, relating to the restructuring; market prices for electricity and natural gas; power plant performance and outages; transmission outages and constraints; weather variations affecting local and regional customer energy usage; customer growth and energy usage; regional economic and market conditions, including the results of litigation and other proceedings resulting from the California energy situation; volatile fuel and purchased power costs and the completion of generation and transmission construction in the region, which could affect customer growth and the cost of power supplies; the cost of debt and equity capital and access to capital markets; current credit ratings remaining in effect for any given period of time; our ability to compete successfully outside traditional regulated markets (including the wholesale market); the performance of our marketing and trading activities due to volatile market liquidity and any deteriorating counterparty credit and the use of derivative contracts in our business (including the interpretation of the subjective and complex accounting rules related to these contracts); changes in accounting principles generally accepted in the United States of America and the interpretation of those principles; the performance of the stock market and the changing interest rate environment, which affect the value of the assets in the trusts holding our nuclear decommissioning, pension, and other postretirement benefit plans assets, the amount of required contributions to Pinnacle West's pension plan and contributions to APS' nuclear decommissioning trust funds, as well as the reported costs of providing pension and other postretirement benefits; technological developments in the electric industry; the strength of the real estate market in SunCor's market areas, which include Arizona, Idaho, New Mexico and Utah; and other uncertainties, all of which are difficult to predict and many of which are beyond the control of Pinnacle West and APS.

1

APS Retail Service Territory

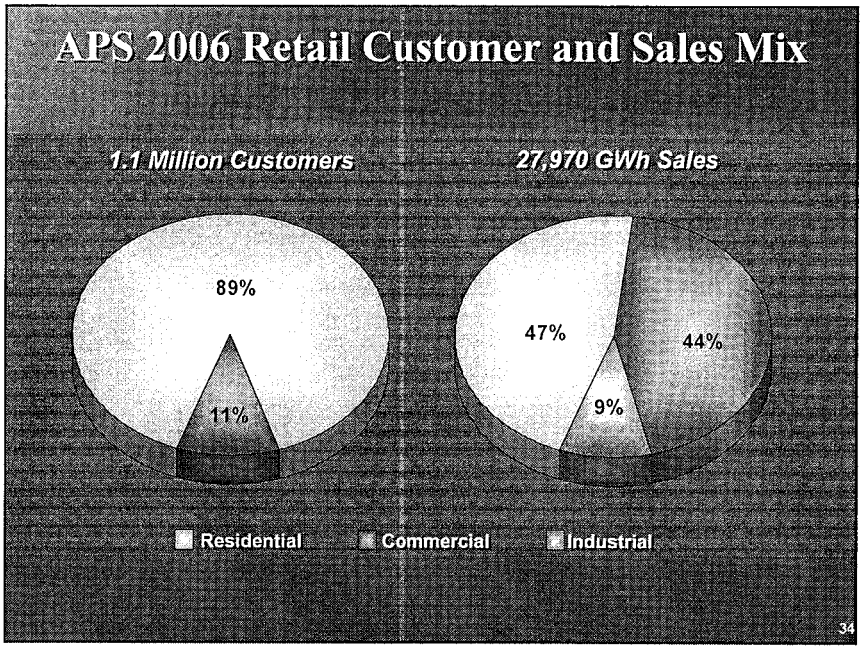


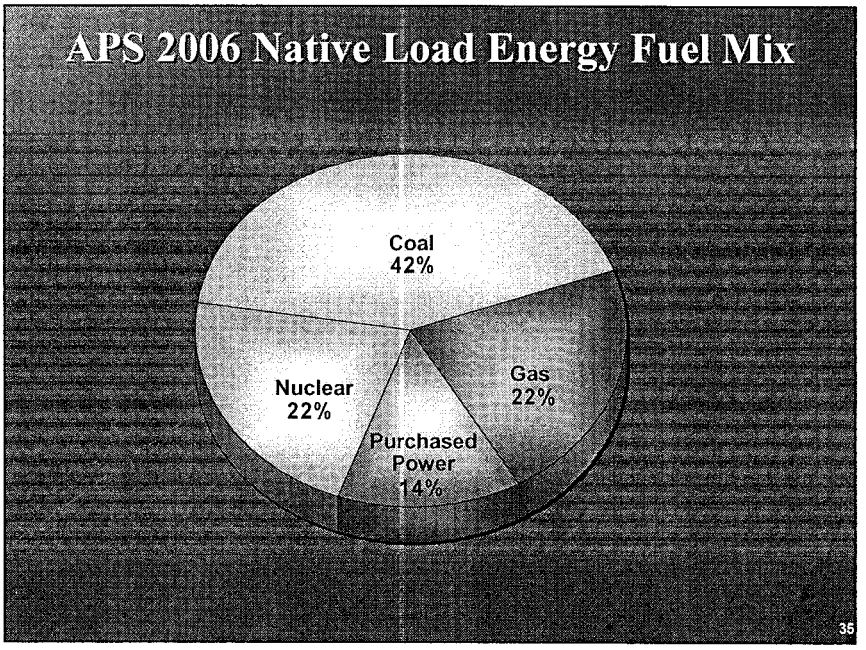
32

Arizona Population Highlights

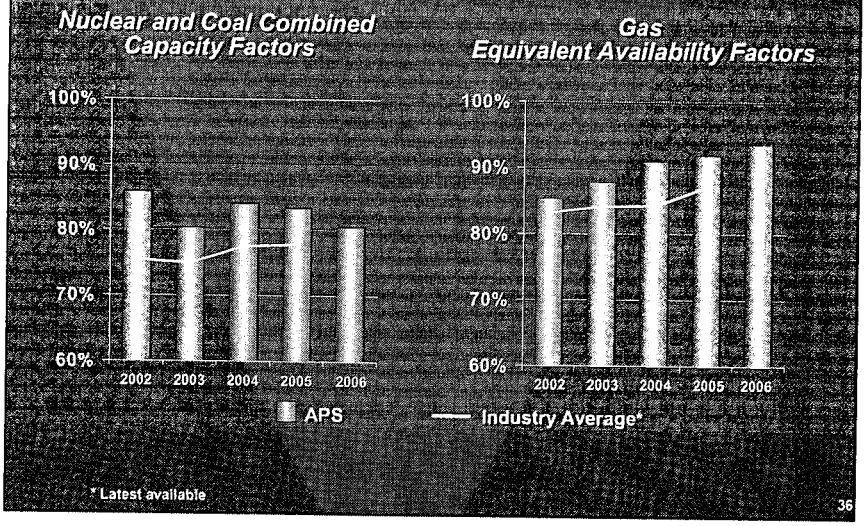
- Arizona's population 6.2 million
- Arizona 16th largest state
- Arizona 16.3% population change since 2001
- Arizona's population expected to reach 10.7 million by 2030
- Phoenix 5th largest city in U.S.

33


APS 2006 Retail Customer and Sales Mix
1.1 Million Customers
27,970 GWh Sales
89%
11%
47%
9%
44%
Residential
Commercial
Industrial
34


APS 2006 Native Load Energy Fuel Mix
Coal
42%
Gas
22%
Purchased
Power
14%
Nuclear
22%
35

Generation Operating History



* Latest available

36

APS Baseload Capacity RFP

Requirements

- Delivery as early as 2009 but no later than 2014
- Equity ownership or purchase power agreement
- 100 - 500 MW of capacity per proposal
- Ability to operate at or above 85% capacity factor

Schedule

- Proposals received July 2006
- Shortlist notification October 2006
- Completion expected in 2007

37

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Only the following portions of this document were relied upon as Source Documents for Joe Gorberg testimony at the May 1-2, 2007 hearing. Copies of the balance of this document will be furnished upon request, but were not copied to reduce the volume of paper in this supplement.

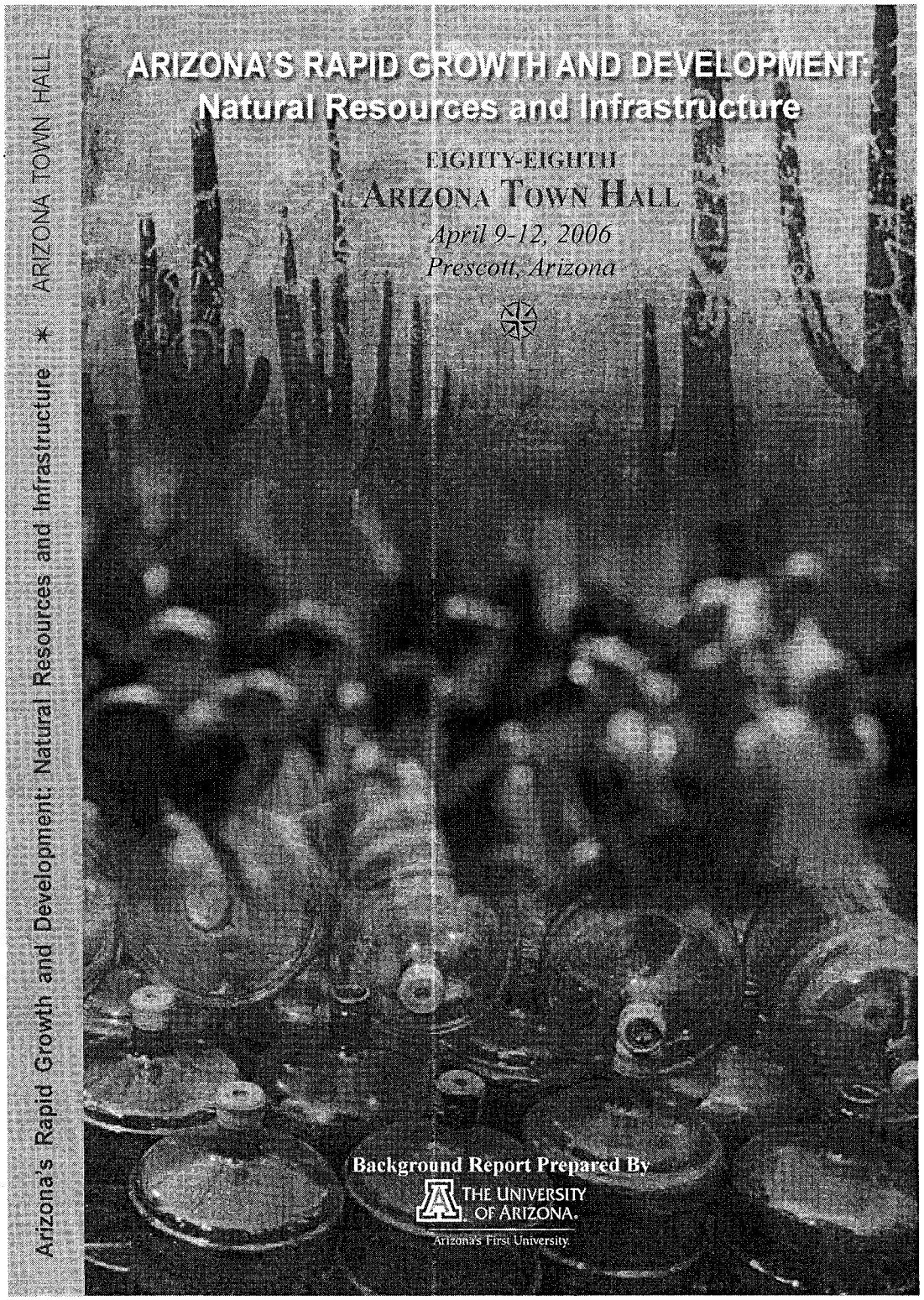
ARIZONA'S RAPID GROWTH AND DEVELOPMENT:
Natural Resources and Infrastructure
EIGHTY-EIGHTH
ARIZONA TOWN HALL
April 9-12, 2006
Prescott, Arizona
Background Report Prepared By
THE UNIVERSITY OF ARIZONA.
Arizona's First University
Arizona's Rapid Growth and Development: Natural Resources and Infrastructure * ARIZONA TOWN HALL

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TABLE 3.8
FY 2000 RAIL PASSENGER RIDERSHIP
(in hundreds)

City	Service	Passengers
Phoenix	Amtrak (Sunset Limited)	8.0
Benson	Amtrak (Sunset Limited)	1.9
Tucson	Amtrak (Sunset Limited)	25.9
Yuma	Amtrak (Sunset Limited)	2.5
Winslow	Amtrak (Southwest Chief)	2.2
Flagstaff	Amtrak (Southwest Chief)	44.9
Williams	Amtrak (Southwest Chief)	5.0
Kingman	Amtrak (Southwest Chief)	3.1
Grand Canyon	Grand Canyon Railway Co.	190.0
Clarkdale	Arizona Central Railway Co.	72.0

Note: Phoenix passengers are bused to Tucson Depot.
Source: ADOT, *Arizona Transportation Factbook,* 2002.

An overview of the commodities transported by rail in Arizona is given in Table 3.9. The state's principal freight lines are the Burlington Northern Santa Fe (BNSF) in the north, and the Union Pacific in the south. The BNSF serves Kingman, Seligman, Williams Junction, Flagstaff, Winslow and Holbrook. Around 60 to 70 trains move over the line every day. The BNSF also operates a branch line to Phoenix from Williams Junction, with about six to eight trains a day. The Union Pacific serves Yuma, Gila Bend, Maricopa, Casa Grande, Tucson, Benson and San Simon with about 40 to 50 trains per day. The Union Pacific also operates a secondary line that runs from Wellton through Phoenix and back to the main line at Picacho. A portion of this line between Wellton and Buckeye is out of service, but four to six trains move daily between Phoenix and Picacho. The legislature has authorized the Arizona Department of Transportation (ADOT) to use vehicle license tax funds to preserve the Wellton/Buckeye corridor, parts of which are owned by the railroad, the state and the U.S. Bureau of Land Management.

TABLE 3.9

GENERAL COMMODITIES TRANSPORTED

Railroad	Commodities
Burlington Northern Santa Fe	Intermodal (80%), Mixed Freight (20%)
Union Pacific	Intermodal (60%), Mixed Freight (40%)
Black Mesa & Lake Powell	Coal (100%)
Coronado	Coal (100%)
Apache	Paper (40%), Grain (30%), Chemicals (30%)
Arizona & California	Mixed Freight (85%), Chemicals (15%)
Arizona Central	Passengers (95%), Coal (5%)
Arizona Eastern	Copper Products (100%)
Copper Basin	Copper Products (100%)
Grand Canyon	Passengers (100%)
Magma*	NA
San Manuel*	NA
San Pedro & Southweestern	Chemicals (90%), Copper Products (10%)
Tucson Cornelia & Gila Bend*	NA

*Currently out of service.
Source: ADOT, *Arizona Transportation Factbook,* 2002.

There are approximately 23 intermodal rail facilities in Arizona. Six of these are lightly used team tracks where trucks park next to rail cars, and transloading is carried out manually or by forklift. The major intermodal facilities are the BNSF's Glendale Intermodal Yard, which handles about 60,000 carloads every year, and the El Mirage automobile distribution facility, which handles between 150,000 and 180,000 cars each year.

The Union Pacific's Phoenix Intermodal Yard handles 43,000 carloads annually, and their Phoenix Auto Yard around 4,800 auto carriers. Union Pacific no longer maintains an intermodal facility in Tucson. Truckload shipments originating there must be driven to Phoenix to be loaded on trains there, thus adding to traffic on I-10. There are smaller intermodal facilities operated by the Arizona & California Railroad in Parker and by the San Pedro & Southwestern Railroad at Bisbee Junction.

Urban Transit

There are two major fixed-route bus transit systems in Arizona. Valley Metro, in the Phoenix area, carries approximately 135,000 passengers daily, and Sun Tran, in Tucson, carries around 60,000 passengers per day. While ridership on Valley Metro has shown robust growth in recent years, up more than one-third from 1999 to 2003, Sun Tran ridership has remained essentially flat over the same time period. On the other hand, Sun Tran ridership did increase 6.5 percent during 2004 while transit ridership declined nationally. Several other smaller cities in Arizona operate fixed-route systems, including Flagstaff, Show Low, Sierra Vista and Yuma. The Navajo Nation and the Hopi Tribe also operate transit services. Coolidge and Lake Havasu City operate dial-a-ride systems. Dial-a-ride and paratransit services for the handicapped also are important parts of the Valley Metro and Sun Tran operations.

The Valley Metro Rail light-rail system is currently under construction, funded as part of a transportation plan in a November 2004 ballot proposition. Its minimum-operating segment will be 20 miles long, running from central Phoenix through Tempe and into west Mesa for about one mile. This segment is scheduled to begin operation at the end of 2008. Also approved as part of Proposition 400 were about 30 miles of extensions to this initial segment, which will run into west and north Phoenix, Glendale and farther into Mesa.

Intercity Bus Service

The principal carrier of intercity bus traffic in Arizona is Greyhound Lines. It provides service at least once a day on most of the major corridors. A growing number of locally-owned operations offer airport limousine services between Phoenix and Tucson, between Tucson and Nogales and other points in southeastern Arizona, and between Phoenix and the more distant communities of Prescott, Sedona and Yuma. Currently there is no bus service between Flagstaff and Page.

Ports of Entry

There are 22 ports of entry in Arizona, with six of these on the Mexican border. Apart from regulating the flow of people and private vehicles across the border, these entry points must also monitor commercial vehicles for registration, motor taxes, size and weight restrictions, vehicle safety, licensing and insurance. In this respect the Nogales facility is by far the state's largest. In 2000 Nogales processed more than 250,000 truck crossings San Luis

around 40,000 and Douglas about 34,000. Nogales is the only major port in Arizona that can accommodate imports by rail. In fact, only Laredo, Texas processes more tons of northbound trade by rail than does Nogales. Although the number of trains crossing the border at Nogales has fallen somewhat in recent years, their length has more than doubled, from an average of 48 containers per train in 1996 to 106 in 2004. The port also is processing a greater percentage of full containers. By value, automobiles account for about three-quarters of the commodities entering the country by rail at Nogales, followed distantly by various copper products and copper ore (9.8 percent), beer (7.6 percent) and portland cement (2.5 percent). The Nogales port of entry is currently being redesigned to accommodate increasing flows of goods and people, both more efficiently and more securely. The Nogales CyberPort Project, commissioned by the Governor's CANAMEX[1] Task Force in Spring 2002, is responding to the need for a more secure Mariposa port of entry following the September 11, 2001 attack. In addition the project seeks to improve the entire trade flow process and reduce commercial traffic bottlenecks. Improvements also are underway at ports of entry in Yuma and Cochise Counties.

TRANSPORTATION PLANNING AND FUNDING

State law empowers the State Transportation Board to set priorities for individual highway and airport projects and award all highway contracts. The Board is made up of seven members appointed by the governor from each of six transportation districts, including two members from district one, Maricopa County.

For planning purposes, Arizona is divided into several planning and development districts. Councils of Governments (COGs) have been established in these districts by agreement among the local governments within each area for the purposes of coordinating comprehensive planning on an area-wide or regional basis (Figure 3.9). ADOT recognizes and assists these COGs as area-wide transportation planning agencies through the provision of its technical and financial support. ADOT also provides advisory assistance to the non-metropolitan COGs through its local assistance program. Transportation planning funds are made available by ADOT to all the rural COGs.

The Maricopa Association of Governments (MAG), Pima Association of Governments (PAG), Flagstaff Metropolitan Planning Organization, Central Yavapai Metropolitan Planning Organization and Yuma Metropolitan Planning Organization are designated by the governor as the Metropolitan

[1] CANAMEX is a 1,504 miles federally designated "high priority" trade corridor that facilitates the flow of trade and tourism between Canada and Mexico through the western states of Montana, Idaho Utah, Nevada and Arizona.

Planning Organizations (MPOs) for the Phoenix, Tucson, Flagstaff, Prescott and Yuma metropolitan areas. As such, these agencies are responsible for developing comprehensive long-range transportation plans. Specific transportation planning responsibilities of the COGs are outlined in their annual work programs, which are approved at local, state and federal levels. Their typical planning activities include: the development of goals and objectives, issue review, data collection and analysis, forecasting needs and deficiencies, developing alternative plans and carrying out special transportation studies. Public input and impact analysis also are important aspects of regional transportation planning.

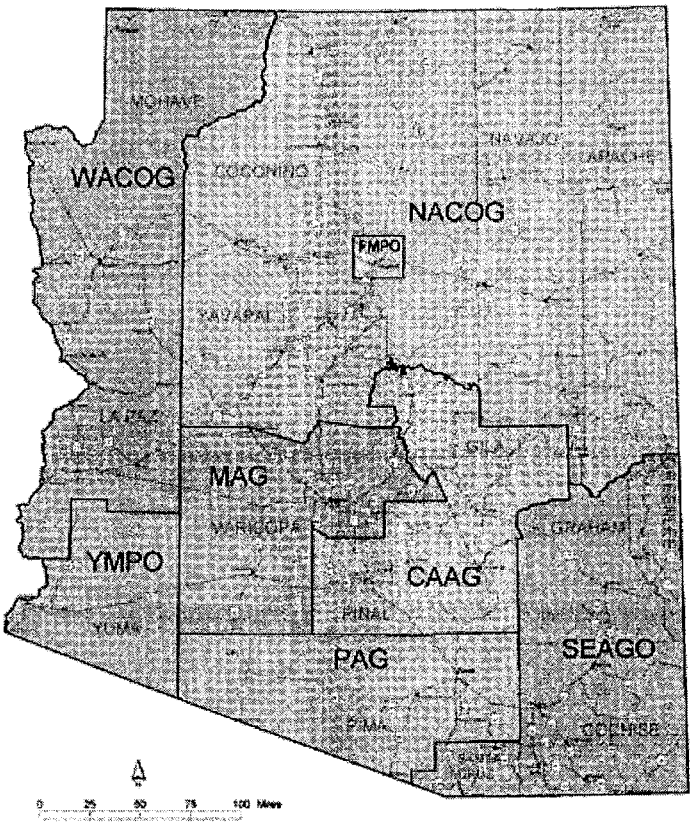
The major source of funding for the construction and improvement of the state's highways and bridges is the Highway User Revenue Fund (HURF). The HURF serves as the depository for state taxes and fees relating to the operation of motor vehicles. These are, in descending order of importance: gasoline taxes, currently 18 cents per gallon; vehicle license taxes, based on the value of the vehicle being taxed; use fuel taxes, a tax on diesel fuel that varies from 18 cents per gallon for passenger cars to 26 cents per gallon for commercial trucks and buses; and motor carrier fees. Of these sources for the HURF, only one, the vehicle license tax, is tied to the rate of inflation, and the rate has been reduced in recent years. These revenues are distributed from the HURF through ADOT to each city and region based upon its size relative to others.

Federal funds are apportioned in accordance with the Transportation Equity Act for the 21st Century (TEA-21). TEA-21 requires that all urban areas with a population over 50,000 have a transportation plan based on a coordinated, comprehensive and continuing planning process. This requirement is the responsibility of the designated MPO. TEA-21 funds are available for road construction, maintenance and safety, bridge replacement and rehabilitation, rail-highway crossing improvements and planning and research.

Several metropolitan areas in Arizona have voter-approved Regional Area Road Fund (RARF) programs that raise money for transportation improvements through sales taxes. Maricopa, Yavapai and Pinal Counties have RARFs, and the Flagstaff metropolitan area also is raising funds for specific transportation projects through local taxes.

Airport funding is generated from two sources in Arizona, the federal Airport Improvement Program (AIP) and the State Aviation Fund. The AIP relies on user fees to address deficiencies in safety, security and capacity. Less than half of the funding of Arizona's primary airports currently comes from this source, however, and none of the secondary airports are eligible to receive it. The State Aviation Fund, administered by ADOT, relies mainly on

FIGURE 3.9
COUNCILS OF GOVERNMENTS



Source: ADOT, Intermodal Transportation Division, 1999.

revenues from the flight property tax, the aircraft license tax, the aviation fuel tax and Grand Canyon Airport revenues.

In the past some funding for railroads has come from the Federal Railroad Administration's Local Rail Freight Assistance Program. No funds have been appropriated for this program since 1994, however. TEA-21 does contain provisions for reviving the program, with priority for projects that address safety, environmental concerns, economic development and the preservation or enhancement of small communities and rural areas. There are currently no state funds dedicated to railroad transportation. Absent the availability of federal funds, Arizona's rail lines are obliged to fund their own capital and maintenance projects.

The federal government funds capital and operating assistance programs for urban transit. MPOs, such as those in Flagstaff and Yuma, can serve as conduits for directing these funds to local operators. Larger cities, however, receive their federal funds directly. ADOT administers two federally funded rural transit programs. The Section 5311 program assists rural transit operations, and the Section 5310 program assists transportation services for the elderly and persons with disabilities. Local governments in the Phoenix metro area also have enacted sales taxes dedicated to transit projects.

One local source of transportation funding in Arizona deserves special mention. In 1985 voters in Maricopa County approved a one-half cent transportation excise tax for the construction of controlled-access highways. This enabled a near doubling of the freeway system in the MAG region, which has added nearly 1,000 new lane-miles since then. In 2004 the voters approved the extension of this tax for another 20 years, which is expected to raise approximately $9 billion over this two-decade span, allowing for the growth of the freeway system by another 50 percent, with the addition of well over 1,000 new lane-miles. Under the voter-approved plan, 56 percent of the tax revenue is allocated to freeways, public transit receives about one-third, to be split almost equally between bus and rail, and streets nine percent. The remainder is dedicated to safety planning, bike paths and walkways. Last fall voters in Pinal County approved a similar measure, which is projected to raise nearly $1 billion dollars for transportation over its 20-year life span.

On May 16, 2006, residents of Pima County approved a 20-year Regional Transportation Authority Expenditure Plan, based on a one-half cent transportation sales tax. The $2.1 billion plan allocates 58 percent to roadway improvements (200 new lane miles), 27 percent for transit improvements, nine percent for safety improvements and six percent for environmental and economic vitality.

STRAINS IN THE CURRENT SYSTEM

Highways

Despite this highly articulated planning structure and the variety of funding sources now in place, population growth in Arizona is already overcoming some of the state's principal roadways. Arizona is not yet adequately considering the growth that is coming in the next twenty-five years; essentially only that growth which has already occurred, especially in the last decade or less, and especially in the Phoenix metro area, is being addressed. In this region the strains are most evident in commuter traffic in the newly developing "Pinal Horseshoe" in the southeast valley, along I-10 in the west valley and along I-17 in the north. These examples are offered only as illustrations of the current strains.

The "Pinal Horseshoe," a crescent arcing around the southeastern edge of the Gila River Indian Community in Pinal County, has experienced explosive population growth in just the last few years, as many homebuyers with jobs in the Phoenix area have followed the "drive until you qualify" strategy. Now, as county and ADOT officials are struggling to come to terms with the new reality, those buyers are discovering a more difficult drive than they perhaps had in mind when they bought their new homes. At the west end of the horseshoe, for example, traffic counts at Maricopa Road (Arizona SR 347) and I-10 nearly doubled between 2002 and 2004; at the intersection of Maricopa Road and Casa Grande Highway counts more than tripled in the same period; at the eastern end, at the intersection of Hunt Highway and Thomson Road counts rose from 2,400 cars per day in 2000 to over 20,000 in 2005. Many of the roads in this area are relatively narrow and often interrupted by four-way stops—an essentially rural infrastructure not designed to handle the heavy traffic of urban commuters. Traffic citations have increased dramatically, as have accidents.

I-10, along a nine-mile stretch between the Loop 101 to the Loop 303 in the west valley communities of Goodyear and Avondale, had a fatality rate of 1.56 per mile in 2004. This makes it one of the deadliest pieces of the highway in the entire country. For comparison, I-10 as a whole averages 0.19 fatalities per mile; in Arizona it averages 0.30 fatalities per mile; and in the Phoenix metro area, including Goodyear and Avondale, it averages 0.71 fatalities per mile. A major reason for this exceptionally dangerous situation is the bottleneck at the mid-point of this nine-mile stretch where I-10 westbound narrows to two lanes each way—another essentially rural system, in other words, being asked to do duty as a throughway for heavy urban commuting traffic. Once again, explosive population growth in the west valley communi-

ties of Litchfield Park, Goodyear and Buckeye has created a problem far in advance of what transportation planners foresaw. According to the construction schedule in MAG's Regional Transportation Plan, widening of this part of I-10 will not begin until 2011.

Suburban growth, however, is not always to blame for deteriorating road conditions. I-17 north of Phoenix was built in the late 1950s and early 1960s as a rural highway connecting a much smaller metropolitan area with a sparsely populated area in the north of the state. For most of its length it has remained essentially unchanged since then. North of Phoenix, now the sixth largest metropolitan area in the country, I-17 narrows from six lanes and a high occupancy vehicle lane to only four just south of Pinnacle Peak Road. Pinnacle Peak is two miles north of the Loop 101, and a full 12 miles south of Anthem, another major contributor to the congestion. Traffic counts at Pinnacle Peak Road have more than doubled in the last ten years, and accidents between that point and Cordes Junction, about 45 miles to the north, have increased from around 300 in 1994 to nearly 750 in 2005. Current ADOT plans do not call for any major expansion of I-17 until after 2020, and even then the improvements will extend only as far as Anthem.

Another sort of strain on the current system is time: the inevitable costs imposed by delays in highway improvement. MAG's 2006 schedule of freeway building had to be altered due to an unexpected rise in construction costs. Bids for projects came in nearly 20 percent higher than anticipated because of shortages in critical commodities, such as cement, brought on in part by general increases in demand as well as demand generated by Hurricane Katrina reconstruction. The result is that some projects, such as the bypass around downtown Wickenburg, have had to be put off, and delays always mean higher costs in the end. Planners hope that booming population growth in the Phoenix metro area also will create transportation tax revenues higher than originally anticipated, so they can catch up with the original work schedule by 2010.

Sky Harbor International Airport

In the year 2000 Sky Harbor ranked third worst in the nation in departure delays caused by airport conditions, behind Newark and La Guardia. Delays had more than doubled since 1998. One of the major causes was air pollution, which caused more delays in Phoenix than rain did in Seattle. Parking at Sky Harbor continues in short supply, creating more pressures for off-site options. Tempe residents continue to voice concerns over airport noise, in particular as plans for a fourth runway begin to be contemplated. In 2001 Sky Harbor started to seek approval for a new West Terminal, to

have a 33-gate capacity, again over objections from Tempe. Approval for this new terminal is not yet final, and it would not open until 2011 at the earliest. Expansion at Sky Harbor also depends on maintaining height restrictions on urban development nearby. The City of Phoenix has recently approved new rules that give the safety of present and any future flight paths priority over real estate development, but the City of Tempe has not followed suit. Intra-metropolitan differences like these could have the effect of either impeding the development of new capacity at Sky Harbor, currently the fifth-busiest airport in the country, or shifting new capacity to alternative locations.

FUTURE TRANSPORTATION NEEDS

Highways

According to the Governor's Transportation Vision 21 Task Force, which submitted its final report in December 2001, the number of daily vehicle miles driven in the Phoenix and Tucson metro areas will grow by more than 50 percent by 2020. Vision 21 also predicted that traffic volume along I-10 between these two cities would double in the same period. Clearly Arizona is on its way to a severe, and costly, transportation problem on its major roadways. A recent study found that increased fuel consumption and lost time due to congestion already amounts to a cost of $540 per capita in the Phoenix metro area and $395 per capita in Tucson. PAG predicts that, even assuming all its roadway improvements are built, the percentage of vehicle miles driven in the region under conditions of either severe or heavy congestion will double in the period from 2000 to 2025, rising from 27 percent to 54 percent. Travel on state highways also is becoming increasingly congested. Table 3.10 shows the growth in numbers of commercial trucks on all Arizona interstates from 1990 to 2000, a decade that saw an increase in this traffic of 105 percent. There is no reason to expect this trend to change over the next 20 years.

TABLE 3.10
ANNUAL COMMERCIAL VEHICLE COUNTS
(trucks greater than 26,000 gross vehicle weight)

Year	I-8	I-10	I-17	I-19	I-40	Total
1990	39,989	948,200	307,200	31,400	313,300	1,640,089
1995	39,234	1,567,100	486,400	38,600	364,000	2,495,334
2000	61,900	2,002,700	598,800	80,200	610,700	3,354,300

Source: ADOT, *Vision 21.*

Aviation

According to the *State Aviation Needs Study (SANS), 2000*, commercial passenger enplanements in Arizona are expected to grow 79 percent between 2000 and 2020, reaching a total of more than 31 million annually at Sky Harbor, and about 3.5 million at Tucson International. Air cargo operations at Sky Harbor are expected to triple by 2020 and double at Tucson. At rural airports, on the other hand, passenger service is declining due to "leakage"—the tendency of passengers to travel to larger airports with better service—and will likely continue to do so into the future.

Passenger Rail

Phoenix is currently the largest urban area in the country without passenger rail service, and Amtrak has no plans to return service to the city. Other ideas for passenger rail service, including a high-speed linkage between Phoenix and Tucson and commuter service in the Phoenix metro area, have been discussed from time to time. The high-speed line would require billions of dollars for service to a currently unknown and untested market. A commuter network in the Phoenix metro area might attract more riders, and examples of the development of such services in Albuquerque/Santa Fe and Salt Lake City are encouraging. In those places, however, builders were able to buy unused track from railroads; in Phoenix any passenger service would have to share tracks with freight trains, and those tracks are already at or near capacity.

Freight Rail

According to ADOT, the number of freight trains crossing Arizona is expected to grow by 15 to 20 percent by 2010. The problems associated with grade-level crossings will likewise get worse.

Funding

The Vision 21 Task Force projected a total of $61.3 billion as necessary to fund all major modes of transportation for the period 2000 through 2020, but then estimated the available revenues from all sources for the same period to be $41 billion, amounting to a shortfall of over $20 billion for this two-decade period. Since roadways demand by far the largest expenditures of all transportation systems, the Vision 21 Task Force projected that they will suffer most from this shortfall. Another study, by the ADOT Transportation

Planning Division, concluded there is a $1.75 billion 20-year backlog to bring rural highways in Arizona up to a "minimally acceptable" standard, and a $728 million backlog to bring urban highways up to this same standard. The *SANS 2000* study concluded that $315 million in additional funding is needed by 2010 to maintain current levels of service at Arizona's 20 commercial service and reliever airports, and that another $649 million in new funding would be needed to bring these airports up to minimally acceptable standards.

The recommendations of the Vision 21 Task Force to make up the shortfall in Arizona's transportation funding are, first of all, to increase the state's gasoline tax. This tax, fixed by law at 18 cents per gallon, is a flat tax, subject to the negative effects of inflation and fuel efficiency. Vision 21 recommended an immediate increase by five cents per gallon, to be followed by another four cents four years later (which, according to the Task Force's original timetable, would be 2006), to be followed by additional two-cent increases at five-year intervals. This would raise the per-gallon tax to a total of 31 cents, one cent lower than the tax currently imposed by Connecticut, and just slightly higher than New York. Because the gasoline tax feeds directly into the HURF, which is constitutionally restricted to roadways and bridges, the Task Force also recommended the development of statewide funding sources that could be used to meet the needs of other modes of transportation. The Task Force called for the phasing in of a dedicated, statewide transportation sales tax, adding up eventually to 0.75 percent, and a dedicated, statewide development impact fee equal to one percent of value, to be imposed on all new commercial and residential development in the state.

Regional Coordination

Another principal recommendation of the Vision 21 Task force, on an issue perhaps even more critical than funding, concerned the coordination of regional land-use planning with long-range transportation plans. This might seem obvious on its face, but the experience of growth in northern Pinal County, of the Anthem development north of Phoenix and of rapid growth in the west valley, all in the absence of the necessary transportation infrastructure, illustrate the extent of the problem. One entity, generally local, approves new development with an eye perhaps on increasing its tax base, leaving the transportation issues to other entities at the regional or state level. In this way as metropolitan growth in the Tucson area begins to bleed into southern Pinal County and eastward into Cochise County—Anthem is currently planning a new development in Benson—the experience of the Phoenix metro area is likely to be repeated, if on a smaller scale.

Chapter 4

WATER AND GROWTH

SUSANNA EDEN AND SHARON B. MEGDAL

The fates of ancient civilizations hint at the risks of growing beyond the natural limits of available water resources. We have seen the consequences of water scarcity in countries that lack economic and technological resources; and even in the United States, long-term drought has caused large-scale dislocations as seen, for example, in the Dust Bowl of the 1930s. The settlement of the western United States, however, has been a story of growth driving water development.[1] Historically, investments in reducing water uncertainty have yielded dividends in financial stability and economic growth. The water displays in Nevada's casinos and decorative lakes in Arizona's subdivisions are emblematic of the value of water in attracting growth. Increases in population, however, are leading to stresses on current supplies and competition for new supplies.

Another engine of growth for Arizona is the quality of life provided by its uniquely beautiful environment, in which water is a key ingredient. Yet there has been consistent tension between the water demands of growing populations and the needs of the environment. Use of surface and groundwater for growth of the population and the economy has resulted in significant loss of riparian areas and habitat. Repairing and maintaining Arizona's environmental heritage will be a major challenge as the state's population continues to grow. Recently, river restoration projects, such as those in Phoenix, Mesa and Yuma, have been undertaken to enhance the quality of life for urban residents and visitors. These projects involve major commitments of resources over extended periods of time. "The importance of these projects to the quality of ... life in the Sonoran Desert is made evident by significant actual and planned public investments" (Megdal, 2005, p. 1).

[1] Recent news from California suggests that the role of water in limiting growth may be a more important policy question in the future. The California Court of Appeals rejected a CALFED plan because its environmental review was based on the notion that growth in California is inevitable and therefore required increased water delivery from north to south. The Court said CALFED "appears not to have considered ... smaller water exports from the Bay-Delta region which might, in turn, *lead to smaller population growth due to the unavailability of water* to support such growth" (Pitzer, p.3, emphasis added).

GROWTH AND WATER DEMAND TRENDS

In the 25 years since 1980, Arizona's population has more than doubled from 2.7 million to 6.0 million. Between 1990 and 2004, the highest rates of growth in the state were experienced in Mohave, Yavapai, Pinal and Yuma Counties, while the greatest growth in absolute numbers has been in Maricopa County (with a gain of more than one million people since 1990), Pima, Pinal and Mohave Counties. Population projections as detailed in Chapter 2 indicate continued high growth rates in these same areas. The needs of the major population centers in Maricopa and Pima Counties are widely known. Although the numbers are smaller, communities in other counties are facing similar challenges. Yavapai County must supply its rapidly growing population and preserve the unique environmental qualities supported by perennial flows in the upper Verde River. Coconino County, with only a slightly lower growth rate, has experienced water supply difficulties when drought conditions have reduced normal supplies. Despite aggressive conservation and water rights acquisition measures taken by Flagstaff, the city continues to face potential shortfalls. Table 4.1 shows the total freshwater withdrawals in selected fast-growing counties in Arizona.

TABLE 4.1
FRESHWATER WITHDRAWALS IN SELECTED FAST GROWING COUNTIES, 1985–2000
(thousand acre-feet)

	1985	1990	1995	2000
Maricopa	2,790	2,800	2,680	2,410
Mohave	114	163	157	172
Pima	260	256	296	337
Pinal	1,100	850	1,410	1,180
Yavapai	78	215	95	92
Yuma	1,480	1,410	1,570	1,640

Source: U.S. Geological Survey, *Water-Use Trends in the Desert Southwest—1950–2000*, 2004.

Increases in urban and suburban populations will increase municipal water demand. Water use increases proportionally with population growth if per capita use remains steady. Many factors affect per capita usage. For example, new construction to accommodate growth can include water-saving features that reduce per capita consumption. On the other hand, large cities can alter their own climates through the creation of urban heat islands, which in turn may lead to higher water use. Of greater importance to water demand are the water-use habits and expectations of residents. Conservation programs have met with mixed results in the past, and the realistic potential for savings is a subject of debate.

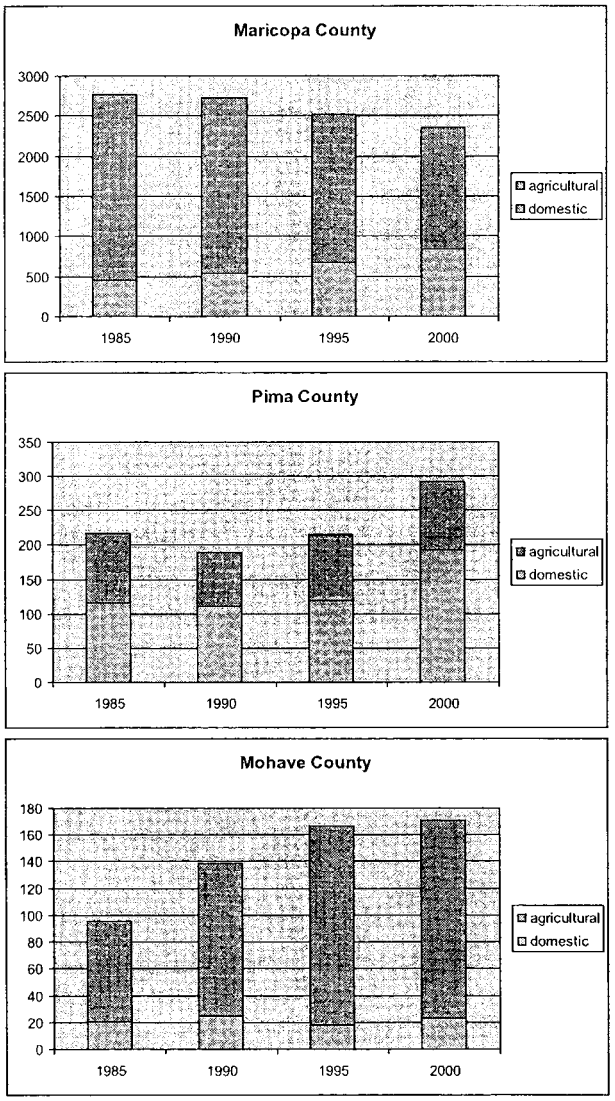
It often is assumed that population growth will occur on previously irrigated farmlands, and when this happens, total water use will decline. But this has not always been the case. In some places, residential development takes place on desert land, or farmland is merely displaced by development to new agricultural parcels further from cities, and total water use increases. In Maricopa County, total water usage declined between 1990 and 2000, when a 56 percent increase in public supply was more than offset by a 30 percent decrease in agricultural irrigation. On the other hand, no long-term change in water use was recorded when Salt River Project agricultural acreage was converted to residential and commercial development. Figure 4.1 compares changes in agricultural and domestic water use in Maricopa, Pima and Mohave Counties from 1985 to 2000.

CURRENT WATER SOURCES

Currently, Arizona draws on four principal sources of water: the Colorado River, other surface water, groundwater and effluent. An average of 39 percent of Arizona's water (2.8 million acre-feet) comes from the Colorado River, and about half of that is delivered through the Central Arizona Project (CAP) to central Arizona. Non-Colorado River surface water sources include the Salt, Verde, Gila and Agua Fria Rivers and the reservoir storage systems located on them. On average, Arizonans get 19 percent of their water (1.4 million acre-feet) from all non-Colorado River surface water sources (Figure 4.2).

Approximately 40 percent of the water used in Arizona comes from groundwater. In total, Arizona's aquifers hold a very large amount of water, most of it water that has been collecting underground for thousands of years. However, the capability to extract and use this groundwater is limited by a number of factors, including depth, geology and chemistry. Natural recharge, which occurs mainly along mountain fronts and in stream channels, continues to add to this supply. In the most populous areas of the state as well as in

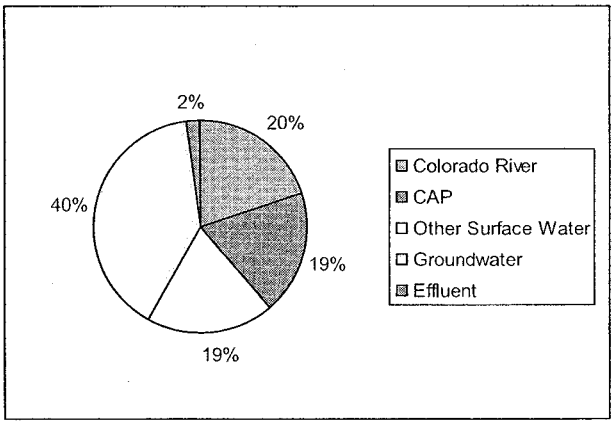
FIGURE 4.1
FRESHWATER USE
(thousand acre-feet)



Source: U.S. Geological Survey, *Water-Use Trends in the Desert Southwest—1950-2000*, 2004.

areas with irrigated agriculture, however, water is pumped from groundwater sources faster than it is replenished naturally. This has led to declines in water level by hundreds of feet in some areas as well as aquifer compaction, subsidence of the ground surface and soil fissures.

FIGURE 4.2
WATER SOURCES, 2004



Source: Kathy Jacobs and Marshall A. Worden, "Water in Arizona: Challenges Met and Remaining," Chapter 1 in *Arizona's Water Future: Challenges and Opportunities*, Phoenix: Arizona Town Hall, 2005.

Effluent is treated wastewater. The larger the population, the more effluent is generated. Only a small portion of the effluent that is generated in Arizona is used: approximately 0.14 million acre-feet per year. Effluent in Arizona is used most often for irrigating non-food crops and turf and for industrial cooling. When released to stream beds, it may support riparian ecosystems. In conjunction with stream releases or in separately constructed facilities, it also is used for artificial recharge of aquifers. Combined, these effluent uses represent only two percent of Arizona's water demand.

WATER RESOURCE MANAGEMENT IN ARIZONA

In Arizona, the different sources of water are managed through different systems and under different agencies. Groundwater in populous parts of the state is managed differently from that in less populous areas. In addition, water quality is managed separately from water supply.

Water from the Colorado River is subject to the Law of the River, a collection of interstate compacts, international treaties, Congressional acts and Supreme Court Decrees resulting from lawsuits between the states sharing the river. The U.S. Bureau of Reclamation is responsible for managing the river, under the decision-making authority of the Secretary of the Interior. The Arizona Department of Water Resources (ADWR) is responsible for making recommendations to the Secretary regarding allocation of Arizona's share of the river, although essentially all of the allocations already have been made.

The CAP is allocated approximately half of Arizona's Colorado River water. Construction on the CAP canal, which carries Colorado River water to users in central Arizona, began in 1973. The first deliveries were made on the incomplete system in 1984, and the project was declared substantially complete in 1993. The canal system has a designed capacity of 1.8 million acre-feet per year, and a total entitlement to 1.5 million acre-feet. The CAP is managed and operated by the Central Arizona Water Conservation District (CAWCD), an organization formed to contract with the federal government for CAP water and subcontract with water users in central Arizona. The CAWCD implements policies set by its Board of Directors, a 15-member body elected from the CAP's three-county service area: Maricopa, Pima and Pinal Counties. The Board sets CAP rates annually.

The Salt River Project (SRP) manages surface water from its reservoirs on the Salt and Verde Rivers. It is a quasi-governmental organization created to gain federal assistance in building one of the first major water development projects in the West. The Bureau of Reclamation, which constructed the reservoirs, retains title to them. Dams and reservoirs have been added to the system as needs expanded, and the organization has evolved to manage and operate the extensive SRP water and power systems. Land owners in the SRP service area own rights to SRP water. Although the SPP was originally developed for agriculture, about 88 percent of its member lands are now residential. The project allocates water to member lands at a standard annual rate of three acre-feet per acre, except in times of shortage, such as in 2004, when two acre-feet per acre were allocated.

A body of law referred to as "prior appropriation" governs other surface water. The right to use a certain amount of surface water for a specified purpose is acquired through the process of obtaining a permit to take the water, constructing the means for taking the water and conveying it to its point of use, and then using the water. The first person to acquire a right to water from any water body has the highest right to water, while the newest water right holder has the lowest right. In times of shortage, the holders of the older rights receive all of their water before newer rights holders receive theirs.

Most of the surface water in Arizona already has been appropriated. ADWR administers the surface water permit program, but the rights holders perform water management, and disputes between rights holders that are not settled between them are litigated.

Arizona law holds that effluent belongs to the entity that generates it (except under certain special circumstances). The entity has the right to recapture the effluent even if the effluent has been discharged to a stream channel for many years and others have appropriated the flow as surface water. ADWR has an interest in effluent as a renewable water resource, especially when it is substituted for groundwater use or recharged to the aquifer in Active Management Areas (AMAs). The uses of effluent are regulated for environmental and public health purposes by the Arizona Department of Environmental Quality (ADEQ) and the U.S. Environmental Protection Agency (EPA). These agencies also share regulatory authority over other activities relating to water quality such as waste discharges, nonpoint source pollution, groundwater remediation and drinking water treatment.

Groundwater is managed under two systems. In critical groundwater areas, *i.e.*, the AMAs, ADWR regulates the use of groundwater under the authority of the 1980 Groundwater Management Act (GMA). In the rest of the state, groundwater is governed by the reasonable use doctrine: the owner of land has the right to pump groundwater from beneath the land for a reasonable use on the land. Like surface water within the prior appropriations system, under reasonable use, groundwater management is the responsibility of the right holder and intractable disputes between rights holders are litigated. ADWR issues permits for water wells and maintains a registry of well permits.

More comprehensive groundwater management is possible in AMAs through the planning and regulatory activities of ADWR. Since the 1940s, groundwater has been pumped more rapidly in certain parts of the state than it has been replenished, resulting in a condition called "overdraft." AMAs were created in basins where groundwater overdraft had become a critical issue because of population growth and agricultural water uses. The management goals of the AMAs differ in some ways because of their different situations, but they share the overall goal of reducing or halting overdraft.

Four AMAs were created at the time of the GMA passage: Phoenix, Tucson, Pinal and Prescott. The Santa Cruz AMA, which split off of the Tucson AMA, became a separate AMA in 1994. The boundaries of the AMAs surround major population centers and generally coincide with the boundaries of groundwater basins (Figure 4.3). Eighty percent of Arizona's population lives within the boundaries of these AMAs. Through

the mechanisms established in the GMA, ADWR can manage groundwater withdrawal and use to achieve AMA-wide goals. Table 4.2 shows the management goals for each of the AMAs. The GMA also established Irrigation Non-Expansion Areas, where irrigated acreage could not expand.

TABLE 4.2
ACTIVE MANAGEMENT AREA GOALS

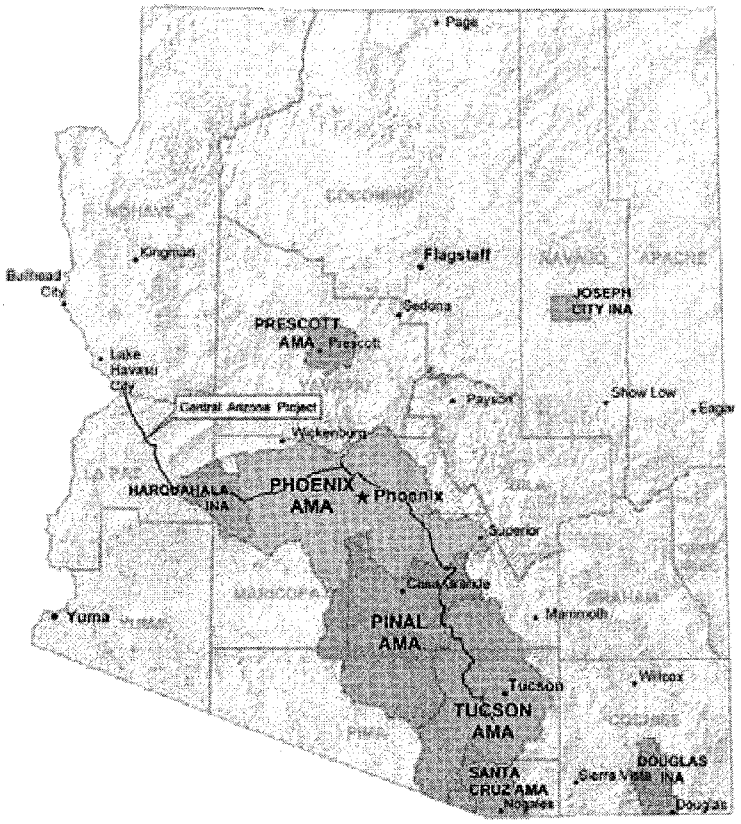
AMA	Description	Goals
Phoenix AMA	Large, urban area; agricultural use	Safe-yield by 2025
Pinal AMA	Agricultural use; small urban area economy	Extend agricultural economy as long as feasible. Allow development of non-irrigation water uses. Preserve water supplies for non-agricultural uses.
Prescott AMA	Large, urban area	Safe-yield by 2025
Santa Cruz AMA	Small urban area; binational; riparian and water level issues	Maintain safe-yield. Prevent local water tables from declining long-term.
Tucson AMA	Large, urban area	Safe-yield by 2025

Note: Safe-yield is defined as a long-term balance between the annual amount of groundwater withdrawn in the AMA and the annual amount of natural and artificial recharge.
Source: Arizona Department of Water Resources, 2002.

No new areas of Arizona have become AMAs since the passage of the Act. The GMA provides for designation of AMAs where overdraft is identified as a critical problem, and ADWR undertook studies to determine the need in the San Pedro watershed of Cochise County. The ADWR opinion, issued in March 2005, stated that the area did not meet statutory requirements for an AMA. This opinion disappointed environmental interests, but reflected the preferences of most jurisdictions in rapidly growing areas outside AMAs. They continue to prefer local action to formation of an AMA and the state-level regulation that would ensue.

Within AMAs, annual groundwater withdrawals are limited and subject to regulation according to the type of right held by the pumper. There are irrigation rights, non-irrigation rights (Type I and Type II), service-area rights and rights pursuant to new groundwater withdrawal permits. Domestic wells with low pump capacities (generally, 35 gallons per minute or less) are exempt from most GMA regulations.

FIGURE 4.3
ACTIVE MANAGEMENT AREAS AND IRRIGATION NON-EXPANSION AREAS



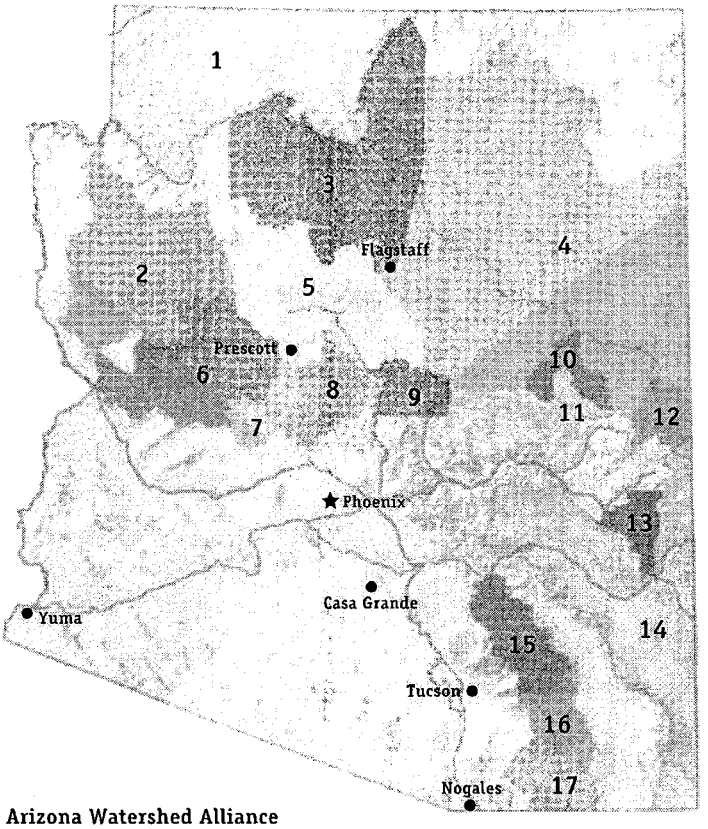
Assured Water Supply and Adequate Supply Rules

Developers of new subdivisions are required to show that they have access to sufficient water to support the needs of the development. Outside of AMAs, developers must obtain a determination of water supply adequacy from ADWR before they can subdivide land and sell lots. However, even when the water supply is determined to be inadequate, lot sales may proceed as long as the first purchaser of the land is informed.

A few new tools exist for counties and communities outside AMAs to help them prepare for growth. The Arizona Legislature has required and authorized rural communities to plan for growth and drought. "Growing Smarter" legislation passed in 2000 contains a requirement that growing municipalities with populations larger than 2,500 and counties with more than 125,000 people include a water resources element in their comprehensive plans. The element must identify legally and physically available supplies that are known to exist, estimate future demand for water, and describe how the demand will be served. The requirement provided an incentive for the counties and municipalities to plan for growth and include water supplies among the elements included in the plans. The Arizona Rural Watershed Initiative has provided planning and technical assistance to rural areas. Authorizing legislation gave impetus to the creation of watershed partnerships and such alliances have been formed in 17 watersheds (Figure 4.4). Active alliances have focused first on acquiring accurate information about their water situations and informing and educating themselves and their communities. Their combined efforts give them a stronger voice in regional and state decisions.

More effective water management tools are available within AMAs. There, developments either must obtain a Certificate of Assured Water Supply (AWS) from ADWR or must be served by a water provider with an ADWR-issued AWS Designation. In order to obtain a certificate or designation, the developer or provider must show that water is physically, continuously and legally available for 100 years and that it meets federal and state potable water quality standards. In addition, the water supplier must show the financial capability to develop any needed water infrastructure. Finally, use of the water must be consistent with the water management goals of the AMA. This final criterion means that a significant portion of the water used by new developments must come from renewable supplies. For the most part, the renewable water used to meet this requirement in central Arizona is CAP water, even for developments too far distant from the CAP canal to take the water directly. Where groundwater conditions are favorable, the rules allow the developer or provider to offset groundwater use by the new development with recharge of renewable water or substitutions of renewable water for an established groundwater use elsewhere in the AMA.

FIGURE 4.4
RURAL WATERSHED GROUPS



Arizona Watershed Alliance

1 Arizona Strip
2 Northwest Arizona Watershed Council
3 Coconino Plateau Regional Water Study
4 Little Colorado Multi-Objective Management
5 Upper Verde and Middle Verde Studies
6 Upper Bill Williams
7 Upper Hassayampa
8 Upper Agua Fria
9 Northern Gila County Water Plan Alliance
10 Silver Creek
11 Show Low Creek
12 Upper Little Colorado River Partnership
13 Eagle Creek
14 Upper Gila
15 Lower San Pedro
16 Middle San Pedro
17 Upper San Pedro Partnership

Source: Arizona Department of Water Resources.

In the process of developing the AWS rules, it became clear that a mechanism was needed to give developments on AMA land distant from the CAP canal access to renewable supply credits for development. At the same time, Arizona was not using its full entitlement to CAP water. The large quantity of "excess" CAP water represented a financial challenge and a water management opportunity. The State legislature authorized development of a Groundwater Recharge Program and creation of the Central Arizona Groundwater Replenishment District (CAGRD) and Arizona Water Banking Authority (AWBA). These actions all were intended, among other goals, to use water available immediately that otherwise would go unused in Arizona. They also provide ways to buffer CAP users from system shortages and outages. In addition, the recharge program and the CAGRD help developers meet AWS requirements.

The Recharge Program

Arizona's groundwater recharge program allows groundwater users to accrue credits that can be used to claim water in the future or to offset current groundwater pumping. Entities with CAP subcontracts can store CAP water they cannot use immediately in recharge facilities, from which they may recover the water later. They may also recover the water at a different location. In Groundwater Saving Facilities, water credits are accrued for substituting CAP water for groundwater pumped pursuant to an irrigation, or other, grandfathered right. Water credits also can be earned by recharging effluent. Long-term groundwater storage credits are banked in the account of the storage permit holder. Later recovery of storage credits requires a recovery well permit. Many issues related to recovery of long-term storage credits remain to be resolved, and they are likely to have an impact on how future water supply plans are configured. Table 4.3 shows the number of permitted recharge projects in AMAs as of June 30, 2005.

Subdivision developers and municipal providers also can comply with AWS requirements by joining the CAGRD. CAGRD members pay the District, which assumes the obligation to replenish excess groundwater use, as determined by implementation of the AWS Rules. This option is especially useful for entities that do not hold CAP subcontracts. Because of factors such as the high cost of infrastructure, a few providers with CAP subcontracts and the new developments in their service areas have chosen to use the CAGRD by requesting that their subcontract entitlements be assigned to that organization. The AWS program and the CAGRD function together to ensure that all new subdivisions in AMAs include a substantial proportion of renewable supplies in their water portfolios. The CAGRD, in its most recent ten-year

plan of operation, projects enormous growth in demand for its replenishment services over the next 25 years. Figure 4.5 projects CAGRD's replenishment obligations both for current members only and for new enrollments. The integrity of the system rests on its ability to meet its future replenishment obligations. In its most recent ten-year plan, the CAGRD projected declining availability of excess CAP water to the point that the District will not be able to meet its replenishment obligation with excess CAP water by 2020 and possibly as early as 2015. Other sources will have to be used.

TABLE 4.3
PERMITTED RECHARGE PROJECTS IN AMAS
(June 30, 2005)

	CAP	Effluent	CAP + Effluent	CAP + Surface Water	Surface Water + Effluent	CAP + Effluent + SW	All
Phoenix AMA							
USF	13	21	3	2		2	41
GSF	5	3	1				9
Prescott AMA							
USF		3			1		4
GSF							0
Pinal AMA							
USF		4					4
GSF	3						3
Tucson AMA							
USF	4	5					9
GSF	6						6
Total AMAs	**31**	**36**	**4**	**3**	**1**	**1**	**76**

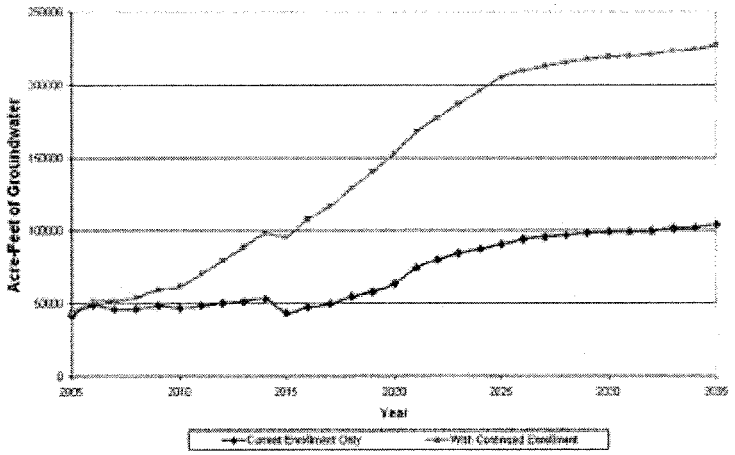
Note: USF = Underground Storage Facility and GSF = Groundwater Savings Facility.
Source: Arizona Department of Water Resources, Semi-Annual Status Report, June 30, 2005

Arizona Water Banking Authority

The AWBA was created in 1996 primarily to ensure reliable municipal water deliveries during future shortages on the Colorado River or CAP system failures. It achieves this by storing CAP water in constructed recharge and groundwater savings facilities. The AWBA does not compete with other CAP water users or rechargers, standing last in line in priority. It has, however, used all the unclaimed and unused CAP water in the system. Since its inception, the AWBA has stored or saved more than two million acre-feet of water for Arizona uses. The AWBA also stores some water for Nevada under

its interstate banking authority. The AWBA works closely with the CAWCD, which has the responsibility to deliver recovered CAP water in times of shortage or outage of the CAP canal.

FIGURE 4.5
PROJECTED CAGRD REPLENISHMENT OBLIGATIONS



Source: Justin Ferris, Sharon B. Megdal and Susanna Eden, "An Introduction to the Central Arizona Groundwater Replenishment District," The University of Arizona, Water Resources Research Center, 2006.

TOOLS AND STRATEGIES

To accommodate new growth, planners are examining their water portfolios and looking for ways to expand them. Three main avenues for expansion have been identified.

Demand Management and Conservation

By using less, Arizonans create a source of water to support growth. This is not a universally popular idea, and generally will not lead to conserving behaviors. But metering and prices can motivate conservation behavior that saves consumers money on their water bills. Incentive and assistance programs can lead to changes in infrastructure that make it more water-efficient. Regulation and ordinances can mandate or prohibit activities in order to reduce water use.

Maximize Use from Existing Sources

Most water plans include maximizing the use of existing renewable sources of water: CAP subcontracts, other surface water rights and effluent, along with continued use of groundwater. As these sources approach full utilization, problems become more apparent and costs rise. Although southern Arizona is rich in groundwater resources, problems associated with overpumping are already severe in some areas. Groundwater overdraft is drawing down water tables, threatening or destroying ecosystems, and, in some places, causing subsidence. In the headwaters of the Verde, Agua Fria and San Pedro Rivers, groundwater pumping will have to be limited if surface water flows are to be maintained. Even in the best of circumstances, the costs of extracting groundwater rise as depth to water increases, and in Arizona the quality of the water usually worsens with depth.

There will be "excess" CAP water for some years into the future, although the annual amount of this "excess" is projected to decline from 900,000 acre-feet in the year 2005 to just over 100,000 acre-feet in 2049, and to zero in 2050. In addition, some CAP water will be available for redistribution over the next 20 years, although uncertainty occasioned by on-going stream adjudications and Indian water settlements makes it impossible for any entity to plan on acquiring more CAP water from this source. Other Colorado River water that is not allocated to the CAP could be leased or acquired by other mechanisms from Indian and non-Indian irrigation water users with rights to pump directly from the river. However, such transfers would be complicated and would require that third-party impacts be addressed.

Develop New Sources

At this time, the outlook for new water is limited. Importation of groundwater from rural areas of Arizona to urban areas is limited by statute. Only the Butler, McMullen and Harquahala Valleys may be exploited for groundwater export to AMAs. It has been estimated that large quantities of water exist in these basins, but acquiring and transporting the water would be extremely expensive. In addition, weather modification and treatment of poor quality water, *e.g.*, desalination, have been mentioned as future ways to increase water supplies, assuming the technologies are cost-effective.

STRATEGIES FOR ASSURING WATER FOR CURRENT AND FUTURE POPULATIONS

Water planning in Arizona has served to accommodate growth, not restrict it. It has been recognized by growth proponents and opponents alike that the more efficiently water resources are managed, the more growth water supplies will support. With current technology, Arizona has enough water to support a population several times its current size, assuming that essentially all the water would go to municipal and industrial users. However, as more than one observer has commented, other environmental stresses and economic dislocations will be felt long before growth reaches the theoretical limits of Arizona's water supply. Finding a smooth path to sustainable water supply is another matter.

Demand Management Strategies

Improvements in treatment and delivery systems, including leak detection and repair are capable of saving large quantities of water. Metering reduces demand by providing consumers with water use information that allows them to monitor and manage their own water use. Other mechanisms that provide users information for the purpose of inducing water conserving behavior include education and assistance programs. These programs have included information, for example, about low-flow plumbing fixtures, low-water-use landscaping, irrigation scheduling and irrigation system maintenance. Water rates also have been used to induce water saving behavior; tiered water rates, which are relatively low for smaller amounts and rise in steps as the amount of water use increases, tend to discourage the use of very large amounts of water, especially for outdoor uses.

Inducing consumers to make costly structural changes like low-water-use plumbing and landscaping may be more effectively achieved through incentives, and some incentive programs have been very successful. One strategy reduces water service hook-up fees in exchange for incorporating water saving into house and landscape designs. Another tool is modification of building practices through changes to building codes. Local ordinances cause reduced water demand by restricting uses temporarily in time of drought or other supply emergencies. Temporary restrictions may limit hours for certain types of use, such as outdoor car washing, or prohibit them outright. More permanent reductions have been achieved by ordinances that limit the amount of high-water-use landscaping in new developments.

Land Use Planning

Land use planning has been used as a growth-management tool to create and preserve amenities valued by the community such as residential character, open space, transportation and historical and cultural values. On the other hand, water planning has been used most often to prepare for and accommodate growth. Some people have suggested, however, that water planning can provide a powerful tool for managing growth. There are communities in the United States where a moratorium on new water hookups has been used to slow and redirect building activity to prevent growth from outstripping the ability of a city or county to supply water. Some private water companies in Arizona have had to impose moratoria within their service areas. The AWS rules for new subdivisions have the potential for regulating growth on the basis of the availability of water within AMAs. The CAGRD has buffered developers from the growth management potential of those rules.

Water Resource Impact and Development Fees

Impact or development fees are common tools used by local jurisdictions to offset the costs imposed by population growth, such as those for transportation and education. Water impact fees do not necessarily reduce water demand, but they provide a source of funds to pay for new supplies to meet new demands. Proponents of such fees argue that the price of new development should reflect the additional costs it imposes on a jurisdiction. Opponents argue, among other things, that development ultimately benefits the entire community, so the whole community should pay.

STRATEGIES FOR AUGMENTING SUPPLIES

Reusing Effluent

Currently more effluent is generated than is reclaimed for direct use or recharged. Effluent is the only source of water that is growing. Growth in effluent follows simply from the fact that more people are washing dishes, taking showers and flushing toilets. Wastewater can be reused through several mechanisms. At the site of use, "graywater"–drain water from washers, tubs, showers and other than kitchen sinks—can be used for landscape watering. Water quality guidelines for graywater use have been established by ADEQ. On-site use of graywater reduces demand for water from the potable water system. Although it currently provides an insignificant proportion of water saving to AMAs, its potential is much larger. However, widespread use of graywater could create sewage treatment system problems as a result of re-

duced flows in sewage lines. It also could affect the water supply plans of providers who are depending on increases in effluent flows based on historical practices, that is, almost no graywater use.

Wastewater, after it has been collected in a central facility, may be used for turf irrigation after tertiary treatment, or after purification it may qualify for some industrial or even for potable uses. Once considered a nuisance, effluent is becoming a valuable commodity. Treated wastewater that meets water quality standards established by ADEQ can be saved for later reuse through recharge. Most municipalities and many developers are planning to use most or all of the effluent they generate in the future. Frequently, water treatment facilities are included in development plans and effluent reuse is specified for golf course and landscaping irrigation. Decorative lakes constructed to enhance the desirability of new residential developments in Arizona were once filled with high quality water, but a law passed in 1987 ended the practice. Such lakes are now filled with treated effluent instead.

Throughout human history treated wastewater has been used in drinking supplies, and it continues to be used in cities that rely on surface water. Dilution in natural rivers removes the stigma of using treated wastewater directly. As population growth strains existing supplies, direct potable reuse of purified wastewater becomes an important resource option. A major impediment to this use is public disapproval and concern for health implications. With all the unregulated substances of concern moving from wastewater into the environment, water suppliers are looking seriously at the issue. Various entities have investigated recharge of effluent to take advantage of soil-aquifer treatment and blending with native groundwater for potable use. A project using effluent that has been purified by advanced treatment has been approved for a residential development in California.

Other Strategies

Weather modification is a strategy for enhancing the amount and timing of precipitation over watersheds. Feasibility studies have been carried out intermittently over several decades with mixed results. Most planners consider the near-term probability of producing more water through weather modification a long shot. Another technologically questionable strategy is desalination. The problems of high energy costs and disposal of brine streams have hindered large-scale desalination for municipal uses in the United States. It can be cost-effective in some situations, and Phoenix, for example, is investigating the possibility of treating and using brackish water from shallow aquifers southwest of the city.

CAP to Sierra Vista

Residents of Sierra Vista are actively studying the possibility of extending the CAP canal to that city. A feasibility study performed by the Bureau of Reclamation estimated construction would cost $193 million. This estimate is based on a pipeline with enough capacity to carry approximately 30,000 acre-feet of water per year. The same study estimated that the Sierra Vista area would use 38,500 acre-feet annually by 2050. The preferred route would run east along Interstate 10 from the current terminus at Pima Mine Road, turn south at Arizona Highway 90, and end near Fort Huachuca's main gate. Sierra Vista currently has no CAP water subcontract. For Sierra Vista, getting the water may be a greater challenge even than paying for the conveyance. On the other hand, although the Green Valley Community Water Company, only seven miles south of the terminus, actually holds a CAP subcontract for 1,900 acre-feet of water per year, the high cost associated with extending the CAP canal has prevented that area from taking its entitlement.

Water harvesting and watershed management are strategies for capturing more of the water that falls as rain or snow for human use. Water harvesting in Arizona generally occurs on site and involves constructing and operating systems that collect, store and distribute precipitation, usually for landscape irrigation. The potential for water harvesting is large, but at the individual lot scale, its success depends on the knowledge and commitment of individual land owners. Watershed management involves manipulating plant cover on watersheds to enhance the amount and timing of runoff. Most commonly, management to increase water yields involves removal of phreatophytes, *i.e.* plants that use a lot of water and thinning of vegetation in general. Watershed management to increase water yields must include an understanding of the implications for water quality, soil stability and unintended environmental consequences.

TRANSFERRING, TRANSPORTING AND IMPORTING WATER

Inter-Sectoral Transfers—the Future of Agriculture

A substantial portion of the water for Arizona's growing population will come from reductions in agricultural irrigation. Currently, agriculture accounts for 80 percent of all water use in Arizona, down from 97 percent in 1950. For the most

part, the conversion of agricultural water use to municipal use occurs on or near the farm. A prime example is conversion of SRP member lands from farms to residences. In 1980, the GMA anticipated the gradual decline of agricultural water use inside AMAs as farmland was replaced by municipal development. For various reasons, however, the overall anticipated decline in agricultural water use has not occurred. Table 4.4 juxtaposes data on irrigated cropland acreage with freshwater withdrawals for agriculture between the years 1990 and 2002.

TABLE 4.4
IRRIGATED CROPLAND AND FRESHWATER WITHDRAWALS FOR AGRICULTURE, 1990–2002

Year	1990	1992	1995	1997	2000	2002
Acres of irrigated cropland (thousands of acres)		903.2		1,016.6		887.1
Freshwater withdrawals (thousands of acre-feet)	6,060		6,390		6,050	

Sources: U.S. Department of Agriculture, Economic Research Service, State Fact Sheets: Arizona, December 8, 2005; and U.S. Geological Survey, Water-Use Trends in the Desert Southwest—1950–2000.

Renewable surface supplies provided about 49 percent of agricultural water use in the year 2000. Cities are eyeing these large quantities of renewable water as they look for new sources to meet their growing demand. Non-Indian irrigation water users on the Colorado mainstem include the Yuma County Water Users Association, Yuma Mesa Auxiliary Unit B, North Gila Valley Unit, Wellton-Mohawk Irrigation and Drainage District (IDD), Yuma Mesa IDD and Cibola Valley IDD. A number of different voluntary mechanisms could be used by cities to acquire water supplies from non-Indian irrigators. These include land purchase, temporary and long-term lease arrangement, forbearance,[2] fallowing and other conservation arrangements. Any agreements for acquiring agricultural water will require compliance with applicable state and federal policies.

Groundwater aquifers outside AMAs hold large quantities of water that might supply growing cities. Under current statutes, however, the num-

[2] Forbearance means that in any one year agricultural parties with rights to use Colorado River water would not take the water to which they are entitled so that others can use it. The right holders are compensated for forgoing their right to a certain amount of water.

Griffith CEC

RECD MEYER, HENDRICKS, BIVENS & MOYER
DEC 21 1998
Arizona Corporation Commission
DOCKETED
DEC 16 1998

BEFORE THE ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

In the matter of the Application of Griffith Energy LLC in conformance with the requirements of Arizona Revised Statutes 40-360.03 and 40-360.06 for a Certificate of Environmental Compatibility authorizing construction of a natural gas-fired, combined cycle generating facility in Mohave County, Arizona, southwest of Kingman, Arizona, a distance of about 9 miles.

CASE NO. 90
DOCKET NO. L-00000H-98-0090

DECISION NO. 61295

CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

Pursuant to notice given as provided by law, the Arizona Power Plant and Transmission Line Siting Committee (the "Committee") held a public hearing in the Mohave County Board of Supervisors Facilities, 809 E. Beale Street, Kingman, Arizona, on September 14, 1998, in conformance with the requirements of Arizona Revised Statutes § 40-360, *et seq.*, for the purpose of receiving evidence and deliberating on the Application of Griffith Energy LLC ("Griffith") for a Certificate of Environmental Compatibility in the above-captioned case.

The following members and designees of members of the Committee were present for the deliberations and vote on the Application at the September 14, 1998, hearing:

Charles S. Pierson	Chairman, Designee for Arizona Attorney General Grant Woods
Steve Olea	Arizona Corporation Commission
Dennis Sundie	Arizona Department of Water Resources
Doug Sawyer	Arizona Department of Environmental Quality
Jeff Maguire	Appointed Member
Arlo Lee	Appointed Member

The Applicant was represented by Jay Moyes of Meyer, Hendricks, Bivens & Moyes, P.A., Attorneys for Griffith. There was one intervenor, Robert K. Holsinger. Sixty letters of

support for the Project and two letters opposing the Project were received and have been placed in the docket.

At the conclusion of the hearing, the Committee, having received the Application, the appearance of Griffith, the evidence, testimony and exhibits presented by Griffith, and the testimony and evidence presented by the intervenor, and being advised of the legal requirements of Arizona Revised Statutes § § 40-360 to 40-360.13, upon motion duly made and seconded, voted unanimously to grant Griffith the following Certificate of Environmental Compatibility (Case No. 90):

Griffith Energy LLC is hereby granted a Certificate of Environmental Compatibility authorizing construction of a baseload 520 megawatt (MW) [650 MW peaking] natural gas-fired, combined cycle generating facility, together with the necessary and related infrastructure and appurtenances, such as roadways, gas and water pipelines, storage tanks, transmission interconnection switchyard, storm water and wastewater management facilities, warehouses and other buildings, which generating facility shall be located in the SW¼ of Section 6, T. 19 N., R. 17 W., in Mohave County, Arizona.

This Certificate is granted upon the following conditions:

1. The Applicant will comply with all existing applicable air and water pollution control standards and regulations, and with all existing applicable ordinances, master plans and regulations of the State of Arizona, the County of Mohave, the United States, and any other governmental entities having jurisdiction.

2. The source of water for operation of the Project shall be a new well field to be located in only that portion of the Sacramento Valley Basin lying south of the Kingman - Oatman Road and West of Interstate 40. Any alternative long-term supply of groundwater for the Project pumped from any different location must be pre-approved by the Arizona Corporation Commission.

3. Prior to construction of the Project, the proposed well field aquifer shall be tested by means of a new well to be drilled and pump tested, using a methodology proposed by Applicant's hydro-geologic consultant and approved by the Arizona Department of Water Resources ("ADWR") in accordance with generally accepted procedures, for a duration of at least 72 hours. The test results shall be made available, within a reasonable

time, to ADWR and Mohave County as a matter of public record.

4. During the operating life of the Project, the Project's water usage and the water table at the well field shall be metered and measured at six-month or shorter intervals and reported to ADWR annually; provided, however, that water table measurement may be reduced to annually, upon approval by ADWR, if the more frequent measurements reflect a consistent trend.

5. A procedure shall be established to annually monitor and report to ADWR any reasonably measurable land surface subsidence, using methodologies pre-approved in writing by ADWR in accordance with generally accepted procedures for measuring subsidence, for so long as the Project is using material quantities of groundwater.

6. This authorization to construct the Project will expire five (5) years from the date the Certificate is approved by the Arizona Corporation Commission unless construction is completed to the point that the plant is capable of operating at its rated capacity by that time; provided, however, that prior to such expiration the Project owner may request the Arizona Corporation Commission to extend this time limitation.

GRANTED this 13th day of November, 1998.

THE ARIZONA POWER PLANT AND
TRANSMISSION LINE SITING COMMITTEE

By _____
Charles S. Pierson, Chairman

. . .

DOCKET NO. L-00000H-98-0090

APPROVED BY ORDER OF THE ARIZONA CORPORATION COMMISSION

Chairman Commissioner Commissioner

In Witness Hereof, I, Jack Rose, Executive Secretary of the Arizona Corporation Commission, set my hand and cause the official seal of this Commission to be affixed, this 14th day of Dec, 1998.

By
Jack Rose
Executive Secretary

Dissent: _____

ADWR Confirmation Letters
May 4, 1999 and June 22, 1999

ARIZONA DEPARTMENT OF WATER RESOURCES
Hydrology Division
500 North Third Street, Phoenix, Arizona 85004
Telephone (602) 417-2448
Fax (602) 417-2425

RECEIVED
MOYES STOREY
MAY 11 1999

JANE DEE HULL
Governor

RITA P. PEARSON
Director

May 4, 1999

Arizona Power Plant and Transmission
Line Siting Committee
c/o Mr. Charles S. Pierson, Chairman
Office of the Attorney General
15 South 15th Avenue
Phoenix, Arizona 85001

Re: Griffith Energy Project, Certificate of Environmental Compatibility

Gentlemen:

The above-referenced Certificate contains conditions that involve approval by this Department ("ADWR") of certain actions required of the Applicant. This letter confirms fulfillment of and/or compliance with those conditions, insofar as ADWR is involved, as follows:

Condition 3:

A new production well has been drilled at the proposed well field site and pump tested using methodologies that were pre-approved by ADWR and in accordance with generally accepted procedures. The well drilling and testing results have been published in a detailed report entitled *Griffith Production Well I, Results of the Drilling and Testing Program*, by Manera, Inc., dated March 20, 1999, which has been furnished to and reviewed by ADWR confirming compliance with the pre-approved methodologies and procedures.

Additionally, for your information with respect to Condition 2, ADWR has recently issued drilling permits for five additional production wells and one monitoring well that are proposed to constitute the well field and water supply for the Project, at locations complying with the designation in Condition 2 of the Certificate.

Respectfully,

Greg Wallace
Assistant Director

cc: Griffith Energy LLC
Jay L. Moyes

ARIZONA DEPARTMENT OF WATER RESOURCES
Hydrology Division
500 North Third Street, Phoenix, Arizona 85004
Telephone (602) 417-2448
Fax (602) 417-2425

JANE DEE HULL
Governor

RITA P. PEARSON
Director

June 22, 1999

Arizona Power Plant and Transmission
Line Siting Committee
c/o Mr. Charles S. Pierson, Chairman
Office of the Attorney General
15 South 15th Avenue
Phoenix, AZ 85001

Re: Griffith Energy Project, Certificate of Environmental Compatibility

Gentlemen:

The above-referenced Certificate contains conditions that involve approval by this Department ("ADWR") of certain actions required of the Applicant. This letter confirms fulfillment of and/or compliance with those conditions, insofar as ADWR is involved, as follows:

Condition 5:

A procedure has been established to monitor for land surface subsidence. ADWR has received and hereby approves the surveyed location and placement of a permanent base reference monument, and the proposed procedure of monitoring surveys to be performed annually by an independent registered survey engineer to detect any movement of that monument after commencement of material groundwater pumping from the proposed well field.

Additionally, for your information with respect to Condition 2, ADWR has recently issued drilling permits for five additional production wells and one monitoring well that are proposed to constitute the well field and water supply for the Project, at locations complying with the designation in the Condition 2 of the Certificate.

Respectfully,

Greg Wallace
Assistant Director

GW/ef

cc: Griffith Energy LLC
Jay I. Moyes
Steve Olson
Dennis Sundie

2001

GRIFFITH ENERGY

Administrative Office:
3003 N. Central Avenue
Suite 1250
Phoenix, AZ 85012
602-604-2136
fax: 602-604-2188

Site Office:
3375 W. Navajo Drive
P.O. Box 3519
Kingman, AZ 86401
928-718-0102
fax: 928-718-0727

RECEIVED
MOYES STOREY
APR 2 9 2002

April 17, 2002

Arizona Department of Water Resources
Attn: Mr. Greg Wallace, Chief Hydrologist
500 North Third Street
Phoenix, AZ 85004

Subject: Griffith Energy Project Report in Compliance with Certificate of Environmental Compatibility Issued by the Arizona Corporation Commission

Gentlemen:

As required under conditions 4 and 5 of Griffith Energy LLC's Certificate of Environmental Compatibility, enclosed are the following: (1) Subsidence Monitoring Report; and (2) a graph depicting the real time readouts of 2001 changes in depth to water below ground level in the monitor well at the Mohave County Griffith Well field.

As the certified engineer's report states, there has been no subsidence of the benchmark monument since installed in November of 1998.

The aquifer water level at the well field monitoring well dropped from approximately 581.5 feet in March, 2001 to the 585.5 foot level in January 2002.

Finally, Peter Kaleta, P.E., Engineering Manager, Mohave County Water Division reports that the total Griffith Project water use for 2001 was just under 370 million gallons (369,667,000) or slightly over one million gallons per day, average.

If you have any questions, please call Chet Vasey at (928) 718-0102 ext. 227, or Jay Moyes at (602) 604-2106.

Sincerely,

Chet Vasey

Chet Vasey
Environmental Safety Manager
Griffith Energy Project

cc: Bill Alkema
[redacted]

MOHAVE ENGINEERING ASSOCIATES, INC.

- CONSULTING CIVIL ENGINEERS & LAND SURVEYORS -

Robert L. Schuetz, P.E.
Vice President / Engineering Mgr.

John A. Proffit, P.E.
President

Thomas R. Christopher, R.L.S.
Vice President / Surveying Manager

March 25, 2002

Mr. Chet Vasey,
Environmental Safety Manager
Griffith Energy, L.L.C.
P.O. Box 3519
Kingman, Arizona 86402

Dear Mr. Vasey,

I, Thomas R. Christopher, Land Surveyor in the State of Arizona, Registration No. 24514 hereby state the following:

That during the period ending March 15, 2002, Mohave Engineering Associates, Inc., under my direct supervision, completed a differential level run from the National Geodetic Survey Bench Mark designated as S 484, located in the Northwest quarter of Section 18, Township 19 North, Range 17 West to the Subsidence Benchmark set by Mohave Engineering Associates, Inc. in November, 1998, located in the Southeast quarter of the Southwest quarter of Section 10, Township 19 North, Range 18 West of the Gila and Salt River Meridian, Mohave County, Arizona.

The results of this differential level circuit indicate that there has been no subsidence or elevation change at the Subsidence Monument from the time the original level circuit was performed on November 20, 1998 and the current level circuit completed on March 15, 2002.

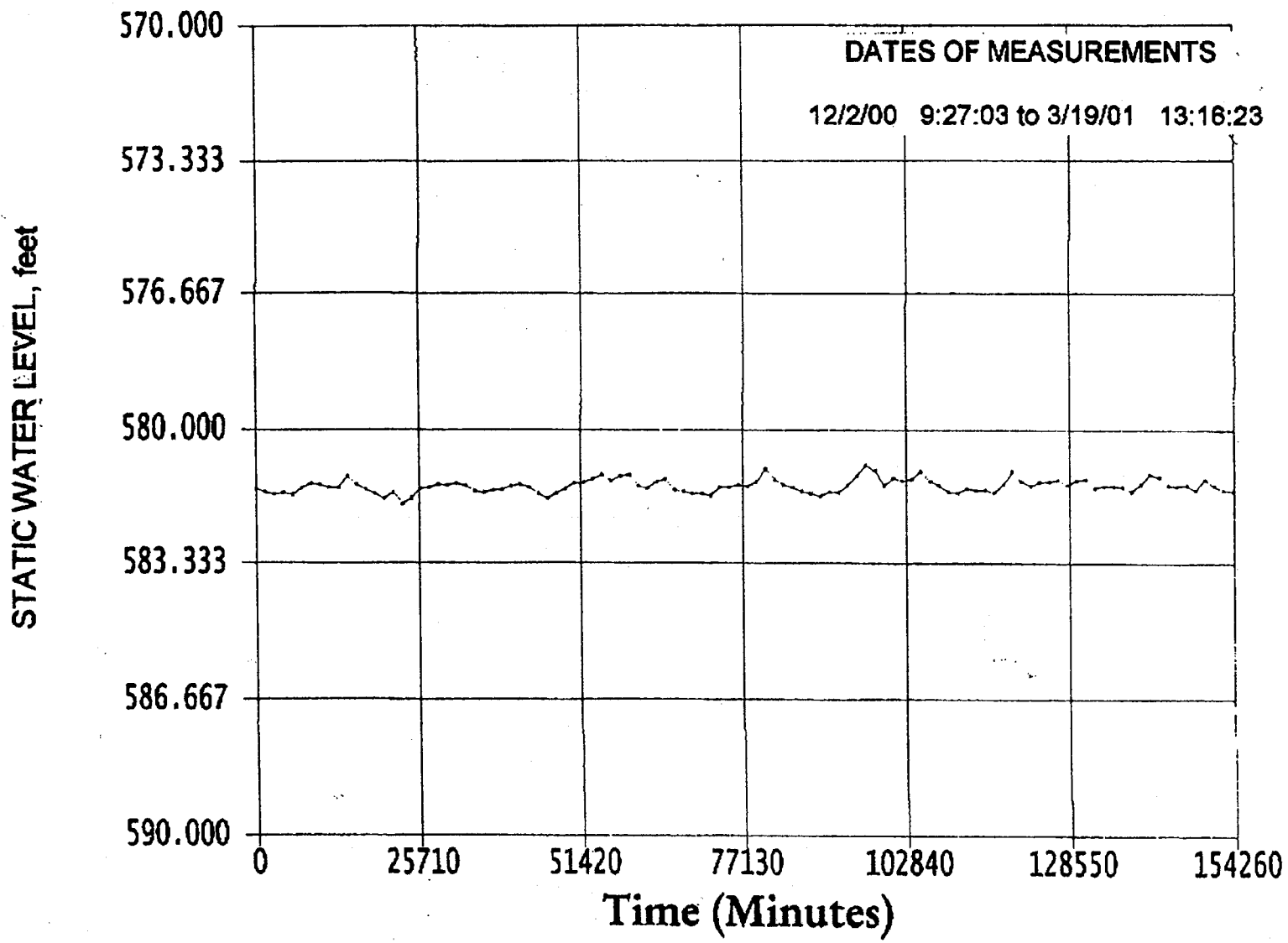
Respectfully,

Thomas R Christopher

Thomas R. Christopher, R.L.S. 24514

405 E. Beale St. • Kingman, AZ 86401 • Ph. 928-753-2627 • FAX 928-753-9118

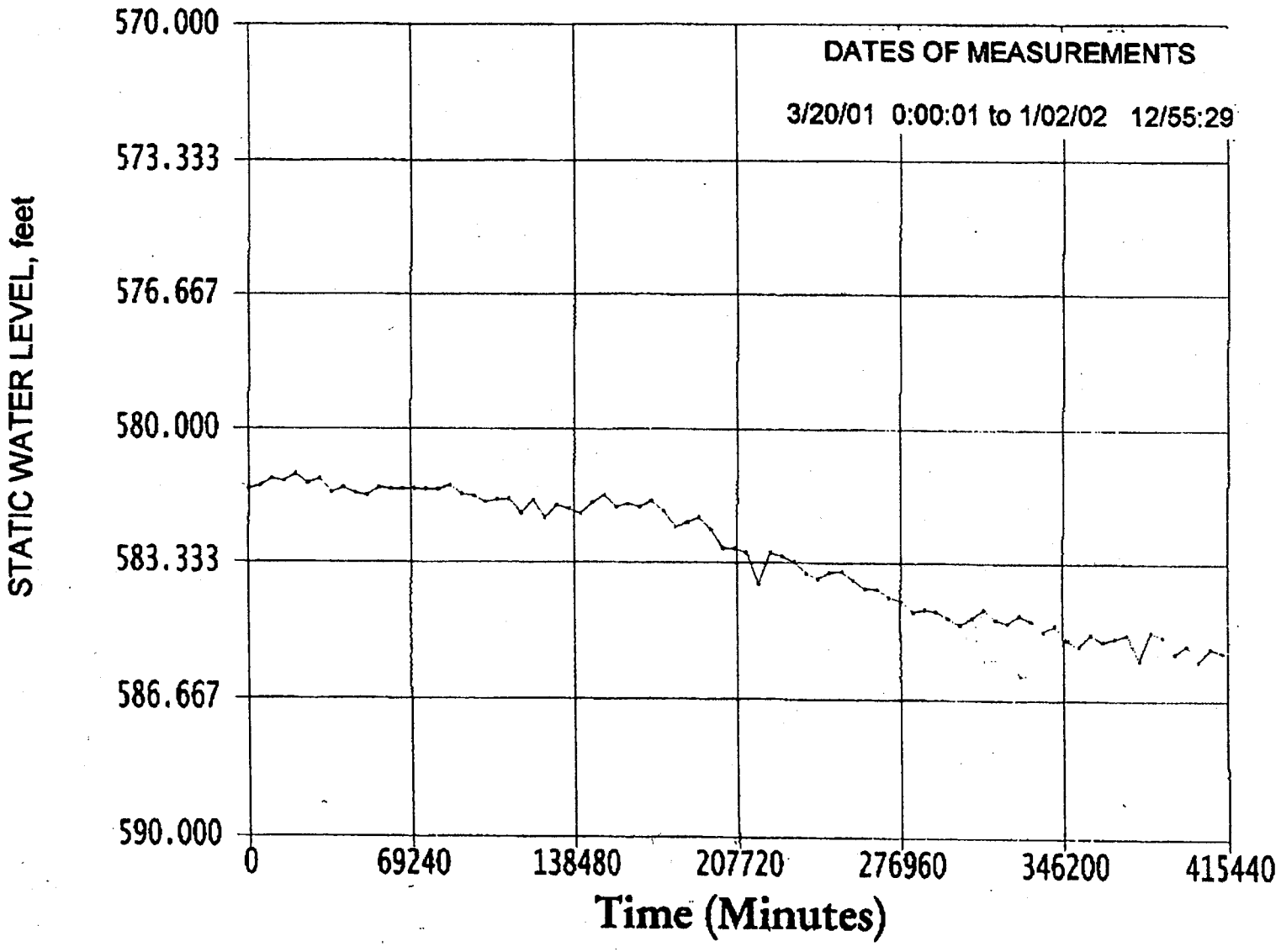
Test #1



[1] - OnBoard Pressure

Mar-22-2002 3:19PM

Griffith#1



[1] - OnBoard Pressure

Mar-22-2002 3:15PM

2002

404-080-56

PRIMESOUTH SM
A SCANA COMPANY

PALMARK SM
A PRIMESOUTH COMPANY

P.O. Box 3519
Kingman, AZ 86402
(928) 718-0102
Fax (928) 718-0727

January 31, 2003

Arizona Department of Water Resources
Attn: Mr. Greg Wallace, Chief Hydrologist
500 North Third Street
Phoenix, AZ 85004

Subject: Griffith Energy Project Report in Compliance with Certificate of Environmental Compatibility Issued by the Arizona Corporation Commission

Gentlemen:

As required under conditions 4 and 5 of Griffith Energy LLC's Certificate of Environmental Compatibility, enclosed are the following: (1) Subsidence Monitoring Report; and (2) a graph depicting the real time readouts of 2002 changes in depth to water below ground level in monitor well no. 3 at the Mohave County Griffith Well field.

As the certified engineer's report states, there has been no subsidence of the benchmark monument since installed in November of 1998.

The aquifer water level at the well field monitoring well maintained from approximately 585.7 feet on January 2, 2002 to the 586 foot level on December 31, 2002.

Finally, Peter Kaleta, P.E., Engineering Manager, Mohave County Water Division reports that the total Griffith Project water use for 2002 was just under 523 million gallons for our first full year of operation (522,962,000).

If you have any questions, please call Chet Vasey at (928) 718-0102 ext. 227, or myself at ext. 222.

Sincerely,

Rex LaMew

Rex LaMew
Plant Manager
Griffith Energy Project

bcc: Jim Parker
Brenda Long
Darren Stephens
David S. Miller
Jay Moyes
File: 404-080-56

MOHAVE ENGINEERING ASSOCIATES, INC.

- CONSULTING CIVIL ENGINEERS & LAND SURVEYORS -

Robert L. Schuetz, P.E.
Vice President / Engineering Mgr.

John A. Proffit, P.E.
President

Thomas R. Christopher, R.L.S.
Vice President / Surveying Manager

RECEIVED
JAN 29 2003

January 23, 2003

Mr. Chet Vasey,
Environmental Safety Manager
Griffith Energy, L.L.C.
P.O. Box 3519
Kingman, Arizona 86402

Dear Mr. Vasey,

I, Craig T. Micek, Land Surveyor in the State of Arizona, Registration No. 31600 hereby state the following:

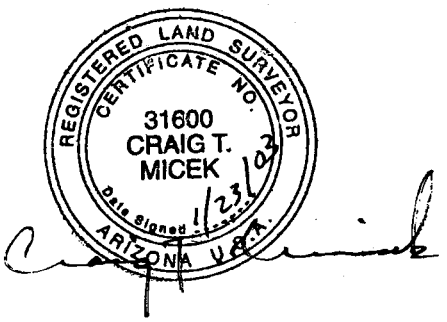
That during the period from January 15 to January 20, 2003, Mohave Engineering Associates, Inc., under my direct supervision, completed a differential level run from the National Geodetic Survey Bench Mark designated as S 484, located in the Northwest quarter of Section 18, Township 19 North, Range 17 West to the Subsidence Benchmark set by Mohave Engineering Associates, Inc. in November, 1998, located in the Southeast quarter of the Southwest quarter of Section 10, Township 19 North, Range 18 West of the Gila and Salt River Meridian, Mohave County, Arizona.

The results of this differential level circuit indicate that there has been no subsidence or elevation change at the Subsidence Monument from the time the original level circuit was performed on November 20, 1998 and the current level circuit completed on January 20, 2003.

Respectfully,

Craig T. Micek

Craig T. Micek, R.L.S. 31600



405 E. Beale St. • Kingman, AZ 86401 • Ph. 928-753-2627 • FAX 928-753-9118

Water Level
(feet from top of casing)
588
587.5
587
586.5
586
585.5
585
584.5
Date
2-Jan-02
13-Jan-02
24-Jan-02
4-Feb-02
15-Feb-02
26-Feb-02
9-Mar-02
20-Mar-02
31-Mar-02
11-Apr-02
22-Apr-02
3-May-02
14-May-02
25-May-02
5-Jun-02
16-Jun-02
27-Jun-02
8-Jul-02
19-Jul-02
30-Jul-02
10-Aug-02
21-Aug-02
1-Sep-02
12-Sep-02
23-Sep-02
4-Oct-02
15-Oct-02
26-Oct-02
6-Nov-02
17-Nov-02
28-Nov-02
9-Dec-02
20-Dec-02
31-Dec-02
2002 Aquifer Levels

2003

PRIMESOUTH SM
A SCANA COMPANY

PALMARK SM
A PRIMESOUTH COMPANY

P.O. Box 3519
Kingman, AZ 86402
(928) 718-0102
Fax (928) 718-0727

January 27, 2004

Arizona Department of Water Resources
Attn: Mr. Greg Wallace – Chief Hydrologist
500 North Third Street
Phoenix, AZ 85004

Subject: Griffith Energy Environmental Compatibility Report

Dear Mr. Wallace,

As required under conditions 4 and 5 of Griffith Energy, LLC's Certificate of Environmental Compatibility, enclosed are the following: (1) Subsidence Monitoring Report; (2) In-situ well linear data; and (3) a graph depicting real time data of 2003 changes in depth to water below ground level in monitor well no. 3 at the Mohave County Griffith well field.

The certified engineers report states, there has been no subsidence or elevation changes at the subsidence monument from the time the original level circuit was performed on November 20, 1998.

The graph, representing real time data, indicates that groundwater in the vicinity of well no. 3 has risen over the past year by approximately 4 feet. This is probably due in part to the usage of groundwater in 2003. Griffith Energy used 109,666,000 fewer gallons than from the previous year. Please see the attached production well monthly usage table.

If you should have any questions please call Brian Henderson, the site Safety & Environmental Coordinator, at (928) 718-0102 ext. 227, or myself at ext. 222.

Sincerely,

Rex LaMew

Rex LaMew
Plant Manager
Griffith Energy Project

Cc: Brenda Long
Darren Stevens
Jim Parker
David S. Miller

File: 404-080-56

MOHAVE ENGINEERING ASSOCIATES, INC.

- CONSULTING CIVIL ENGINEERS & LAND SURVEYORS -

Joseph R. Leedy, P.E.
Vice President / Engineering Mgr.

Peter J. Proffit, P.E.
President

Thomas R. Christopher, R.L.S.
Vice President / Surveying Manager

January 26, 2004

Mr. Brian Henderson
Environmental Safety Manager
Griffith Energy , L.L.C.
P.O. Box 3519
Kingman, Arizona 86402

Dear Mr. Henderson:

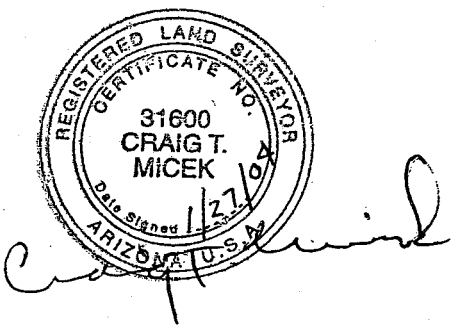
I, Craig T. Micek, Land Surveyor in the State of Arizona, Registration No. 31600 hereby state the following:

During the period from January 16, 2004 to January 26, 2004, Mohave Engineering Associates, Inc., under my direct supervision, has completed a differential level run from the National Geodetic Survey Bench Mark designated as S 484, located in the North West quarter of Section 10, Township 19 North, Range 18 West of the Gila and Salt River Meridian, Mohave County, Arizona.

The results of this differential level circuit indicate that there has been no subsidence or elevation change at the Subsidence Monument from the time the original level circuit was performed on November 20, 1998 and the current level circuit completed on January 26, 2004.

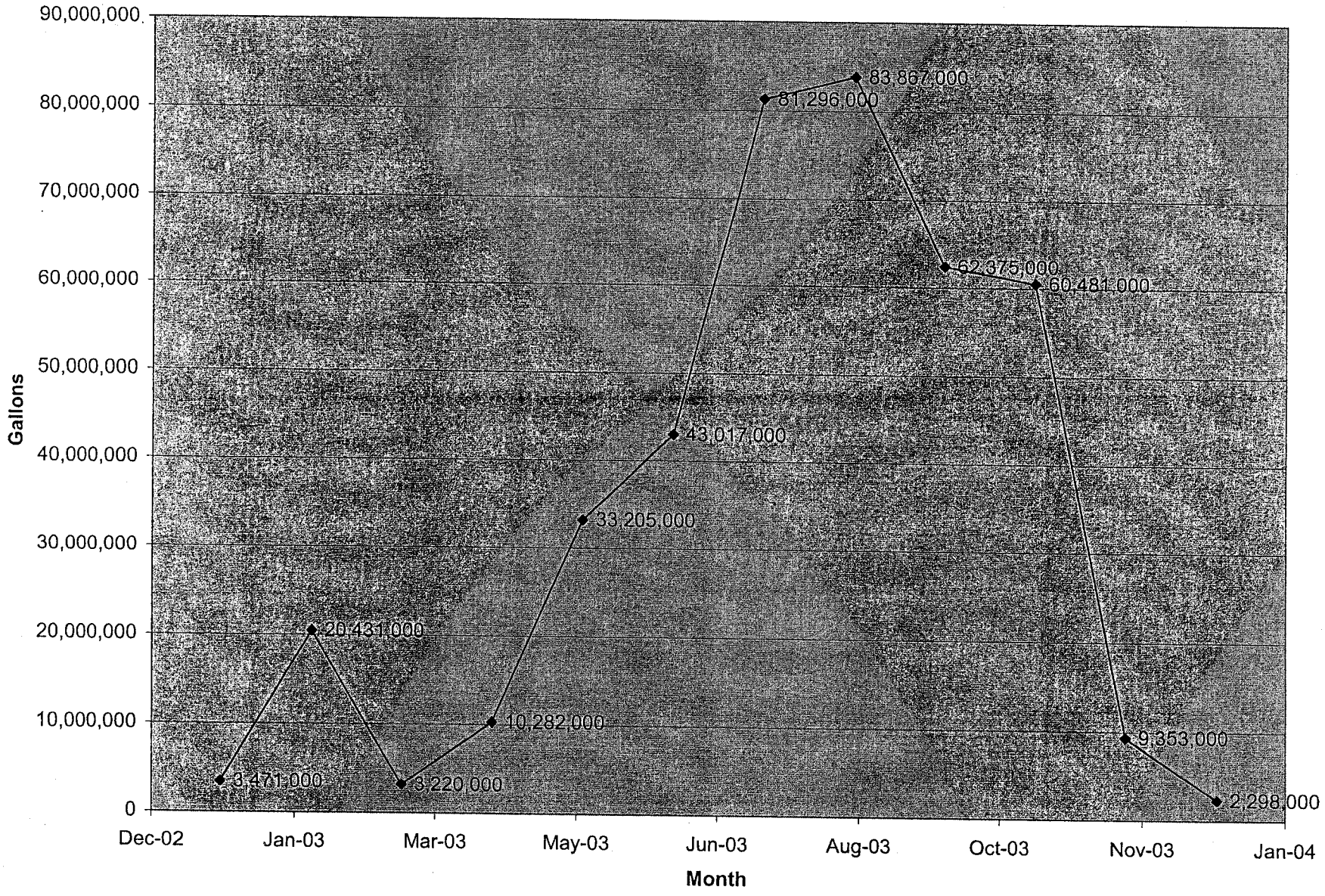
Respectfully,

Craig T. Micek,
R.L.S. 31600

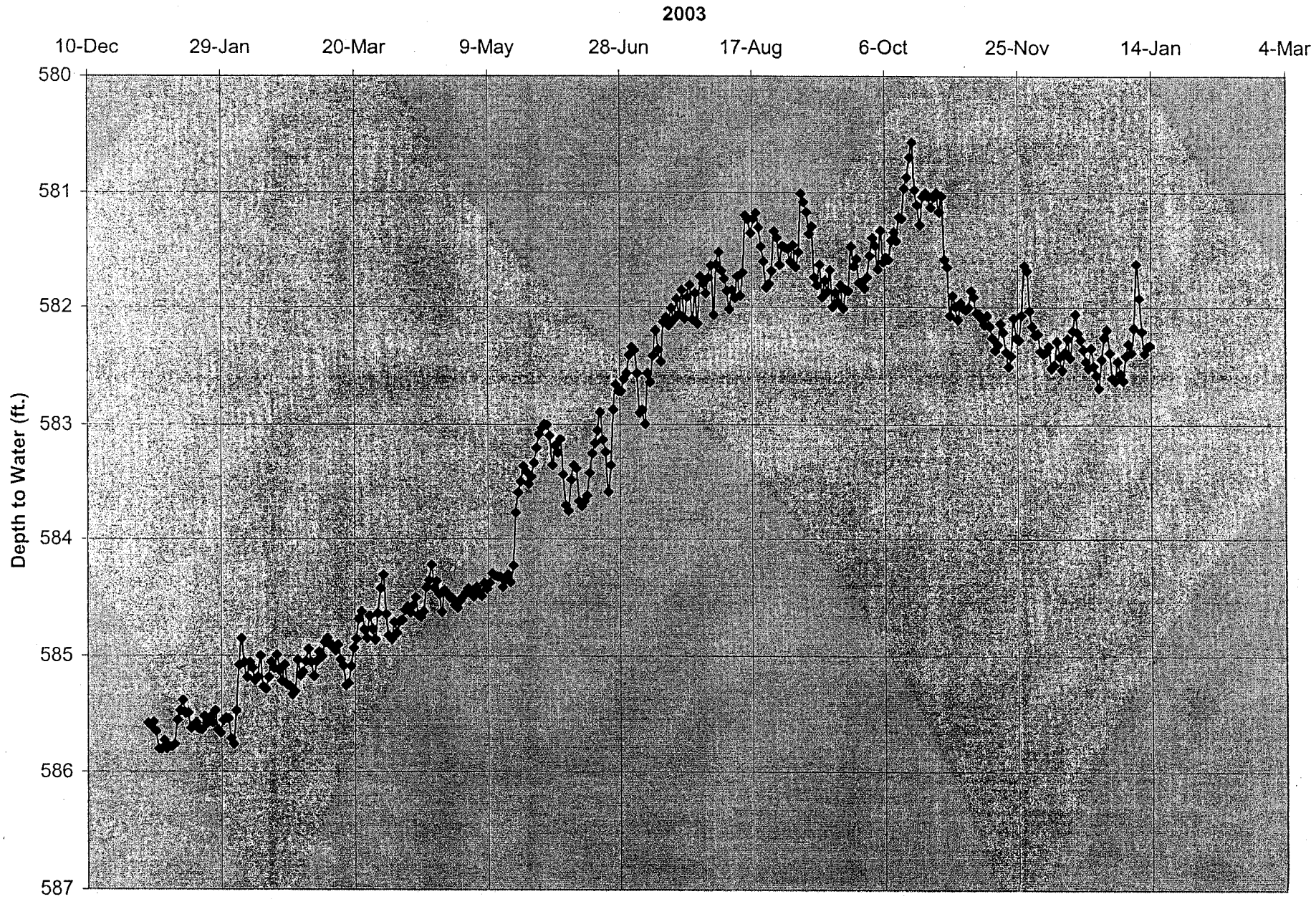


405 E. Beale St. • Kingman, AZ 86401 • Ph. 928-753-2627 • FAX 928-753-9118
www.mohave-engineering.com

Griffith Well #3 Monthly Water Usage For 2003



Griffith Energy Production Well #3 - Depth To Water Over Time



2003 Monthly Water Usage - Griffith Power Plant - Griffith Well #3

Month	Gallons
Jan-03	3,471,000
Feb-03	20,431,000
Mar-03	3,220,000
Apr-03	10,282,000
May-03	33,205,000
Jun-03	43,017,000
Jul-03	81,296,000
Aug-03	83,867,000
Sep-03	62,375,000
Oct-03	60,481,000
Nov-03	9,353,000
Dec-03	2,298,000
Total 2003 Usage:	**413,296,000**

2002 Monthly Water Usage - Griffith Power Plant - Griffith Well #3

Month	Gallons
Jan-02	21,574,000
Feb-02	45,932,000
Mar-02	36,848,000
Apr-02	30,323,000
May-02	22,615,000
Jun-02	71,475,000
Jul-02	78,456,000
Aug-02	75,958,000
Sep-02	56,920,000
Oct-02	26,193,000
Nov-02	27,897,000
Dec-02	28,771,000
Total 2002 Usage:	**522,962,000**

Griffith Energy used **109,666,000** fewer gallons than from the previous year.

2004

PRIMESOUTH
A SCANA COMPANY

PALMARK
A PRIMESOUTH COMPANY

P.O. Box 3519
Kingman, AZ 86402
(928) 718-0102
Fax (928) 718-0727

January 10, 2005

Arizona Department of Water Resources
Attn: Mr. Greg Wallace – Chief Hydrologist
500 North Third Street
Phoenix, AZ 85004

Subject: Griffith Energy Environmental Compatibility Report

Dear Mr. Wallace,

As required under conditions 4 and 5 of Griffith Energy, LLC's Certificate of Environmental Compatibility, we have enclosed the following: (1) Subsidence Monitoring Report; (2) Monthly water usage with associated graph and comparative information for Well # 3 at the Mohave County well field.

The certified engineers report states, there has been no subsidence or elevation changes at the subsidence monument from the time the original level circuit was performed on November 20, 1998. The monthly water usage data indicates that Griffith Energy used 48,583,000 fewer gallons than from the previous year.

Regrettably, real-time water level data is not available due to an electronic data logger failure. The data logger unit has been sent to the manufacturer for repair and will be back in-service within January, 2005.

If you should have any questions please call Brian Henderson, the site Safety & Environmental Coordinator, at (928) 718-0102 ext. 227, or myself at ext. 222.

Sincerely,

Rex LaMew
Plant Manager
Griffith Energy Project

Cc: David A. Gillespie
Charles Baker
Brenda Long
David S. Miller

File: 404-080-56

MOHAVE ENGINEERING ASSOCIATES, INC.

2202 Stockton Hill Road Ste A
KINGMAN, AZ. 86401
928-753-2627
928-753-9118 (FAX)

December 6, 2004

Mr. Brian Henderson
Environmental Safety manager
Griffith Energy
PO Box 3519
Kingman, AZ 86402

Dear Mr. Henderson:

I, Craig T. Micek, Land Surveyor in the State of Arizona, Registration No. 31600 , hereby state the following:

That during the period from November23 to November 29, 2004, Mohave Engineering Associates, Inc., under my direct supervision, completed a differential level run from the National Geodetic Survey Bench Mark designated as S 484, located in the Northwest quarter of Section 18, Township 19 North, Range 17 West to the Subsidence Bench Mark set by Mohave Engineering Associates, Inc. in November, 1998, located in the Southeast quarter of the Southwest quarter of Section 10, Township 19 North, Range 18 West of the Gila and Salt River Meridian, Mohave County, Arizona.

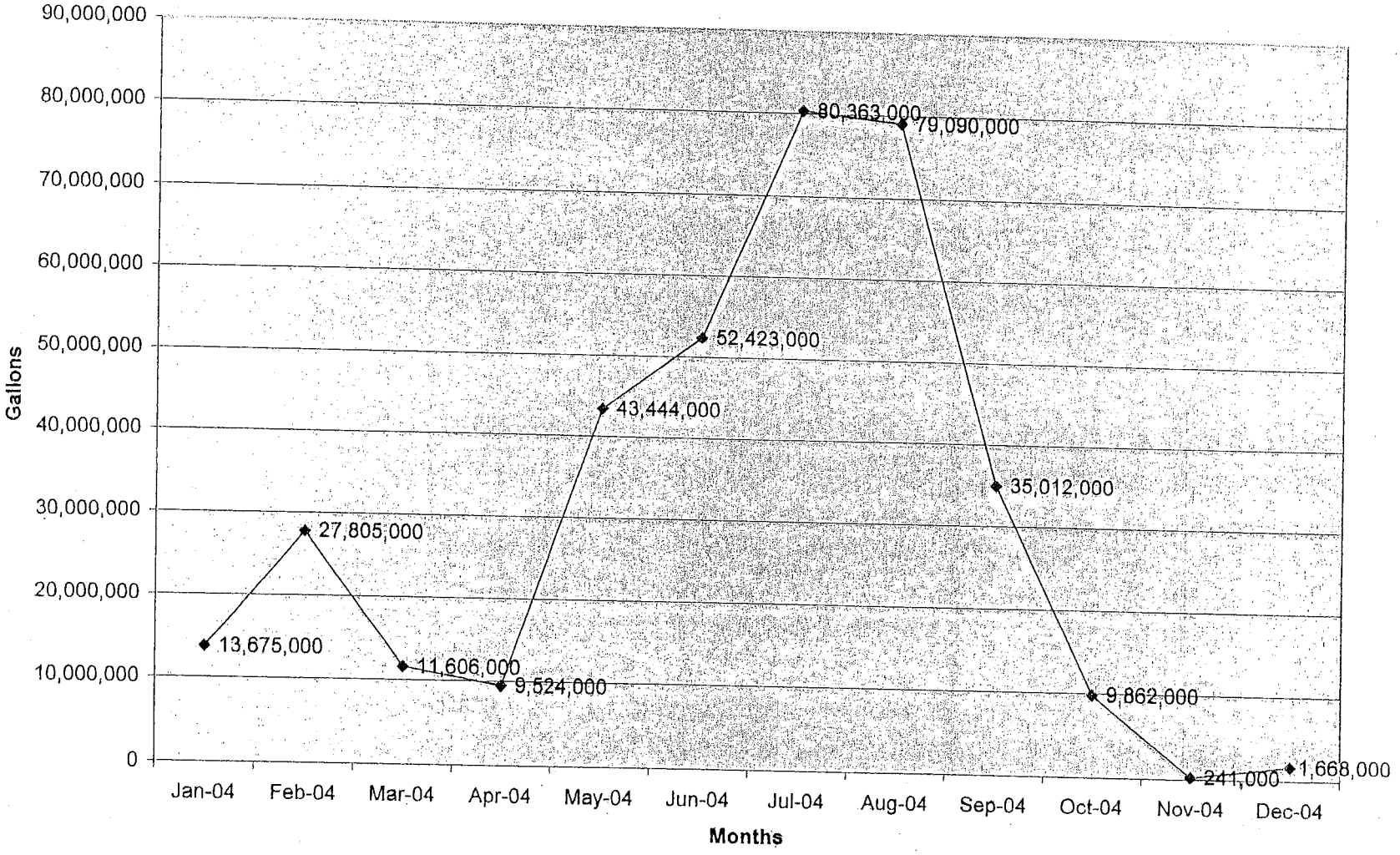
The results of this differential level circuit indicate that there has been no subsidence or elevation change at the Subsidence Monument from the time the original level circuit was performed on November 20, 1998 and the current level circuit completed on November 29, 2004.

Respectfully,

REGISTERED LAND SURVEYOR
31600
CRAIG T. MICEK
12/7
ARIZONA U.S.A.

Craig T. Micek, R.L.S. 31600

2004 Griffith Energy Water Usage



2003 Monthly Water Usage - Griffith Power Plant

Month	Gallons
Jan-03	3,471,000
Feb-03	20,431,000
Mar-03	3,220,000
Apr-03	10,282,000
May-03	33,205,000
Jun-03	43,017,000
Jul-03	81,296,000
Aug-03	83,867,000
Sep-03	62,375,000
Oct-03	60,481,000
Nov-03	9,353,000
Dec-03	2,298,000

Total 2003 Usage:	**413,296,000**	gal/year
Ave 2003 Usage:	47,149	gal/hr
	786	gal/min

2004 Monthly Water Usage - Griffith Power Plant

Month	Gallons
Jan-04	13,675,000
Feb-04	27,805,000
Mar-04	11,606,000
Apr-04	9,524,000
May-04	43,444,000
Jun-04	52,423,000
Jul-04	80,363,000
Aug-04	79,090,000
Sep-04	35,012,000
Oct-04	9,862,000
Nov-04	241,000
Dec-04	1,668,000

Total 2004 Usage:	**364,713,000**	gal/yr
Ave 2004 Usage:	41,606	gal/hr
	693	gal/hr

Griffith Energy used **48,583,000** fewer gallons than from the previous year.

2005

PRIMESOUTH SM
A SCANA COMPANY

PALMARK SM
A PRIMESOUTH COMPANY

P.O. Box 3519
Kingman, AZ 86402
(928) 718-0102
Fax (928) 718-0727

January 26, 2006

Arizona Department of Water Resources
Attn: Mr. Greg Wallace – Chief Hydrologist
500 North Third Street
Phoenix, AZ 85004

Subject: Griffith Energy Environmental Compatibility Report

Dear Mr. Wallace,

As required under conditions 4 and 5 of Griffith Energy, LLC's Certificate of Environmental Compatibility, we have enclosed the following: (1) Subsidence Monitoring Report; (2) Monthly water usage with associated graph and comparative information for Well # 3 at the Mohave County well field.

The certified engineers report states, there has been no subsidence or elevation changes at the subsidence monument from the time the original level circuit was performed on November 20, 1998. The monthly water usage data indicates that Griffith Energy used 80,268,000 fewer gallons than from the previous year.

If you should have any questions please call Brian Henderson, the site Safety & Environmental Coordinator, at (928) 718-0102 ext. 227, or myself at ext. 222.

Sincerely,

Rex LaMew
Plant Manager
Griffith Energy Project

Cc: David A. Gillespie
Charles Baker
Brenda Long

File: 404-080-56

MOHAVE ENGINEERING ASSOCIATES, INC.

January 25, 2006

Mr. Brian Henderson
Environmental Safety Manager
Griffith Energy
P.O. Box 3519
Kingman, AZ 86402

Dear Mr. Henderson:

I, Justin Wright, Land Surveyor in the State of Arizona, Registration No. 43351, hereby state the following:

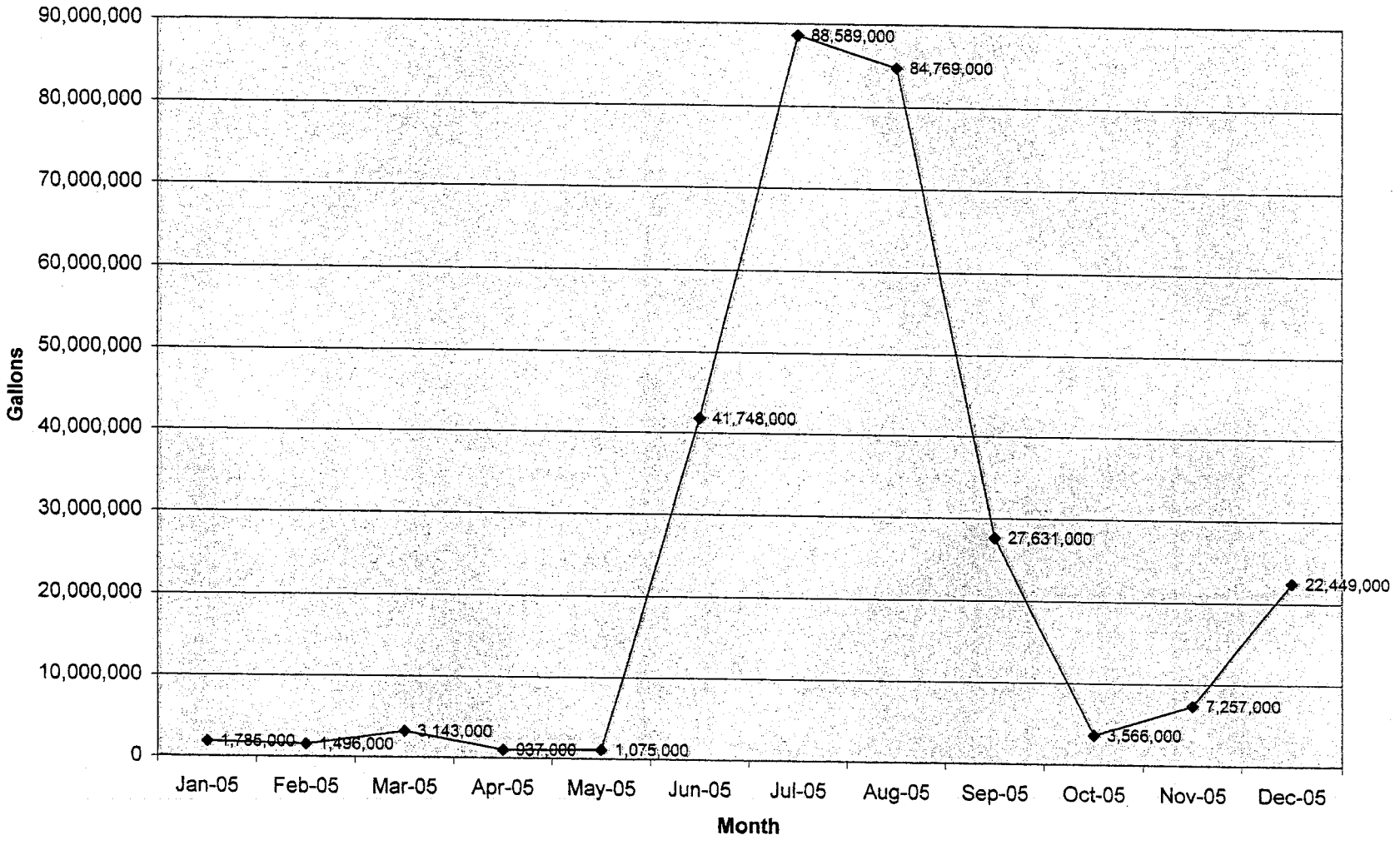
That during the period from December 6, 2005 to December 7, 2005, Mohave Engineering Associates, Inc., under my direct supervision, completed a differential level run from the National Geodetic Survey Bench Mark designated as S 484, located in the Northwest quarter of Section 18, Township 19 North, Range 17 West to the Subsidence monuments located on the Brine Pond dam on the Griffith Energy property located in the southeast quarter, Section 6, Township 19 N, Range 17 West of the Gila and Salt River Meridian, Mohave County, Arizona.

The results of this differential level circuit indicate that there has been no subsidence or elevation change at the Subsidence Monument from the time the original level circuit was performed on August, 2001 and the current level circuit completed on December 7, 2005.

Respectfully,

Justin Wright, R.L.S. 43351

2005 Griffith Energy Water Usage



Monthly Water Usage - Griffith Energy Power Plant

2005 Month		2004 Month	Gallons
Jan-05	1,785,000	Jan-04	13,675,000
Feb-05	1,496,000	Feb-04	27,805,000
Mar-05	3,143,000	Mar-04	11,606,000
Apr-05	937,000	Apr-04	9,524,000
May-05	1,075,000	May-04	43,444,000
Jun-05	41,748,000	Jun-04	52,423,000
Jul-05	88,589,000	Jul-04	80,363,000
Aug-05	84,769,000	Aug-04	79,090,000
Sep-05	27,631,000	Sep-04	35,012,000
Oct-05	3,566,000	Oct-04	9,862,000
Nov-05	7,257,000	Nov-04	241,000
Dec-05	22,449,000	Dec-04	1,668,000
	284,445,000 GALLONS		364,713,000 GALLONS
	779,301 GPD		996,484 GPD

Griffith Energy used **80,268,000** fewer gallons than from the previous year.

2006

PRIMESOUTH SM
A SCANA COMPANY

PALMARK SM
A PRIMESOUTH COMPANY

P.O. Box 3519
Kingman, AZ 86402
(928) 718-0102
Fax (928) 718-0727

January 10, 2007

Arizona Department of Water Resources
Attn: Mr. Greg Wallace – Chief Hydrologist
500 North Third Street
Phoenix, AZ 85004

Subject: Griffith Energy Environmental Compatibility Report

Dear Mr. Wallace,

As required under conditions 4 and 5 of Griffith Energy, LLC's Certificate of Environmental Compatibility, we have enclosed the following: (1) Subsidence Monitoring Reports; (2) Monthly water usage for Well # 3 at the Mohave County well field; and (3) Water table data with graphical representation.

The certified engineers report states, there has been no subsidence or elevation changes at the subsidence monument from the time the original level circuit was performed on November 20, 1998.

If you should have any questions please call Brian Henderson, the site Safety & Environmental Coordinator, at (928) 718-0102 ext. 227, or myself at ext. 222.

Sincerely,

Rex LaMew

Rex LaMew
Plant Manager
Griffith Energy Project

Cc: Jim Hinrichs
Brenda Long

File: 404-080-56

MOHAVE ENGINEERING ASSOCIATES, INC.

CIVIL ENGINEERING • LAND SURVEYING

November 21. 2006

Mr. Brian Henderson
Environmental Safety Manager
Griffith Energy
P.O. Box 3519
Kingman, AZ 86402

Dear Mr Henderson:

I. Tom Christopher. Land Surveyor in the State of Arizona, Registration No. 24514 hereby state the following:

That during the period from November 03 2006 to November 07, 2006, Mohave Engineering Associates, Inc.. under my direct supervision, completed a differential level run from National Geodetic Survey Bench mark designated as S 484, located in the Northwest quarter of Section 18, Township 19 North, Range 17 West to Subsidence monuments located on the Brine Pond dam on the Griffith Energy property located in the Southeast quarter Section 6, Township 19 N, Range 17 West of the Gila and Salt River Meridian. Mohave County, Arizona

The results of this differential level circuit indicate that there has been no subsidence or elevation change at the Subsidence Monument from the time the original level circuit was performed on August, 2001 and the current level circuit completed on November 07. 2006.

Respectfully,

Tom Christopher. R L S 24514

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
24514
THOMAS R. CHRISTOPHER
Date signed 11/27/06
ARIZONA U.S.A.

J:\2006\06-557\Ltr to Brian Henderson Griffith Energy.doc

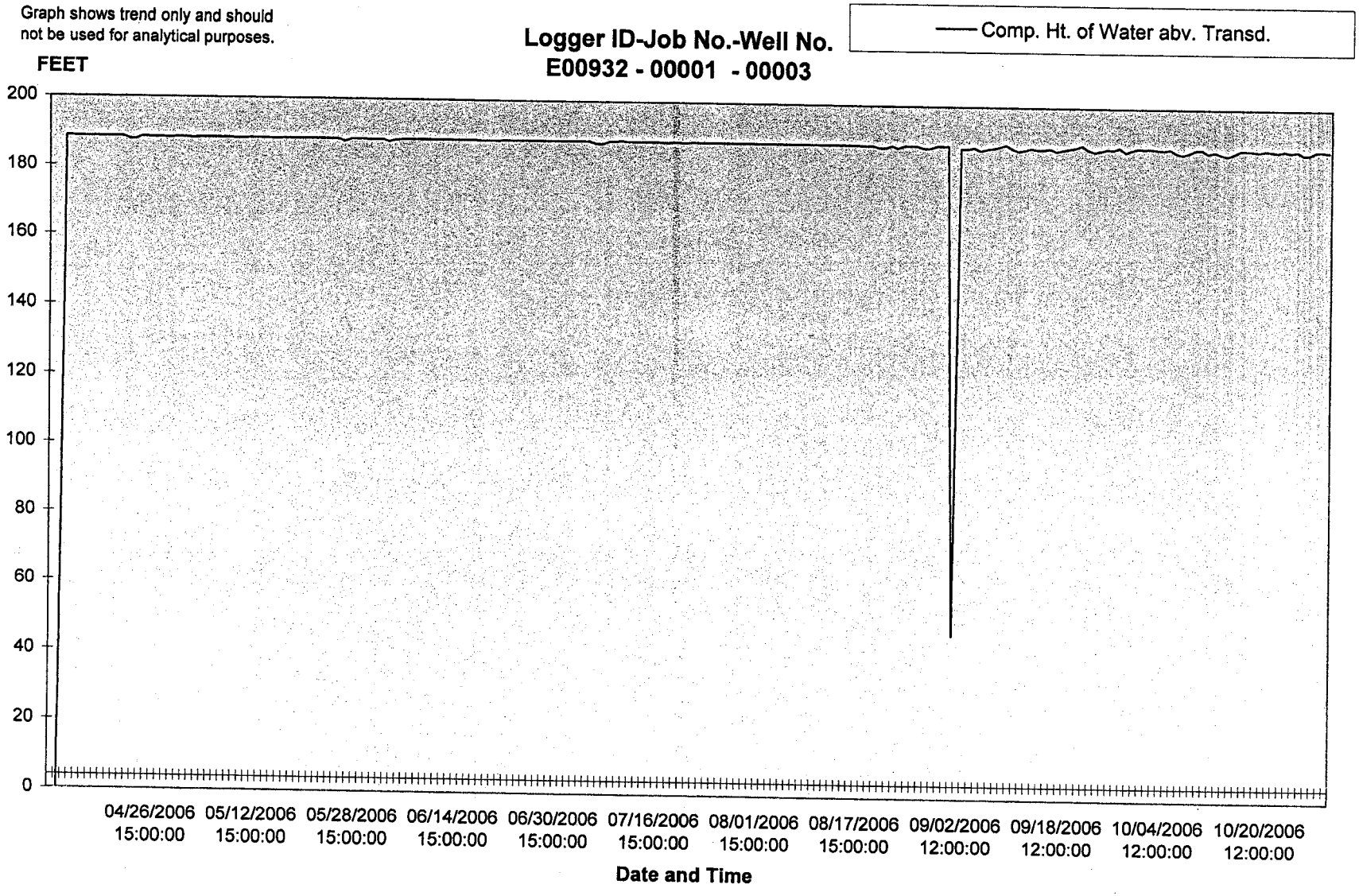
Monthly water usage - Griffith Power Plant

2006 Month	Gallons
Jan-06	1,696,000
Feb-06	706,000
Mar-06	666,000
Apr-06	1,485,000
May-06	320,000
Jun-06	7,128,000
Jul-06	37,712,000
Aug-06	101,325,000
Sep-06	86,280,000
Oct-06	78,776,000
Nov-06	53,232,000
Dec-06	42,667,000

411,993,000 GALLONS

1,128,748 GPD

Graph shows trend only and should not be used for analytical purposes.



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Zero calibration check and does not represent aquifer level.

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6/3/2006 15:00:00	188
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9/7/2006 12:00:00	188
9/8/2006 12:00:00	189

Data logger removed for cleaning and calibration verification. This reading was from testing. It does not represent aquifer level

9/9/2006 12:00:00	189
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Monthly Usage Summary

Monthly water usage - Griffith Power Plant

2006		2005		2004		2003		2002		2001	
Month	Gallons	Month	Gallons	Month	Gallons	Month	Gallons	Month	Gallons	Month	Gallons
Jan-06	1,696,000	Jan-05	1,785,000	Jan-04	13,675,000	Jan-03	3,471,000	Jan-02	21,574,000	Jan-01	
Feb-06	706,000	Feb-05	1,496,000	Feb-04	27,805,000	Feb-03	20,431,000	Feb-02	45,932,000	Feb-01	
Mar-06	666,000	Mar-05	3,143,000	Mar-04	11,606,000	Mar-03	3,220,000	Mar-02	36,848,000	Mar-01	6,988,000
Apr-06	1,485,000	Apr-05	937,000	Apr-04	9,524,000	Apr-03	10,282,000	Apr-02	30,323,000	Apr-01	21,550,000
May-06	320,000	May-05	1,075,000	May-04	43,444,000	May-03	33,205,000	May-02	22,615,000	May-01	35,339,000
Jun-06	7,128,000	Jun-05	41,748,000	Jun-04	52,423,000	Jun-03	43,017,000	Jun-02	71,475,000	Jun-01	78,731,000
Jul-06	37,712,000	Jul-05	88,589,000	Jul-04	80,363,000	Jul-03	81,296,000	Jul-02	78,456,000	Jul-01	12,123,000
Aug-06	101,325,000	Aug-05	84,769,000	Aug-04	79,090,000	Aug-03	83,867,000	Aug-02	75,958,000	Aug-01	64,300,000
Sep-06	86,280,000	Sep-05	27,631,000	Sep-04	35,012,000	Sep-03	62,375,000	Sep-02	56,920,000	Sep-01	47,256,000
Oct-06	78,776,000	Oct-05	3,566,000	Oct-04	9,862,000	Oct-03	60,481,000	Oct-02	26,193,000	Oct-01	44,410,000
Nov-06	53,232,000	Nov-05	7,257,000	Nov-04	241,000	Nov-03	9,353,000	Nov-02	27,897,000	Nov-01	41,567,000
Dec-06	42,667,000	Dec-05	22,449,000	Dec-04	1,668,000	Dec-03	2,298,000	Dec-02	28,771,000	Dec-01	8,402,000
	411,993,000 GALLONS		284,445,000 GALLONS		364,713,000 GALLONS		413,296,000 GALLONS		522,962,000 GALLONS		360,666,000 GALLONS
	1,128,748 GPD		779,301 GPD		996,484 GPD		1,132,318 GPD		1,432,773 GPD		1,178,647 GPD

Evaluation of the Pumping Impact of the Northern Arizona Energy Project (NAEP) on the Mohave County Water System Well Field and the Sacramento Valley Aquifer, Mohave County, AZ, prepared by Southwest Ground-water Consultants, Inc. (Submitted under separate binding)

DRAFT

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR QUALITY CLASS I PERMIT

COMPANY: *Northern Arizona Energy, LLC*
FACILITY: *Northern Arizona Energy Project*
PERMIT #: *43801*
DATE ISSUED: *Draft*
EXPIRY DATE:

SUMMARY

This operating permit is issued to Northern Arizona Energy, LLC the Permittee, for the operation a gas-fired peaking power generation plant. The facility will be located approximately 3 miles north of Griffith Interchange on Interstate 40 in Mohave County, Arizona. The Northern Arizona Energy Project (NAEP) will interconnect with the Western Area Power Administration (WAPA) transmission system at the Griffith Switchyard. The project location is in an area designated as attainment for all criteria pollutants.

The project is designed to serve peak load requirements of customers in Mohave County and surrounding regional load centers. The project will be constructed in a phased manner, and at full capacity, the project will have four (4) combustion turbine generators (CTG), 48 MW each. The CTGs will be fired exclusively on natural gas and will use water injection systems to control nitrogen oxide (NO_X) emissions. In addition, a selective catalytic reduction (SCR) system will be used to further reduce NOx emissions, and oxidation catalyst will be used to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions. Each CTG will also be equipped with a SPRINT (SPRay INTercooling) system to enhance turbine efficiency and preserve peak output during the hottest ambient temperature days. A chiller system will be utilized to cool the incoming air to improve turbine efficiency. Other auxiliary equipment include air filter, chiller coils, water treatment equipment, natural gas compressors, transformers and water storage tanks.

Due to the proposed common management of NAEP and Griffith Energy (operating under a Class I Title V permit) and location on contiguous property, the operations at NAEP and Griffith Energy have been evaluated as a single "stationary source". At the request of the Permittee, a separate Class I Title V Permit is being issued for the facility. NAE has proposed voluntary emission limitations with pollution controls (water injection and SCR for control of nitrogen oxides, and oxidation catalyst for control of carbon monoxide emissions) to ensure that the emissions from the facility remain below significance levels. Thus, the NAE operations will not be subject to New Source Review (NSR).

Continuous emissions monitoring systems (CEMS), fuel flow monitoring, and data acquisition and handling systems (DAHS) will be utilized to demonstrate compliance with applicable NO_X and CO emission limitations for CTGs, including New Source Performance Standards (NSPS) Subpart KKKK (NO_X and SO_2) and synthetic minor limitations (NO_X, CO, SO_2, VOCs, and PM_{10}).

This permit is issued in accordance with Title 49, Chapter 3 of Arizona Revised Statutes. All definitions, terms, and conditions used in this permit conform to those in Arizona Administrative Code (A.A.C.) R18-2-101 et. seq. and Title 40, Code of Federal Regulations (CFR), except as otherwise defined in this permit. Unless noted otherwise, references cited in the permit conditions refer to the A.A.C. All material permit conditions have been identified within the permit by underline and italics. All terms and conditions in this permit are enforceable by the Administrator of the United States Environmental Protection Agency (U.S. EPA), except for those terms and conditions that have been designated as "State requirements."

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ATTACHMENT "A": GENERAL PROVISIONS

Air Quality Control Permit No. 43801
for
Northern Arizona Energy, LLC

I. PERMIT EXPIRATION AND RENEWAL

[ARS § 49-426.F, A.A.C. R18-2-304.C.2, and -306.A.1]

A. This permit is valid for a period of five years from the date of issuance.

B. The Permittee shall submit an application for renewal of this permit at least 6 months, but not more than 18 months, prior to the date of permit expiration.

II. COMPLIANCE WITH PERMIT CONDITIONS

[A.A.C. R18-2-306.A.8.a and b]

A. The Permittee shall comply with all conditions of this permit including all applicable requirements of the Arizona air quality statutes and air quality rules. Any permit noncompliance constitutes a violation of the Arizona Revised Statutes and is grounds for enforcement action; for permit termination, revocation and reissuance, or revision; or for denial of a permit renewal application. In addition, noncompliance with any federally enforceable requirement constitutes a violation of the Clean Air Act.

B. It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

III. PERMIT REVISION, REOPENING, REVOCATION AND REISSUANCE, OR TERMINATION FOR CAUSE

[A.A.C. R18-2-306.A.8.c, -321.A.1, and -321.A.2]

A. The permit may be revised, reopened, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit revision, revocation and reissuance, termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

B. The permit shall be reopened and revised under any of the following circumstances

1. Additional applicable requirements under the Clean Air Act become applicable to the Class I source. Such a reopening shall only occur if there are three or more years remaining in the permit term. The reopening shall be completed no later than 18 months after promulgation of the applicable requirement. No such reopening is required if the effective date of the requirement is later than the date on which the permit is due to expire, unless an application for renewal has been submitted pursuant to A.A.C. R18-2-322.B. Any permit revision required pursuant to this subparagraph shall comply with the provisions in A.A.C. R18-2-322 for permit renewal and shall reset the five-year permit term.

2. Additional requirements, including excess emissions requirements, become applicable to an affected source under the acid rain program. Upon approval by the Administrator, excess emissions offset plans shall be deemed to be incorporated into the Class I permit.

3. The Director or the Administrator determines that the permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of the permit.

4. The Director or the Administrator determines that the permit needs to be revised or revoked to assure compliance with the applicable requirements.

C. Proceedings to reopen and reissue a permit, including appeal of any final action relating to a permit reopening, shall follow the same procedures as apply to initial permit issuance and shall, except for reopenings under Condition III.B.1 above, affect only those parts of the permit for which cause to reopen exists. Such reopenings shall be made as expeditiously as practicable. Permit reopenings for reasons other than those stated in Condition III.B.1 above shall not result in a resetting of the five-year permit term.

IV. POSTING OF PERMIT

[A.A.C. R18-2-315]

A. The Permittee shall post this permit or a certificate of permit issuance where the facility is located in such a manner as to be clearly visible and accessible. All equipment covered by this permit shall be clearly marked with one of the following:

1. Current permit number; or

2. Serial number or other equipment ID number that is also listed in the permit to identify that piece of equipment.

B. A copy of the complete permit shall be kept on site.

V. FEE PAYMENT

[A.A.C. R18-2-306.A.9 and -326]

The Permittee shall pay fees to the Director pursuant to ARS § 49-426(E) and A.A.C. R18-2-326.

VI. ANNUAL EMISSION INVENTORY QUESTIONNAIRE

[A.A.C. R18-2-327.A and B]

A. The Permittee shall complete and submit to the Director an annual emissions inventory questionnaire. The questionnaire is due by March 31st or ninety days after the Director makes the inventory form available each year, whichever occurs later, and shall include emission information for the previous calendar year.

B. The questionnaire shall be on a form provided by the Director and shall include the information required by A.A.C. R18-2-327.

VII. COMPLIANCE CERTIFICATION

[A.A.C. R18-2-309.2.a, -309.2.c-d, and -309.5.d]

A. The Permittee shall submit a compliance certification to the Director semiannually, which describes the compliance status of the source with respect to each permit condition. The first certification shall be submitted no later than May 15th, and shall report the compliance status of the source during the period between October 1st of the previous year and March 31st of the current year. The second certification shall be submitted no later than November 15th, and shall report the compliance status of the source during the period between April 1st and September 30th of the current year.

The compliance certifications shall include the following:

1. Identification of each term or condition of the permit that is the basis of the certification;

2. Identification of the methods or other means used by the Permittee for determining the compliance status with each term and condition during the certification period,

3. The status of compliance with the terms and conditions of the permit for the period covered by the certification, including whether compliance during the period was continuous or intermittent. The certification shall be based on the methods or means designated in Condition VII.A.2 above. The certifications shall identify each deviation and take it into account for consideration in the compliance certification;

4. For emission units subject to 40 CFR Part 64, the certification shall also identify as possible exceptions to compliance any period during which compliance is required and in which an excursion or exceedance defined under 40 CFR Part 64 occurred;

5. All instances of deviations from permit requirements reported pursuant to Condition XII.B of this Attachment; and

6. Other facts the Director may require to determine the compliance status of the source.

B. A copy of all compliance certifications shall also be submitted to the EPA Administrator.

C. If any outstanding compliance schedule exists, a progress report shall be submitted with the semi-annual compliance certifications required in Condition VII.A above.

VIII. CERTIFICATION OF TRUTH, ACCURACY AND COMPLETENESS [A.A.C. R18-2-304.H]

Any document required to be submitted by this permit, including reports, shall contain a certification by a responsible official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

IX. INSPECTION AND ENTRY [A.A.C. R18-2-309.4]

Upon presentation of proper credentials, the Permittee shall allow the Director or the authorized representative of the Director to:

A. Enter upon the Permittee's premises where a source is located, emissions-related activity is conducted, or where records are required to be kept under the conditions of the permit;

B. Have access to and copy, at reasonable times, any records that are required to be kept under the conditions of the permit;

C. Inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit;

D. Sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with the permit or other applicable requirements; and

E. Record any inspection by use of written, electronic, magnetic and photographic media.

X. PERMIT REVISION PURSUANT TO FEDERAL HAZARDOUS AIR POLLUTANT STANDARD [A.A.C. R18-2-304.C]

If this source becomes subject to a standard promulgated by the Administrator pursuant to Section 112(d) of the Act, then the Permittee shall, within twelve months of the date on which the standard is promulgated, submit an application for a permit revision demonstrating how the source will comply with the standard.

XI. ACCIDENTAL RELEASE PROGRAM [40 CFR Part 68]

If this source becomes subject to the provisions of 40 CFR Part 68, then the Permittee shall comply with these provisions according to the time line specified in 40 CFR Part 68.

XII. EXCESS EMISSIONS, PERMIT DEVIATIONS, AND EMERGENCY REPORTING

A. Excess Emissions Reporting [A.A.C. R18-2-310.01.A and -310.01.B]

1. Excess emissions shall be reported as follows:

   a. The Permittee shall report to the Director any emissions in excess of the limits established by this permit. Such report shall be in two parts as specified below:

      (1) Notification by telephone or facsimile within 24 hours of the time when the Permittee first learned of the occurrence of excess emissions including all available information from Condition XII.A.1.b below.

      (2) Detailed written notification by submission of an excess emissions report within 72 hours of the notification pursuant to Condition XII.A.1.a.(1) above.

   b. The report shall contain the following information:

      (1) Identity of each stack or other emission point where the excess emissions occurred;

      (2) Magnitude of the excess emissions expressed in the units of the applicable emission limitation and the operating data and calculations used in determining the magnitude of the excess emissions;

      (3) Date, time and duration, or expected duration, of the excess emissions;

      (4) Identity of the equipment from which the excess emissions emanated;

      (5) Nature and cause of such emissions;

      (6) If the excess emissions were the result of a malfunction, steps taken to remedy the malfunction and the steps taken or planned to prevent the recurrence of such malfunctions; and

      (7) Steps taken to limit the excess emissions. If the excess emissions resulted from start-up or malfunction, the report shall contain a list of the steps taken to comply with the permit procedures.

2. In the case of continuous or recurring excess emissions, the notification requirements of this section shall be satisfied if the source provides the required notification after excess emissions are first detected and includes in such notification an estimate of the time the excess emissions will continue. Excess emissions occurring after the estimated time period, or changes in the nature of the emissions as originally reported, shall require additional notification pursuant to Condition XII.A.1 above. [A.A.C. R18-2-310.01.C]

B. Permit Deviations Reporting [A.A.C. R18-2-306.A.5.b]

The Permittee shall promptly report deviations from permit requirements, including those attributable to upset conditions as defined in the permit, the probable cause of such deviations, and any corrective actions or preventive measures taken. Prompt reporting shall mean that the report was submitted to the Director by certified mail, facsimile, or hand delivery within two working days of the time when emission limitations were exceeded due to an emergency or within two working days of the time when the owner or operator first learned of the occurrence of a deviation from a permit requirement.

C. Emergency Provision [A.A.C. R18-2-306.E]

1. An "emergency" means any situation arising from sudden and reasonable unforeseeable events beyond the control of the source, including acts of God, that require immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

2. An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if Condition XII.C.3 is met.

3. The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:

   a. An emergency occurred and that the Permittee can identify the cause(s) of the emergency;

   b. The permitted facility was being properly operated at the time;

   c. During the period of the emergency, the Permittee took all reasonable steps to minimize levels of emissions that exceeded the emissions standards or other requirements in the permit; and

   d. The Permittee submitted notice of the emergency to the Director by certified mail, facsimile, or hand delivery within two working days of the time when emission limitations were exceeded due to the emergency. This notice shall contain a description of the emergency, any steps taken to mitigate emissions, and corrective action taken.

4. In any enforcement proceeding, the Permittee seeking to establish the occurrence of an emergency has the burden of proof.

5. This provision is in addition to any emergency or upset provision contained in any applicable requirement.

D. Compliance Schedule [ARS § 49-426.I.5]

For any excess emission or permit deviation that cannot be corrected within 72 hours, the Permittee is required to submit a compliance schedule to the Director within 21 days of such occurrence. The compliance schedule shall include a schedule of remedial measures, including an enforceable sequence of actions with milestones, leading to compliance with the permit terms or conditions that have been violated.

E. Affirmative Defenses for Excess Emissions Due to Malfunctions, Startup, and Shutdown

[A.A.C. R18-2-310]

1. Applicability

This rule establishes affirmative defenses for certain emissions in excess of an emission standard or limitation and applies to all emission standards or limitations except for standards or limitations:

a. Promulgated pursuant to Sections 111 or 112 of the Act;

b. Promulgated pursuant to Titles IV or VI of the Clean Air Act;

c. Contained in any Prevention of Significant Deterioration (PSD) or New Source Review (NSR) permit issued by the U.S. EPA;

d. Contained in A.A.C. R18-2-715.F; or

e. Included in a permit to meet the requirements of A.A.C. R18-2-406.A.5.

2. Affirmative Defense for Malfunctions

Emissions in excess of an applicable emission limitation due to malfunction shall constitute a violation. When emissions in excess of an applicable emission limitation are due to a malfunction, the Permittee has an affirmative defense to a civil or administrative enforcement proceeding based on that violation, other than a judicial action seeking injunctive relief, if the Permittee has complied with the reporting requirements of A.A.C. R18-2-310.01 and has demonstrated all of the following:

a. The excess emissions resulted from a sudden and unavoidable breakdown of process equipment or air pollution control equipment beyond the reasonable control of the Permittee;

b. The air pollution control equipment, process equipment, or processes were at all times maintained and operated in a manner consistent with good practice for minimizing emissions;

c. If repairs were required, the repairs were made in an expeditious fashion when the applicable emission limitations were being exceeded. Off-shift labor and overtime were utilized where practicable to ensure that the repairs were made as expeditiously as possible. If off-shift labor and overtime were not utilized, the Permittee satisfactorily demonstrated that the measures were impracticable;

d. The amount and duration of the excess emissions (including any bypass operation) were minimized to the maximum extent practicable during periods of such emissions;

e. All reasonable steps were taken to minimize the impact of the excess emissions on ambient air quality;

f. The excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance;

g. During the period of excess emissions there were no exceedances of the relevant ambient air quality standards established in Title 18, Chapter 2, Article 2 of the Arizona Administrative Code that could be attributed to the emitting source;

h. The excess emissions did not stem from any activity or event that could have been foreseen and avoided, or planned, and could not have been avoided by better operations and maintenance practices;

i. All emissions monitoring systems were kept in operation if at all practicable; and

j. The Permittee's actions in response to the excess emissions were documented by contemporaneous records

3. Affirmative Defense for Startup and Shutdown

a. Except as provided in Condition XII.E.3.b below, and unless otherwise provided for in the applicable requirement, emissions in excess of an applicable emission limitation due to startup and shutdown shall constitute a violation. When emissions in excess of an applicable emission limitation are due to startup and shutdown, the Permittee has an affirmative defense to a civil or administrative enforcement proceeding based on that violation, other than a judicial action seeking injunctive relief, if the Permittee has complied with the reporting requirements of A.A.C. R18-2-310.01 and has demonstrated all of the following:

(1) The excess emissions could not have been prevented through careful and prudent planning and design;

(2) If the excess emissions were the result of a bypass of control equipment, the bypass was unavoidable to prevent loss of life, personal injury, or severe damage to air pollution control equipment, production equipment, or other property;

(3) The air pollution control equipment, process equipment, or processes were at all times maintained and operated in a manner consistent with good practice for minimizing emissions;

(4) The amount and duration of the excess emissions (including any bypass operation) were minimized to the maximum extent practicable during periods of such emissions;

(5) All reasonable steps were taken to minimize the impact of the excess emissions on ambient air quality;

(6) During the period of excess emissions there were no exceedances of the relevant ambient air quality standards established in Title 18, Chapter 2, Article 2 of the Arizona Administrative Code that could be attributed to the emitting source;

(7) All emissions monitoring systems were kept in operation if at all practicable; and

(8) Contemporaneous records documented the Permittee's actions in response to the excess emissions.

b. If excess emissions occur due to a malfunction during routine startup and shutdown, then those instances shall be treated as other malfunctions subject to Condition XII.E.2 above.

4. Affirmative Defense for Malfunctions during Scheduled Maintenance

If excess emissions occur due to a malfunction during scheduled maintenance, then those instances will be treated as other malfunctions subject to Condition XII.E.2 above.

5. Demonstration of Reasonable and Practicable Measures

For an affirmative defense under Condition XII.E.2 or XII.E.3 above, the Permittee shall demonstrate, through submission of the data and information required by Condition XII.E and A.A.C. R18-2-310.01, that all reasonable and practicable measures within the Permittee's control were implemented to prevent the occurrence of the excess emissions.

XIII. RECORD KEEPING REQUIREMENTS [A.A.C. R18-2-306.A.4]

A. The Permittee shall keep records of all required monitoring information including, but not limited to, the following:

1. The date, place as defined in the permit, and time of sampling or measurements;

2. The date(s) analyses were performed;

3. The name of the company or entity that performed the analyses;

4. A description of the analytical techniques or methods used;

5. The results of such analyses; and

6. The operating conditions existing at the time of sampling or measurement.

B. The Permittee shall retain records of all required monitoring data and support information for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip-chart recordings or other data recordings for continuous monitoring instrumentation, and copies of all reports required by the permit.

C. All required records shall be maintained either in an unchangeable electronic format or in a handwritten logbook utilizing indelible ink.

XIV. REPORTING REQUIREMENTS [A.A.C. R18-2-306.A.5.a]

The Permittee shall submit the following reports:

A. Compliance certifications in accordance with Section VII of Attachment "A".

B. Excess emission; permit deviation, and emergency reports in accordance with Section XII of Attachment "A".

C. Other reports required by any condition of Attachment "B".

XV. DUTY TO PROVIDE INFORMATION

[A.A.C. R18-2-304.G and -306.A.8.e]

A. The Permittee shall furnish to the Director, within a reasonable time, any information that the Director may request in writing to determine whether cause exists for revising, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. Upon request, the Permittee shall also furnish to the Director copies of records required to be kept by the permit. For information claimed to be confidential, the Permittee shall furnish an additional copy of such records directly to the Administrator along with a claim of confidentiality.

B. If the Permittee has failed to submit any relevant facts or has submitted incorrect information in the permit application, the Permittee shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information.

XVI. PERMIT AMENDMENT OR REVISION

[A.A.C. R18-2-318, -319, and -320]

The Permittee shall apply for a permit amendment or revision for changes to the facility that do not qualify for a facility change without revision under Section XVII, as follows:

A. Administrative Permit Amendment (A.A.C. R18-2-318);

B. Minor Permit Revision (A.A.C. R18-2-319); and

C. Significant Permit Revision (A.A.C. R18-2-320)

The applicability and requirements for such action are defined in the above referenced regulations.

XVII. FACILITY CHANGE WITHOUT A PERMIT REVISION

[A.A.C. R18-2-306.A.4 and -317]

A. The Permittee may make changes at the permitted source without a permit revision if all of the following apply:

1. The changes are not modifications under any provision of Title I of the Act or under ARS § 49-401.01(19);

2. The changes do not exceed the emissions allowable under the permit whether expressed therein as a rate of emissions or in terms of total emissions;

3. The changes do not violate any applicable requirements or trigger any additional applicable requirements;

4. The changes satisfy all requirements for a minor permit revision under A.A.C.-R18-2-319.A; and

5. The changes do not contravene federally enforceable permit terms and conditions that are monitoring (including test methods), record keeping, reporting, or compliance certification requirements.

B. The substitution of an item of process or pollution control equipment for an identical or substantially similar item of process or pollution control equipment shall qualify as a change that does not require a permit revision, if it meets all of the requirements of Conditions XVII.A and XVII.C of this Attachment.

C. For each change under Conditions XVII.A and XVII.B above, a written notice by certified mail or hand delivery shall be received by the Director and the Administrator a minimum of 7 working

days in advance of the change. Notifications of changes associated with emergency conditions, such as malfunctions necessitating the replacement of equipment, may be provided less than 7 working days in advance of the change, but must be provided as far in advance of the change, as possible or, if advance notification is not practicable, as soon after the change as possible.

D. Each notification shall include:

1. When the proposed change will occur;

2. A description of the change;

3. Any change in emissions of regulated air pollutants; and

4. Any permit term or condition that is no longer applicable as a result of the change.

E. The permit shield described in A.A.C. R18-2-325 shall not apply to any change made under this Section, other than implementation of an alternate to Conditions XVII.A and XVII.B above.

F. Except as otherwise provided for in the permit, making a change from one alternative operating scenario to another as provided under A.A.C. R18-2-306.A.11 shall not require any prior notice under this Section.

G. Notwithstanding any other part of this Section, the Director may require a permit to be revised for any change that, when considered together with any other changes submitted by the same source under this Section over the term of the permit, do not satisfy Condition XVII.A above.

XVIII. TESTING REQUIREMENTS

[A.A.C. R18-2-312]

A. The Permittee shall conduct performance tests as specified in the permit and at such other times as may be required by the Director.

B. Operational Conditions during Testing

Tests shall be conducted during operation at the maximum possible capacity of each unit under representative operational conditions unless other conditions are required by the applicable test method or in this permit. With prior written approval from the Director, testing may be performed at a lower rate. Operations during periods of start-up, shutdown, and malfunction (as defined in A.A.C. R18-2-101) shall not constitute representative operational conditions unless otherwise specified in the applicable standard.

C. Tests shall be conducted and data reduced in accordance with the test methods and procedures contained in the Arizona Testing Manual unless modified by the Director pursuant to A.A.C. R18-2-312.B.

D. Test Plan

At least 14 calendar days prior to performing a test, the Permittee shall submit a test plan to the Director in accordance with A.A.C. R18-2-312.B and the Arizona Testing Manual. This test plan must include the following:

1. Test duration;

2. Test location(s);

3. Test method(s); and

4. Source operation and other parameters that may affect test results.

E. Stack Sampling Facilities

The Permittee shall provide, or cause to be provided, performance testing facilities as follows:

1. Sampling ports adequate for test methods applicable to the facility;

2. Safe sampling platform(s);

3. Safe access to sampling platform(s); and

4. Utilities for sampling and testing equipment.

F. Interpretation of Final Results

Each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard. For the purpose of determining compliance with an applicable standard, the arithmetic mean of the results of the three runs shall apply. In the event that a sample is accidentally lost or conditions occur in which one of the three runs is required to be discontinued because of forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances beyond the Permittee's control, compliance may, upon the Director's approval, be determined using the arithmetic mean of the results of the other two runs. If the Director or the Director's designee is present, tests may only be stopped with the Director's or such designee's approval. If the Director or the Director's designee is not present, tests may only be stopped for good cause. Good cause includes: forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances beyond the Permittee's control. Termination of any test without good cause after the first run is commenced shall constitute a failure of the test. Supporting documentation, which demonstrates good cause, must be submitted.

G. Report of Final Test Results

A written report of the results of all performance tests shall be submitted to the Director within 30 days after the test is performed. The report shall be submitted in accordance with the Arizona Testing Manual and A.A.C. R18-2-312.A.

XIX. PROPERTY RIGHTS [A.A.C. R18-2-306.A.8.d]

This permit does not convey any property rights of any sort, or any exclusive privilege.

XX. SEVERABILITY CLAUSE [A.A.C. R18-2-306.A.7]

The provisions of this permit are severable. In the event of a challenge to any portion of this permit, or if any portion of this permit is held invalid, the remaining permit conditions remain valid and in force.

XXI. PERMIT SHIELD [A.A.C. R18-2-325]

Compliance with the conditions of this permit shall be deemed compliance with all applicable requirements identified in the portions of this permit subtitled "Permit Shield". The permit shield shall

not apply to minor revisions pursuant to Condition XVI.B of this Attachment and any facility changes without a permit revision pursuant to Section XVII of this Attachment.

XXII. PROTECTION OF STRATOSPHERIC OZONE [40 CFR Part 82]

If this source becomes subject to the provisions of 40 CFR Part 82, then the Permittee shall comply with these provisions accordingly.

ATTACHMENT "B": SPECIFIC CONDITIONS

Air Quality Control Permit No. 43801
for
Northern Arizona Energy, LLC

I. RELATIONSHIP OF PERMIT TO APPLICABLE STATE IMPLEMENTATION PLAN

This permit is issued pursuant to the provisions of the Arizona Revised Statutes (ARS) and constitutes an Installation Permit for the purpose of the applicable State Implementation Plan. [ARS § 49-404.c and -426]

II. FACILITY WIDE REQUIREMENTS

A. Within 7 days of site mobilization, the Permittee shall have on-site or on-call a person that is certified in EPA Reference Method 9 for the observation and evaluation of visible emissions. [A.A.C. R18-2-306.A.2]

B. At the time the compliance certification required by Section VII of Attachment "A" are submitted, the Permittee shall submit reports of all monitoring activities required by this Attachment performed in the same six month period as applies to the compliance certification period. [A.A.C. R18-2-306.A.5.a]

C. The Permittee shall keep a log of all emission related maintenance activities performed at the facility. These records shall be made available to ADEQ upon request. [A.A.C. R18-2-306.A.3.c]

III. COMBUSTION GAS TURBINES (CTGs)

A. Applicability

This section applies to the four (4) simple cycle combustion gas turbine units (CT1, CT2, CT3 and CT4).

B. General Provisions

The following requirements apply to the operation, maintenance, recordkeeping and testing of gas turbines and associated monitoring systems in accordance with 40 CFR Part 60, Subpart A – General Provisions.

1. All requests, reports, applications, submittals, and other communications to the Director pursuant to A.A.C. R18-2-901, -902, and 40 CFR Part 60 shall be submitted in duplicate to the EPA Region 9 office at the following addresses:

   Director, Air Division (Attn: AIR-1)
   U.S. Environmental Protection Agency
   75 Hawthorne Street
   San Francisco, CA 94105 [40 CFR 60.4(a)]

2. The Permittee shall comply with the general notification requirements contained in 40 CFR 60.7(a), including but not limited to:

   a. Notification of the date of construction of each affected CTG postmarked no later than 30 days after such date.

b. Notification of the actual date of initial startup of each affected CTG postmarked within 15 days after such date.

c. Notification of the date upon which demonstration of the continuous monitoring system performance commences in accordance with 40 CFR 60.13(c) post-marked not less than 30 days prior to such date. [40 CFR 60.7(a)]

3. The Permittee shall maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected CTG; any malfunction of the air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device is inoperative. [40 CFR 60.7(b)]

4. The Permittee shall submit excess emissions and monitoring systems performance reports and/or summary report form on a semi-annual basis as required by 40 CFR 60.7(c) and (d). All reports shall be postmarked by the 30th day following the end of each 6-month period. [40 CFR 60.7(c), 40 CFR 60.7(d)]

5. The Permittee shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required in a permanent form suitable for inspection. The file shall be retained for at least two years following the date of such measurements, maintenance, reports, and records, except as provided in 40 CFR 60.7(f)(1) and (2). [40 CFR 60.7(f)]

6. *At all times, including periods of startup, shutdown, and malfunction, the Permittee shall, to the extent practicable,* maintain and *operate each combustion gas turbine including associated air pollution control equipment in a manner consistent with manufacturer equipment operating guidelines and good air pollution control practice for minimizing emissions*. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.
[40 CFR 60.11(d), A.A.C. R18-2-331.A.3.e]
[Material permit conditions are indicated by underline and italics]

7. For the purpose of submitting compliance certifications or establishing whether or not the Permittee has violated or is in violation of any standard in 40 CFR Part 60, nothing shall preclude the use, including the exclusive use, of any credible evidence or information, relevant to whether a source would have been in compliance with applicable requirements if the appropriate performance or compliance test or procedure had been performed. [40 CFR 60.11(g)]

8. The Permittee shall not build, erect, install, or use any article, machine, equipment or process, the use of which conceals an emission, which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with opacity standard or with a standard, which is based on the concentration of a pollutant in the gases discharged to the atmosphere. [40 CFR 60.12]

9. The Permittee shall comply with the "General Notification and Reporting Requirements" found in 40 CFR 60.19. [40 CFR 60.19]

10. State-only Enforceable NSPS Provisions

Until such time as Subpart KKKK of 40 CFR Part 60 is incorporated by reference into A.A.C. R18-2-901, the Permittee shall comply with all applicable provisions of Subpart GG of 40 CFR Part 60. [A.A.C. R18-2-901(40): State-only enforceable]

C. Operational Limitations

Fuel Limitation

The Permittee shall not cause or allow the combustion of any fuel in gas turbines other than natural gas meeting the definition of "natural gas" in 40 CFR 60.4420.

[A.A.C. R18-2-306.01.A, -306.A.2, -331.A.3.a]

[Material permit conditions are indicated by underline and italics]

D. Nitrogen Oxides

1. Emission Limitations/Standards

a. The Permittee shall not cause to be discharged into the atmosphere any gas turbine gases which contain nitrogen oxides (NO_X) in excess of 25 ppm at 15% oxygen. [40 CFR 60.4320(a)]

b. *Total combined emissions of NO_X from all the gas turbine units shall not exceed 39.0 tons per year, calculated daily as a rolling 365-day total.*

[A.A.C. R18-2-306.01, -306.02, -331.A.3.a]

[Material permit conditions are indicated by underline and italics]

2. Air Pollution Control Equipment

a. *At all times when the gas turbines are in operation, including during startup, shutdown, and malfunction, the Permittee shall* maintain and *operate the water injection systems in a manner consistent with consistent with manufacturer equipment operating guidelines and good air pollution control practices for minimizing NO_X emissions.* [40 CFR 60.4333, A.A.C. R18-2-331.A.3.e]

[Material permit conditions are indicated by underline and italics]

b. *At all times when the gas turbines are in operation, including during startup, shutdown, and malfunction, the Permittee shall* maintain and *operate a Selective Catalytic Reduction (SCR) system in a manner consistent with consistent with manufacturer equipment operating guidelines and good air pollution control practices for minimizing NO_X emissions.* [40 CFR 60.4333, A.A.C. R18-2-331.A.3.e]

[Material permit conditions are indicated by underline and italics]

3. Monitoring, Recordkeeping, and Reporting Requirements

a. *At all times when the gas turbines are in operation, including during startup, shutdown, and malfunction, the Permittee shall install, certify, maintain,* and operate *Continuous Emission Monitoring Systems (CEMS) consisting of NO_X and O_2 (or CO_2) monitors to determine the hourly NO_X emission rate in parts per million from all four CTGs.*

[40 CFR 60.4333, 40 CFR 60.4335(b)(1), A.A.C. R18-2-306.02.C, -306.A.3, -331.A.3.c]

[Material permit conditions are indicated by underline and italics]

b. *At all times when the gas turbines are in operation, including during startup, shutdown, and malfunction, the Permittee shall install, calibrate, maintain* and operate *fuel flow meters to continuously measure the heat input to each gas turbine*. The fuel flowmeters shall meet the installation, certification, and quality assurance requirements of appendix D to 40 CFR 75.

[40 CFR 60.4333, 40 CFR 60.4335(b)(2), 40 CFR 60.4345(c), A.A.C. R18-2-306.02.C, -306.A.3, -331.A.3.c]

[Material permit conditions are indicated by underline and italics]

c. For the NO_X and O_2 or CO_2 diluent CEMS, the Permittee shall meet all applicable requirements of 40 CFR Part 75, including but not limited to:

(1) 75.10 – General Operating Requirements;

(2) 75.12 – Specific Provisions for Monitoring NO_X Emission Rate;

(3) Subpart C – Operation and Maintenance Requirements;

(4) Subpart D – Missing Data Substitution Procedures;

(5) Subpart F – Recordkeeping Requirements;

(6) Subpart G – Reporting Requirements;

(7) Appendix A – Specifications and Test Procedures;

(8) Appendix B – Quality Assurance and Quality Control Procedures;

(9) Appendix C – Missing Data Estimation Procedures; and

(10) Appendix F – Conversion Procedures

The relative accuracy test audit (RATA) of the CEMS shall be performed on a lb/MMBtu basis.

[40 CFR 60.4345(a), A.A.C. R18-2-306.02.C, -306.A.3]

d. As specified in 40 CFR 60.13(e)(2), during each full unit operating hour, both the NO_x monitor and the diluent (O_2 or CO_2) monitor must complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each 15-minute quadrant of the hour, to validate the hour. For partial unit operating hours, at least one valid data point must be obtained for each quadrant of the hour in which the unit operates. For unit operating hours in which required quality assurance and maintenance activities are performed on the CEMS, a minimum of two valid data points (one in each of two quadrants) are required to validate the NOx emission rate for the hour. [40 CFR 60.4345(b)]

e. The Permittee shall implement quality assurance (QA) program and plan described in Section 1 of appendix B to 40 CFR 75 for all of the continuous monitoring equipment in paragraphs a and b above. [40 CFR 60.4345(e)]

f. For purposes of identifying excess emissions associated with Condition III.D.1.a above,

(1) All CEMS data must be reduced to hourly averages as specified in 40 CFR 60.13(h). [40 CFR 60.4350(a)]

(2) For each unit operating hour in which a valid hourly average, as described in Condition III.D.3.d above, is obtained for both NO_X and diluent, the data acquisition and handling system must calculate and record the hourly NO_X emissions in the units of ppm. [40 CFR 60.4350(b)]

(3) Only quality assured data shall be used to identify excess emissions. Periods where the missing data substitution procedures in subpart D of 40 CFR 75 are applied are to be reported as monitor downtime in the excess emissions and monitoring performance report required under Condition III.B.4 of this Attachment. [40 CFR 60.4350(d)]

(4) The Permittee shall use the calculated hourly average emission rates from (2) above to assess excess emissions on a 4-hour rolling average basis, as described in Condition III.D.3.g (1) below. [40 CFR 60.4350(f) and 40 CFR 60.4350(g)]

g. The Permittee shall submit reports of excess emissions and monitor downtime, in accordance with Condition III.B.4 of this Attachment. Excess emissions shall be reported for all periods of operation of gas turbines, including startup, shutdown and malfunction. Periods of excess emissions and monitor downtime that shall be reported are defined as follows: [40 CFR 60.4375(a)]

(1) An excess emissions shall be any unit operating period in which the 4-hour or 30-day rolling average NO_X emission rate exceeds the applicable emission limit in Condition III.D.1.a above. A "4-hour rolling average NO_X emission rate" is the arithmetic average of the average NO_X emission rate in ppm measured by the continuous emission monitoring equipment for a given hour and the three unit operating hour average NO_X emission rates immediately preceding that unit operating hour. Calculate the rolling average if a valid NO_X emission rate is obtained for at least 3 of the 4 hours. A "30-day rolling average NO_X emission rate" is the arithmetic average of all hourly NO_X emission data in ppm measured by the continuous emission monitoring equipment for a given day and the twenty-nine unit operating days immediately preceding that unit operating day. A new 30-day average is calculated each unit operating day as the average of all hourly NO_X emissions rates for the preceding 30 unit operating days if a valid NO_X emission rate is obtained for at least 75 percent of all operating hours. [40 CFR 60.4380(b)(1)]

(2) A period of monitor downtime is any unit operating hour in which the data for any of the following parameters are either missing or invalid: NO_X concentration, CO_2 or O_2 concentration, fuel flow rate or megawatts. [40 CFR 60.4380(b)(2)]

h. The Permittee shall determine and record the gross caloric value (GCV) of the pipeline quality natural gas at least once per month in accordance with the procedures in Section 2.3.4.1 or 2.3.4.2 of 40 CFR 75 Appendix D, as applicable. [A.A.C. R18-2-306.02.C, 306.A.3]

i. For demonstrating compliance with Condition III.D.1.b above, the Permittee shall utilize the NO_X and diluent CEMS required by Condition III.D.3.a in conjunction with the fuel flow rate monitoring systems required by Condition III.D.3.b and a Data Acquisition and Handling System (DAHS) to calculate mass emissions in units of pounds per million Btu (lb/MMBtu), pounds per hour

(lb/hr), pounds per day, and tons per daily rolling 365-day total from all four (4) CTGs. [A.A.C. R18-2-306.02.C, -306.A.3]

(1) To calculate mass emissions in lb/MMBtu, the Permittee shall use the Procedures for NO_X Emission Rate in 40 CFR 75 Appendix F.

(2) The Permittee shall calculate mass emissions in lb/hr using the calculated lb/MMBtu rates, fuel flow monitoring data, and the GCV of the pipeline quality natural gas as determined under Condition III.D.3.h above.

j. During CEMS or fuel flow rate monitoring system downtime, the Permittee shall implement the missing data procedures in 40 CFR Part 75 Subpart D, Appendix C, and Appendix D, as applicable. [A.A.C. R18-2-306.02.C, 306.A.3]

k. Each calendar day during which total combined rolling 365-day total NOx emission rate from all four CTGs exceeds 39.0 tons shall constitute an exceedance of Condition III.D.1.b of this Attachment. Exceedances shall be reported to the Director in accordance with Condition XII.A of Attachment "A". [A.A.C. R18-2-306.02.C]

l. Each individual day and 365-day rolling total NO_X, emission rate in the reporting period shall be included in the semiannual compliance certification required by Condition VII of Attachment "A". [A.A.C. R18-2-306.02.C, -306.A.5]

4. Performance Testing Requirements

a. For each CTG, the Permittee shall perform an initial performance test for NO_X emissions within 60 days after achieving the maximum production rate at which the unit will be operated but not later than 180 days after initial startup. [40 CFR 60.8]

b. Each initial performance test for NO_X emissions shall be performed as follows. [40 CFR 60.8]

(1) Perform a minimum of nine RATA reference method runs, with a minimum time per run of 21 minutes, at a single load level, within plus or minus 25 percent of 100 percent of peak load. The ambient temperature must be greater than 0 °F during the RATA runs. [40 CFR 60.4405(a)]

(2) For each RATA run, concurrently measure the heat input to the unit using a fuel flow meter (or flow meters) and measure the electrical and thermal output from the unit. [40 CFR 60.4405(b)]

(3) Use the test data both to demonstrate compliance with the NO_X emission limit in Condition III.D.1.a of this Attachment and to provide the required reference method data for the RATA of the CEMS required by Conditions III.D.3.a and III.D.3.b above. [40 CFR 60.4405(c)]

(4) Compliance with the emission limit in Condition III.D.1.a of this Attachment is achieved if the arithmetic average of all of the NO_X emission rates for the RATA runs, expressed in units of ppm, does not exceed the emission limit. [40 CFR 60.4405(d)]

5. Permit Shield

Compliance with the conditions of this Part shall be deemed compliance with the following requirements as of the date of issuance of this permit: 40 CFR 60.4320(a),40 CFR 60.4333, 40 CFR 60.4335(b)(1), 40 CFR 60.4335(b)(2), 40 CFR 60.4345(a), 40 CFR 60.4345(b), 40 CFR 60.4345(c), 40 CFR 60.4345(e), 40 CFR 60.4350(a), 40 CFR 60.4350(b), 40 CFR 60.4350(c), 40 CFR 60.4350(d), 40 CFR 60.4350(g), 40 CFR 60.4375(a), 40 CFR 60.4380(b)(1), 40 CFR 60.4380(b)(2), and 40 CFR 60.4405.

[A.A.C. R18-2-325]

E. Sulfur Dioxide

1. Emission Limitations/Standards

a. The Permittee shall not burn in Combustion Turbine Generators (CTGs) any fuel that will emit SO_2 in excess of 0.060 pound/MMBtu of heat input.

[40 CFR 60.4330(a)(2)]

b. *Total combined emissions of SO_2 from all the gas turbine units shall not exceed 36.0 tons per year on a rolling 12-month total.*

[A.A.C. R18-2-306.01, -306.02, -331.A.3.a]

[Material permit conditions are indicated by underline and italics]

2. Performance Testing Requirements

a. The Permittee shall perform an initial performance test for SO_2 emissions from CTGs to demonstrate compliance with the emission limit contained in Condition III.E.1 above. The initial performance test shall be completed within 60 days after achieving the maximum production rate at which the unit will be operated, but not later than 180 days after initial startup. Subsequent performance test shall be conducted on annual basis (no more than 14 months following the previous performance test). [40 CFR 60.8, 40 CFR 60.4415(a)]

b. Performance tests shall be conducted in accordance with 40 CFR 60.8 and using the methodologies in 40 CFR 4415(a). [40 CFR 60.8, 40 CFR 60.4415(a)]

c. The Permittee shall record and report the results of each performance test for SO_2 emissions in units of lb/MMBtu heat input. [A.A.C. R18-2-306.A.3.c]

3. Monitoring, Recordkeeping, and Reporting Requirements

a. The Permittee shall demonstrate compliance with emission standard in III.E.1.a above by maintaining a current, valid purchase contract, tariff sheet, or transportation contract specifying that the maximum total sulfur content of the natural gas is 20 grains/100 scf or less. [40 CFR 60.4365(a)]

b. The Permittee shall demonstrate compliance with emission standard in III.E.1.b as follows:

Within 10 days after the end of each calendar month, the Permittee shall calculate and record rolling 12-month SO_2 emissions from all four CTGs. The SO_2 emission rate shall be calculated as the product of the SO_2 emission factor determined in accordance with Condition III.E.2.c from the most recent performance test and the heat input rate for the 12-month period, as determined in accordance with Condition III.D.i of this Attachment. [A.A.C. R18-2-306.A.3.c]

3. Permit Shield

Compliance with the conditions of this Part shall be deemed compliance with 40 CFR 60. 40 CFR 60.4330(a)(2), 40 CFR 60.4365(a), 40 CFR 60.4415(a). [A.A.C. R18-2-325]

F. Carbon Monoxide

1. Emission Limitations/Standards

Total combined emissions of CO from all four CTGs shall not exceed 90.0 tons per year, calculated daily as a rolling 365-day total. [A.A.C. R18-2-306.01, -306.02.A, -331.A.3.a]

[Material permit conditions are indicated by underline and italics]

2. Air Pollution Control Equipment

At all times when the gas turbines are in operation, including during startup, shutdown, and malfunction, the Permittee shall, to the extent practicable, maintain and *operate the oxidation catalyst system in a manner consistent with consistent with manufacturer equipment operating guidelines and good air pollution control practices for minimizing CO emissions.* [40 CFR 60.11(d), A.A.C. R18-2-331.A.3.e]

[Material permit conditions are indicated by underline and italics]

3. Monitoring, Recordkeeping, and Reporting Requirements

a. *At all times when the gas turbines are in operation, including during startup, shutdown, and malfunction, the Permittee shall install, certify, maintain,* operate and *quality-assure Continuous Emission Monitoring Systems (CEMS) consisting of CO and O_2 (or CO_2) monitors for measuring CO emissions from CTGs.*

[A.A.C. R18-2-306.02.C, -306.A.3, -331.A.3.c]

[Material permit conditions are indicated by underline and italics]

b. The CO CEMS shall meet all applicable requirements of 40 CFR Part 60, including but not limited to the following: [A.A.C. R18-2-306.02.C, -306.A.3]

(1) 60.13 – Monitoring Requirements;

(2) Appendix B – Performance Specification 4A; and

(3) Appendix F – Quality Assurance Procedures.

c. For demonstrating compliance with Condition III.F.1, the Permittee shall utilize the CO and diluent CEMS required by Condition III.F.3.a in conjunction with the fuel flow rate monitoring systems required by Condition III.D.3.b and a Data Acquisition and Handling System (DAHS) to calculate mass emissions in units of pounds per million Btu (lb/MMBtu), pounds per hour (lb/hr), pounds per day, and tons per daily rolling 365-day total from all the CTGs.

[A.A.C. R18-2-306.02.C, -306.A.3]

(1) To calculate mass emissions in lb/MMBtu, the Permittee shall use the Procedures for NO_X Emission Rate in 40 CFR 75 Appendix F. For CO, the value of K in Equations F-5 and F-6 = 7.266×10^{-8} (lb/dscf)/ppm CO.

(2) The Permittee shall calculate mass emissions in lb/hr using the calculated lb/MMBtu rates, fuel flow monitoring data, and the GCV of the pipeline

quality natural gas as determined under Condition III.D.3.h of this Attachment.

d. During CEMS or fuel flow rate monitoring system downtime, the Permittee shall implement the missing data procedures in 40 CFR Part 75 Subpart D, Appendix C, and Appendix D, as applicable. For CO monitoring data, the Permittee shall use the missing data estimation and substitution procedures prescribed for NO_X. [A.A.C. R18-2-306.02.C, -306.A.3]

e. Each calendar day during which total combined rolling 365-day total CO emission rate from all the CTGs exceeds 90.0 tons shall constitute an exceedance of Condition III.F.1. Exceedances shall be reported to the Director in accordance with Condition XII.A of Attachment "A". [A.A.C. R18-2-306.02.C]

f. Each individual day and 365-day rolling total CO emission rate in the reporting period shall be included in the semiannual compliance certification required by Condition VII of Attachment "A". [A.A.C. R18-2-306.02.C, -306.A.5]

G. Particulate Matter

1. Emission Limitations/Standards

Total combined emissions of PM_{10} from all four CTGs shall not exceed 14.0 tons per year on a rolling 12-month total. [A.A.C R18-2-306.01.A, A.A.C R18-2-331.A.3.a]
[Material permit conditions are indicated by underline and italics]

2. Performance Testing Requirements

a. For each CTG, the Permittee shall perform an initial performance test for PM_{10} emissions within 60 days after achieving 300 fired hours on the CTG. Subsequent performance test shall be conducted annually. If at the end of any month, the 12-month rolling total of PM_{10} emissions for the 4 CTGs exceeds 13.5 tons, the test frequency will change to semi-annual. [A.A.C. R18-2-312]

b. Each performance test for PM_{10} emissions shall be performed using EPA Methods 5 and EPA Method 202. [A.A.C. R18-2-312]

c. The Permittee shall record and report the results of each performance test for PM_{10} emissions in units of lb/MMBtu heat input. [A.A.C. R18-2-306.A.3.c]

3. Monitoring, Recordkeeping, and Reporting Requirements

Within 10 days after the end of each calendar month, the Permittee shall calculate and record rolling 12-month PM_{10} emissions from all four CTGs. The PM_{10} emission rate shall be calculated as the product of the PM_{10} emission factor determined in accordance with Condition III.G.2.c from the most recent performance test and the heat input rate for the 12-month period, determined in accordance with Condition III.D.i of this Attachment. [A.A.C. R18-2-306.A.3.c]

H. Volatile Organic Compounds (VOCs)

1. Emission Limitations/Standards

Total combined emissions of VOCs from all four CTGs not exceed 36.0 tons per year, on a rolling 12-month total. [A.A.C. R18-2-306.01, -306.02.A, -331.A.3.a]

[Material permit conditions are indicated by underline and italics]

2. Air Pollution Control Equipment

At all times when gas turbines are in operation, including during startup, shutdown, and malfunction, the Permittee shall, to the extent practicable, maintain and *operate the oxidation catalyst system in a manner consistent with manufacturer equipment operating guidelines and good air pollution control practices for minimizing CO emissions.*

[40 CFR 60.11(d), A.A.C. R18-2-331.A.3.e]

[Material permit conditions are indicated by underline and italics]

3. Performance Testing Requirements

a. For each CTG, the Permittee shall perform an initial performance test for VOC emissions within 60 days after achieving 300 fired hours on the CTG. Subsequent performance test shall be performed annually. [A.A.C. R18-2-312]

b. Each performance test for VOC emissions shall be performed using EPA Methods 25A/25B. [A.A.C. R18-2-312]

c. The Permittee shall record and report the results of each performance test for VOC emissions in units of lb/MMBtu heat input. [A.A.C. R18-2-306.A.3.c]

4. Monitoring, Recordkeeping, and Reporting Requirements

Within 10 days after the end of each calendar month, the Permittee shall calculate and record rolling 12-month VOC emissions from all four CTGs. The VOC emission rate shall be calculated as the product of the VOC emission factor determined in accordance with Condition III.H.3.c from the most recent performance test and the heat input rate for the 12-month period, determined in accordance with Condition III.D.i of this Attachment.

[A.A.C. R18-2-306.A.3.c]

I. Ammonia

1. Emission Standards

The Permittee shall not allow the emissions of ammonia (slippage) from each CTG to exceed 10 ppmvd corrected to 15% O_2. [A.A.C. R18-2-306.A.2]

2. Testing Requirements

Within 180 days of initial startup, and annually thereafter, the Permittee shall conduct a performance test for ammonia slippage using methods approved by the Director.

[A.A.C. R18-2-312]

IV. AIR CHILLER SYSTEM/AMMONIA STORAGE

A. Applicability

This section applies to the air chilling system serving CTGs and ammonia storage tank.

B. Particulate Matter and Opacity

1. Emission Limitations/Standards

a. The Permittee shall not emit or cause to be emitted into the atmosphere particulate matter in excess of the allowable hourly emission rate determined as follows:

i. Determination of the allowable emission rates (E) for process weight rates up to 60,000 lb/hr shall be accomplished by use of the equation: [A.A.C. R18-2-730.A.1.a]

$$E = 4.10P^{0.67}$$

Where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour; and

P = the process weight rate in tons-mass per hour.

ii. Determination of the allowable emission rates (E) for process weight rates in excess of 60,000 lb/hr shall be accomplished by use of the equation: [A.A.C. R18-2-730.A.1.b]

$$E = 55.0P^{0.11} - 40$$

Where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour; and

P = the process weight rate in tons-mass per hour.

b. The Permittee shall not cause, allow or permit to be emitted into the atmosphere any plume or effluent the opacity of which exceeds 20 percent, measured in accordance with Reference Method 9 in 40 CFR 60, Appendix A . [A.A.C.R18-2-702.B]

c. If the presence of uncombined water is the only reason for an exceedance of the applicable opacity requirement, the exceedance shall not constitute a violation of the applicable opacity limit. [A.A.C.R18-2-702.C]

d. The Permittee shall not emit gaseous or odorous materials from equipment, operations or premises under his control in such quantities or concentrations as to cause air pollution. [A.A.C. R18-2-730.D]

e. Materials including solvents or other volatile compounds, paints, acids, alkalies, pesticides, fertilizers and manure shall be processed, stored, used, and transported in such a manner and by means that they will not evaporate, leak, escape or be otherwise

discharged into the ambient air so as to cause or contribute to air pollution. Where means are available to reduce effectively the contribution to air pollution from evaporation, leakage or discharge, the installation and use of such control methods, devices, or equipment shall be mandatory. [A.A.C. R18-2-730.F]

f. Where a stack, vent, or other outlet is at such a level that fumes, gas mist, odor, smoke, vapor or any combination thereof constituting air pollution is discharged to adjoining property, the Director may require the installation of abatement equipment or the alteration of such stack, vent, or other outlet by the Permittee thereof to a degree that will adequately dilute, reduce, or eliminate the discharge of air pollution to adjoining property. [A.A.C.R18-2-730.G]

2. Monitoring, Recordkeeping, and Reporting

A certified EPA Reference Method 9 observer shall conduct a monthly survey of visible emissions emanating from the chiller system. If the opacity of the emissions observed appears to exceed the standard, the observer shall conduct a certified EPA Reference Method 9 observation. The Permittee shall keep records of the initial survey and any EPA Reference Method 9 observations performed. These records shall include the emission point observed, name of observer, date and time of observation, and the results of the observation. [A.A.C.R18-2-306.A.3.c]

3. Permit Shield

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-702.B, A.A.C. R18-2-702.C, A.A.C. R18-2-730.A.1, A.A.C. R18-2-730.D, A.A.C. R18-2-730.F, and A.A.C. R18-2-730.G. [A.A.C.R18-2-325]

V. FUGITIVE DUST REQUIREMENTS

A. Applicability

This Section applies to any source of fugitive dust in the facility.

B. Particulate Matter and Opacity

1. Open Areas, Roadways & Streets, Storage Piles, and Material Handling

a. Emission Limitations/Standards

i. Opacity of emissions from any fugitive dust source shall not be greater than 40% measured in accordance with the Arizona Testing Manual, Reference Method 9. [A.A.C. R18-2-614]

ii. The Permittee shall not cause, allow or permit visible emissions from any point source, in excess of 20 percent opacity. [A.A.C-R18-2-702.B]

iii. The Permittee shall employ the following reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne:

(a) Keep dust and other types of air contaminants to a minimum in an open area where construction operations, repair operations, demolition activities, clearing operations, leveling operations, or any earth moving or excavating activities are taking place, by good modern practices such as using an approved dust suppressant or adhesive soil stabilizer, paving, covering,

landscaping, continuous wetting, detouring, barring access, or other acceptable means; [A.A.C. R18-2-604.A]

(b) Keep dust to a minimum from driveways, parking areas, and vacant lots where motor vehicular activity occurs by using an approved dust suppressant, or adhesive soil stabilizer, or by paving, or by barring access to the property, or by other acceptable means; [A.A.C. R18-2-604.B]

(c) Keep dust and other particulates to a minimum by employing dust suppressants, temporary paving, detouring, wetting down or by other reasonable means when a roadway is repaired, constructed, or reconstructed; [A.A.C. R18-2-605.A]

(d) Take reasonable precautions, such as wetting, applying dust suppressants, or covering the load when transporting material likely to give rise to airborne dust; [A.A.C. R18-2-605.B]

(e) Take reasonable precautions, such as the use of spray bars, wetting agents, dust suppressants, covering the load, and hoods when crushing, handling, or conveying material likely to give rise to airborne dust; [A.A.C. R18-2-606]

(f) Take reasonable precautions such as chemical stabilization, wetting, or covering when organic or inorganic dust producing material is being stacked, piled, or otherwise stored; [A.A.C. R18-2-607.A]

(g) Operate stacking and reclaiming machinery utilized at storage piles at all times with a minimum fall of material, or with the use of spray bars and wetting agents; [A.A.C. R18-2-607.B]

(h) Any other method as proposed by the Permittee and approved by the Director. [A.A.C. R18-2-306.A.3.c]

b. Monitoring and Recordkeeping Requirements

i. The Permittee shall maintain records of the dates on which any of the activities listed in Conditions V.B.1.a.iii.(a) through V.B.1.a.iii(h) above were performed and the control measures that were adopted. [A.A.C. R18-2-306.A.3.c]

ii. Opacity Monitoring Requirements

(a) A certified Method 9 observer shall conduct a monthly visual survey of visible emissions from the fugitive dust sources. The Permittee shall keep a record of the name of the observer, the date and location on which the observation was made, and the results of the observation.

(b) If the observer sees a visible emission from a fugitive dust source that on an instantaneous basis appears to exceed applicable opacity standard, then the observer shall, if practicable, take a six-minute Method 9 observation of the visible emission.

(1) If the six-minute opacity of the visible emission is less than or equal to applicable opacity standard, the observer shall make a record of the following:

a) Location, date, and time of the observation; and

b) The results of the Method 9 observation.

(2). If the six-minute opacity of the visible emission exceeds applicable opacity standard, then the Permittee shall do the following:

a) Adjust or repair the controls or equipment to reduce opacity to below the applicable standard; and

b) Report it as an excess emission under Section XII.A of Attachment "A".

[A.A.C. R18-2-306.A.3.c]

c. Permit Shield

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-604.A, A.A.C. R18-2-604.B, A.A.C. R18-2-605, A.A.C. R18-2-606, A.A.C. R18-2-607, and A.A.C. R18-2-612. [A.A.C. R18-2-325]

2. Open Burning

a. Emission Limitation/Standard

Except as provided in A.A.C. R18-2-602.C.1, C.2, C.3, and C.4, and except when permitted to do so by either ADEQ or the local officer delegated the authority for issuance of open burning permits, the Permittee shall not conduct open burning.

[A.A.C. R18-2-602]

b. Monitoring and Recordkeeping Requirement

Compliance with the requirements of Condition V.B.2.a above may be demonstrated by maintaining copies of all open burning permits on file.

[A.A.C. R18-2-306.A.3.c]

c. Permit Shield

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-602. [A.A.C. R18-2-325]

VI. MOBILE SOURCE REQUIREMENTS

A. Applicability

The requirements of this Section are applicable to mobile sources which either move while emitting air contaminants or are frequently moved during the course of their utilization but are not classified as motor vehicles, agricultural vehicles, or are agricultural equipment used in normal farm operations. Mobile sources shall not include portable sources as defined in A.A.C. R18-2-101.90. [A.A.C.R18-2-801.A]

B. Particulate Matter and Opacity

1. Emission Limitations/Standards

a. Off-Road Machinery

The Permittee shall not cause, allow, or permit to be emitted into the atmosphere from any off-road machinery, smoke for any period greater than ten consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first ten minutes. Off-road machinery shall include trucks, graders, scrapers, rollers, and other construction and mining machinery not normally driven on a completed public roadway. [A.A.C.R18-2-802.A and -802.B]

b. Roadway and Site Cleaning Machinery

i. The Permittee shall not cause, allow or permit to be emitted into the atmosphere from any roadway and site cleaning machinery smoke or dust for any period greater than ten consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first ten minutes. [A.A.C.R18-2-804.A]

ii. The Permittee shall take reasonable precautions, such as the use of dust suppressants, before the cleaning of a site, roadway, or alley. Earth or other material shall be removed from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water or by other means. [A.A.C. R18-2-804.B]

iii. Unless otherwise specified, no mobile source shall emit smoke or dust the opacity of which exceeds 40%. [A.A.C.R18-2-801.B]

2. Recordkeeping Requirement

The Permittee shall keep a record of all emissions related maintenance activities performed on the Permittee's mobile sources stationed at the facility as per manufacturer's specifications. [A.A.C.R18-2-306.A.5.a]

3. Permit Shield

Compliance with this Section shall be deemed compliance with A.A.C. R18-2-801, A.A.C. R18-2-802.A, A.A.C. R18-2-804.A and A.A.C. R18-2-804.B. [A.A.C.R18-2-325]

VII. OTHER PERIODIC ACTIVITY REQUIREMENTS

A. Abrasive Blasting

Particulate Matter and Opacity

1. Emission Limitations/Standards

a. The Permittee shall not cause or allow sandblasting or other abrasive blasting without minimizing dust emissions to the atmosphere through the use of good modern practices. Good modern practices include:

i. wet blasting;

ii. effective enclosures with necessary dust collecting equipment; or

iii. any other method approved by the Director.

[A.A.C. R18-2-726]

b. Opacity

The Permittee shall not cause, allow or permit visible emissions from sandblasting or other abrasive blasting operations in excess of 20% opacity, as measured by EPA Reference Method 9. [A.A.C. R18-2-702.B]

2. Monitoring and Recordkeeping Requirement

Each time an abrasive blasting project is conducted, the Permittee shall log in ink or in an electronic format, a record of the following:

a. The date the project was conducted;

b. The duration of the project; and

c. Type of control measures employed.

[A.A.C. R18-2-306.A.3.c]

3. Permit Shield

Compliance with this Part shall be deemed compliance with A.A.C. R18-2-726, A.A.C. R18-2-702.B. [A.A.C.R18-2-325]

B. Use of Paints

1. Volatile Organic Compounds

a. Emission Limitations/Standards

While performing spray painting operations, the Permittee shall comply with the following requirements:

i. The Permittee shall not conduct or cause to be conducted any spray painting operation without minimizing organic solvent emissions. Such operations, other than architectural coating and spot painting, shall be conducted in an enclosed area equipped with controls containing no less than 96 percent of the overspray. [A.A.C.R18-2-727.A]

ii. The Permittee or their designated contractor shall not either:

(a) Employ, apply, evaporate, or dry any architectural coating containing photochemically reactive solvents for industrial or commercial purposes; or

(b) Thin or dilute any architectural coating with a photochemically reactive solvent.

[A.A.C.R18-2-727.B]

iii. For the purposes of Conditions VII.B.1.a.ii and VII.B.1.a.v, a photochemically reactive solvent shall be any solvent with an aggregate of more than 20 percent of its total volume composed of the chemical compounds classified in Conditions VIII.B.1.a.iii(a) through VIII.B.1.a.iii(c) below, or which exceeds any of the following percentage composition limitations, referred to the total volume of solvent:

(a) A combination of the following types of compounds having an olefinic or cyclo-olefinic type of unsaturation-hydrocarbons, alcohols, aldehydes, esters, ethers, or ketones: 5 percent.

(b) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8 percent.

(c) A combination of ethylbenzene, ketones having branched hydrocarbon structures, trichloroethylene or toluene: 20 percent.
[A.A.C.R18-2-727.C]

iv. Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one of the groups of organic compounds described in Conditions VII.B.1.a.iii(a) through VII.B.1.a.iii(c) above, it shall be considered to be a member of the group having the least allowable percent of the total volume of solvents. [A.A.C.R18-2-727.D]

v. The Permittee shall not dispose of by evaporation more than 1.5 gallons of photochemically reactive solvent in any one day.
[SIP Provision R9-3-527.C]

b. Monitoring and Recordkeeping Requirements

i. Each time a spray painting project is conducted, the Permittee shall log in ink, or in an electronic format, a record of the following:

(a) The date the project was conducted;

(b) The duration of the project;

(c) Type of control measures employed;

(d) Material Safety Data Sheets for all paints and solvents used in the project; and

(e) The amount of paint consumed during the project.

ii. Architectural coating and spot painting projects shall be exempt from the recordkeeping requirements of Condition VII.B.1.b.i above.
[A.A.C. R18-2-306.A.3.c]

c. Permit Shield

Compliance with this Part shall be deemed compliance with A.A.C.R18-2-727 and SIP Provision R9-3-527.C. [A.A.C.R18-2-325]

2. Opacity

a. Emission Limitation/Standard

The Permittee shall not cause, allow or permit visible emissions from painting operations in excess of 20% opacity, as measured by EPA Reference Method 9. [A.A.C. R18-2-702.B]

b. Permit Shield

Compliance with the conditions of this Part shall be deemed compliance with A.A.C.R18-2-702.B. [A.A.C. R18-2-325]

C. Demolition/Renovation - Hazardous Air Pollutants

1. Emission Limitation/Standard

The Permittee shall comply with all of the requirements of 40 CFR 61 Subpart M (National Emissions Standards for Hazardous Air Pollutants - Asbestos). [A.A.C. R18-2-1101.A.8]

2. Monitoring and Recordkeeping Requirement

The Permittee shall keep all required records in a file. The required records shall include the "NESHAP Notification for Renovation and Demolition Activities" form and all supporting documents. [A.A.C. R18-2-306.A.3.c]

3. Permit Shield

Compliance with the conditions of this Part shall be deemed compliance with A.A.C. R18-2-1101.A.8. [A.A.C. R18-2-325]

ATTACHMENT "C": EQUIPMENT LIST

Air Quality Control Permit No. 43801
for
Northern Arizona Energy, LLC

NAME	CAPACITY	MAKE	MODEL	SERIAL NUMBER	DATE OF MANUFACTURE	EQUIPMENT NUMBER
Combustion Gas Turbine 1*	48 MW	General Electric	LM6000PC-Sprint Nxgen	TBD	TBD	CT1
Combustion Gas Turbine 2*	48 MW	General Electric	LM6000PC-Sprint Nxgen	TBD	TBD	CT2
Combustion Gas Turbine 3*	48 MW	General Electric	LM6000PC-Sprint Nxgen	TBD	TBD	CT3
Combustion Gas Turbine 4*	48 MW	General Electric	LM6000PC-Sprint Nxgen	TBD	TBD	CT4
Chiller System for Combustion Turbines	345 gallons per minute Recirculation rate	TBD	TBD	TBD	TBD	Chiller
Aqueous Ammonia Storage Tank	10000 gallons	TBD	TBD	TBD	TBD	TBD

* Each turbine is equipped with selective catalytic reduction system (SCR), and oxidation catalyst unit.

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ATTACHMENT "D": PHASE II ACID RAIN PROVISIONS
Air Quality Control Permit No. 43801
for
Northern Arizona Energy, LLC

I. Statement of Basis

Statutory and Regulatory Authorities: In accordance with Arizona Revised Statutes, Title 49, Chapter 3, Article 2, Section 426.N, and Titles IV and V of the Clean Air Act, the Arizona Department of Environmental Quality issues this Phase II Acid Rain Permit pursuant to Arizona Administrative Code, Title 18, Chapter 2, Article 3, Section 333 (A.A.C. R18-2-333), "Acid Rain."

II. SO_2 Allowance* Allocations and NO_X Requirements for each Affected Unit

A. The Permittee shall comply with the Acid Rain Permit and 40 CFR Parts 72, 73, and 75.

B. The Permittee shall hold SO_2 allowances as of the allowance transfer deadline in each Gas Turbine Unit compliance sub-account not less than the total annual actual emissions of SO_2 from each gas turbine unit for the previous calendar year as required by the Acid Rain Program.

C. The SO_2 Allowance Requirements and NO_X requirements for CT1, CT2, CT3 and CT4 are as follows:

CT1

Year:	2007-2012
Annual SO_2 allowances	NA
NOx Limits:	This Unit is not subject to a NO_X limit under 40 CFR Part 76.

CT2

Year:	2007-2012
Annual SO_2 allowances	NA
NOx Limits:	This Unit is not subject to a NO_X limit under 40 CFR Part 76.

CT3

Year:	2007-2012
Annual SO_2 allowances	NA
NOx Limits:	This Unit is not subject to a NO_X limit under 40 CFR Part 76.

CT4

Year:	2007-2012
Annual SO_2 allowances	NA
NOx Limits:	This Unit is not subject to a NO_X limit under 40 CFR Part 76.

*As defined under 40 CFR §72.2, "Allowance" means an authorization by the Administrator under the Acid Rain Program to emit up to one ton of sulfur dioxide during or after a specified calendar year.

III. Permit Application

The Permittee, and any other owners or operators of the affected units at this facility, shall comply with the requirements contained in the Acid Rain Permit Application signed by the Designated Representative on March 23, 2007.

DRAFT

TECHNICAL SUPPORT DOCUMENT
FOR
NORTHERN ARIZONA ENERGY, LLC
AIR QUALITY PERMIT NO. 43801

I. INTRODUCTION

Northern Arizona Energy, LLC, the Permittee, has proposed to construct and operate a gas-fired peaking power generation plant, consisting of four (4) combustion turbine generators (CTG) of 48 MW each. The facility will be located approximately 3 miles north of the Griffith Interchange on Interstate 40 in Mohave County, Arizona. The project will interconnect with the Western Area Power Administration (WAPA) transmission system at the Griffith Switchyard. The project is designed to serve peak load requirements of customers in Mohave county and surrounding regional load centers.

A. Company Information

1. Facility Name

   Northern Arizona Energy Project

2. Mailing Address

   Northern Arizona Energy, LLC
   1735 Technology Drive Suite 820
   San Jose, CA 95110

3. Facility Address

   Apache and Haul Road
   Golden Valley, AZ 86413
   Approximately 3 miles north of the I-40 Griffith Interchange in Mohave County, Arizona.

B. Attainment Classification

The project will be located in Mohave County, which is designated as attainment or unclassifiable for all criteria air pollutants.

C. Learning Sites

The facility has no learning sites located within 2 miles.

II. FACILITY DESCRIPTION

A. Process Description

The Northern Arizona Energy, LLC (NAE) has proposed to construct the project in a phased manner, and at full capacity, the project will have four (4) combustion turbine generators (CTG) of 48 MW each. The CTGs will be fired exclusively on natural gas. A chiller system will be utilized to cool the incoming air to improve turbine efficiency and preserve peaking output during the hottest ambient temperature days. Other auxiliary equipment includes air filter, chiller coils, water treatment equipment, natural gas compressors, transformers and water storage tanks. Each CTG will also be equipped with a SPRINT (SPRay INTercooling) system to enhance turbine efficiency and power output.

B. Air Pollution Control Equipment

The CTGs will have a water injection system to control nitrogen oxide (NO_X) emissions. In addition, a selective catalytic reduction (SCR) system will be used to further reduce NOx emissions. Also, an oxidation catalyst will be used to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions. The water chiller system will be equipped with a drift eliminator.

III. EMISSIONS

A. Potential Annual Emissions

The project is owned by NAE. NAE is owned by an entity that is jointly owned by LS Power Corporation and Dynegy Corporation. Griffith Energy is also owned by Dynegy. Due to common management of NAE and Griffith Energy (operating under a Class I Title V permit), and location on contiguous property, the operations at NAE and Griffith Energy have been evaluated as a single "stationary source". Consequently, NAE operations are also being covered by a Class I Title V Permit. Potential emissions of nitrogen oxides (NO_X), sulfur dioxide (SO_2), and particulate matter less than 10 microns (PM_{10}), carbon monoxide (CO), and volatile organic compounds (VOCs) each exceed the significant threshold. However, total allowable NO_X, SO_2, CO, VOCs, and PM_{10} emissions are limited by enforceable permit conditions to less than the significant level. Thus, the NAE operations will not be subject to New Source Review (NSR). Combined potential emissions of hazardous air pollutants (HAP) for NAE and Griffith Energy are below 10 and 25 tpy for individual and total combined HAP, respectively. Therefore, the facility is not a major source of HAP emissions for the purposes of CAA Section 112 and Article 11 of A.A.C. title 18, chapter 2.

The following emission limits are specified in the permit:

TABLE 1: Emission Limits

Pollutant	Significant Threshold Tons/year	Emission Limits for 4 CTGs Tons/year
NO_X	40.0	39.0
CO	100.0	90.0
PM_{10}	15.0	14.0
VOCs	40.0	36.0
SO_2	40.0	36.0

1. Particulate Matter

The PM_{10} emissions from the proposed project include emissions from the new combustion turbines and chiller system.

a. Combustion Turbines

The maximum allowable PM_{10} emissions from the 4 CTGs collectively are limited to 14.0 tons per year. Compliance with this limit is to be demonstrated

through use of continuous fuel flow monitoring in conjunction with unit-specific emission factors based on performance testing. Total PM_{10} emissions from the 4 CTGs are to be calculated and recorded monthly, based on a 12-month rolling sum.

b. Cooling Tower

The potential PM_{10} emissions from the cooling tower are expected to be 0.47 tons per year, based on 6000 hours of operation (chiller will be operated only when ambient temperature is more than 60° F), and 345 gallons per minute recirculation rate.

2. Nitrogen Oxides

The maximum allowable NO_X emissions from the 4 CTGs collectively are limited to 39.0 tons per year. Compliance with this limit is to be demonstrated through use of a continuous emission rate monitoring system, with total NO_X emissions from the 4 CTGs to be calculated and recorded daily, based on a 365-day rolling sum.

3. Carbon Monoxide

The maximum allowable CO emissions from the 4 CTGs collectively are limited to 90.0 tons per year. Compliance with this limit is to be demonstrated through use of a continuous emission rate monitoring system, with total CO emissions from the 4 CTGs to be calculated and recorded daily, based on a 365-day rolling sum.

4. Sulfur Dioxide (SO_2)

The maximum allowable SO_2 emissions from the 4 CTGs collectively are limited to 36.0 tons per year. Compliance with this limit is to be demonstrated through use of continuous fuel flow monitoring in conjunction with unit-specific emission factors based on performance testing. Total SO_2 emissions from the 4 CTGs are to be calculated and recorded monthly, based on a 12-month rolling sum.

5. Volatile Organic Compounds (VOCs)

The maximum allowable VOCs emissions from the 4 CTGs collectively are limited to 36.0 tons per year. Compliance with this limit is to be demonstrated through use of continuous fuel flow monitoring in conjunction with unit-specific emission factors based on performance testing. Total VOC emissions from the 4 CTGs are to be calculated and recorded monthly, based on a 12-month rolling sum.

IV. APPLICABLE REGULATIONS

Section 5 of the NAE permit application presented a regulatory analysis and generally identified Federal and State air quality regulations applicable to the proposed source and emission units. Table 2 summarizes the findings of the Department with respect to the applicability or non-applicability of specific regulations to emission units and emission unit groups.

TABLE 2: REGULATORY ANALYSIS

Unit ID	Construction Date	Control Device	Regulation(s)	Applicable? (Y/N)	Verification
Gas Turbines CT1, CT2, CT3, CT4	2007	Selective Catalytic Reduction and Oxidation Catalyst	NSPS Gen. Provisions A.A.C R18-2-901(1) 40 CFR 60 subpart A	Y	Units are subject to an NSPS rule. See below.
			NSPS Subpart KKKK 40 CFR § 60.4305	Y	Each combustion turbine has heat input greater than 10 million Btu per hour and will be constructed after 2/18/2005.
			NSPS Subpart KKKK 40 CFR § 60.4320	Y	Each combustion turbine is subject to NO_X standards for gas-fired units with heat input equal to or greater than 10 million Btu per hour and less than 850 million Btu per hour.
			NSPS Subpart KKKK 40 CFR § 60.4330	Y	Each combustion turbine is subject to SO_2 standards for units located in the continental U.S.
			NSPS Subpart KKKK 40 CFR § 60.4335, 40 CFR § 60.4345, 40 CFR § 60.4350	Y	Each combustion turbine is subject to NO_X monitoring requirements for units equipped with water injection. Permittee has elected to use continuous emissions monitoring systems.
			NSPS Subpart KKKK 40 CFR § 60.4365	Y	Each combustion turbine is subject to SO_2 monitoring and recordkeeping requirements. Permittee has elected to maintain records of fuel specifications from tariff or contract.
			NSPS Subpart KKKK 40 CFR § 60.4375 40 CFR § 60.4380	Y	Each combustion turbine is subject to NO_X reporting requirements. Permittee has elected to use continuous emissions monitoring systems.

			NSPS Subpart KKKK 40 CFR § 60.4405	Y	Each combustion turbine is subject to NO_X performance testing requirements. Permittee has elected to use continuous emissions monitoring systems.
			NSPS Subpart KKKK 40 CFR § 60.4415	Y	Each combustion turbine is subject to SO_2 performance testing requirements.
			NSPS Subpart GG A.A.C R18-2-901(40)	Y	Each combustion turbine was constructed after October 3, 1977 and has a heat input at peak load greater than 10.7 gigajoules per hour. NSPS subpart KKKK includes an exemption from complying with the provisions of subpart GG, but this exemption does not extend to A.A.C R18-2-901(40) until such time as subpart KKKK is incorporated into the A.A.C. The requirements of subpart GG are applicable, but have been incorporated into the permit only by reference, as the exemption is expected to take effect prior to startup of these combustion turbines.
			Acid Rain Program A.A.C. R18-2-333 40 CFR 72 – 78	Y	Each combustion turbine is a utility unit.
			NESHAP Subpart YYYY	N	40 CFR 63 Subpart YYYY applies to stationary combustion turbines located at major sources of HAP emissions. NAE is an area (i.e., non-major) source of HAP.
			PSD A.A.C. R18-2-406 A.A.C. R18-2-407	N	Permittee has voluntarily accepted limitations on criteria pollutant emissions to ensure that the project will not result in a significant net emissions increase.
			Compliance Assurance Monitoring 40 CFR 64	N	Each combustion turbine uses a control device only for NO_X and CO emissions. For each of these pollutants, the permit specifies use of CEMS as "a continuous compliance determination method". Therefore, CAM is not applicable.

Chiller system and aqueous ammonia storage	2007	Drift Eliminator	A.A.C R18-2-702(B)	Y	Unit is subject to the generally applicable opacity emission standard because it is not subject to any other opacity standard.
			A.A.C R18-2-730	Y	Unit is subject to the generally applicable emission standard and conditions as these are unclassified process sources

V. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS

A. Combustion Gas Turbines

1. NSPS Requirements

As shown in Table 2, each combustion turbine is subject to the NO_X and SO_2 emission standards and the accompanying monitoring, recordkeeping, and reporting requirements under 40 CFR 60 subpart KKKK. These provisions include a requirement to operate a continuous emission monitoring system for NO_X emissions, and to maintain records of current valid natural gas purchase contract, specifying maximum total sulfur content to demonstrate compliance with sulfur limit.

2. Fuel Restriction

Each combustion turbine is permitted to burn only pipeline quality natural gas.

3. Synthetic Minor NO_X and CO Emission Limits

The Permittee has voluntarily accepted enforceable emission limits that will ensure that the proposed project will not result in a significant net emissions increase that would trigger PSD applicability. The Permittee is required to use continuous emission rate monitoring systems to demonstrate continuous compliance with these limits.

4. Synthetic Minor PM_{10} Emission Limit

The Permittee has voluntarily accepted an enforceable emission limit that will ensure that the proposed project will not result in a significant net emissions increase that would trigger NSR applicability. The Permittee is required to use continuous fuel flow monitoring systems, in conjunction with performance test results, in order to demonstrate continuous compliance with this limit. For calculating emissions, the most recent performance test results shall be used to calculate emissions.

5. Synthetic Minor SO_2 and VOC Emission Limits

The Permittee has voluntarily accepted enforceable emission limits that will ensure that the proposed project will not result in a significant net emissions increase that would trigger NSR applicability. The Permittee is required to use continuous fuel flow monitoring systems, in conjunction with performance test results, in order to demonstrate continuous compliance with this limit. For calculating emissions, the most recent performance test results shall be used to calculate emissions.

B. Chiller System

The Permittee is required to perform monthly survey of visible emissions from the chiller system. If the opacity appears to exceed the standard, the Permittee is required to conduct EPA Method 9 observation by a certified EPA Reference Method 9 observer.

II. PERFORMANCE TESTING REQUIREMENTS

A. NSPS Requirements

Each combustion turbine is subject to the NO_X and SO_2 emission standards and the accompanying performance testing requirements under 40 CFR 60 subpart KKKK.

B. PM_{10}

The Permittee is required to perform an initial performance test for PM_{10} emissions using EPA 5 and EPA Method 202 within 60 days after achieving 300 fired hours on the CTG. Subsequent performance test shall be performed annually. . If at the end of any month, the 12-month rolling total of PM_{10} emissions for the 4 CTGs exceeds 13.5 tons, the test frequency shall change to semi-annual.

C. VOC

The Permittee is required to perform an initial performance test for VOC emissions within 60 days after achieving 300 fired hours on the CTG. Subsequent performance test shall be performed annually. Performance test for VOC emissions shall be performed using EPA Methods 25A/25B.

D. Ammonia

The Permittee is required to an annual perform test for ammonia slippage.

VII. IMPACTS TO AMBIENT AIR QUALITY

A dispersion modeling analysis was conducted by the Permittee to demonstrate compliance with National Ambient Air Quality Standard (NAAQS) and Arizona Ambient Air Quality Guideline (AAAQGs). The modeling analysis design, input parameters, and results are documented in Section 4 of the permit application. The modeling analysis took into consideration the combined impact of existing Griffith Energy facility and Northern Arizona Energy project, and the background ambient air quality data provided by ADEQ. The modeling analysis was reviewed, and the Department concluded that the modeling demonstrated compliance with both the NAAQS and the AAAQG. The results of the modeling analysis are summarized below:

Table 3: Summary of Maximum Modeled Concentrations and NAAQS Compliance

Pollutant	Averaging Period	Modeled Conc. (NAEP+ Griffith) ($\mu g/m^3$)	Background Conc. ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Total Impact (% of Standard)
NO_X	Annual	8	4	12	100	12%
SO_2	3-hour	8	246	254	1,300	20%
	24-hour	2	52	54	365	15%
	Annual	0.3	6	6.3	80	8%
CO	1-hour	590	582	1172	40,000	3%
	8-hour	94	582	676	10,000	7%
PM_{10}	24-hour	14	46	60	150	40%
	Annual	1	14	15	50	31%

Table 4: Summary of AAAQG Modeling Results

AAAQG Pollutant	1-Hour Impact ($\mu g/m^3$)	1-Hour AAAQG ($\mu g/m^3$)	24-Hour Impact ($\mu g/m^3$)	24-Hour AAAQG ($\mu g/m^3$)	Annual Impact ($\mu g/m^3$)	Annual AAAQG ($\mu g/m^3$)
1,3-Butadiene	1.78E-03	7.20E+00	2.90E-04	1.90E+00	2.00E-05	6.70E-02
Acetaldehyde	1.67E-01	2.30E+03	2.76E-02	1.40E+03	2.0E-05	5.00E-01
Acrolein	2.76E-03	6.70E+00	4.63E-03	2.00E+00	--	--
Ammonia	--	--	1.69E+00	1.40E+02	--	--
Benzene	6.57E-02	6.30E+02	1.16E-02	5.10E+01	1.04E-03	1.40E-01
Ethylbenzene	1.51E-01	4.50E+03	2.58E-02	3.50E+03	--	--
Formaldehyde	9.46E-01	2.00E+01	1.57E-01	1.20E+01	1.12E-02	8.00E-02
Hexane	7.26E-01	5.30E+03	1.20E-01	1.40E+03		
Naphthalene	8.15E-03	6.30E+02	1.46E-03	4.00E+02	--	--
Propylene Oxide	4.45E+00	1.50E+03	2.37E-01	4.00E+02	3.77E-02	2.00E+00
Toluene	6.12E-01	4.70E+03	1.04E-01	3.00E+03	--	--
Xylenes	3.20E-01	5.50E+03	5.52E-02	3.50E+03	--	--

VIII. INSIGNIFICANT ACTIVITIES

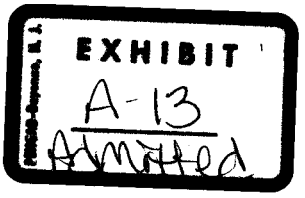
The applicant has requested the following activities to be deemed as "insignificant". According to A.A.C. R18-2-101.57, for an activity to be deemed "insignificant", there should be no applicable requirement for the activity. This was the basis used to determine if the activities in the following list qualify as an "insignificant" activity under Arizona law.

TABLE 5: INSIGNIFICANT ACTIVITIES

Activity	Insignificant Yes/No	Reason and Applicable Regulation
Turbine Compartment Ventilation Exhaust Vents	Yes	A.A.C. R18-2-101.57(j)
Compressed Air System	Yes	A.A.C. R18-2-101.57(j)
Turbine Lube Oil Vapor extractors and Lube Oil Mist eliminator Vents	Yes	A.A.C. R18-2-101.57(j)
Sulfuric Acid Storage tanks Vents	Yes	A.A.C. R18-2-101.57(j)
Welding Equipment	Yes	A.A.C. R18-2-101.57(j)
Water Wash System Storage tank vent	Yes	A.A.C. R18-2-101.57(j)
Fuel Purge Vents	Yes	A.A.C. R18-2-101.57(j)
Oil/Water Separator Waste Oil Collection Tank Vents	Yes	A.A.C. R18-2-101.57(j)

IX. LIST OF ABBREVIATIONS

AAAQG.....Arizona Ambient Air Quality Guideline
A.A.C.....Arizona Administrative Code
ADEQ.....Arizona Department of Environmental Quality
ADHS.....Arizona Department of Health Services
AQD.....Air Quality Division
AQG.....Air Quality Guidelines
Btu/ft^3.....British Thermal Units per Cubic Foot
CO.....Carbon Monoxide
CO_2.....Carbon Dioxide
FERC.....Federal Energy Regulatory Commission
ft.....Feet
g.....Grams
HAP.....Hazardous Air Pollutant
hp.....Horsepower
hr.....Hour
IC.....Internal Combustion
lb.....Pound
m.....Meter
MMBtu.....Million British Thermal Units
$\mu g/m^3$.....Microgram per Cubic Meter
MMCFD.....Million Cubic Feet Per Day
NAAQS.....National Ambient Air Quality Standard
NO_x.....Nitrogen Oxide
O_3.....Ozone
PM.....Particulate Matter
PM_{10}.....Particulate Matter Nominally less than 10 Micrometers
PTE.....Potential-to-Emit
SO_2.....Sulfur Dioxide
TPY.....Tons per Year
TSP.....Total Suspended Particulate
USEPA.....United States Environmental Protection Agency
VOC.....Volatile Organic Compound
yr.....Year



EVALUATION OF THE PUMPING IMPACT OF THE NORTHERN ARIZONA ENERGY PROJECT (NAEP) ON THE MOHAVE COUNTY WATER SYSTEM WELL FIELD AND THE SACRAMENTO VALLEY AQUIFER MOHAVE COUNTY, ARIZONA

Prepared for:
Northern Arizona Energy, LLC
c/o Moyes Storey, Ltd.
1850 North Central Avenue
Suite 1100
Phoenix, Arizona 85004

Prepared by:
Southwest Ground-water Consultants, Inc.
3033 North 44th Street
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Phoenix, Arizona 85018

June 21, 2007

EVALUATION OF THE PUMPING IMPACT OF THE NORTHERN ARIZONA ENERGY PROJECT (NAEP) ON THE MOHAVE COUNTY WATER SYSTEM WELL FIELD AND THE SACRAMENTO VALLEY AQUIFER MOHAVE COUNTY, ARIZONA

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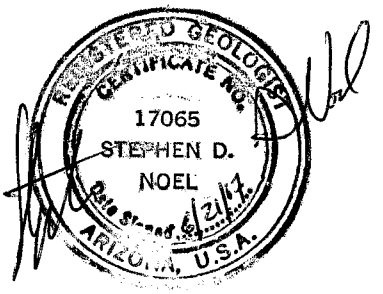

June 21, 2007

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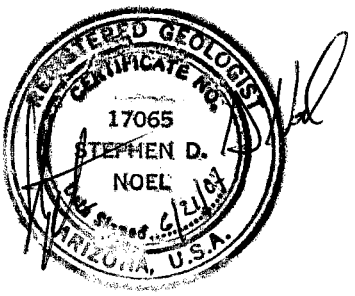


LIST OF ATTACHMENTS

Attachment No.

I	Montgomery, 2005, Figure 1 Location Map for Sacramento Valley
II	Figure 1 - Well Locations, Depth to Water, and Saturated Thickness
III	ADWR Office of Assured and Adequate Water Supply, Hydrology Review, File No. 23-401823, Golden Valley 5800
IV	Selected portions from the Golden Valley 5800 (Montgomery, 2005), GVID (Manera, 2006), and Griffith Energy Well Field (Manera, 1998) Reports
V	Griffith Power Plant, Actual versus Projected Cumulative Water Use, 2001 - 2006
VI	Figure 2 - NAEP Impact Analysis
VII	Figure 3 – Estimated Drawdown at Production Well #8, 55-580149 B(19-18) 10aaa

1.0 BACKGROUND

The Northern Arizona Energy Project (NAEP) is proposing to install a 175 MW natural gas fired simple cycle power plant located adjacent to the Griffith Energy Project south of Kingman, Arizona. Raw water will be required for process water supply. The water demand will average 160 acre-feet per year (ac-ft/yr) based on an expected 2,500 annual operating hours. The "theoretical worst case" water demand is 268 ac-ft/yr which is based on a hypothetical 5,000 annual operating hours. The Northern Arizona Energy Project is expected to operate for 40 years.

The proposed water supply for the NAEP is ground water from the Sacramento Valley Aquifer pumped by the Mohave County Water System Well Field (County Well Field) located in Sections 10, 11, 14, and 15, Township 19 North, Range 18 West. The well field is located approximately two miles southwest of the NAEP Project Site.

Reports and data sources utilized in this current analysis to document the availability of ground water from the County Well Field are referenced below.

- Arizona Department of Water Resources (ADWR) Records.
- ADWR, 1994 Staff Report on Kingman Area Water Supply and Demand, (Regarding need to establish an AMA in the Sacramento or Hualapai Basins). Phoenix, Arizona.
- Arizona Department of Water Resources, August 14, 2006. Analysis of Adequate Water Supply – Golden Valley 5800. File Number 23-401823.0001. Signed by Sandra Fabritz-Whitney, Assistant Director, Water Management Division.
- Errol L. Montgomery & Associates, Inc. July 25, 2005. Consultants Report – Regional Hydrogeology, Source of Water Supply, and Projected 100-Year Drawdown Impacts in the Vicinity of the Golden Valley South Master Planned Community, Mohave County, Arizona.
- Manera, Inc. August 3, 1998. Consultants Report – Preliminary Hydrogeologic Evaluation, Griffith Energy Well Field, Sacramento Valley, Mohave County, Arizona.
- Manera, Inc. November 13, 2006. Consultants Report – Hydrologic Evaluation, Sacramento Valley, Mohave County, Arizona, Golden Valley County Improvement District No.1 Report.

2.0 SACRAMENTO VALLEY AQUIFER

2.1 Aquifer Geometry

The Sacramento Valley ground-water basin is comprised of a thick sequence of alluvial deposits underlain by granitic, metamorphic, and volcanic bedrock. The alluvial deposits range in thickness from zero feet along the basin margins to greater than 3,200 feet in the north-central portion of the basin. The lower alluvial unit is the primary aquifer in the Sacramento Valley ground-water basin.

A summary of the depth to bedrock and the ground-water surface in the Sacramento Valley and study area is presented in Attachment I (Montgomery, 2005). Review of this figure and ground-water level data from ADWR indicates:

1) Depth to bedrock is greatest in the north-central portion of the basin and is approximately 1,600 to 3,200 feet below land surface (bls) in the County Well Field area;
2) ground-water flow direction is south along the axis of the valley; and
3) depth to ground water at the County Well Field ranges from approximately 530 to 630 feet bls due specifically to variations in land surface elevations (Figure 1, Attachment II).

The saturated thickness of the regional aquifer in the vicinity of the County Well Field was conservatively calculated to be 770 feet. That thickness is based on a depth to bedrock of 1,400 feet bls and a depth to ground water of 634 feet bls (Figure 1, Attachment II; see well # 55-580149).

Using a generally accepted rule that the practical recoverable volume of ground water from the aquifer is 66% of the total saturated thickness, and based on a saturated thickness of 770 feet at the County Well Field, this equates to a projected maximum drawdown of 508 feet (770 feet x 66%) or recoverable depth to water of 1,142 feet bls.

2.2 Aquifer Parameters

The aquifer parameters of transmissivity (gallons per day per foot) and hydraulic conductivity (gallons per day per square foot), including the testing conducted by Manera at the County Well Field, were summarized and reported by Montgomery (2005). Review of these aquifer test results indicates that the aquifer transmissivity of the lower alluvial unit ranges from 17,000 gpd/ft to 200,000 gpd/ft, and the specific yield is approximately 0.07.

ADWR used an average transmissivity value of 33,750 gpd/ft, a specific yield of 0.07, and an average aquifer saturated thickness of only 435 feet in its review of the Golden Valley 5800 Analysis of Adequate Supply Application (Attachment III, Office of Assured and Adequate Water Supply, Hydrology Review, File No. 23-401823, Golden

Valley 5800). The Golden Valley 5800 proposed withdrawal site is located four miles north of the County Well Field.

The more conservative ADWR-approved aquifer parameters are used in this report to evaluate the NAEP pumping impact on the aquifer (Section 4.2).

3.0 REGIONAL GROUND-WATER PUMPING

The major current and projected demands on the regional aquifer are presented in the chart below.

CURRENT AND PROJECTED REGIONAL GROUND-WATER DEMAND			
Project	Pumped Volume (acre-feet/year)	Source	Remarks
Golden Valley 5800 (Rhodes Homes)	14,714*	Montgomery, July, 2005. Regional Hydrogeology, Source of Water Supply, and Projected 100-Year Drawdown Impacts in the Vicinity of the Golden Valley South Master Planned Community, Mohave County, Arizona.	Montgomery (2005) Application with impact analysis was for 14,714 ac-f/yr. ***ADWR approved only 9,000 acre-feet per year**; therefore, the Montgomery projected drawdown impact is overstated by approximately 40% versus the ADWR allowable pumping rate.
GVID	7,211	Manera, November 13, 2006. Hydrologic Evaluation, Sacramento Valley, Mohave County, Arizona, Golden Valley County Improvement District No.1.	GVID demand – 1,400 ac-ft/yr; Valley Pioneer Water Company – 2,811 ac-ft/yr; Mineral Park Mine Call – 3,000 ac-ft/yr.
Mohave County Water System (County Well Field)	5,323	Manera, August 3, 1998. Preliminary Hydrologic Evaluation, Griffith Energy Well Field, Sacramento Valley, Mohave County, Arizona.	This pumped volume represents the "worst case" – maximum day pumping 365 days per year. The more probable pumping rate is projected at 3,060 ac-ft/yr. However, the actual pumping rate for 2001 – 2006 averaged only about 1,200 ac-ft/yr.
NAEP	268	Northern Arizona Energy, LLC.	"Worst case" – maximum theoretical 5,000 operating hours. Probable pumping 160 ac-ft/yr and 2,500 operating hours.
Total Impact	**27,516 (21,802)****		Represents worst case conditions which are not anticipated to occur. ****Accounts for ADWR approved 9,000 ac-ft/yr (out of 14,714 ac-ft/yr requested) for the Golden Valley 5800 Project.**

4.0 AQUIFER IMPACT ANALYSIS

The projected regional aquifer impacts presented below incorporate calculations and conclusions prepared by Manera (1998, 2006) and Montgomery (2005). These analyses used the THWELLS analytical method.

4.1 Golden Valley, GVID, and Griffith Energy Project Aquifer Impacts

Previous investigations into pumping impacts on the regional aquifer underlying the County Well Field include Manera (1998, 2006) for the Griffith Energy Project and GVID, respectively, and Montgomery (2005) for Golden Valley 5800. The projected impacts of those projects and investigations are presented in the following chart.

REGIONAL PUMPING IMPACTS

Project	Pumped Volume (acre-feet/year)	Time (years)	Drawdown Impact at County Well Field (feet)	Source	Remarks
Golden Valley 5800 (Rhodes Homes)	14,714*	100	115 The ADWR approved volume of 9,000 ac-ft/yr results in a drawdown of approximately 40% less, or 61 feet.	Montgomery, July, 25 2005. Regional Hydrogeology, Source of Water Supply, and Projected 100-Year Drawdown Impacts in the Vicinity of the Golden Valley South Master Planned Community, Mohave County, Arizona.	Golden Valley 5800 Application and impact analysis was for 14,714 acre-feet per year. ***ADWR approved only 9,000 ac-ft/yr.**
GVID	7,211	100	55	Manera, November 13, 2006. Hydrologic Evaluation, Sacramento Valley, Mohave County, Arizona, Golden Valley County Improvement District No.1.	GVID demand – 1,400 ac-ft/yr, Valley Pioneer Water Company – 2,811 ac-ft/yr, Mine Call – 3,000 ac-ft/yr.
Mohave County Water System (County Well Field)	5,323**	40	110 **The more probable pumping volume of 3,060 ac-ft/yr results in a drawdown of 70 feet (Manera, 1998).	Manera, August 3, 1998. Preliminary Hydrologic Evaluation, Griffith Energy Well Field, Sacramento Valley, Mohave County, Arizona.	Worst Case – maximum day pumping 365 days per year. ** Probable pumping is 3,060 ac-ft/yr.

Selected portions from the Golden Valley 5800 (Montgomery, 2005), GVID (Manera, 2006), and Griffith Energy Well Field (Manera, 1998) reports are presented in Attachment IV, for reference.

In the 1998 Report, Manera analyzed the potential impacts on the Sacramento Valley aquifer using the "probable" and "worst case" water demand scenarios. However, due to the electric power market conditions from 2001 through 2006, the annual operating hours and actual water demand for the Griffith Energy Project resulted in annual pumping volumes that were considerably less than the estimated scenarios. See below:

GRIFFITH ENERGY GROUNDWATER PROJECTED AND ACTUAL USE

Griffith Energy Demand	Annual Volume (acre-feet/year)	Remarks
Estimated Probable Case	3,060*	Based on expected operating profile. * Manera, 1998.
Estimated Worst Case	5,323*	Continuous maximum peak demand, 365 days/yr. *Manera, 1998.
Average Actual Case (from 2001 through 2006)	1,200**	Actual use range: 875 – 1,600 ac-ft/yr. **Griffith Energy, 2007.

Actual water use over Griffith Energy's first six years of operation was approximately 24,702 ac-ft less than the calculated impact of the "worst case" pumping scenario that was the basis for Maner's (1998) impact analysis (Attachment V). This savings in pumped water is equivalent to 92 years of pumping the "worst case" NAEP demand at 268 ac-ft/yr, or 154 years under the likely annual pumping volume of 160 ac-ft/yr. As a result, the impact of the proposed new NAEP demand on the aquifer over its entire project life of 40 years has already been taken into account as part of the initial aquifer impact projections (Manera, 1998) for the Griffith Project and by subsequent studies. Therefore, no additional impacts on the underlying regional aquifer, beyond those already accounted for in the relevant aquifer studies, will occur as a result of the proposed NAEP ground-water demand.

4.2 NAEP Aquifer Impact

The impact analysis of the proposed NAEP water demand on the regional aquifer was calculated by SGC using aquifer parameters approved by ADWR in its review of the Golden Valley 5800 Analysis of Adequate Water Supply, and the program THWELLS v 4.01 multi-Theis analysis software (van der Heijde, 1996). The THWELLS analysis simulates one production well using the "worst case" pumping rate of 268 ac-ft/yr, and image well boundaries consistent with the boundary locations used by Montgomery (2005). The locations of the proposed well and image well boundaries are shown in Attachment VI (Figure 2).

Considering only aquifer impacts caused by NAEP's "worst case" withdrawal scenario, the maximum drawdown at the pumping well would be 15 feet after 40 years of continuous pumping (see Attachment VI, Figure 2). Alternatively, the projected drawdown would be 5.7 feet at a distance of 1,000 feet from the pumping well. As noted above, Manera (1998) concluded that the Griffith Energy Project withdrawals over 40 years would result in a drawdown of 110 feet at the well for the "worst case," and 70 feet for the more probable pumping volume. However, the actual annual pumping volumes have been considerably less than even the "probable case." Thus, actual drawdowns are less than those projected. Consequently, combining the projected 15 feet of drawdown at the pumping well under NAEP's "worst case" scenario with the actual drawdown likely results in a total impact that is still less than Manera's (1998) previously projected impact for the County Well Field of 110 feet.

4.3 Cumulative Aquifer Impact

The projected drawdown at the County Well Field was conservatively estimated using "worst case" annual pumping for NAEP (40 years), the Griffith Energy Project (40 years), the Golden Valley 5800 (100 years), and GVID projects (100 years), as well as accounting for the regional decline trend. A schematic of the drawdown projections at the County Well Field is presented in Attachment VII, Figure 3.

Based on these projected worst case withdrawals, the cumulative aquifer impact at the County Well Field is 395 feet. This projected drawdown is less than the 508 feet that comprises the saturated thickness' practical recoverable volume (66% of saturated thickness, Section 2.1). Thus, even after considering the projected "worst case" demand of all other major ground-water pumping, NAEP, and regional trends, the aquifer still has additional pumping capacity at the County Well Field.

4.4 Summary

The Northern Arizona Energy Project's maximum pumping requirement is 10,720 acre-feet over 40 years. Projected drawdown at the pumping well caused by NAEP's maximum pumping requirement is 15 feet. NAEP's 40-year pumping requirement and projected drawdown, however, are already accounted for in water savings. This savings is due to the difference between the County Well Field's initial projections and actual pumping from 2001 through 2006. Specifically, the County Well Field saved 24,702 acre feet over the first six years of operation, or more than two times NAEP's maximum lifetime pumping requirement. Consequently, no additional impact on the aquifer will be realized due to NAEP.

5.0 REFERENCES

Arizona Department of Water Resources. August 14, 2006. Analysis of Adequate Water Supply – Golden Valley 5800. File Number 23-401823.0001. Signed by Sandra Fabritz-Whitney, Assistant Director, Water Management Division.

Arizona Department of Water Resources (ADWR) Records.

Errol L. Montgomery & Associates, Inc. July 25, 2005. Consultants Report – Regional Hydrogeology, Source of Water Supply, and Projected 100-Year Drawdown Impacts in the Vicinity of the Golden Valley South Master Planned Community, Mohave County, Arizona.

Manera, Inc. August 3, 1998. Consultants Report – Preliminary Hydrogeologic Evaluation, Griffith Energy Well Field, Sacramento Valley, Mohave County, Arizona.

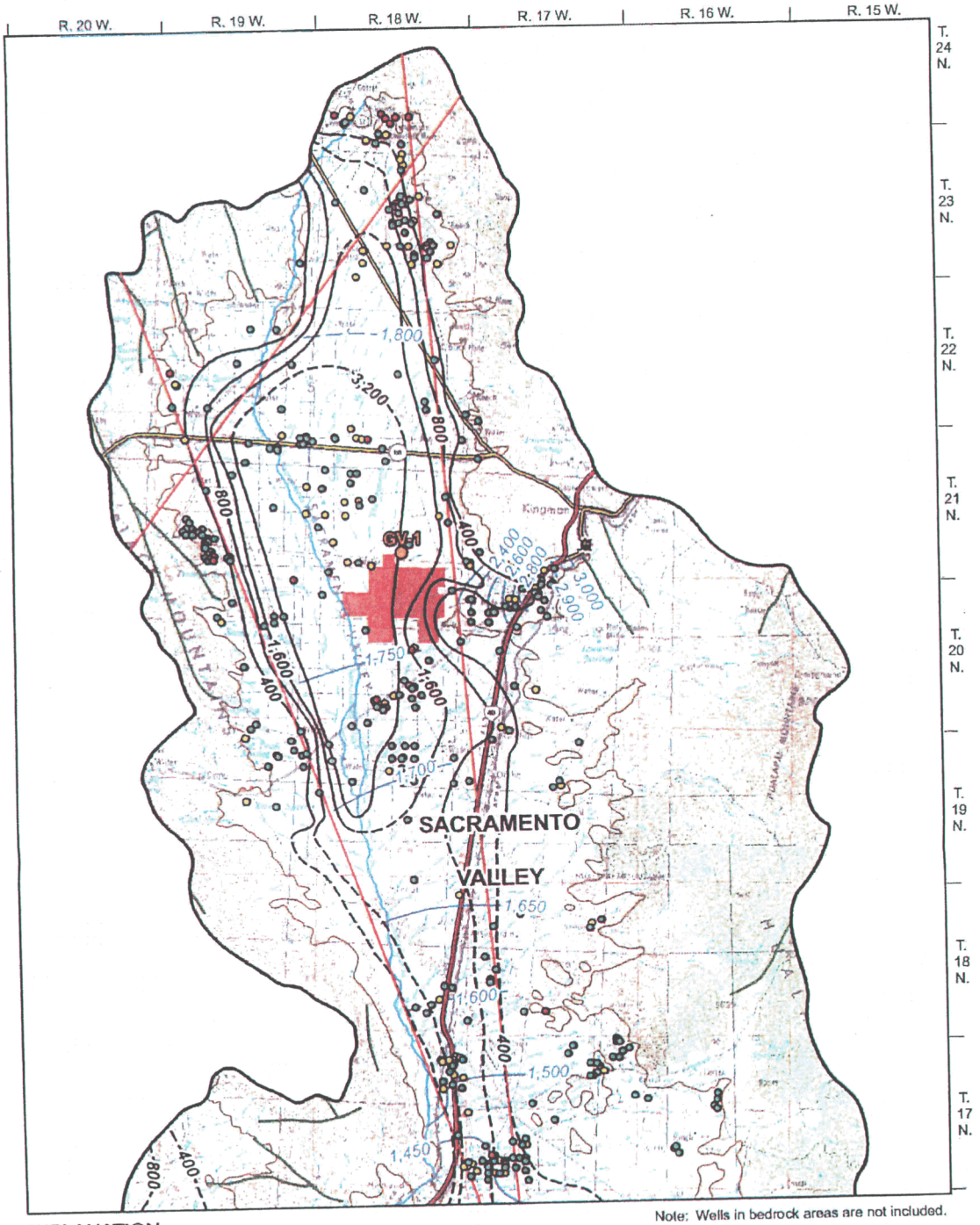
Manera, Inc. November 13, 2006. Consultants Report – Hydrologic Evaluation, Sacramento Valley, Mohave County, Arizona, Golden Valley County Improvement District No.1 Report.

van der Heijde. 1996. THWELLS, Flow in Confined or Unconfined Aquifer with Multiple Wells. Released by International Ground-water Modeling Center, May, 1996, v. 4.01.

ATTACHMENTS

ATTACHMENT I

Montgomery, 2005, Figure 1
Location Map for Sacramento Valley



Note: Wells in bedrock areas are not included.

EXPLANATION

- Well from ADWR Groundwater Site Inventory
- Well from ADWR 55 Registry Inventory
- Well from ADWR 35 Registry Inventory
- New Well GV-1, B(21-18)34dba
- Fault (Arizona Geological Survey Digital Information Series 08, Ver. 3.0)
- Bedrock Boundary (ADWR Hydrologic Map Series, Report No. 21, 1991)
- Approximate Depth to Bedrock, in feet; dashed where unknown (Oppenheimer & Sumner, 1980)
- Boundary of Groundwater Basin (ADWR Hydrologic Map Series, Report No. 21, 1991)
- Groundwater Level Altitude Contour of 1990, in feet msl (ADWR Hydrologic Map Series, Report No. 21, 1991)
- Hydrologic Model Boundary
- Golden Valley South Master Planned Community

N

0 1 2 3 4

Miles

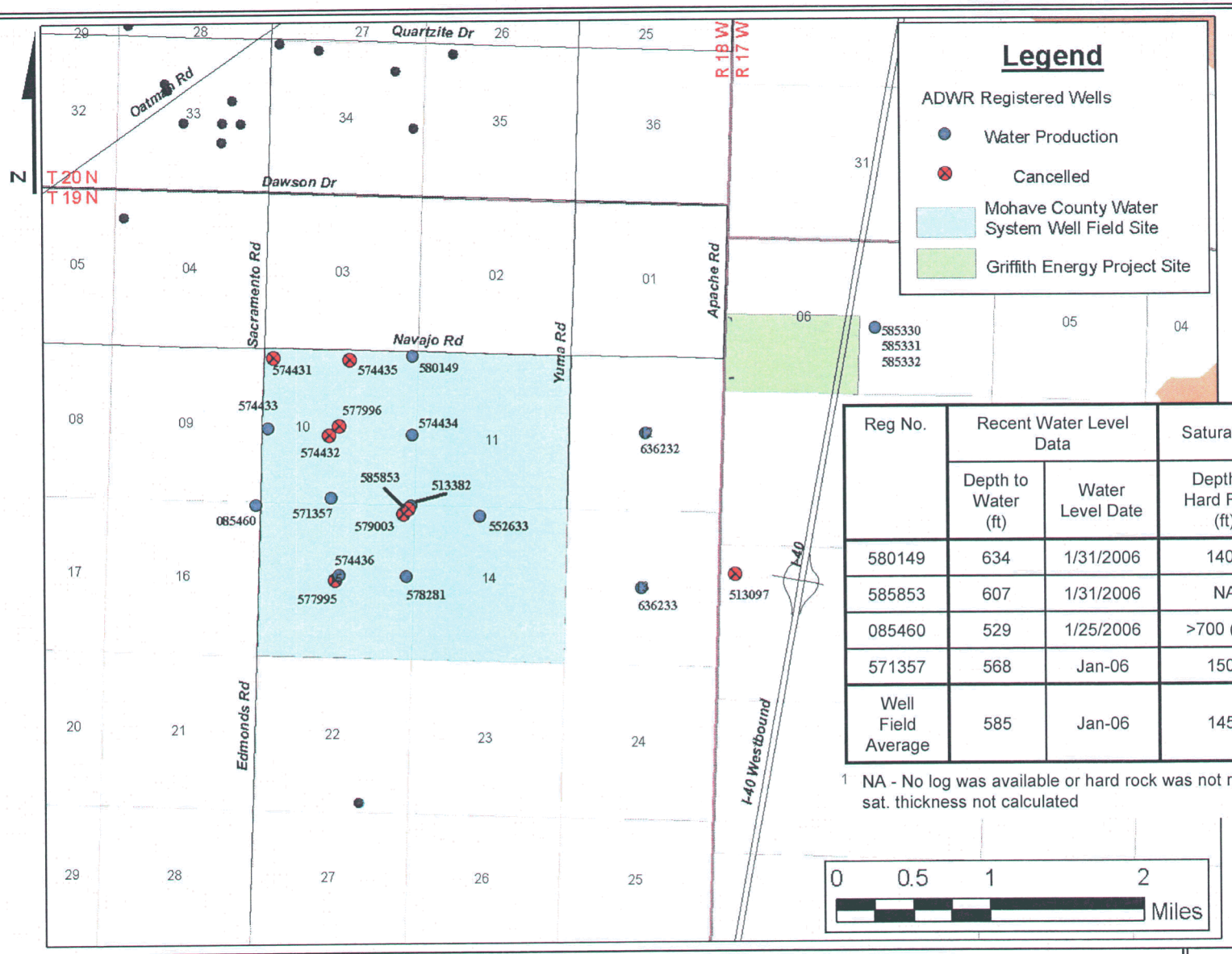
FIGURE 1. LOCATION MAP FOR SACRAMENTO VALLEY

GISDATA\Projects\440.21\SacramentoValleyBasin_extend.mxd UTM NAD27 12July2005

ERROL L. MONTGOMERY & ASSOCIATES, INC.

ATTACHMENT II

Figure 1 - Well Locations, Depth to Water, and Saturated Thickness



Reg No.	Recent Water Level Data		Saturated Thickness	
	Depth to Water (ft)	Water Level Date	Depth to Hard Rock (ft)	bsat (ft)
580149	634	1/31/2006	1400	766
585853	607	1/31/2006	NA	NA
085460	529	1/25/2006	>700 (NA)	NA
571357	568	Jan-06	1500	932
Well Field Average	585	Jan-06	1450	849

1 NA - No log was available or hard rock was not reached, so sat. thickness not calculated

Southwest Ground-water Consultants, Inc.

April 26, 2007 Project B.1476

WELL LOCATIONS, DEPTH TO WATER, AND SATURATED THICKNESS

Mohave County Water System Well Field, Mohave County, Arizona

Figure 1

ATTACHMENT III

ADWR Office of Assured and Adequate Water Supply, Hydrology Review, File No. 23-401823, Golden Valley 5800

ARIZONA DEPARTMENT OF WATER RESOURCES
Office of Assured and Adequate Water Supply
500 North Third Street, Phoenix, Arizona 85004
Telephone (602) 417-2465
Fax (602) 417-2467

Janet Napolitano
Governor

Herbert R. Guenther
Director

ANALYSIS OF ADEQUATE WATER SUPPLY

October 19, 2005

File Number:	23-401823.0000
Development:	Golden Valley 5800
Location:	Township 20 North, Range 18 West, Sections 2, 3, 4, 8, 9, 10, 11, 14, 16 Township 21 North, Range 18 West, Section 34 Mohave County, Arizona
Land Owner:	American Land Management, L.L.C.

The Arizona Department of Water Resources has evaluated the Analysis of Adequate Water Supply application for Golden Valley 5800 pursuant to A.A.C. R12-15-723. The proposed development includes 32,000 single-family residential lots. Water provider for the master planned community has not yet been selected. Conclusions of the review are indicated below based on the adequate water supply criteria referenced in A.R.S. § 45-108 and A.A.C. R12-15-701, 715, 723 *et seq.*

- **Physical, Continuous, and Legal Availability of Water for 100 Years**
  On the basis of the Department's review, the Department has determined that 9,000.00 acre-feet per year of groundwater will be **physically available**, which is less than the applicant's projected build out demands for the development, including system losses, of 15910.90 acre-feet per year. The application did not specify a provider, and the water provider has not yet been selected. Therefore, both **legal availability** and **continuous availability** of the water are not proven at this time. These requirements of an Analysis of Adequate Water Supply will be re-evaluated for each application for a Water Adequacy Report. Applications for Water Adequacy Reports that follow the Analysis of Adequate Supply will need to reference this letter to demonstrate physical availability. Individual Notices of Intent to Serve will be required for each application for a Water Adequacy Report.

- **Adequate Water Quality**
  Water quality has not been demonstrated at this time. This requirement of an Analysis of Adequate Water Supply will be re-evaluated for each application for a Water Adequacy Report.

The term of this Analysis of Adequate Water Supply is ten years from the date of this letter and may be renewed upon request, subject to approval by the Department. Throughout the term of this determination, the projected demand of this development will be considered when reviewing other requests for adequate water supply in the area.

Prior to obtaining plat approval by the local platting authority and approval of the public report by the Department of Real Estate, a Water Adequacy Report must be obtained for each subdivision plat. The findings of this Analysis of Adequate Water Supply may be used to demonstrate that certain requirements for a Water Adequacy Report have been met. This determination may be invalidated if the development plan or other conditions change prior to filing for a Water Adequacy Report.

Questions may be directed to the Office of Assured/Adequate Water Supply at (602) 417-2465.

Sandra Fabritz-Whitney, Assistant Director
Water Management Division

cc: Greg Wallace, E. L. Montgomery and Associates
Alan R. Dulaney, Office of Assured/Adequate Water Supply

23-401823.0000
GOLDEN VALLEY 5800

Arizona Department of Water Resources
OFFICE OF ASSURED AND ADEQUATE WATER SUPPLY
500 NORTH THIRD STREET
PHOENIX, ARIZONA 85004-3921
(602) 417-2460

RECEIVED
JUL 18 2005
OFFICE OF ASSURED WATER SUPPLY

APPLICATION FOR AN ANALYSIS OF WATER ADEQUACY

(Refer to application guidelines for assistance in completing this form)

PART A - GENERAL INFORMATION

1. Name of development: Golden Valley 5800

2. Location: 20N (Township) 18W (Range) 2,3,4,8,9,10,11,14,16 (Section(s)) Mohave (County)

2. Location: 21N (Township) 18W (Range) 34 (Section(s)) Mohave (County)

3. Owner Name: AMERICAN LAND MANAGEMENT LLC Phone: 702-873-5582 Address: 4730 South Fort Apache Road, Suite 300 - Las Vegas, NV 89147

4. Water Provider: Pioneer Valley water co. or new water company (undecided) Phone: _____ Address: _____

5. Consultant Name: Errol L. Montgomery and Associates, Inc. Phone: 48-948-7747
Address: 7949 East Acome Drive, Suite 100 Scottsdale, AZ. 85260

6. Primary Contact:
Name: Greg Wallace Phone: 602-818-2399
Address: 7949 East Acome Drive, Suite 100 Scottsdale, AZ. 85260

PART B - WATER DEMAND INFORMATION

1. Include a map of the proposed development, and reference as an attachment: Attatchment 1

2. Number of lots: 32,000 Size of lots: 7500 Total Acreage: 5,800

3. Total demand projected for development: 16,000 acre-feet (AF) per year
Projected water demand per residential lot: .58 gallons per day
Non-Residential demands: Golf course: 600 AF/year Parks: 230 AF/year Lakes: _____ AF/year
Other (specify): _____ _____ AF/year

4. Expected year of completion (build-out): 2015

PART C- WATER SUPPLY INFORMATION

1. Please indicate source(s) of water to be used: X Groundwater __ Surface Water __ Effluent
(If the sources includes non-groundwater supplies, please complete "Supplement C.")

2. Provide a hydrologic study, and reference the attachment: #5

3. a. Method of water distribution: X central distribution system ___ dry lot subdivision (individual wells)

   b. If water is to be obtained from a water provider, include a "Notice of Intent to Serve" agreement and reference the attachment: _____

4. If any wells proposed to serve the development are within one mile of a Water Quality Assurance Revolving Fund or Superfund site (or any monitor wells associated with the site), or if the proposed water supply fails to meet safe drinking water quality standards, provide a study identifying and describing this water and reference the attachment: N/A

5. If a "Letter of Water Availability" has previously been issued for this provide a copy of the document and reference the attachment: n/a

PART D - FEES

The application fee for an Analysis of Water Adequacy is $ 1,000. The payment may be made by cash, check, or in some cases, by entry in an existing Department fee credit account. Checks should be made payable to the Department of Water Resources. **Failure to enclose the required fees will cause the application to be returned.**

Fee for Application for Analysis of Water Adequacy: $1000.00

I DO HEREBY certify that the information contained in this application and all information accompanying it is true and correct to the best of my knowledge and belief.

Charles Sakuma	Charles Sa C	6/9/05
Owner Name (Please type or print)	Signature	Date

ARIZONA DEPARTMENT OF WATER RESOURCES

OFFICE OF ASSURED WATER SUPPLY
500 NORTH THIRD STREET
PHOENIX, ARIZONA 85004
(602) 417-2460

SUPPLEMENT TO APPLICATION FOR AN ANALYSIS OF ADEQUATE WATER SUPPLY

NOTICE OF INTENT TO SERVE

Municipal Water Provider Name (please type or print): Perkins Mountain Water Company

ADEQ Public Water System Number (please indicate the number valid for this subdivision): _____

Subdivision/Development Name: Golden Valley South

The undersigned municipal water provider agrees to provide to the development indicated above an amount of water sufficient to satisfy the water demands of the development as stated in the application for an analysis of adequate water supply or water adequacy. This Notice of Intent to Serve is conditioned upon the provider's receipt of necessary approvals from the Arizona Corporation Commission and other regulatory agencies, and the provider's receipt of all necessary payments.

The municipal water provider, if a private water company, further attests that the subject development is either within the boundaries of the company's existing Certificate of Convenience and Necessity or that a formal request has been filed with the Arizona Corporation Commission to extend the boundaries to include the development.

This Notice of Intent To Serve Agreement is agreed to under the signature of an agent of the municipal water provider authorized to sign the agreement:

Name of Municipal Water Provider's authorized agent (please type or print): Kirk Brynjulson

_____
Signature of Authorized Agent of Municipal Water Provider

_____
Date

AFFIDAVIT OF AUTHORITY

I, Charles Sakura, the undersigned authority, hereby declare under penalty of perjury that I have the right and the authority to execute any and all documents on behalf of American Land Management, LLC including but not limited to the Arizona Department of Water Resources Application for an Analysis of Water Adequacy together with any supplements thereto.

Dated this 16th day of February, 2005.

Charles Sakura, Manager
American Land Management, LLC

Parcel Information (Click for Tax Information)

Tax Year:	2005
Parcel:	215-01-080 **Click for Improvement Information**
Site Address:	UNK STREET ADDRESS
Owner:	DESERT COMMUNITIES INC ATTN: M WALKER
Mailing Address:	4730 S FORT APACHE RD STE 300 , LAS VEGAS , NV 89147
Tax Area:	0430
Full Cash Value:	$60,421.00
Assessed Full Cash Value:	$9,667.00
Limited Value:	$60,421.00
Assessed Limited Value:	$9,667.00
Value Method:	Land Market Model
Exempt Amount:	$0.00
Exemption Type:	
Use Code:	0004
Property Use:	VACANT LAND
Class Code:	Ag, Vacant Land or Non-profit
Assessment Ratio:	16.00%

Last Sale Information (Click for more Sale Info)

Sale Price:	0
Sale Date:	1/3/2005
Recorded Instr Type:	WARRANTY DEED
Book:	5273
Page:	721

Legal Description Information

Parcel Size:	604.21 ACRES
Township, Range and Section:	20N 18W 2
Legal Description:	ALL EXCEPT THE SE4 SE4, W2 NW4 NW4 NW4 NE4 NE4 & EXCEPT THE N & W 50' CONT 604.21 AC 215-01-005(215-01-080 & COUNTY RD)

BACKGROUND INFORMATION

Office of Assured and Adequate Water Supply
General Information and Review Status - Adequate

File Number **23-401823.0000**

Subdivision **Golden Valley 5800**

Owner **American Land Management LLC**

County **Mohave**

Quadrant	T 21	R 18	S 34	1/4s
	20	18		2,3,

Consultant **Errol L. Montgomery & Associates, Inc.**

Water Provider **To Be Determined**

Date Received **07/18/2005**

Application Status **Issued**

Status Date **10/19/2005**

REVIEW / APPROVAL STATUS

OAWS	**Alan Dulaney**	☑ Approved	☐ Not Approved	Date **08/02/200**
Water Quality	**Alan Dulaney**	☐ Approved	☑ Not Approved	Date **07/27/200**
Hydrology	**A. Kurtz**	☑ Approved	☐ Not Approved	Date **09/06/200**
Legal	**Maxine Becker**	☑ Approved	☐ Not Approved	Date **10/21/200**
CRM		☐ Approved	☑ Not Approved	Date

Office of Assured and Adequate Water Supply
Adequacy Application Review

File Number **23-401823.0000** Subdivision **Golden Valley 5800**

Application complete	☑
Hydrologic study attached	☑
Contracts attached	☑
Plat	☑
Correct Fees	☑
Signed NOI	☐

Application Routed to:

Hydro	☑	Date **07/27/2005**
WQ	☑	Date **07/27/2005**
Legal	☑	Date **10/19/2005**
Chief Hydrologist	☐	Date
CRM	☐	Date

Number of Lots **32000**

City/County Platting Authority **Mohave County**

Dry Lot	☐
CCN	☐

Time Frame

1st Letter	
1st Response	
2nd Letter	
2nd Response	
3rd Letter	
3rd Response	

Demand Totals, af/yr

Residential	**9,684.85**
Non Residential	**4,768.54**
Construction	**12.17**
Lost + Unaccounted	**1,445.34**
Total Annual Demand	**15,910.90**

100 year demands

Groundwater	**1,591,090.00**
Effluent	
Surface Water	
CAP Water	
Colorado River	
Total 100 yr Demand	**1,591,090.00**
Applicant's Estimate	**1,471,381.00**

Comments **Location T 20N, R 18W, Sec. 2,3,4,8,9,10,11,14 & 16 and T 21N, R 18W, Sec. 34. This is an Analysis of Adequate Water Supply for a very large area west of Kingman. No maps for the master plan community were included. Application was signed by Charles Sakura, but no signatory authority from American Land Management was provided. Provider is undetermined at this time, so no NOI. Legal, continuous availability cannot be established with this application, only physical availability. Incomplete letter may be needed. UPDATE: Consultant faxed over an affadavit affirming signatory authority for Charles Sakura. Also, NOI to Serve from Perkins Mountain Water Company, but this may not be provider. Awaiting Hydrology approval. ARD, 8/2/05. UPDATE: Hydrology has determined that only 9000 afa have been demonstrated as physically available; letter will be written with this amount. Draft sent to Legal. 10/19/05, ARD. Sent for Assistant Director's signature.**

OAWS Reviewer **Alan Dulaney** Approved ☑ Not Approved ☐ Date **08/02/2005**

Office of Assured and Adequate Water Supply
Legal Review - Adequacy

File Number 23-401823.0000 **Subdivision** Golden Valley 5800

Legal Ownership/Authority		Legal Availability	
Proof of Ownership for non-indivdual owners, principals/beneficaries holding 10 % or greater interest identified	Yes	Contracts Verfified	No
		Non-CAP / Colorado River SW	No
Owner / representative signed application	Yes	Certificated/Decreed/Pre-1919/ Appurtenant	No
Approval of other Divisions		Evidence of Use / Non-Abandonment (Last Five Years)	No
Hydrology	Yes		
Water Quality	Yes	NOI to Serve verified	Yes
OAWS	Yes		

Comments **No division checksheets in file. MMB 10/20/05. Analysis approved w/one edit to letter. MMB 10/21/05**

Legal Reviewer **Maxine Becker** Approved ☑ Not Approved ☐ Date **10/21/2005**

Office of Assured and Adequate Water Supply
Hydrology Review

File Number **23-401823.0000** Subdivision **Golden Valley 5800**

SubBasin	SAC	Aquifer description	layered volcanics , basin fill alluvium(???
Depth to Water, ft	765	Regional decline, ft/yr	1
T, g/d/ft	33750	Groundwater stored, af	0
SY, %	7	Recharge, af/yr	
Sat Thickness, ft	435	Groundwater Flux, af/yr	
		Method of Analysis	theis

Impact

Projected water level decline, ft/yr 4.35

Within area of impact of a recharge facility? ☐

If yes, is criteria met w/o considering stored water? ☐

Estimated Depth to Water After 100 Years:

min, ft 1161 Location on property

max, ft 1200 Location on property

Surface Water Supply Analysis

Source not applicable

SW Right No. 0

Type of Right decree ☐ Pre-1919 Right ☐ Cert. of Appropriation ☐ Permit of Appropriation ☐

Firm yield, af/yr 0

Median flow, af/yr 0.000

Demand

Applicant's projected demand, af/100 yrs	1500000
AMA's projected demand, af/100 yrs	1591090
Demand served by service area wells, af/100 yrs	0

Groundwater Supply

Basis of Physical Availability

☐ Water Availability Letter/PAD

☐ Analysis

Year 2005

File No.

☑ Study included w/ application

☐ Hydrologic data on file

Model used thwells

Original amount of physical availability, af/yr 9000

Balance after this application, af/yr 9000

Comments **The hydrologic study does not conclusively demonstrate quantity and dependability of the groundwater supply for 15,000 ac-ft/yr. Issues exist with the aquifer test data, use of Thwells for impact analysis over the entire basin, lack of committed demand for the entire basin, etc. However, the reviewer attempted to account for the hydrologic study's weaknesses and determined that a maximum demand of 9000 ac-ft/yr could be approved for the development. This would virtually eliminate any further development via groundwater adjacent to and north of the master planned community until more data becomes available that provides evidence of additional groundwater supplies. (A.Kurtz 9/10/05, KM 10/6/05) Approved at this time for maximum demand of 9000 AF/yr only.**

Hydrologist	**A. Kurtz**	Approved	☑	Not Approved	☐	Date	**09/06/2005**
Section Manager	**K. Modesto**	Approved	☑	Not Approved	☐	Date	**10/06/2005**

Office of Assured and Adequate Water Supply
Water Quality Review

File Number **23-401823.0000** Subdivision **Golden Valley 5800**

Water Provider	**undetermined**
PWS Number	
New Provider (checked if yes)	☐
Is Water Provider in compliance with Safe Drinking Water Standards, per ADEQ/County?	**NA**
Is there a known WQARF, Superfund, or Solid Waste site within one mile?	**No**
Are there expected changes to water quality so as to make it likely that the pledged water supply in the future will not meet current water quality standards?	**No**

Comments: **No provider has been selected at this time. No water quality approval is possible for this Analysis of Adequate Water Supply. Water quality will have to be established later with individual Water Adequacy Report applications.**

Preliminary WQ Reviewer	**Alan Dulaney**	☐ Approved	☑ Not Approved	Date	**07/27/2005**
Final WQ Reviewer	**Alan Dulaney**	☐ Approved	☑ Not Approved	Date	**07/27/2005**

CHECK DEPOSIT REQUEST
OFFICE OF ASSURED AND ADEQUATE WATER SUPPLY

SUBMITTED BY Patricia Smith

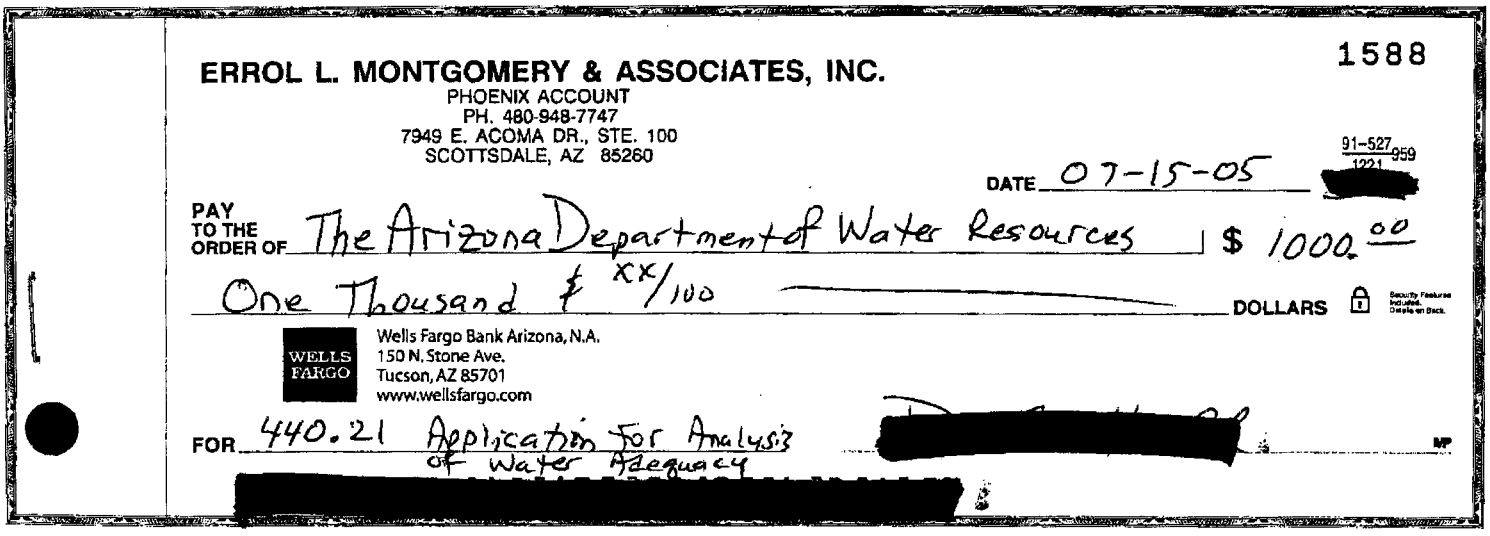
DATE: July 20, 2005

APPLICANT: American Land Management LLC

CHECK SENT BY: Errol L. Montgomery & Associates, Inc.

NAME OF COMPANY OTHER THAN APPLICANT)

FILE PREFIX	TYPE OF FILING FEE	PUBLIC NOTICE FEE	APP. FEE	TOTAL AMOUNT OF CHECK
20-	Application for a Physical Availability Demonstration (PAD)			
21-	Application for a Designation of Adequate Water Supply			
22-	Application for a Water Adequacy Report			
23- 401823.0000	Application for an Analysis of Water Adequacy		1,000.00	1,000.00
26-	Application for a Designation of Assured Water Supply			
27-	Assignment of a Certificate of Assured Water Supply			
28-	Application for an Analysis of Assured Water Supply			
TOTAL				1,000.00



1588

ERROL L. MONTGOMERY & ASSOCIATES, INC.
PHOENIX ACCOUNT
PH. 480-948-7747
7949 E. ACOMA DR., STE. 100
SCOTTSDALE, AZ 85260

91-527/1221 959

DATE 07-15-05

PAY TO THE ORDER OF The Arizona Department of Water Resources $ 1000.00

One Thousand & XX/100 DOLLARS

WELLS FARGO
Wells Fargo Bank Arizona, N.A.
150 N. Stone Ave.
Tucson, AZ 85701
www.wellsfargo.com

FOR 440.21 Application for Analysis of Water Adequacy

[redacted]

Golden Valley 5800 7/27/05

ry 18, 2005

CERTIFICATE OF ASSURED WATER SUPPLY GENERIC DEMAND CALCULATOR

INSTRUCTIONS: This spreadsheet is designed to help you calculate the water demand for your new subdivision for purposes of applying for a Certificate of Assured Water Supply. Please fill out all blue boxes. If you need help, contact the Office of Assured and Adequate Water Supply at (602) 417-2465.

NOTE: This sheet, when completed, does not constitute approval of the demand estimate for your subdivision. It is intended for general estimation purposes only. Final official demand estimates will be determined by the Department upon review of your complete application.

Enter the AMA the subdivision is located in*: tuc

* Enter PHX for Phoenix, TUC for Tucson, PIN for Pinal, PRE for Prescott or SCR for Santa Cruz. If you are not located within an AMA, or are not sure which AMA you are located in, contact the Office of Assured and Adequate Water Supply at (602) 417-2465.

Residential Usage

Category	PPHU	GPCD or per house/day	Demand/HU/YR (af/yr)	No. HU (Lots)	Residential Demand/Yr (af/yr)
Single Family (int)	2.67	57.00	0.17	32000.00	5455.19
Multi-Family (int)		57.00	0.00		0.00
Single Family Landscape (ext)	1.00	118.00	0.13	32000.00	4229.66
Multi-Family Landscape (ext)	0.00	21.00	0.00	0.00	0.00
Single family Demand/HU/YR			0.30		
Multifamily Demand/HU/YR			0.00		

*NOTE: If the application is in the Pinal AMA, and lot sizes are no greater than 10,000 sq. ft., 125 GPCD is used to estimate both interior and exterior demand for single family homes. Do not enter lot numbers under the Landscape rows. Contact the Office of Assured and Adequate Water Supply for more information.

	Square Feet	Acres	Demand Factor (af/yr)	No. HU (Lots)	Large Lot Adjustment Demand/Yr (af/yr)
Average Lot Size (sq. ft)**	7500.00	0.17			
TMP Model Lot Size (sq. ft)	7,500 - 10,000	0.17 - 0.23			
Large Lot Adjustment	0.00	0.00			
1/2 low water use	0.00	0.00	1.50	32000.00	0.00
1/2 turf	0.00	0.00	4.60	32000.00	0.00

**NOTE: If the subdivision contains several groupings of lot sizes, the large lot adjustment needs to be calculated for each grouping of large lot sizes. Contact the Office of Assured and Adequate Water Supply for assistance in calculating the large lot adjustment for subdivisions with several groupings of large lot sizes.

Total Residential Demand **9684.85**

Non-Residential Usage

For each category please enter either square feet or acres of land for that type of non-residential use within your subdivision.

Category	Square Feet	Acres	Demand Factor (af/ac)		Non-Residential Demand (af/yr)
Common Area1		174.00	1.50	low water use	261.00
Common Area2		206.00	4.60	turf	947.60
Right of Way		0.00	1.50	low water use	0.00
Golf Course		110.00	AMA Turf Program - contact AMA		0.00
Commercial use		635.20	2.25	all acres	1429.20
Public Pool (length x width = square feet)		0.00	AMA TMP model	pool	0.00
Parks1		288.60	1.50	low water use	432.90
Parks2		288.60	4.60	turf	1327.56
Retention/Detention Basins		0.00	1.50	low water use	0.00
Retention/Detention Basins		12.60	4.60	turf	57.96
School Landscape1		0.00	1.50	low water use	0.00
School Landscape2		40.50	4.60	turf	186.30
School Interior****		4500.00	25 GPCD	interior demand	126.02

***NOTE: If application is for a change of ownership from a previously issued Certificate of Assured Water Supply, and is for only a portion of the original Certificate, contact the Office of Assured and Adequate Water Supply to pro-rate non-residential area acreage.

****NOTE: For school interior demand, enter the number of students. If the proposed school is a high school or middle school, the demand factor is 43 GPCD.

Total Non-Residential Demand **4768.54**

Distribution Losses

	Residential	Non-Residential	Total	Loss Factor %	Distribution Losses (af/yr)
Demand af/yr	9684.85	4768.54	14453.39	10.00	1445.34

Construction

	No. of Lots	Demand (gals/lot)	100 yr demand (af)	Construction Demand (af/yr)
	32000.00	10000.00	1216.72	12.17

Total Demand Per Year

Residential Demand (af/yr)	Non-Residential Demand (af/yr)	Distribution Losses (af/yr)	Construction Demand (af/yr)	Total Demand Not Incl. Const. (af/yr)	Total Demand Per Year (af/yr)
9684.85	4768.54	1445.34	12.17	6226.04	15910.90

Water Usage GPCD	Total Demand GPCD
101	166

Annual Golf Course Demand

15910.90

January 18, 2005

CERTIFICATE OF ASSURED WATER SUPPLY GENERIC DEMAND CALCULATOR

INSTRUCTIONS: This spreadsheet is designed to help you calculate the water demand for your new subdivision for purposes of applying for a Certificate of Assured Water Supply. Please fill out all blue boxes. If you need help, contact the Office of Assured and Adequate Water Supply at (602) 417-2465.

NOTE: This sheet, when completed, does not constitute approval of the demand estimate for your subdivision. It is intended for general estimation purposes only. Final official demand estimates will be determined by the Department upon review of your complete application.

Enter the AMA the subdivision is located in*: pa

* Enter PHX for Phoenix, TUC for Tucson, PIN for Pinal, PRE for Prescott or SCR for Santa Cruz. If you are not located within an AMA, or are not sure which AMA you are located in, contact the Office of Assured and Adequate Water Supply at (602) 417-2465.

Category	PPHU	GPCD or per house/day	Demand/HU/YR (af/yr)	No. HU (Lots)	Residential Demand/Yr (af/yr)
Single Family (int)	2.47	70.00	0.22	24354.00	5335.88
Multi-Family (int)	2.30	57.00	0.15	9240.00	1380.65
Single Family Landscape (ext)	1.00	125.00	0.14	24354.00	3396.00
Multi-Family Landscape (ext)	1.00	100.00	0.11	9240.00	1009.25
Single family Demand/HU/YR			0.36		
Multifamily Demand/HU/YR			0.27		

*NOTE: If the application is in the Pinal AMA, and lot sizes are no greater than 10,000 sq. ft., 125 GPCD is used to estimate both interior and exterior demand for single family homes. Do not enter lot numbers under the Landscape rows. Contact the Office of Assured and Adequate Water Supply for more information.

	Square Feet	Acres	Demand Factor (af/yr)	No. HU (Lots)	Large Lot Adjustment Demand/Yr (af/yr)
Average Lot Size (sq. ft)**	4,400.00	0.17			
TMP Model Lot Size (sq. ft)	7,500 - 10,000	0.17 - 0.23			
Large Lot Adjustment	0.00	0.00			
1/2 low water use	0.00	0.00	1.50	33264.00	0.00
1/2 turf	0.00	0.00	No AMA	33264.00	

**NOTE: If the subdivision contains several groupings of lot sizes, the large lot adjustment needs to be calculated for each grouping of large lot sizes. Contact the Office of Assured and Adequate Water Supply for assistance in calculating the large lot adjustment for subdivisions with several groupings of large lot sizes.

Total Residential Demand **11121.78**

For each category please enter either square feet or acres of land for that type of non-residential use within your subdivision.

Category	Square Feet	Acres	Demand Factor (af/ac)		Non-Residential Demand (af/yr)
Common Area1	0.00	174.00	1.50	low water use	261.00
Common Area2	0.00	206.00	5.00	turf	1030.00
Right of Way	0.00	0.00	1.50	low water use	0.00
Golf Course	0.00	110.00	6.00	6.00	660.00
Commercial use	0.00	0.00	2.25	all acres	1429.20
Public Pool (length x width = square feet)	0.00	0.00	AMA TMP model	pool	0.00
Parks1	0.00	288.00	1.50	low water use	432.90
Parks2	0.00	0.00	No AMA	turf	0.00
Retention/Detention Basins	0.00	0.00	1.50	low water use	0.00
Retention/Detention Basins	0.00	12.60	8.00	turf	100.80
School Landscape1	0.00	0.00	1.50	low water use	0.00
School Landscape2	0.00	40.50	5.00	turf	202.50
School interior****	0.00	1,500.00	25 GPCD	interior demand	126.02

***NOTE: If application is for a change of ownership from a previously issued Certificate of Assured Water Supply, and is for only a portion of the original Certificate, contact the Office of Assured and Adequate Water Supply to pro-rate non-residential area acreage.

****NOTE: For school interior demand, enter the number of students. If the proposed school is a high school or middle school, the demand factor is 43 GPCD.

Total Non-Residential Demand **2243.00**

	Residential	Non-Residential	Total	Loss Factor %	Distribution Losses (af/yr)
Demand af/yr	11121.78	2243.00	13364.78	10.00	1336.48

	No. of Lots	Demand (gals/lot)	100 yr demand (af)		Construction Demand (af/yr)
	33264.00	10000.00	1255.51		12.56
Total Demand Per Year					
11121.78	**2243.00**	**1336.48**	**12.56**	**3592.03**	**14713.81**
122					**161**
14713.81					

January 18, 2005

CERTIFICATE OF ASSURED WATER SUPPLY GENERIC DEMAND CALCULATOR

INSTRUCTIONS: This spreadsheet is designed to help you calculate the water demand for your new subdivision for purposes of applying for a Certificate of Assured Water Supply. Please fill out all blue boxes. If you need help, contact the Office of Assured and Adequate Water Supply at (602) 417-2465.

NOTE: This sheet, when completed, does not constitute approval of the demand estimate for your subdivision. It is intended for general estimation purposes only. Final official demand estimates will be determined by the Department upon review of your complete application.

Enter the AMA the subdivision is located in*: PHX

* Enter PHX for Phoenix, TUC for Tucson, PIN for Pinal, PRE for Prescott or SCR for Santa Cruz. If you are not located within an AMA, or are not sure which AMA you are located in, contact the Office of Assured and Adequate Water Supply at (602) 417-2465.

Residential Usage*

Category	PPHU	GPCD or per house/day	Demand/HU/YR (af/yr)	No. HU (Lots)	Residential Demand/Yr (af/yr)
Single Family (int)	2.60	57.00	0.17	1859.00	308.60
Multi-Family (int)		57.00	0.00		0.00
Single Family Landscape (ext)	1.00	178.00	0.20	1859.00	370.66
Multi-Family Landscape (ext)	1.00	77.00	0.09	0.00	0.00
Single family Demand/HU/YR			0.37		
Multifamily Demand/HU/YR			0.09		

*NOTE: If the application is in the Pinal AMA, and lot sizes are no greater than 10,000 sq. ft., 125 GPCD is used to estimate both interior and exterior demand for single family homes. Do not enter lot numbers under the Landscape rows. Contact the Office of Assured and Adequate Water Supply for more information.

	Square Feet	Acres	Demand Factor (af/yr)	No. HU (Lots)	Large Lot Adjustment Demand/Yr (af/yr)
Average Lot Size (sq. ft)**	7600.00	0.17			
TMP Model Lot Size (sq. ft)	7,500 - 10,000	0.17 - 0.23			
Large Lot Adjustment	0.00	0.00			
1/2 low water use	0.00	0.00	1.50		0.00
1/2 turf	0.00	0.00	4.90	0.00	0.00

**NOTE: If the subdivision contains several groupings of lot sizes, the large lot adjustment needs to be calculated for each grouping of large lot sizes. Contact the Office of Assured and Adequate Water Supply for assistance in calculating the large lot adjustment for subdivisions with several groupings of large lot sizes.

Total Residential Demand **679.26**

Non-Residential Usage***

For each category please enter either square feet or acres of land for that type of non-residential use within your subdivision.

Category	Square Feet	Acres	Demand Factor (af/ac)		Non-Residential Demand (af/yr)
Common Area1		0.00	1.50	low water use	0.00
Common Area2		0.00	4.90	turf	0.00
Right of Way		0.00	1.50	low water use	0.00
Golf Course		110.00	AMA Turf Program - contact AMA		548.62
Commercial use		317.50	2.25	all acres	714.38
Public Pool (length x width = square feet)		0.00	AMA TMP model	pool	0.00
Parks1		44.35	1.50	low water use	66.53
Parks2		44.35	4.90	turf	217.32
Retention/Detention Basins		0.00	1.50	low water use	0.00
Retention/Detention Basins		0.00	4.90	turf	0.00
School Landscape1		0.00	1.50	low water use	0.00
School Landscape2		0.00	4.90	turf	0.00
School interior****		0.00	25 GPCD	interior demand	0.00

***NOTE: If application is for a change of ownership from a previously issued Certificate of Assured Water Supply, and is for only a portion of the original Certificate, contact the Office of Assured and Adequate Water Supply to pro-rate non-residential area acreage.

****NOTE: For school interior demand, enter the number of students. If the proposed school is a high school or middle school, the demand factor is 43 GPCD.

Total Non-Residential Demand **1544.84**

Distribution Losses

	Residential	Non-Residential	Total	Loss Factor %	Distribution Losses (af/yr)
Demand af/yr	679.26	1544.84	2224.10	10.00	222.41

Construction

	No. of Lots	Demand (gals/lot)	100 yr demand (af)	Construction Demand (af/yr)
	1859.00	10000.00	126.06	1.26

Total Demand Per Year

Residential Usage af/yr	Non-Residential Usage	Lost & Unaccounted for	Construction	Total Non-Res	Total Demand Per Year (af/yr)
679.26	1544.84	222.41	1.26	1768.51	2447.77

Residential Usage GPCD	Total Demand GPCD
125	452

Annual Build Out Demand 2447.77

ERROL L. MONTGOMERY & ASSOCIATES, INC.
CONSULTANTS IN HYDROGEOLOGY

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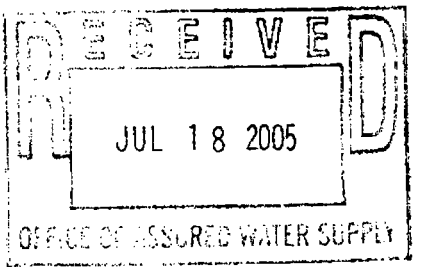
TODD KEAY, P.G.
JAMES S. DAVIS, P.G.
MICHAEL J. ROSKO, P.G.
CHARLES F. BARTER (1937-1999)
DANIEL S. WEBER, P.G.
LESLIE T. KATZ, P.G.

July 15, 2005



Mr. Doug Dunham
ARIZONA DEPARTMENT OF WATER RESOURCES
Office of Assured Water Supply
500 N. 3rd Street
Phoenix, Arizona 85004

Dear Mr. Dunham:

Enclosed please find the materials that Errol L. Montgomery & Associates, Inc., has prepared on behalf of American Land Management, LLC, in support of an Analysis of Water Adequacy for the Golden Valley South Master Planned Community in Mohave County, Arizona. The materials include copies of the following documents that we are submitting for your review and approval.

1) Application for Arizona Department of Water Resources (ADWR) Analysis of Water Adequacy

2) Hydrologic Study in Support of the Analysis of Water Adequacy

3) Copies of demand calculations for a lower density and maximum density development utilizing data from ADWR and Mohave County

4) Copies of the preliminary Planned Unit Development

5) A notice of intent to serve as yet incomplete since water company negotiations are underway with various potential providers

6) Ownership documents verifying ownership of all parcels listed in item 3 as belonging to American Land Management, LLC

Although we are aware that not having the water company information finalized can result in delays to a formal application, we do wish to proceed immediately with the Analysis of Water Adequacy.

If you have any questions or require clarification of any documents in the application, please do not hesitate to contact Greg Wallace or me.

Sincerely,

ERROL L. MONTGOMERY & ASSOCIATES, INC.

William R Victor

William R. Victor, P.G.

Enclosures (2 copies)

ARIZONA DEPARTMENT OF WATER RESOURCES
Office of Assured and Adequate Water Supply
2nd Floor, 3550 N. Central Ave., Phoenix, AZ 85012
Telephone (602) 771-8585
Fax (602) 771-8689

Janet Napolitano
Governor

Herbert R. Guenther
Director

February 17, 2006

COPY

Ms. Christine Ballard, Director,
Mohave County Planning and Zoning Department
3675 E. Andy Devine Avenue
Kingman, AZ 86401

RE: Golden Valley Ranch
Phases 1, 2, & 3

Ms. Ballard:

According to the information provided by Stanly Consultants (Stanley) the proposed initial phases of Golden Valley Ranch (Phases 1, 2, and 3) consist of approximately 485 acres and 1,859 single family lots. The provider of the water service is yet to be determined. However, the Department understands that Perkins Mountain Water Company (PMWC) has applied to the Arizona Corporation Commission (ACC) to have its Certificate of Convenience and Necessity (CC&N) expanded to include the Golden Valley Ranch area.

As you may be aware, the department issued an Analysis of Adequate Water Supply to Golden Valley 5800 on October 19, 2005. While the application was for the entire Golden Valley Ranch master plan, the Department could not issue an adequate finding for the entire master plan. The full master plan called for 32,000 single-family lots, golf courses, schools, parks and other common areas, and over 600 acres of commercial uses. The Department determined that this total demand would be nearly 15,000 acre-feet per year (af/yr). Insufficient demonstration of physical availability prevented the Department from issuing the water analysis for the entire master plan. The Department determined, based upon the hydrologic information submitted, that only 9,000 af/yr could be demonstrated to be physically available for 100 years. Legal availability and proof of adequate water quality were not demonstrated on the water analysis.

Using the generic plats provided by Stanley for phases 1, 2, and 3, of Golden Valley Ranch, the Department has completed a rough calculation of projected demands. The Department has made several assumptions on population, landscaping and other factors that will impact the overall demand estimate. The Department included one 18-hole golf course, included approximately half of the projected commercial acreage (317 acres), and made landscaping assumptions on the 89 acres of common area/open space. Using these assumptions and the demand associated with 1,859 lots, the department has calculated the demand to be 2,447 af/yr for phases 1, 2, and 3. This is within the 9,000 af/yr of groundwater demonstrated to be available on the October 2000, analysis.

Please be aware that this is a rough estimate based upon the general plan proposal. This is not the final water adequacy determination as required under statute (A.R.S. §45-108). Demands for the proposed development area will likely be different depending upon the final density and community design. Demands may be reduced with less water intensive landscaping, and other measures such as effluent use in the proposed parks and golf courses. Estimated demands may also increase if other uses the Department is not aware of at this time are included in the subdivision. It should also be noted that the Department could not consider PMWC to be the provider for the proposed development until such time as the ACC approves the final extension of PMWC's Certificate of Convenience and Necessity to cover the proposed development.

If you have any additional questions, please feel free to call me at (602) 771-8590

Sincerely,

Douglas W. Dunham, Manager
Office of Assured and Adequate Water Supply

CC: Steve Olea, ACC
Kristen Keener-Busby, Department of Commerce
Alan Dulaney, ADWR
Tom Whitmer, ADWR

ATTACHMENT IV

Selected portions from the Golden Valley 5800 (Montgomery, 2005), GVID (Manera, 2006), and Griffith Energy Well Field (Manera, 1998) Reports

PRELIMINARY HYDROLOGIC EVALUATION

GRIFFITH ENERGY WELL FIELD

SACRAMENTO VALLEY, MOHAVE COUNTY, ARIZONA

MANERA INC.
8316 N. 53rd Street
Paradise Valley, AZ 85253

INTRODUCTION

Location of the Griffith Energy Project

The proposed Griffith Energy Project (the "Project")is a natural gas-fired combined cycle electric generating facility to be located ten miles south of the City of Kingman, Mohave County, Arizona, approximately two miles north of the Interstate 40 Griffith interchange.

The proposed site is located on a 160 acre parcel of land (SW¼ of Section 6, T. 19 N., R. 17 W.) within the designated Mohave County I-40 Industrial Corridor. The Industrial Corridor is undeveloped in the vicinity of the Griffith Interchange with the exception of the Praxair industrial complex.

Scope and Purpose of the Study

The scope of this study is to evaluate the available geohydrological data for the purpose of generating a preliminary professional opinion outlining the ground water resources available for development in the area of study. This evaluation entailed determining:

- the hydrological characteristics of the aquifer;
- the movement of the ground water in the aquifer;
- the volume of ground water available in the area around Griffith, and;
- the probable impact of withdrawing ground water at a peak flow rate of 3,300 gpm and an annual average cumulative withdrawal of 3,060 acre feet per annum for consumption throughout the 40-year projected life of the Project.

Area of Study

The proposed location of the well field to withdraw ground water for the I -40 Industrial Corridor industrial complex, with specific emphasis on the development of a water supply for the Griffith Energy Project, comprises Sections 10, 11, 14 and 15, T. 19 N., R. 18 W., as shown on Figure 1.

To properly evaluate the area of the proposed well field, the area of investigation encompassed the northern portion of the Sacramento Valley, with the primary emphasis extending from the Project Site on the east to the Sacramento Wash on the west, and

from the Kingman -Oatman Road (Old Route 66) on the north to approximately six (6) miles south of Griffith on the south. These relationships can be seen on Figure 1.

Existing Wells

Two eight (8) inch diameter wells are present in the proposed well field:

- the MCEDA/Praxair well in the southeast corner of Section 10, drilled to a total depth of 800 feet, with a static water level below ground surface ("SWL") of 597 feet;

- the Citizens Utilities Company well in the NE Corner of NW 1/4 of section 14, T. 19 N. R. 18 W., drilled to a total depth of 1,010 feet, with SWL of 605 feet.

Both wells encountered water, and neither well penetrated the total thickness of the alluvial fill, proving the thickness of the alluvium exceeds 1,000 feet in the proposed well field area.

Neither well has been tested; however, the Praxair well is fitted with a pump which will deliver 160 gallons per minute. The Citizens Utilities well has not been equipped.

GEOHYDROLOGY

Geophysical Surveys

Seismic surveys (Gillespie and Bentley, 1971) and a number of electrical resistivity soundings (Turner, 1958, 1966; Manera, 1964, 1967) were made in the Sacramento Valley to measure the thickness of the alluvial deposits.

The seismic surveys conducted by the U. S. Geological Survey utilized conventional refraction methods.

The results of the seismic profile, depicted in Figure 2, run east - west approximately four miles north of the proposed Project well field area, as illustrated on Figure 1, and indicate that the alluvial basin near Griffith is approximately 32,000 feet wide and 4,400 feet deep. The seismic profile implies a sloped bottom to the basin rather than the step faulting that would more commonly be expected to occur.

Layers V_1 and V_2 are both considered to be alluvial fill, with layer V_1 inferred to be the dry portion of the alluvium and layer V_2 the saturated portion of the sediments. It is

believed that the water saturating the sediments causes the difference in the seismic velocity readings.

The electrical resistivity soundings indicate that the thickness of the saturated alluvial fill extends below the depth range limitations of the soundings, two thousand (2,000) feet, confirming the fact that the alluvial basins are relatively deep.

These surveys strongly suggest that the saturated thickness of the aquifer is well in excess of one thousand (1,000) feet. The limited drilling, however, has only penetrated the upper four hundred (400) feet of that saturated thickness at the north end of the basin, six hundred (600) feet in the Yucca area, and four hundred (400) feet under the proposed well field, where, in each case, adequate water for the needs of those respective wells was encountered without the need to drill deeper.

Geological Setting

The Sacramento Valley is a fault controlled, intermontane basin of the Basin and Range type of Fenneman (1931), located in the southwestern portion of Mohave County, Arizona. The basin is surrounded by adjacent block faulted mountains consisting of igneous and metamorphic rocks. The mountains forming the boundaries of the basin are the Cerbat Mountains to the northeast, the Hualapai Mountains to the southeast and the Black Mountains to the west.

The Sacramento Valley basin has historically been addressed by reference to three topographic portions, all hydrologically connected: the *northern portion*, locally called Golden Valley, extending from twelve (12) miles north of Highway 68 at the north to six (6) miles north of Yucca on the south; the *middle portion* extending from six (6) miles north of Yucca to the opening between the Black Mountains and Buck Mountain; and the *southern portion*, called Dutch Flat, extending twenty five (25) miles southeast from the opening between the Black Mountains and Buck Mountain; and. The outlet from the basin is through the opening between Buck Mountain and the Black Mountains, through the Franconia narrows extending west from the opening between the Black Mountains and an extension of the Mohave Mountains. These relationships can be seen on Figure 1.

The Sacramento Valley basin was formed in a period of faulting during which blocks of rocks were uplifted and tilted, leaving intervening basins. The blocks between the predominantly northwest - southeast trending faults were not all uplifted an equal amount, thus the basin bottoms and sides are probably a series of stair-step fault blocks. Secondary, northeast - southwest, trending faulting and uplift during this period of movement further complicated the structure of the basins by the formation of deeper to shallower sub-basins within the major basin, causing the width of the basin to vary along the length of the basin. Following and during the structural deformation, erosion from

the uplifted blocks and the extrusion of volcanic materials filled the basins with alluvial fill consisting of sands, clays and gravels of sedimentary origin, and tuffs, clays and rocks of volcanic origin.

The geological interpretation of the seismic profiles and electrical resistivity soundings completed in the basin, coupled with the data from Driller's logs of wells drilled in the basin, indicate that the basin is sub-divided into a broad, deep sub-basin (4,400 feet) under the Golden Valley (northern) portion of the basin and a broad, deep sub-basin (greater than 2,000 feet) under the Dutch Flat (southeastern) extension of the basin, separated by a narrower throat at Yucca where the basin is partially filled with a ridge of volcanic rocks appearing, based on limited data at this time, to be non-water-bearing, but covered by layers of alluvial fill ranging in thickness from six hundred (600) feet to more than one thousand (1,000) feet.

The estimated width of the basin aquifer, based on the various data sets available, appears to be:

Golden Valley	- 9 miles or 47,500 feet
Griffith Area	- 6 miles or 32,000 feet
Yucca Area	- 4 miles or 20,000 feet
Dutch Flat	- 8 miles or 42,000 feet
Franconia area	- 2.65 miles or 14,000 feet

The proposed well field would be located in the southern half of the northern (Golden Valley) sub-basin.

Withdrawal from the Aquifer

Prior to 1965, ground water withdrawals from the Sacramento Valley were limited to a few acre feet per year from relatively shallow private wells. In the early 1960's the Duval Copper Company developed the well field now owned and operated by the Cyprus Company for use at the Mineral Park Mine. During the period from 1964 to 1980, an average of 5,645 acre feet per year of water was withdrawn from the Golden Valley portion of the basin aquifer. In 1981, because of scaled back mining operations and consequent reduced water demand, the volume of withdrawal was reduced to 1,935 acre feet per year; and in 1986 the rate of withdrawal was further reduced to five hundred (500) to seven hundred (700) acre feet per year, still primarily for use in the Mineral Park Mine operation (Rascona, 1991).

Currently, withdrawals from the aquifer of the Sacramento Valley are concentrated in two (2) general areas:

- The Golden Valley area had a demand of twelve hundred fifty eight (1,258) acre feet per year in 1990 and is projected to grow to a demand of thirty two hundred forty (3,240) acre feet per year in 2040 (Arizona Department of Water Resources [ADWR], Staff Report, 1994). In addition, ADWR projects that the Cyprus Mineral Park withdrawal, within the Golden Valley portion of the basin, will approach eight hundred (800) acre feet per year for the period 1994 - 2009. This projected volume of withdrawal by Cyprus has not been met during the period 1994 -1998, however. After 2009, the Cyprus Mineral Park operation and ground water withdrawal is expected to be terminated.

- The Yucca area, including the Ford Proving Ground facility and related uses in Yucca, has an estimated withdrawal of one hundred fifty (150) acre feet per year (Miller, 1969).

Little additional withdrawal from the ground water aquifer has been initiated since 1994.

Aquifer Characteristics

The two aquifer characteristics of importance are:

- the specific yield (SY) which is the volume of water that will drain from a unit of a water table aquifer under the force of gravity, stated as a percent of the total volume of the unit; and,

- the transmissivity (T), a measure of the ability of the aquifer to transmit water, expressed in gallons per foot per day.

The specific yield (SY) is an elusive parameter that can only be estimated from observable data, such as the type and shape of the drill cuttings, the homogeneity of the materials in the cuttings, etc. As a result of the conservative nature of most consultants in the field of hydrology, published estimates of specific yield are almost always smaller than the actual field parameters. The transmissivity, on the other hand, can be calculated from the data collected during a properly conducted pumping test or estimated from pumping data; therefore, this value more nearly approaches the actual field value. Although both parameters are not exact, the values are useful in approximating the reaction of the aquifer to the stress of withdrawal.

Transmissivity

Transmissivity (T), the hydrologic conductivity of a unit cross-sectional area of the aquifer, is calculated from properly formatted pumping test data. In the event that the pumping test data is insufficient to calculate the T, or if no test data are available, the value of T can be estimated by multiplying the specific capacity of a well (yield divided

by the drawdown) by a coefficient determined from wells for which both specific capacity and transmissivity data were available. This coefficient of proportionality for the Sacramento Valley has been calculated to be 4,400 (Gillespie and Bentley, 1971).

T values ranging from 29,000 gallons per day per foot (gpd/ft) to 37,000 gpd/ft have been calculated or estimated in three wells in the northern portion of the Sacramento Valley (Golden Valley Well No.1, and Cyprus Well No.s 4 and 5). Although there are wells with lower values of T in the northernmost part of the aquifer near the mountain fronts, it can be fairly estimated that typical wells in the center of this portion of the basin will have similar aquifer transmissivity characteristics to those stated above. Therefore, using an average T value of 35,000 gpd/ft for the northern portion of the basin appears reasonable for this report.

A deep well and a moderately deep well are present in the middle portion of the basin in the Yucca area. Neither Driller's log indicated that the well penetrated the complete thickness of the aquifer. The deep well (1000 feet) has an estimated value of T of 120,000 gpd/ft while the moderately deep well (600 feet) has an estimated T value of 26,000 gpd/ft. A T value of 40,000 gpd/ft appears to be a reasonable value for the middle portion of the basin.

Well data is not available for the Dutch Flat portion of the basin.

Based on the present data, it appears that the value of T increases from 35,000 gpd/ft in the northern part of the basin to more than 40,000 gpd/ft in the middle part of the basin.

Using an average value of T = 35,000 gpd/ft for further calculations is believed to be conservative, and would produce computations falling within or below the range of conditions actually occurring in the aquifer throughout the northern and middle portions of the basin. It is expected that the actual field transmissivity will be greater than 35,000 gpd/ft, consequently the actual drawdown impacts that would occur in the aquifer due to the proposed Project, will be less than the projected impacts set forth in this study.

Specific Yield

The specific yield has been estimated as ten (10) percent (Gillespie and Bentley, 1971) and fifteen (15) percent (Turner, 1966). Todd (1980) states that the specific yield of materials range from eight (8) percent for silt up to twenty eight (28) percent for fine grained sand. As the estimate of ten (10) percent by Gillespie and Bentley (1971) falls near the lower end of the range described by Todd (1980), it is believed to be conservative and would produce computations falling within or below the range of conditions actually occurring in the aquifer of the basin.

Water Levels and Slope of the Water Level

Three historical water level maps have been published, 1971 (Gillespie and Bentley), 1979 (Pfaff and Clay) and 1991 (Rascona). Comparison of these three sets of data illustrates three significant conclusions:

- there are virtually no changes in the water levels or the slope of the water levels south of the Kingman - Oatman Road (the proposed area of withdrawal) during the period of recorded data, 1971 -1990;

- a cone of depression was established in the Golden Valley (northern) portion of the aquifer by the withdrawal of 102,000 acre feet of water from the Mineral Park Mine well field during the period 1971 -1994; and,

- the Mineral Park cone of depression is rapidly recovering and has shrunk significantly during the period 1981 - 1998 as a result of the substantial reduction in the rate of withdrawal from the Mineral Park Mine well field, even though other withdrawals have been initiated in the Golden Valley area.

Subsurface Flow and Outflow From the Basin

The subsurface flow of ground water in the aquifer can be calculated by the formula v = TiL, where:

v = volume of flow in gallons per day
T = transmissivity in gpd/ft
i = slope of the water table in feet/foot
L = length of the cross - sectional area of flow in feet;

then the flow of ground water from the northern portion of the basin through the Yucca narrows area when:

i = 250 / 63,360 = .0039 feet per foot

T = 35,000 gpd/ft

L = 20,000 feet

is:

v = 35,000 x .0039 x 20,000 = 2,730,000 gpd

2,730,000 / 325,851 = 8.378 acre feet per day

8.378 x 365 = 3,058 acre feet per year.

And using the water level contours of Rascona (1991), Plate 1, the total subsurface outflow of both the northern part of the basin (Golden Valley) and the southern part of the basin (Dutch Flat) through Franconia narrows is calculated to be:

i = 250 / 55,000 = .0091 feet per foot;
(1,300 foot contour to 800 foot contour)

T = 35,000 gpd/ft;

L = 14,000 feet;

then:

v = 35,000 x .0091 x 14,000 = 3,882,000 gpd/ft

3,882,000 / 325,851 = 11.73 acre feet per day

11.73 x 365 = 4,281 acre feet per year.

The calculated outflow of 4,281 acre feet per year based on Rascona's data essentially agrees with the estimated outflow of 4,000 acre feet using the data and calculations of Gillespie and Bentley (1971).

Storage

Gillespie and Bentley (1971) calculated a minimum of 6.5 million acre feet of ground water in storage in the Sacramento Valley aquifer *above 1,500 feet below the surface* and implied that the volume might be twice this minimum amount, or 13 million acre feet.

The Arizona Department of Water Resources (ADWR Staff Report, 1994) estimates the volume of water in storage in the aquifer north of Yucca, *above 1,200 feet below the land surface*, to be 2.3 million acre feet. Considering that ADWR used roughly only seventy five (75) percent of the lateral extent of the saturated aquifer (i.e., only the Golden Valley portion of the aquifer) and only one half the thickness of the aquifer utilized by Gillespie and Bentley, the *minimum* estimates of storage of Gillespie and Bentley and that of the ADWR are remarkably close; however, the actual volume of

storage is significantly higher than these estimates if Gillespie and Bentley's *higher* estimate of 13 million acre feet is correct.

Impact of Withdrawal from the Ground Water Aquifer

Griffith Energy LLC/Mayes (1998) stated that the peak flow demand for water for all uses at the Griffith Energy Project would be approximately 3,300 gallons per minute. The year-round expected operating profile projected for the Plant, accounting for projected percentages of base-load operating hours (normal flow demand), maximum output operating hours (peak flow demand), and maintenance and other non-operating hours (minimal flow demand), adjusted for monthly differentials of ambient air temperature and humidity, indicates an actual aggregate annual water requirement of approximately 3,060 acre feet per annum. (Griffith Energy Operations Profile, 1998).

The impact of the proposed withdrawal for a period of forty (40) years was calculated using the simulation model THWells, version 4.01 (van der Heijde, 1996). The calculations of total drawdown are based on the Theis equation for non - steady state flow in an isotropic, homogeneous confined aquifer of infinite extent. The model can be reliably used for water table aquifers, provided the calculated drawdowns are less than half the thickness of the saturated aquifer and a correction factor is applied. In this case, boundary conditions located four and one half (4.5) miles on either side of the well field were simulated using image wells.

For the most conservative analysis, we have assumed a *worst case hypothetical* of maximum peak flow continuously, year-round, which would pump 5323 acre feet.

Simulating a well field of six (6) wells, three (3) wells by two (2) wells, with a spacing of two thousand (2,000) feet between wells, with a continuous withdrawal of 792,000 gallons per day per well for a period of forty (40) years, and including boundary conditions (reflecting the worst case scenario of lateral aquifer extent and continuous peak pumping) gave a calculated maximum drawdown of one hundred and nine and one half (109.5) feet in the pumped wells and a drawdown of less than eighty (80) feet at a radius of one thousand (1,000) feet from the well field.

This projected volume of withdrawal, *which assumes the maximum peak flow demand were pumped continuously for forty (40) years,* would remove 213,000 acre feet from the minimum estimate of 2.3 million acre feet (ADWR, 1994) in storage. This is without considering any of the significant natural recharge to the aquifer that is clearly evidenced by the near-static condition of wells under current withdrawals and the recovery of the Mineral Park Mine cone of depression.

The more realistic projection, however, using the same model and calculations, but with demand figures from the projected actual operating profile and resulting reduced aggregate annual water demand of 3,060 acre feet, but still using assumed worst case

boundary conditions, gave a calculated most-likely-case drawdown of 70 feet at the well field, and 40 feet at a radius of one thousand (1,000) feet from the well field. Figures 3, 4, 5 and 6 reflect these two cases, respectively.

Water Quality and Temperature

The results of inorganic chemical analyses of water from Golden Valley Wells 1 and 2, in the northern end of the basin, show a total dissolved solids content of 250 and 280 milligrams per liter (mg/l) respectively. Similar analyses of waters collected at depths of seven hundred (700) feet and nine hundred (900) feet during the drilling program of a test well at Yucca, in the middle portion of the basin, show a total dissolved solids content of 300 mg/l. The results of partial chemical analysis of the Praxair well fall within these parameters. Thus, it appears that the ground waters withdrawn in the proposed well field will fall within the range of 250 mg/l to 300 mg/l.

There have been reports of a more highly mineralized water in the northeastern portion of the basin near the areas being mined in the Cerbat Mountains.

The temperature of the waters from wells in the northern portion of the Sacramento Valley basin were measured at 102 degrees F. in 1991. Reported temperature of the waters from the Praxair well in the southeast corner of Section 10, T. 19 N., R. 18 W. was greater than 102 degrees F. (Lindstrom, 1998) It appears that the waters in the aquifer are above normal temperature for the depths of the aquifer. Thus, it is expected that waters withdrawn from the aquifer in the proposed well field will fall in the temperature range of 102 degrees F. to 105 degrees F.

CONCLUSIONS

The conclusions reached on the basis of the available data are:

- The probability of developing wells capable of yielding between five hundred (500) and eight hundred (800) gallons per minute within the proposed well field (Sections 10 and 15, T. 19 N., R. 18 W.) approaches the ninety eight (98) percent confidence level.

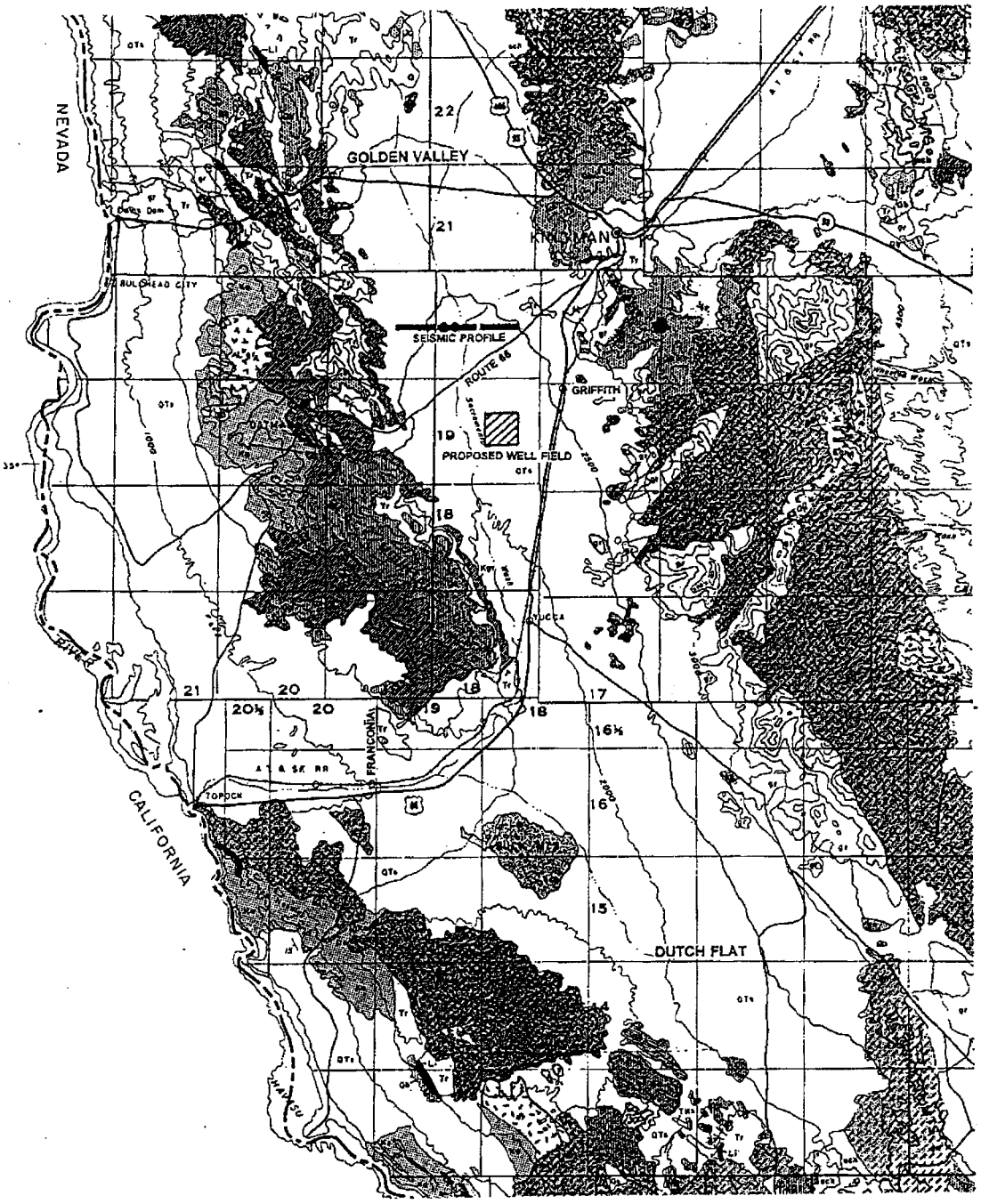
- The capability of withdrawing 5,323 acre feet per year (worst case hypothetical demand) from the ground water reservoir under the proposed well field for a period of forty (40) years appears almost certain; and the projected *actual* demand of 3,060 acre feet per year, virtually certain.

- The probable impact of the *worst case hypothetical* volume of withdrawal for the period of forty (40) years would result in an increase in the pumping depth of one hundred and ten (110) feet in the well field for the Project (approximately a seven hundred foot pumping level) and an eighty (80) foot lowering of the water level one thousand (1,000) feet from the well field. Such a forty (40) year cumulative withdrawal of 213,000 acre feet would constitute nine and one fourth (9.25) percent of the minimum estimate of the 2.3 million acre feet of water in storage in the Golden Valley portion of the Sacramento Valley.

- The probable impact of the *most likely case* volume of cumulative withdrawal for the period of forty (40) years would result in an increase in the pumping depth of sixty (60) feet at the well field for the Project, and a forty-five (45) feet lowering of the water level one thousand (1,000) feet from the well field. And the corresponding forty (40) year withdrawal of 122,400 acre feet would be 5.32% of the minimum aquifer storage estimate.

- The probable water temperature of the water drawn from the ground water reservoir will be in the neighborhood of 102 degrees F.

- The probable total dissolved solids content of the water drawn from the ground water reservoir will approach 300 milligram per liter.



GRIFFITH ENERGY PROJECT

MAP SHOWING THE

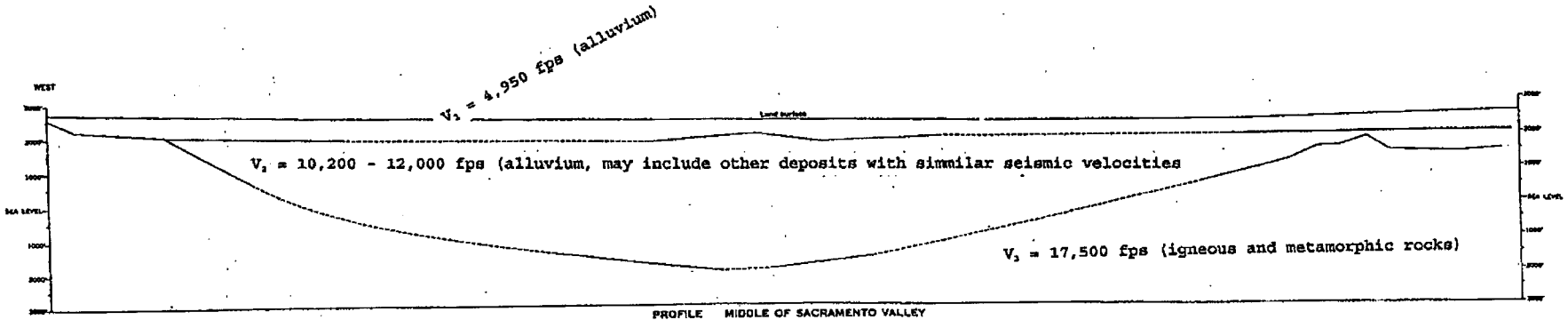
SACRAMENTO VALLEY AND SUBDIVISIONS,

PROPOSED WELL FIELD

AND SEISMIC PROFILE LOCATION

Taken from
Mohave County Geologic Map

FIGURE 1

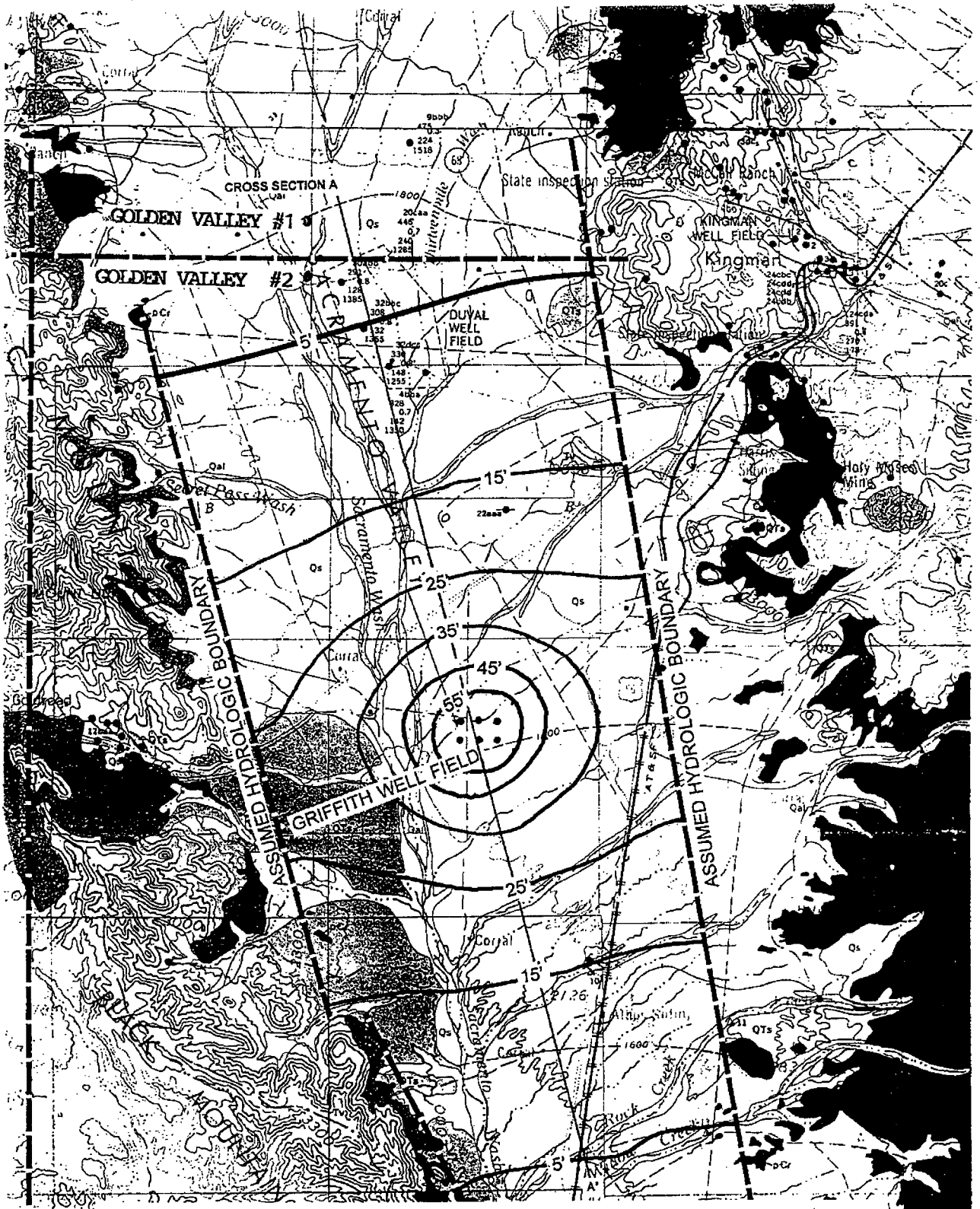


ANALYSIS OF SEISMIC PROFILE ACROSS SACRAMENTO VALLEY, FOUR MILES NORTH OF GRIFFITH, MOHAVE COUNTY, ARIZONA

Taken from USGS Water Supply Paper 1899-H

Seismology modified from R. H. Godson, Branch of Astrogeology, USGS, 1966

FIGURE 2



GRIFFITH ENERGY

PROJECTED WATER LEVEL DECLINES AFTER

FORTY (40) YEARS OF WITHDRAWAL

AT THE RATE OF 792,000 GPD PER WELL, SIX (6) WELLS

BASED ON ESTIMATED AQUIFER PARAMETERS

Figure 3

5323aft/1

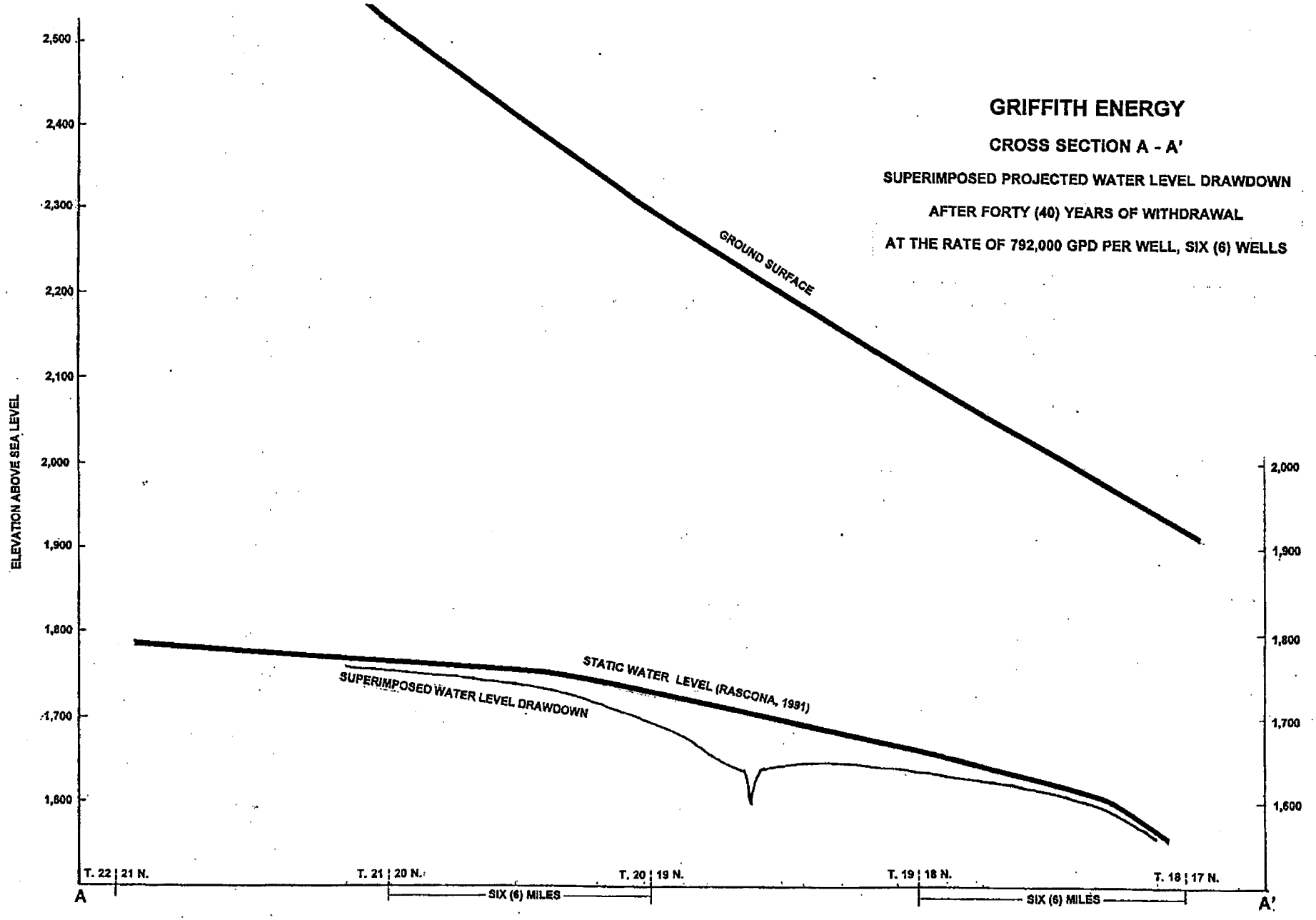
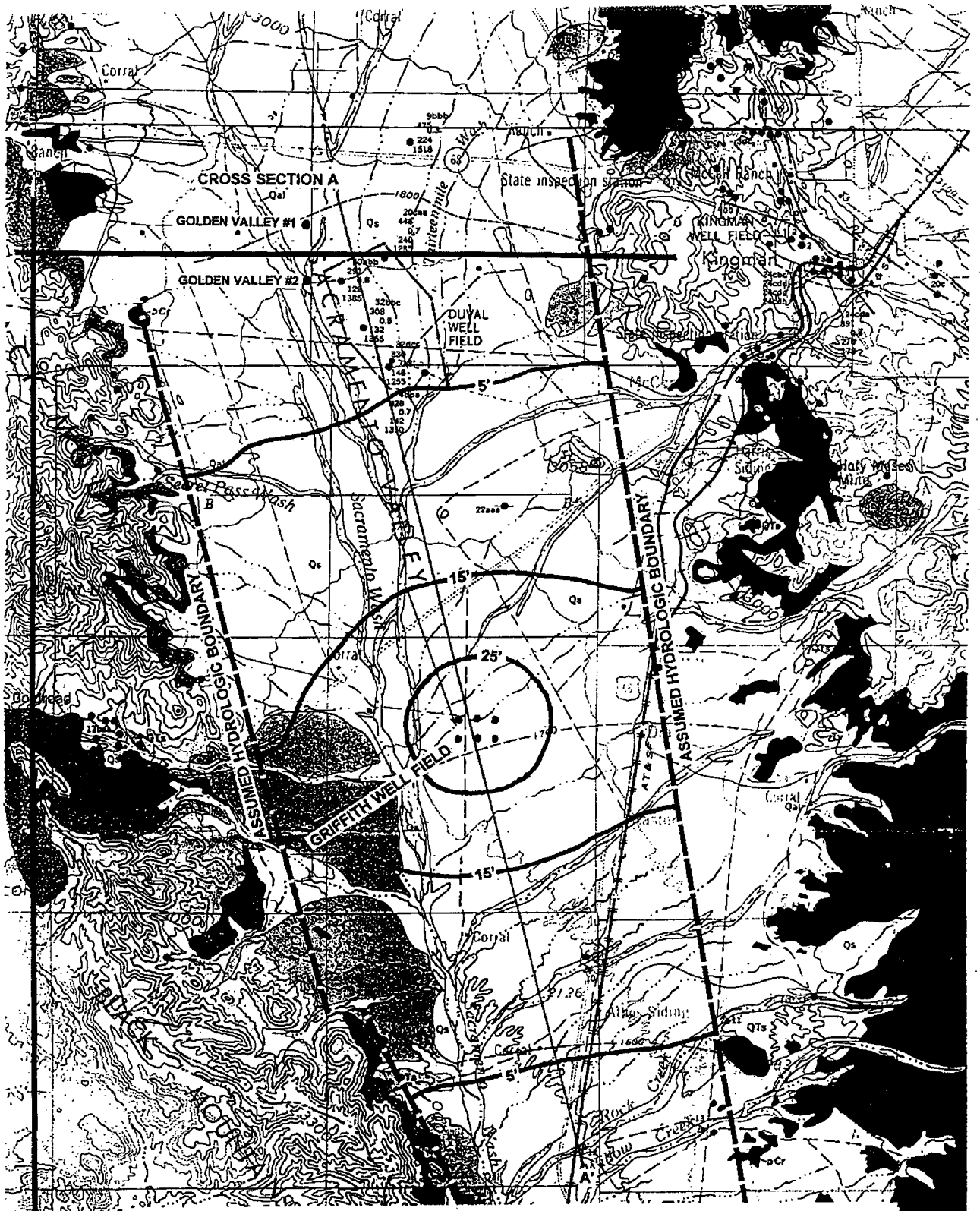

GRIFFITH ENERGY
CROSS SECTION A - A'
SUPERIMPOSED PROJECTED WATER LEVEL DRAWDOWN
AFTER FORTY (40) YEARS OF WITHDRAWAL
AT THE RATE OF 792,000 GPD PER WELL, SIX (6) WELLS
ELEVATION ABOVE SEA LEVEL
2,500
2,400
2,300
2,200
2,100
2,000
1,900
1,800
1,700
1,600
GROUND SURFACE
STATIC WATER LEVEL (RASCONA, 1991)
SUPERIMPOSED WATER LEVEL DRAWDOWN
T. 22 | 21 N.
T. 21 | 20 N.
T. 20 | 19 N.
T. 19 | 18 N.
T. 18 | 17 N.
SIX (6) MILES
SIX (6) MILES
A
A'

Figure 4



GRIFFITH ENERGY

PROJECTED WATER LEVEL DECLINES AFTER

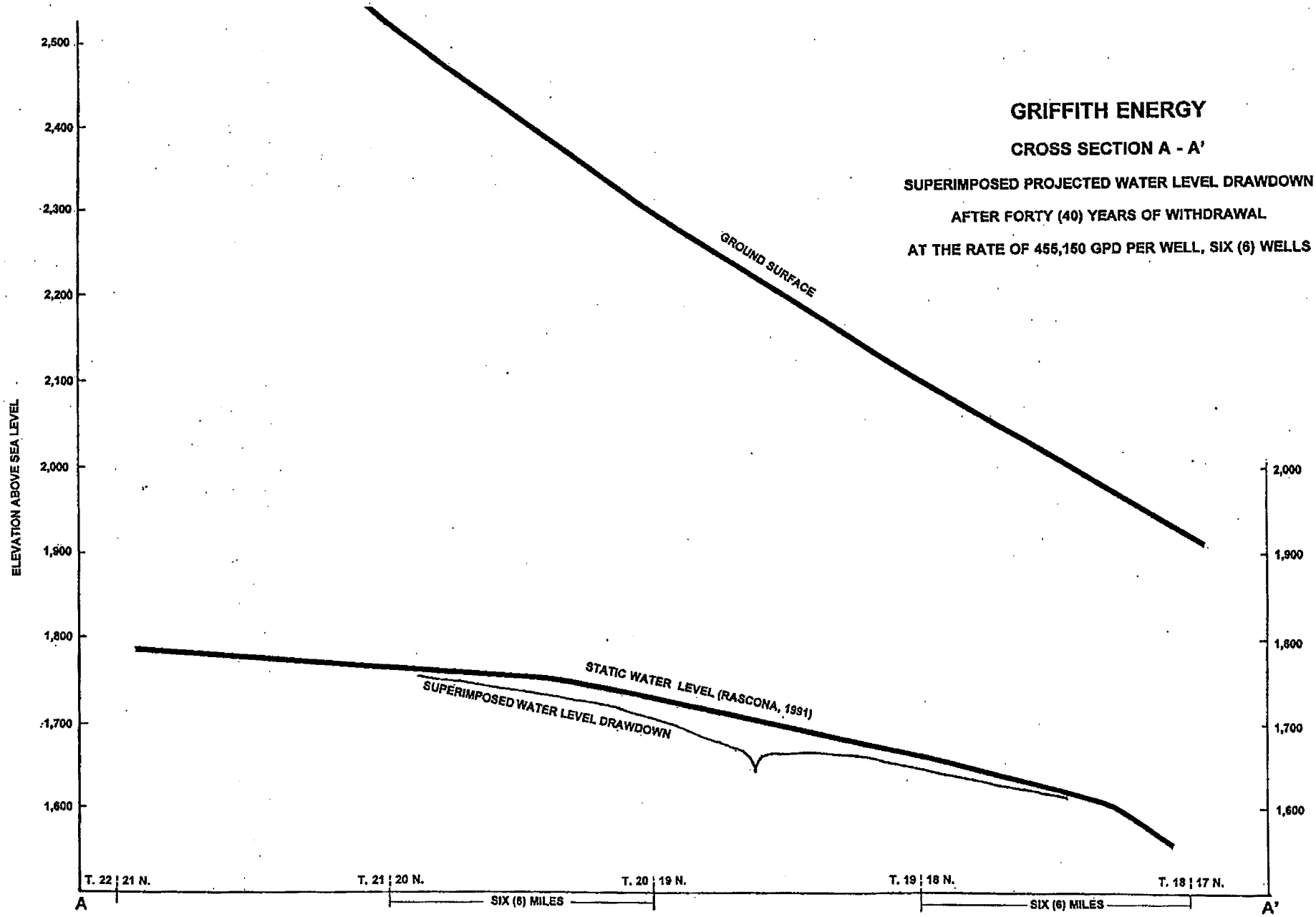
FORTY (40) YEARS OF WITHDRAWAL

AT THE RATE OF 455,150 GPD PER WELL, SIX (6) WELLS

BASED ON ESTIMATED AQUIFER PARAMETERS

Figure 5

3055 ecf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T. 18 | 17 N.
SIX (6) MILES
SIX (6) MILES
A
A'

Figure 6

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HYDROLOGIC EVALUATION

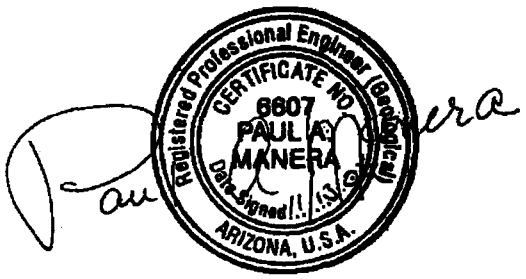
SACRAMENTO VALLEY

MOHAVE COUNTY, ARIZONA

GOLDEN VALLEY COUNTY IMPROVEMENT DISTRICT No. 1

REPORT

MANERA, INC.
8316 North 53rd Street
Paradise Valley, AZ 85253
480-948-9818



November 13, 2006

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INTRODUCTION

The Golden Valley County Improvement District No. 1 (GVID) was formed by the Mohave County Board of Supervisors in January 1976. Prior to 1987 no community water sources or facilities were available within the District. An agreement with the Crystal Springs Utility Company in 1987 established a storage - standpipe facility which could deliver approximately 30 gallons per minute. A long range plan for water development and distribution within the District in Phases 1 - 4 was initiated in the late 1980's. Engineering is now in progress on Phases 5 and beyond.

Two wells were drilled to supply the District. Following an evaluation of the ground water availability, the ADWR issued a letter determining that 1,400 acre feet of water would be available in the District (December 4, 1991). The letter stated that the 1,400 acre feet of water would be sufficient for about 6,200 lots at 200 gpd/lot and that 5,405 of those lots were already assigned.

Recent requests for service by multiple developers of property within the District far exceeds the 795 lots remaining, therefore, the District desires to increase the volume of water availability to satisfy these requests. Rather than attempt to determine the exact number of lots requesting service, as in many cases, the preliminary plats will not be started until it is known that water service is available, the District is applying for a designation increase of an additional 6,000 acre feet per year.

The ADWR in a letter dated August 14, 2006, the Department stated that it had determined that 9,000 acre feet per year will be physically and legally available to Golden Valley 5800, per the Department's Analysis of Adequate Water Supply (DWR#23-401823.0000) subject to review of specific restrictions upon the submission of each plat within the project. In effect, the volumes of waters allotted to the GVID (1,400 acre feet per year), Valley Pioneer Water Company (2,810 acre feet per year), the Mine Call (3,000 acre feet per year) and the Golden Valley 5800 (9,000 acre feet per year) and other undocumented demands in the northern portion of the Sacramento Valley, virtually eliminate the possibility of proving additional ground water availability for the GVID under the District.

Consequently, the District has elected to prove that additional ground water is available to the south in the Sacramento Valley approximately six miles south of Griffith and six miles north of Yucca to be moved to the District to satisfy the desired demand of 6,000 acre feet per year.

Location

The Sacramento Valley is a north - south trending basin, approximately twelve miles wide, located west of Kingman between the Cerbat - Hualapai Mountain complex on the east and the Black Mountains on the west in west central Mohave County, Arizona. The valley extends from Chloride on the southern end of the Cerbat Mountains south to the southern end of the Black Mountains four miles south of Yucca. The Sacramento Wash flows southward from the northern end of the valley around the south end of the Black Mountains then turning westward to flow into the Colorado River at Topock. The alluvial portion of the basin is exposed over approximately 360 square miles of the basin. These relationships are illustrated on Figure 1.

The Golden Valley County Improvement District No. 1 encompasses Sections 25 through 29 and 31 through 36, T. 22 N., R. 19 W. and Sections 1 through 5, Sections 8 through 17, Sections 20 through 29 and Sections 31 through 36, T. 21 N., R. 19 W. as illustrated on Figure 6.

Purpose and Scope

The Initial purpose of this study was to determine the quantity of ground water available to support the development of land within the GVID. As it became apparent that additional ground water availability was not present within the District boundaries, the focus of the study changed to determining whether the water availability to the south in the basin was sufficient to satisfy the projected demand of 6,000 acre feet per year

The study was to be completed based upon data available through public sources, i.e. literature, open files of the governmental agencies, private consultant reports available to the public, etc. No additional field work was authorized for this study.

Previous Investigations

Prior to 1960, numerous investigations in the Kingman area were conducted, primarily by personnel of the United States Geological Survey, however, none of these specifically pertained to the ground water conditions in the Sacramento Valley. The first major work concerning ground water in the basin was conducted by Gillespie and Bentley (1971). After 1971, a number of site specific investigations were conducted by Consultants for the development of individual wells. Most of these reports or letters of opinion are not available to the general public. Manera (1991) evaluated the ground water available to the Golden Valley Improvement District and later, the development of the Griffith Energy well field (2000). Montgomery, Errol L. and Associates, Inc., (2005) conducted an investigation of the ground water supply available for the development of Golden Valley 5800.

HYDROGEOLOGY

Rock Types

The rock types present consist of:

various types of volcanic rock which appear to be non-water-bearing in the Black Mountains which form the western edge of the Sacramento basin. The core of the Black Mountain range, consisting of Paleozoic sedimentary and intrusive rocks, are visible only on the western side of the mountains;

primarily granite and metamorphic rock forming the Cerbat - Hualapai Mountains with a small area of Quaternary and Tertiary volcanics in the saddle between the two ranges in the Kingman area. The granitic - metamorphic complex is relatively non-water-bearing. The younger volcanic rocks have proven to be water-bearing and have been exploited to some degree in the Kingman well field, and;

the alluvial fill of the basin between the two mountain ranges which has been divided by ADWR, in the review of the Golden Valley 5800 application, into two portions:

> interbedded alluvium and volcanic rocks along the western front of the Cerbat - Hualapai Mountain complex. This area is water bearing, although the water levels indicate that in some areas the flooded portion of the formation rests upon non-water-bearing rock types at depth, and;
>
> alluvial fill extending to depths exceeding 1,800 feet, which form the primary aquifer of the basin. The total thickness of the alluvial fill has not yet been fully determined by the drill. The alluvium of Quaternary and Tertiary age have been divided into three major units (Gillespie and Bentley, (1971), older, intermediate and younger alluvium of which the older unit is the major aquifer as both the intermediate and younger alluvium are primarily above the water level in the basin. This may not be true in the southern portion of the basin where the water level is 300 feet or less.
>
> The Arizona Department of Water Resources Well Report giving the well characteristics for wells in the Sacramento Valley is included as Appendix A . Representative Drillers' logs of the alluvial fill portion illustrating the types of materials encountered in the subsurface of the basin are included as Appendix B.

Basin Limits

The extent of the exposure of the alluvial fill in the Sacramento Valley is illustrated on Figure 1, a portion of the geologic map of Mohave County. The Arizona Department of Water Resources sub-divided the alluvial basin into two portions;

> the alluvial fill portion of the basin was considered to be the western six mile wide strip along the eastern front of the Black Mountains extending from Highway 68 south to south of Yucca. This portion of the alluvial fill section was defined as that portion of the basin in which the drill cutting logs indicated that the primary subsurface materials were sand, gravel and clay in various forms, i.e. unconsolidated, mildly, moderately or hard consolidation in the form of conglomerate, which the Department considered to be the sole aquifer for the basin, and;
>
> the three mile plus or minus strip along the western front of the Hualapai Mountains was considered to be that portion of the exposed alluvial fill underlain by interbedded layers of alluvium and volcanic rocks of various forms. It was considered that the interbedded formations were not part of the aquifer.

The delineation of the alluvial aquifer, the interbedded alluvial fill and volcanic rocks and the hydrologic boundaries enclosing the aquifer are illustrated on Figure 1. The dividing line between these two divisions of the alluvial fill was considered by ADWR to be the eastern hydrologic boundary in the review of the Golden Valley 5800 study.

Although it is believed that the alluvial aquifer is slightly larger than that delimited by ADWR, the limits set by ADWR will be followed in this study.

Thickness of the Alluvial Fill

Gilllespie and Bentley (1971) estimated the thickness of the 4,400 feet across the middle of the Sacramento Valley, based on geophysical (conventional refractive seismic) evidence.

Although it is expected that the alluvial - bedrock contact is not a smooth curve across the basin, many deep wells were terminated in the alluvial fill, i.e.:

Owner	Well	Total Depth, feet
Standard Metals Corp.	B(17-17)30ddd	1,000 feet;
Mohave County	B(19-18)10daa	1,525 feet;
GVID	B(21-19)13ddd	1,505 feet.

and the Geologic Cross-Section A - A', Figure 2, extending from B(21-19)2ddd to B(21-18)32dcc illustrate that the thickness of the alluvial fill exceeds 1,500 feet in various parts of the basin. The location of Geologic Cross-Section A - A' is shown on Figure 6.

Water Levels

The water levels are relatively flat in the northern end of the basin, ranging from an elevation of 1775 feet north of Highway 68 to 1746 feet twelve miles south at the southern boundary of T. 20 N., R. 18 W. The water level then slopes rapidly south to Yucca where the water level elevation is 1480 feet, a slope of 17.73 feet per mile.

Water levels in the Sacramento Valley basin appear to be in equilibrium at the present time. The fact that the water levels of 2006 are almost identical to those measured by Rascona (1991) and Pfaff and Clay (1981) and is similar to those reported by Gillespie and Bentley (1971) show that few, if any, gross changes have occurred in the past thirty five years. The pumping of the mine wells in T. 21 N., R. 18 W. in the 1960's and 70's generated a limited cone of depression which has virtually disappeared since withdrawal for mining purposes ceased in around 1980.

The water levels in the alluvial center of the basin are illustrated on Figure 3 and the depth to water are illustrated on Figure 4. The trend of the water level in the hydrograph of well B(20-18)22aac, Figure 5, shows a decline of approximately eight feet during the period 1964 - 2004 illustrating that the water levels in the northern portion of the alluvial basin of the Sacramento Valley have remained relatively constant for the last forty years.

Thickness of the Saturated Aquifer

The minimum saturated thickness of the aquifer was calculated by subtracting the total depths of the wells, usually but not always, terminating in the alluvium, from the water level.

The aquifer in the Golden Valley portion of the Sacramento Valley has a saturated thickness ranging from 443 feet, in a well that terminated in bedrock, to more than 575 feet in wells that terminated in alluvial fill. Further south, in the Griffith area, the thickness of the aquifer exceeds 1,000 feet.

Figure 6 illustrates the locations of the calculated thickness.

Water Quality

In general, the water quality from the aquifer(s) within the Sacramento Valley meets the current drinking water standards. Both GVID and the Valley Pioneer Water Company are in compliance with the Department of Environmental Quality as a water providers.

Laboratory analysis of the waters from the Golden Valley 5800 Well GV-1 [B(21-18)3dba] show that the chemical quality of the composite sample taken from the well head during the pumping test meets all the requirements for a "New Source" public water supply (Errol L. Montgomery & Associates, 2005).

No recorded WQARF Superfund sites have been designated in the area of study.

Recharge to the Sacramento Valley

The majority of the recharge to the Sacramento Valley occurs as runoff of the Hualapai Mountains on the eastern side of the basin infiltrating into the alluvial deposits of the valley floor. The flow is then towards the central portion of the basin and southward.

The estimates of the outflow of the basin, and consequently the recharge when the basin is in equilibrium, was calculated at 4,000 acre feet per year (Gillespie and Bentley, 1971, p. H27, Manera, 1994) and 1,000 acre feet per year by Rascona (1991). However, Rascona does not describe the method used to calculate the outflow. Using the slope of the water levels determined by Rascona on his map, 300 feet in seven miles, a width of the outlet measured at 3.4 miles on the surface, constricted to 2 miles in the subsurface and a transmissivity value of 46,000 gpd/ft then:

Transmissivity x slope of water level x width in feet x 365 (year) / 325,851 (gallons per acre foot) = acre feet per year.

$$46{,}000 \times \frac{300}{36{,}960} \times 10{,}560 \times 365 / 325{,}851 = 4{,}416 \text{ ac/ft/yr}$$

which matches the calculations of Gillespie and Bentley (1971) and Manera (1994) of approximately 4,000 ac/ft/yr

Aquifer Parameters

Transmissivity

The values of transmissivity, calculated from pumping tests were taken from various reports calculated by Manera Inc from pumping tests or in one case estimated from the specific capacity of a well (Theis and others pages 331 - 341, in Bentall 1963), in the Sacramento Basin are

Well	Pumping T gpd/ft	Recovery T gpd/ft
B(17-17)9cdd[1]	63,000	
B(17-17)32bcb[2]	52,000	
B(19-18)10aaa	61,983	63 360
B(19-18)10cdd	76 344	
B(19-18)10daa	69,375	42 818
B(19-18)15acc	66 000	44 968
B(19-18)15add	29 106	35 280
B(20-18)4bba[2]	46 000	
B(21-18)32dcc[2]	35,000	
B(21-19)13ddd	17 000	
B(21-19)25aaa	37,000	

[1] calculated from specific capacity
[2] taken from Gillespie and Bentley (1971)

The pumping test and recovery data indicate that the portion of the basin including and south of T 20 N have values of T greater than 43 000 gpd/ft with a majority of the values exceeding 50,000 gpd/ft There is one exception to this range and the recovery data indicates a value of 35 000 gpd/ft

Two of the three wells in T 21 N , R 19 W , which have test reports available have values of T of 35 000 gpd/ft and 37,000 gpd/ft In the remaining well B(21-19)13ddd (GVID Well 1), the value of T = 17 000 gpd/ft was calculated from the first seventy minutes of the pumping test i e the early T_E The pumping levels during the latter fourteen (1 400 minutes) of the test, Figure 7, indicate that value of T_L is much larger than the calculated T_E of 17,000 gpd/ft

The average of the pumping T value is 50 255 say 50,000 gpd/ft and the average of the recovery T values is 46 606 gpd/ft Thus the average value of T = 46,000 gpd/ft used in the model appears reasonable

The value of T = 46 000 gpd/ft is higher than the T value used in the ADWR review of the Golden Valley 5800 model however it is believed the data supports the use of this higher value

Specific Yield

All of the wells used in the model penetrate primarily alluvial materials containing a high percentage of sand and gravels and moderate to minor amounts of clay Therefore it is believed that a specific yield of nine (9) percent is reasonable Model runs using a specific yield of seven (7) percent will be made to project a worst case scenario

There are at several factors which makes the use of the nine (9) percent value for the specific yield viable

the recharge to the basin was not included in the calculations of drawdown in the simulation model

the eastern hydrologic boundary was established on the basis that wells east of the hydrologic boundary penetrate interbedded layers of alluvial fill and volcanics or only the younger volcanics Regardless of the source rocks these wells yield various amounts of water

consequently the eastern hydrologic boundary has to be a leaky boundary which will allow both the recharge and water draining from aquifers of the various rock types to the east to flow into the "alluvial basin as delimited of the Sacramento Wash as the water level in the Sacramento alluvial basin declines due to withdrawal and

the exact location of the eastern hydrologic boundary was determined by the location of wells containing subsurface volcanics in the drill cutting logs The separation of the wells does not allow an exact delineation of the hydrologic boundary therefore, it is possible that the alluvial basin could be slightly wider than stated, allowing a larger storage area than delimited It is unlikely that the delimited alluvial basin would be smaller

SIMULATION MODELING

Method of Calculating Drawdown

The simulation model utilized for this study was THWells ver 4 01 (van der Heijde 1996) The program THWells calculates the drawdown of piezometric head due to the combined effect of up to 100 discharge wells in a confined leaky-confined or unconfined aquifer The calculations of the total drawdown, in this case are based on the Theis equation for non-steady state flow in an isotropic homogeneous confined aquifers with a correction applied for water table aquifers Boundary effects can be included through the use of image well theory

In this case the number of wells was 19 discharge points within the alluvial aquifer with 19 image well discharge points west of the alluvial basin and 19 image well discharge points east of the alluvial basin for a total of 57 discharge points to simulate the two hydrologic boundaries of the alluvial basin

It is understood that there are inherent weaknesses in the model as designed, including the fact that the aquifer had to be considered a isotropic homogeneous formation, however the model is as good or better than a more sophisticated model design considering the limited volume of data available to establish the aquifer characteristics

Although this is a relatively simple model the field data is sufficient to generate "good results

Calculation - Description of Withdrawal

The volume of withdrawal was based on the volume of the designation of the Water Company or the approved volume of ground water allotted to a proposed subdivision or the projected industrial use of the I-40 (Griffith) Industrial Corridor The volume allotted to the designated areas are

Golden Valley Improvement District	1 400 acre feet per year
Valley Pioneer Water Company	
8 300 lots at 0,32 ac/ft/lot	2 656 acre feet per year
Non-residential parcels	155 acre feet per year
Mine call	3,000 acre feet per year
Golden Valley 5800	9,000 acre feet per year
I-40 Corridor	
Praxair	20 acre feet per year
MTC Prison	200 acre feet per year
Wal-Mart	180 acre feet per year
Griffith Energy, 2,396 96 ac/ft/yr/35 years	839 acre feet per year

The GVID, the Valley Pioneer Water Company the Mine call and Golden Valley 5800 have fixed amounts of water allotted to the entity

The I-40 Corridor water demands were determined in the following manner

The Praxair, the MTC Prison and Wal Mart water demands were the values given by the entity

The Griffith Energy facility has a projected life of 40 years The plant has been in operation for a period of five years The present owners of the Griffith Energy Plant calculated the use of 2 396 96 acre feet per year for the next 35 years based on

100 million gallons per day for the months of June, July August and September

75 million gallons per day for the months of October November December April and May and,

2 million gallons per day for January, February and March.

The 35 year usage of 83,894 acre feet was then spread over the 100 year period of the simulated withdrawal yielding 839 ac/ft/yr.

The total I-40 Corridor well field then had a projected withdrawal of 1,239 acre feet per year.

The total volume of withdrawal was then apportioned to the number of wells operated in each entity.

Simulated Withdrawal from Basin

Withdrawal of ground water from the alluvial basin, used in the simulation model, was based on the complete build out as of January 1, 2007. The volume of withdrawal was the volume allocated by some form of an adequate water supply designation by the ADWR, plus the projected demand of the I-40 Industrial Corridor near Griffith and the 6,000 acre feet per year requested by virtue of this report and application.

The location of wells, ADWR I.D. Number and the committed volume of withdrawal, as of October 2006, from each well used in model are:

Present Designations or Demands:

Golden Valley Improvement District		1,400 ac/ft/yr
B(21-19)13ddd	55-530666	624,960 gpd
B(21-19)25aaa	55-530665	624,960 gpd
Valley Pioneer Water Company, including the Mine call		5,810 ac/ft/yr
B(21-18)20dbb	55-623084	1,296,631 gpd
B(21-18)30bba	55-623082	1,296,631 gpd
B(21-18)32bbb	55-623083	1,296,631 gpd
B(21-18)32dcc	55-623081	1,296,631 gpd
I-40 Industrial Corridor	(100 year basis)	1,239 ac/ft/yr
B(19-18)15acc	55-574436	276,527 gpd
B(19-18)10cdd	55-571367	276,527 gpd
B(19-18)10aaa	55-580149	276,527 gpd
B(19-18)10daa	55-574434	276,527 gpd
Golden Valley 5800		9,000 ac/ft/yr
B(20-18)4aaa		1,339,114 gpd
B(20-18)8bbb		1,339,114 gpd
B(20-18)8ccc		1,339,114 gpd

B(21-18)9bbb	1,339,114 gpd
B(20-18)15ccc	1,339,114 gpd
B(20-18)15ddd	1,339,114 gpd

Application to be Filed

Proposed Yucca Well Field:	6,000 ac/ft/yr
B(18-18)11baa	1,785,485 gpd
B(18-18)12bcd	1,785,485 gpd
B(18-18)13bdd	1,785,485 gpd

Model Design

The model utilized for the analysis of the drawdown in water levels was THWells, ver. 4.01. The origin of the model grid was located at the northwest corner of T. 21 N., R. 20 W. G&SR B&M. Townships 17 through 21 North., Ranges 17 through 20 West were included in the grid so as to include the alluvial portion of the Sacramento Valley extending from Highway 68 south to Yucca and the areas of the image wells.

The model design was:

grid interval	5280 feet in both the x and the y directions;
transmissivity	46,000 gallons per day per foot;
specific yield	7 percent (.07) and 9 percent (.09)
aquifer thickness	500 feet
well locations:	
production	given in Table 1
image	given in Table 1
volume of withdrawal:	
GVID	1,400 acre feet per year
Valley Pioneer Water Co.	2,810 acre feet per year
Mine call	3,000 acre feet per year
I-40 Industrial Corridor	1,239 acre feet per year
Golden Valley 5800	9,000 acre feet per year
Yucca Well Field	4,000 and 6,000 acre feet per year

The Golden Valley Improvement District wells, the Valley Pioneer Water Company wells and the I-40 Corridor wells used in the model are presently in place. Not all of the existing wells owned by those entities were utilized in the model, however, the total projected production for each entity was divided among the wells used.

The wells used in the model for withdrawal by the Golden Valley 5800 project and the proposed Yucca Well Field for Golden Valley Improvement District are theoretical wells. These well locations are approximate and the location of the wells may be moved based on land acquisition.

TABLE 1

GOLDEN VALLEY IMPROVEMENT DISTRICT
SACRAMENTO VALLEY BASIN WELLS AND IMAGE WELL LOCATIONS

Well Location GVID	x	y	Model I.D.
B(21-19)13aaa	62,832	15,840	1
B(21-19)25aaa	62,832	21,120	2
VALLEY PIONEER			
B(21-18)20dbb	71,280	18,744	7
B(21-18)30bba	66,792	21,648	8
B(21-18)32bbb	69,696	26,928	9
B(21-18)32dcc	71,808	31,416	10
RHODES			
Theoretical			
B(20-18)4bbb	77,352	32,208	19
B(20-18)8bbb	71,808	38,016	20
B(20-18)8ccc	71,808	42,504	21
B(20-18)9bbb	77,088	38,544	22
B(20-18)9ccc	77,088	42,240	23
B(20-18)16ccc	77,088	47,520	24

Well Location GVID	x	y	Model I.D.
B(21-18)20dbb	25,608	31,680	3
B(21-18)30bba	29,832	35,376	4
B(21-18)32bbb	21,648	39,864	11
B(21-18)32dcc	26,928	38,280	12
RHODES	25,872	44,088	13
Theoretical	30,888	48,840	14
B(20-18)4bbb	27,984	53,856	25
B(20-18)8bbb	35,376	53,856	26
B(20-18)8ccc	38,016	56,496	27
B(20-18)9bbb	31,416	57,288	28
B(20-18)9ccc	35,112	60,456	29
B(20-18)16ccc	38,280	63,888	30

Well Location GVID	x	y	Model I.D.
B(21-18)20dbb	80,784	7,920	5
B(21-18)30bba	84,480	12,408	6
B(21-18)32bbb	76,560	16,632	15
B(21-18)32dcc	82,368	15,048	16
RHODES	84,480	20,592	17
Theoretical	86,064	25,344	18
B(20-18)4bbb	83,424	30,096	31
B(20-18)8bbb	91,344	28,512	32
B(20-18)8ccc	93,456	32,736	33
B(20-18)9bbb	87,120	33,792	34
B(20-18)9ccc	90,816	36,960	35
B(20-18)16ccc	94,512	39,600	36

TABLE 1, Page 2

Well Location	x	y	*Model I.D.*	x	y	*Model I.D.*	x	y	*Model I.D.*
I-40 CORRIDOR									
B(19-18)10aaa	86,064	69,168	*37*	47,520	86,064	*41*	104,808	61,512	*45*
B(19-18)10cdd	83,952	74,448	*38*	51,744	87,648	*42*	108,768	63,360	*46*
B(19-18)10daa	86,064	71,808	*39*	49,104	87,648	*43*	105,600	63,360	*47*
B(19-18)15acc	84,480	77,088	*40*	53,328	89,760	*44*	110,880	65,736	*48*
YUCCA									
B(18-18)11baa	88,176	105,072	*49*	69,696	112,464	*52*	117,744	101,376	*55*
B(18-18)12bcd	94,512	102,960	*50*	64,416	115,632	*53*	111,408	100,840	*56*
B18-18)13bdd	94,512	109,824	*51*	68,640	120,384	*54*	112,464	107,712	*57*

Model Runs and Results

Eight model runs were completed with the THWells results included as Appendices C through J and plotted as Plates 1 through 8. Each run was for 100 years starting in the year 2007 and ending in 2107. Each run assumed complete build out with its attendant demand as of January 1, 2007.

Although not a committed or requested demand for residential use, the I-40 Industrial Corridor projected use of 1,239 acre feet per year was included in all runs.

The eight runs were subdivided into four scenarios (cases) with a specific yield of seven (7) percent and nine percent (9) in each scenario.

Case 1 existing conditions or designations

Plate 1 Water Level Declines in 100 Years When T = 46,000 gpd/ft and SY = .07 for the committed demand of GVID = 1,400 ac/ft/yr, Valley Pioneer Water Company = 2,811 ac/ft/yr and the Mine Call = 3,000 ac/ft/yr.

Plate 2 Water Level Declines in 100 Years When T = 46,000 gpd/ft and SY = .09 for the committed demand of GVID = 1,400 ac/ft/yr, Valley Pioneer Water Company = 2,811 ac/ft/yr and the Mine Call = 3,000 ac/ft/yr.

Result in Case 1 (Plates 1 and 2)

the drawdown caused by the withdrawal of a total of 7,211 acre feet per year from the wells of the Golden Valley Improvement District and the Valley Pioneer wells in the northern end of the basin and 1,239 acre feet per year at Griffith (I-40 Industrial Corridor) would result in a decline in the water level of approximately one and one half foot per year in the extreme northern end of the basin around the wells in the southwest portion of T. 21 N., R. 18 W. and one half foot per year in the Griffith area. The difference caused by the difference in specific yield is relatively small in this case.

Case 2 the existing conditions of Case 1 plus the additional withdrawal of 9,000 acre feet per year for Golden Valley 5800.

Plate 3 Water Level Declines in 100 Years When T = 46,000 gpd/ft and SY = .07 for the committed demand of GVID = 1,400 ac/ft/yr, Valley Pioneer Water Company = 2,811 ac/ft/yr and the Mine Call = 3,000 ac/ft/yr and the Requested Demand for Golden Valley 5800 = 9,000 ac/ft/yr.

Plate 4 Water Level Declines in 100 Years When T = 46,000 gpd/ft and SY = .09 for the committed demand of GVID = 1,400

ac/ft/yr, Valley Pioneer Water Company = 2,811 ac/ft/yr and the Mine Call = 3,000 ac/ft/yr and the Requested Demand for Golden Valley 5800 = 9,000 ac/ft/yr.

Result In Case 2 (Plates 3 and 4) the decline caused by 16,211 acre feet in the northern end of the basin and the 1,239 acre feet per year at Griffith (I-40 Industrial Corridor) would result in a decline in the water level:

ranging up to 4 feet per year in the concentrated well field in the northern end of the basin and 1.5 feet per year at Griffith when the specific yield was .07;

slightly more than 3 feet per year in the concentrated well field in the northern end of the basin and 1 foot per year at Griffith when the specific yield was .09, and;

Case 3 the conditions of Case 2 plus an additional withdrawal of 4,000 acre feet per year at the proposed Yucca Well Field in T. 18 N., R. 18 W.

Plate 5 Water Level Declines in 100 Years When T = 46,000 gpd/ft and SY = .07 for the committed demand of GVID = 1,400 ac/ft/yr, Valley Pioneer Water Company = 2,811 ac/ft/yr and the Mine Call = 3,000 ac/ft/yr and the Requested Demand for Golden Valley 5800 = 9,000 ac/ft/yr and the Proposed Yucca Well Field = 4,000 ac/ft/yr.

Plate 6 Water Level Declines in 100 Years When T = 46,000 gpd/ft and SY = .09 for the committed demand of GVID = 1,400 ac/ft/yr, Valley Pioneer Water Company = 2,811 ac/ft/yr and the Mine Call = 3,000 ac/ft/yr and the Requested Demand for Golden Valley 5800 = 9,000 ac/ft/yr and the Proposed Yucca Well Field = 4,000 ac/ft/yr.

Result In Case 3 (Plates 5 and 6) the decline caused by 16,211 acre feet in the northern end of the basin, 1,239 acre feet per year at Griffith (I-40 Industrial Corridor) and 4,000 acre feet per year at the proposed Yucca Well Field would result in a decline in the water level:

ranging from 2 feet up to 5 feet per year around one well near the eastern hydrologic boundary in the concentrated well field in the northern end of the basin, 1.75 feet per year at Griffith and 1.25 feet per year at the Yucca Well Field when the specific yield was .07;

ranging from 2 feet up to slightly more than 3.5 feet per year around one well near the eastern hydrologic boundary in the concentrated well field in the northern end of the basin, one foot per year at Griffith and 1.2 feet per year at the Yucca Well Field when the specific yield was .09;

Case 4 the conditions of Case 2 plus an additional withdrawal of 6,000 acre feet per year at the proposed Yucca Well Field in T. 18 N., R. 18 W.

Plate 7 Water Level Declines in 100 Years When T = 46,000 gpd/ft and SY = .07 for the committed demand of GVID = 1,400 ac/ft/yr, Valley Pioneer Water Company = 2,811 ac/ft/yr and the Mine Call = 3,000 ac/ft/yr and the Requested Demand for Golden Valley 5800 = 9,000 ac/ft/yr and the Proposed Yucca Well Field = 6,000 ac/ft/yr.

Plate 8 Water Level Declines in 100 Years When T = 46,000 gpd/ft and SY = .09 for the committed demand of GVID = 1,400 ac/ft/yr, Valley Pioneer Water Company = 2,811 ac/ft/yr and the Mine Call = 3,000 ac/ft/yr and the Requested Demand for Golden Valley 5800 = 9,000 ac/ft/yr and the Proposed Yucca Well Field = 6,000 ac/ft/yr.

Result In Case 4 (Plates 7 and 8) the decline caused by 16,211 acre feet in the northern end of the basin, 1,239 acre feet per year at Griffith (I-40 Industrial Corridor) and 6,000 acre feet per year at the proposed Yucca Well Field would result in a decline in the water level:

ranging from 2 feet up to 5 feet per year around one well near the eastern hydrologic boundary in the concentrated well field in the northern end of the basin, 2 feet per year at Griffith and 1.6 feet per year at the Yucca Well Field when the specific yield was .07;

ranging from 2 feet up to slightly more than 3.5 feet per year around two wells near the eastern hydrologic boundary in the concentrated well field in the northern end of the basin, 1.75 foot per year at Griffith and 1.6 feet per year at the Yucca Well Field when the specific yield was .09;

CONCLUSIONS

The Sacramento Valley basin is capable of yielding:

the 1,400 acre feet per year committed to the Golden Valley Improvement District;

the 2,810 acre feet per year committed to the Valley Pioneer Water Company;

the 3,000 acre feet per year for the Mine Call;

the 1,239 acre feet per year demand of the I-40 Industrial Corridor;

the 9,000 acre feet per year application for Golden Valley 5800, and;

the 6,000 acre feet per year requested in this application, to be transported to the GVID area in the northern portion of the basin;

for the next 100 years based on a value of transmissivity of 46,000 gallons per day per foot and a specific yield of either seven percent or nine percent.

The thickness of the saturated aquifer in the northern end of the basin, that portion called Golden Valley, ranges from 443 feet to more than 575 feet, thus the drawdown does not exceed the saturated thickness. Further, although the model indicates that the water level will decline 500 feet around one well in the concentrated well field in the northern portion of the basin, there are a number of mitigating circumstances which will restrict the water level from declining to that depth during the 100 year period defined for this study:

1. the model runs were all based on complete build out on January 1, 2007, whereas at this time:

    a. the Golden Valley Improvement District has an allotment for 6,200 lots but is serving only 1,380 meter connections for a withdrawal of 317 acre feet per year;
    b. Valley Pioneer Water Company has an allotment for 8,300 lots but is serving only 2,072 meter connections with a withdrawal of 537 acre feet per year;
    c. Golden Valley 5800 has not yet started ground water withdrawal, but may be approved for approximately 20,000 lots, and;
    d. the I-40 Industrial Corridor will not be at full withdrawal for another two years.

    As it is unlikely that complete build out will be complete for at least 25 plus years, the volume of withdrawal will be significantly less than stated in the model;

2. the recharge of approximately 4,000 acre feet per was not included in the model which will add 400,000 acre feet of water to the aquifer over the next 100 years;

3. there are numerous producing wells east of the eastern hydrologic boundary of the defined alluvial aquifer, indicating a minor aquifer in the alluvial - volcanic inter-bedded formation to the east of the defined alluvial aquifer. As the water level in the defined alluvial basin decline, ground water from the minor aquifer to the east will flow through the delimited hydrologic boundary into the defined alluvial basin, increasing the recharge rate to the alluvial aquifer, and;

4. finally, as the mine call is dependent on the economics of copper, the mine call may not be a continuous withdrawal of the 3,000 acre feet per year for the next 100 years. In the past 60 years withdrawal from the ground water reservoir for the mine was in effect only 26 years..

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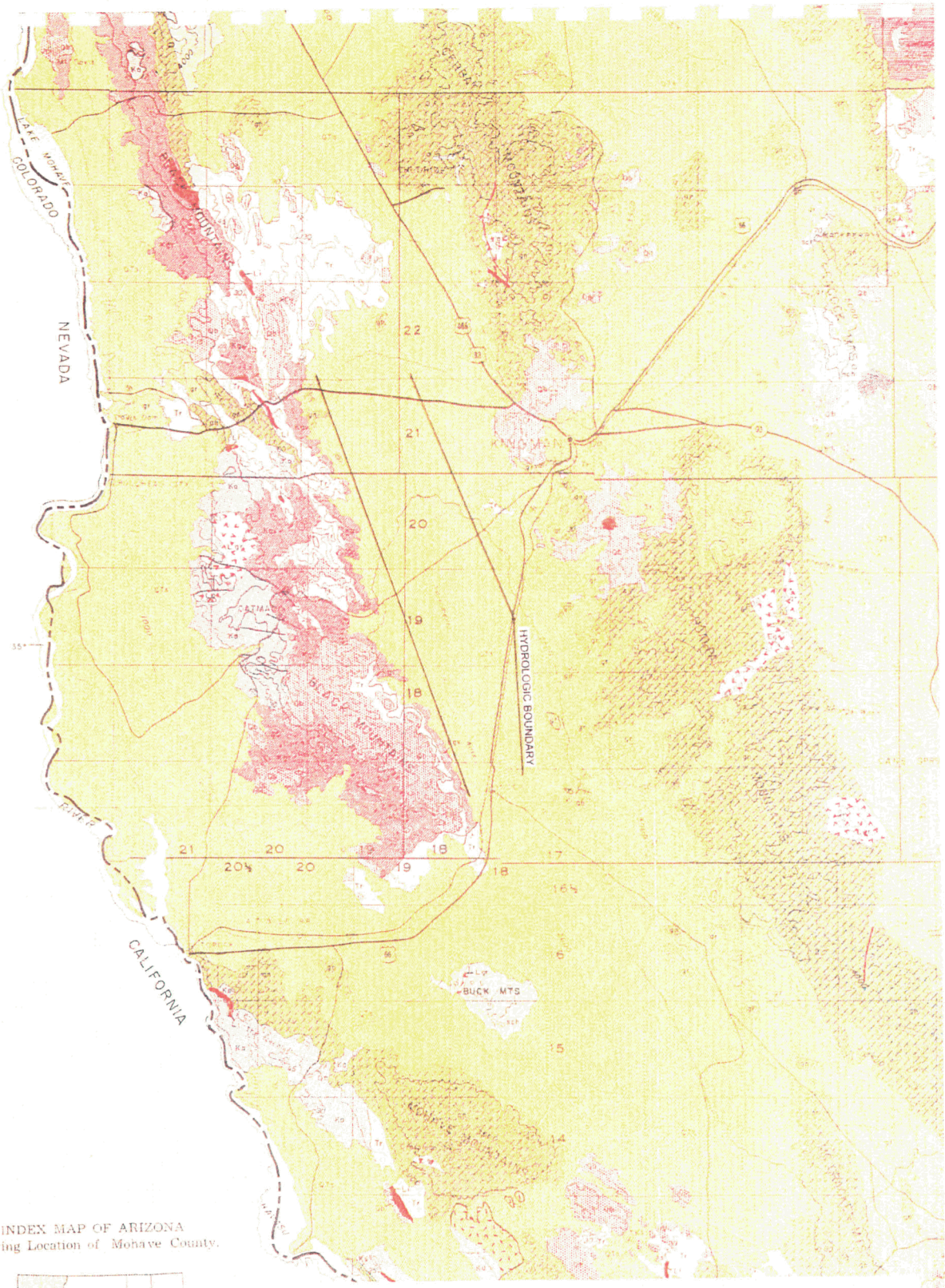
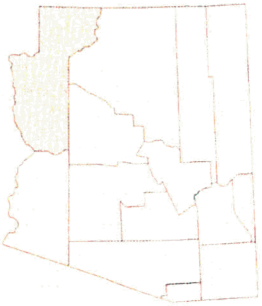
FIGURES 1 - 7



INDEX MAP OF ARIZONA
Showing Location of Mohave County.



GEOLOGIC MAP OF THE SOUTHWESTERN PORTION OF MOHAVE COUNTY

SHOWING THE HYDROLOGIC BOUNDARIES OF THE ALLUVIAL BASIN OF THE SACRAMENTO VALLEY AS ESTABLISHED BY ADWR

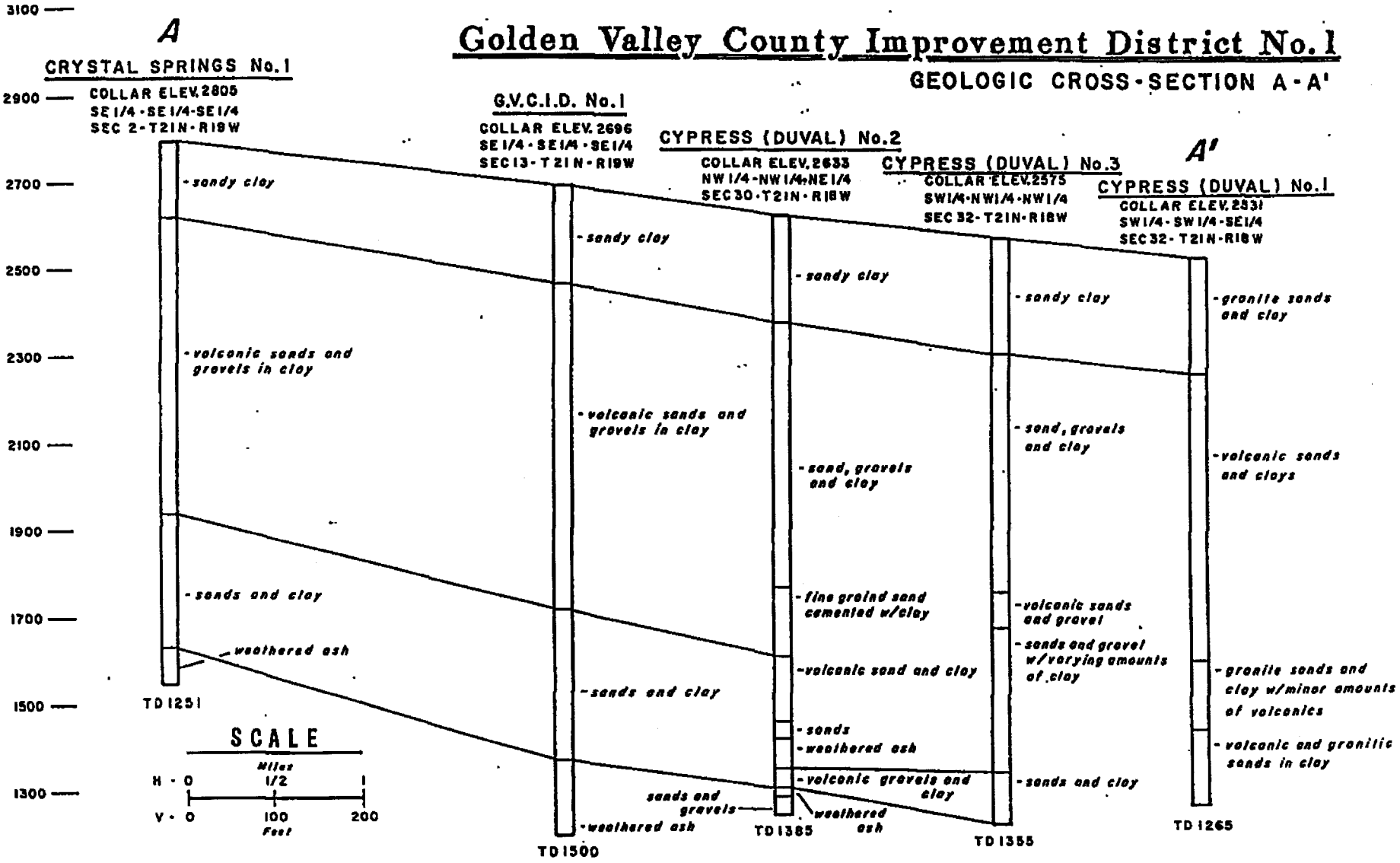
SCALE: 1 inch = 6 miles

FIGURE 1

Taken from: The Geologic Map of Mohave County, Arizona
Wilson, E. D. et al., 1959

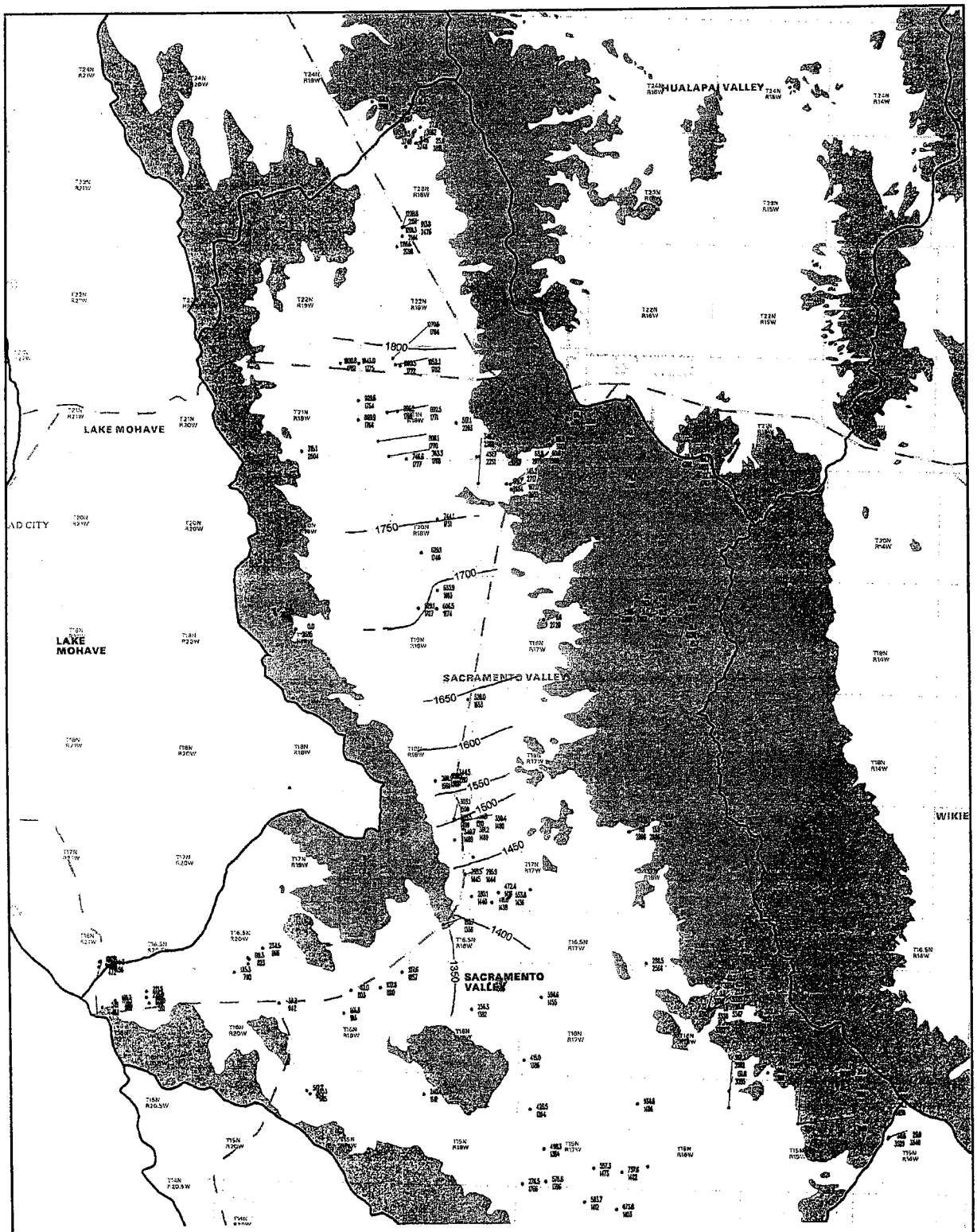
Golden Valley County Improvement District No. 1

GEOLOGIC CROSS-SECTION A-A'



MANERA, INC.
Consultants in Water Resources

FIGURE 2



Hardrock

Wells Measured

Townships

Subbasins

Basins

Depth to Water

Water Level Elevation

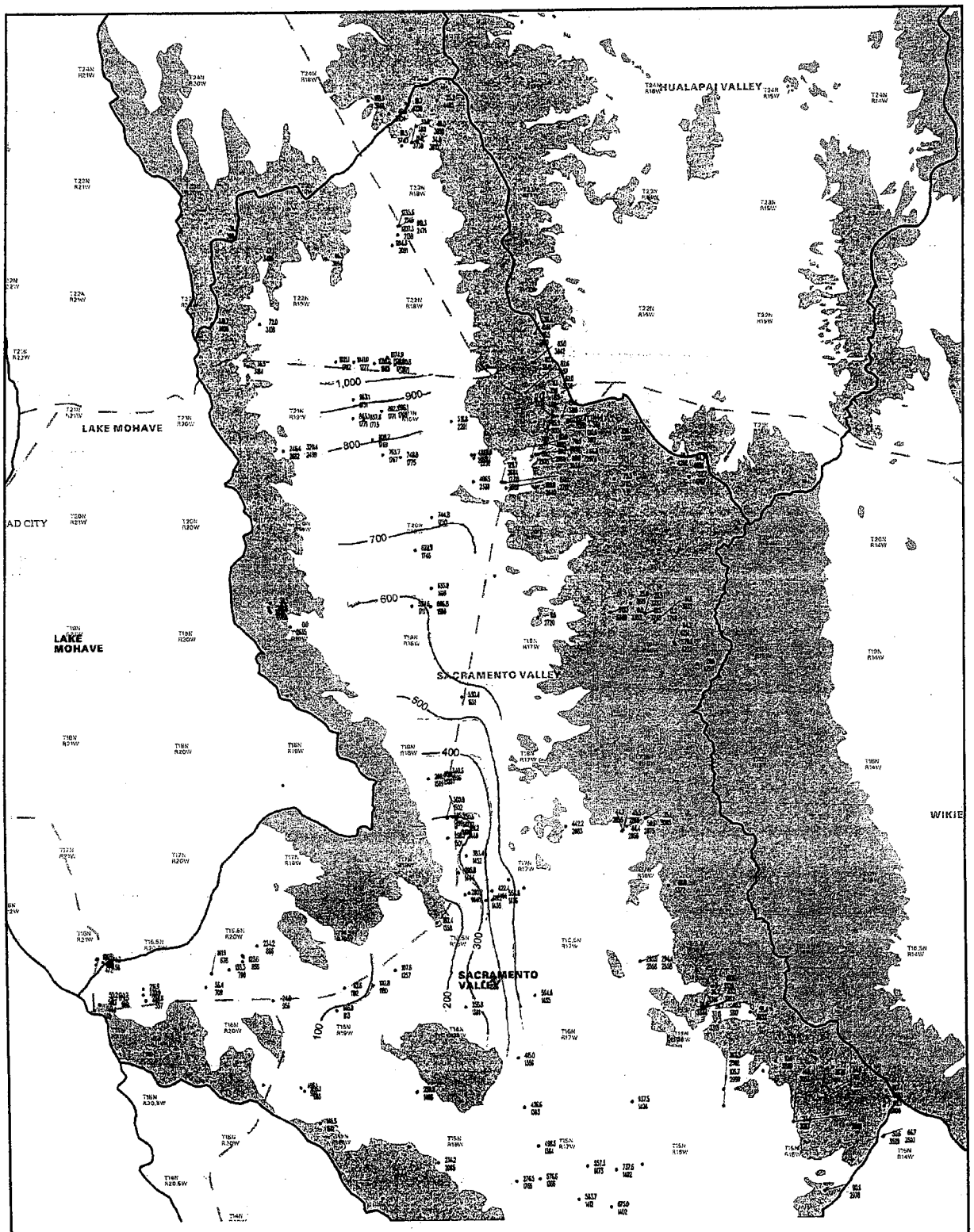
SACRAMENTO VALLEY

WATER LEVEL ELEVATIONS BETWEEN

JANUARY 2000 AND JANUARY 2006

Base and Data Taken From the Open Files
Arizona Department of Water Resources

FIGURE 3



Hardrock

Wells Measured

Townships

Subbasins

Basins

Depth to Water

Water Level Elevation

SACRAMENTO VALLEY

DEPTH TO WATER

JANUARY 2000 AND JANUARY 2006

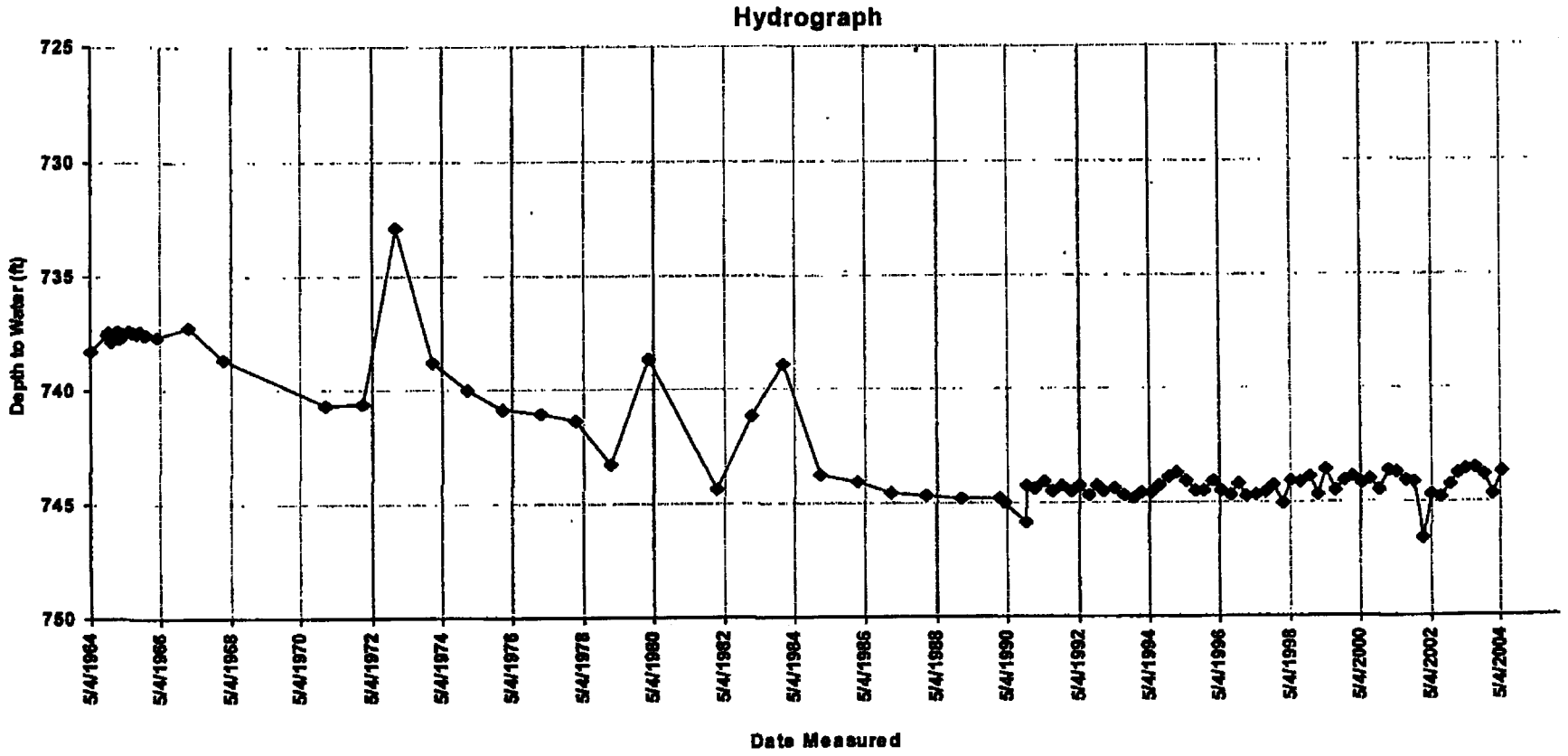
Base and Data Taken From the Open Files
Arizona Department of Water Resources

FIGURE 4

GWSI Well Report and Hydrograph

AZ Dept of Water Resources

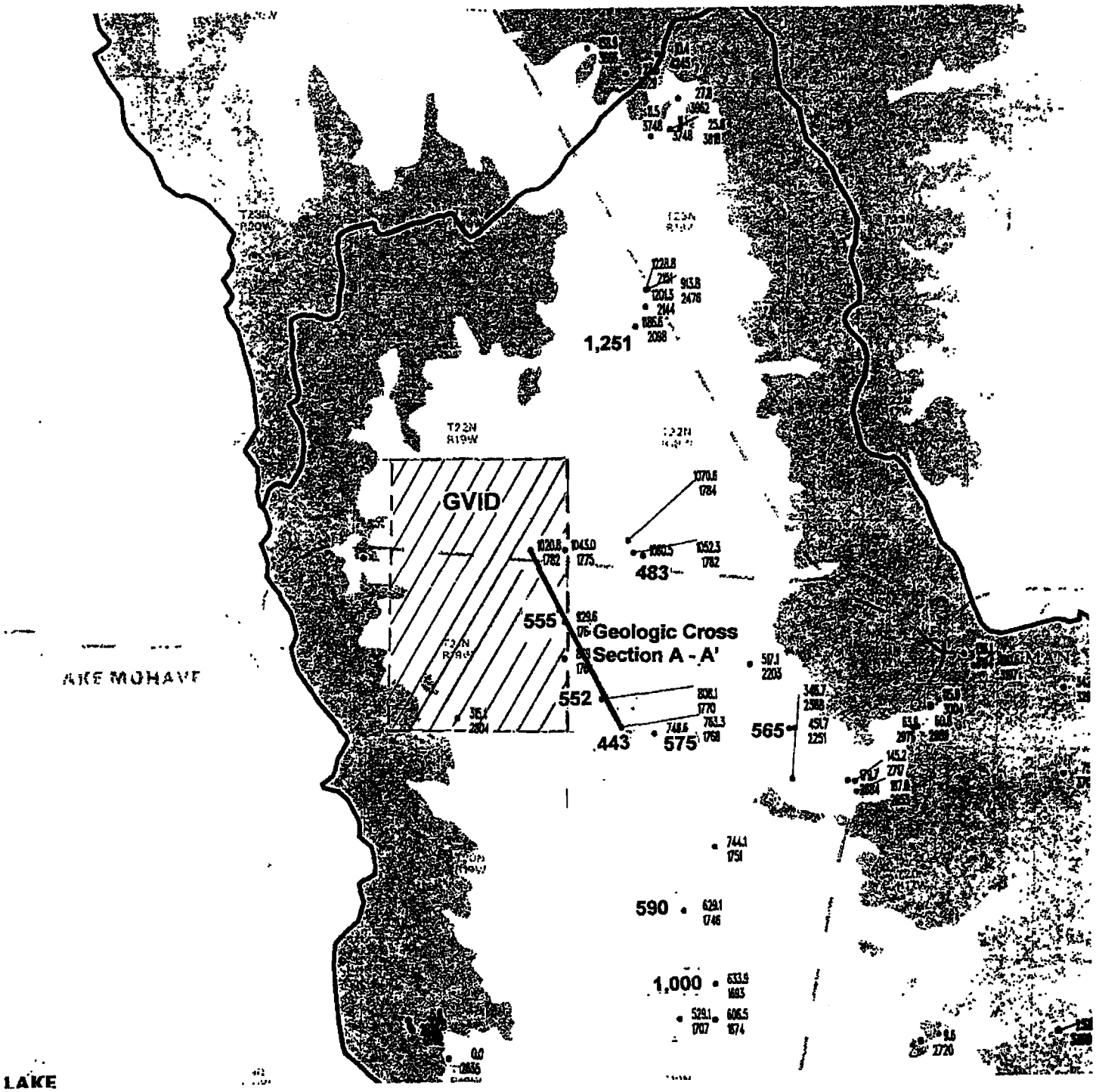
Local ID	Site ID	ADWR Reg. No.	Latitude	Longitude	Water Uses	Well Depth	Drill Date	Case Dia.	Latest WL Date	Depth to Water	WL Alt. above Mean Sea Level	Times Meas.
B-20-18 22AAC	350633114103701		35° 6' 33.59"	114° 10' 38.29"	UNUSED	779			5/11/2004	743.75	1751.25	95



GWSI is ADWR's technical database of well locations, construction data, and water levels.

Thursday, October 26, 2006

FIGURE 5



NORTHERN SACRAMENTO VALLEY

SHOWING MINIMUM THICKNESS OF SATURATED ALLUVIAL FILL

MINIMUM THICKNESS BECAUSE MANY WELL LOGS TERMINATE IN ALLUVIUM INDICATING GREATER THICKNESSES

443 Known Thickness of saturated alluvial fill In feet

Taken from ADWR Open File Data

FIGURE 6

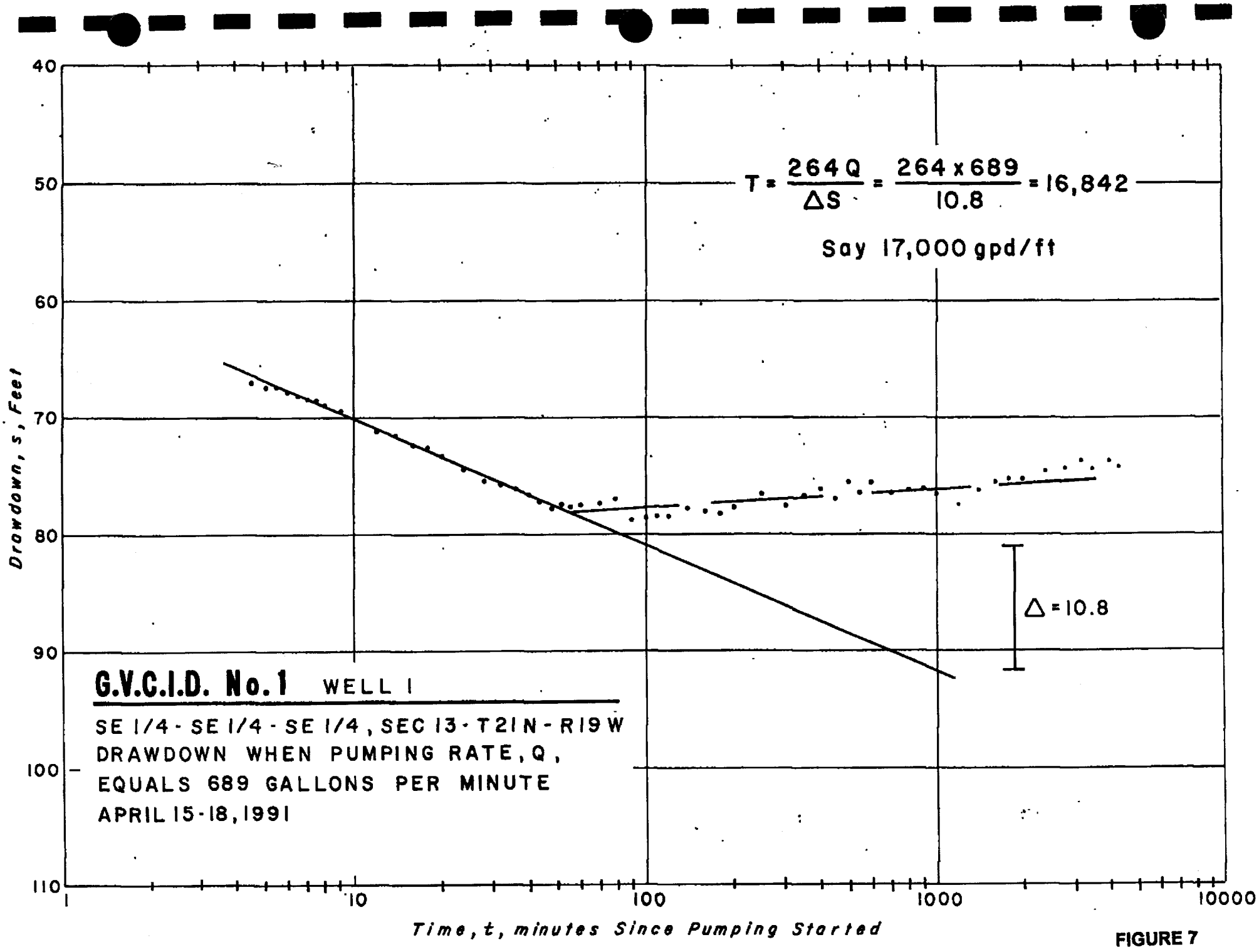
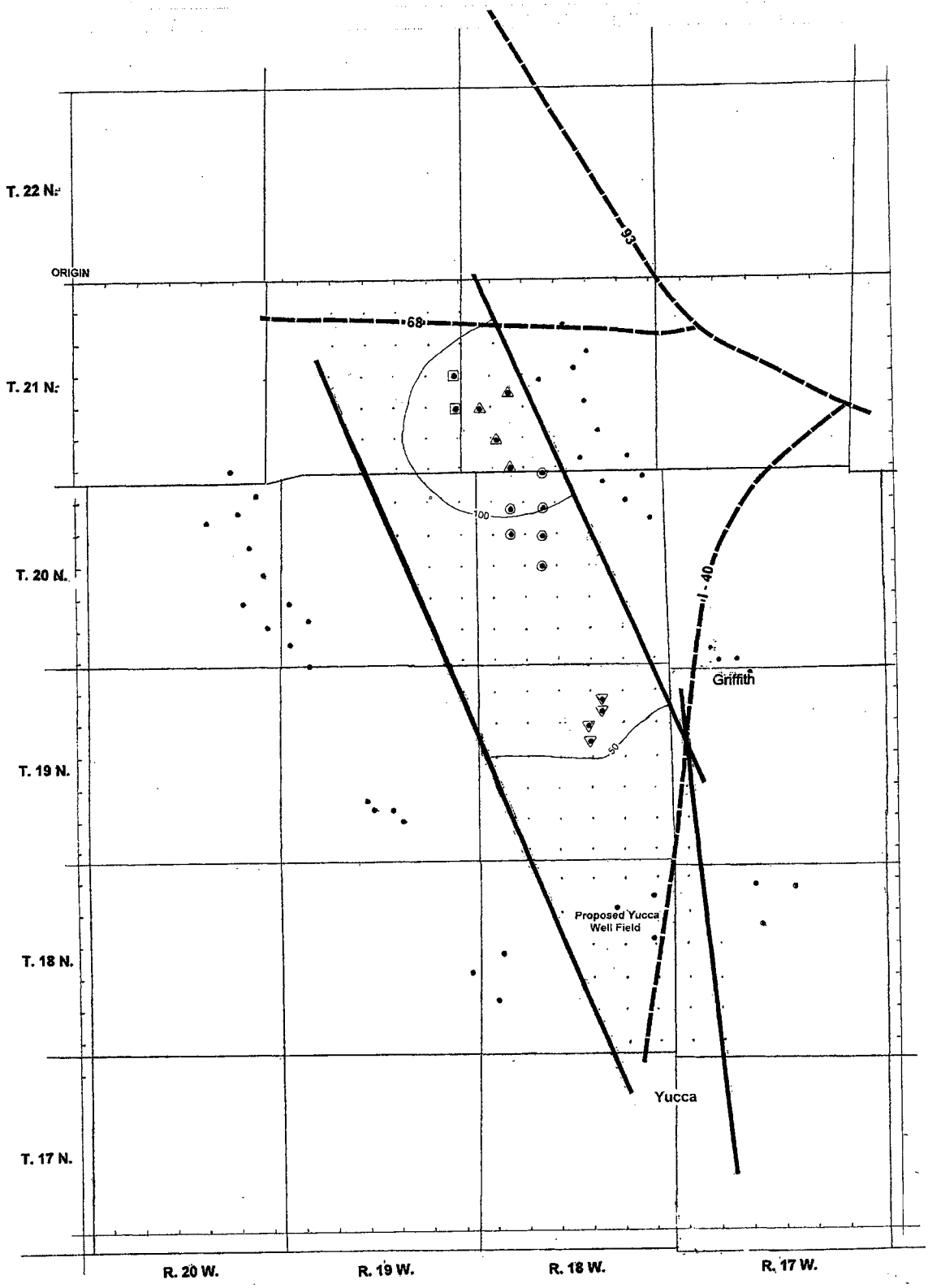

$T = \frac{264Q}{\Delta S} = \frac{264 \times 689}{10.8} = 16{,}842$
Say 17,000 gpd/ft
Δ = 10.8
G.V.C.I.D. No. 1 WELL 1
SE 1/4 - SE 1/4 - SE 1/4, SEC 13 - T21N - R19W
DRAWDOWN WHEN PUMPING RATE, Q,
EQUALS 689 GALLONS PER MINUTE
APRIL 15-18, 1991
Drawdown, s, Feet
Time, t, minutes Since Pumping Started
40
50
60
70
80
90
100
110
1
10
100
1000
10000

FIGURE 7

PLATES 1 - 8



Legend

- G.V.I.D. Wells
- Valley Pioneer Water Company Wells
- Rhodes Golden Valley South Wells
- I - 40 Corridor Wells
- Yucca (theoretical) Wells
- Hydrologic (Model) Boundaries
- Highways

N

0 1 2 3 4

Scale, miles

GOLDEN VALLEY IMPROVEMENT DISTRICT

WATER LEVEL DECLINES IN 100 YEARS

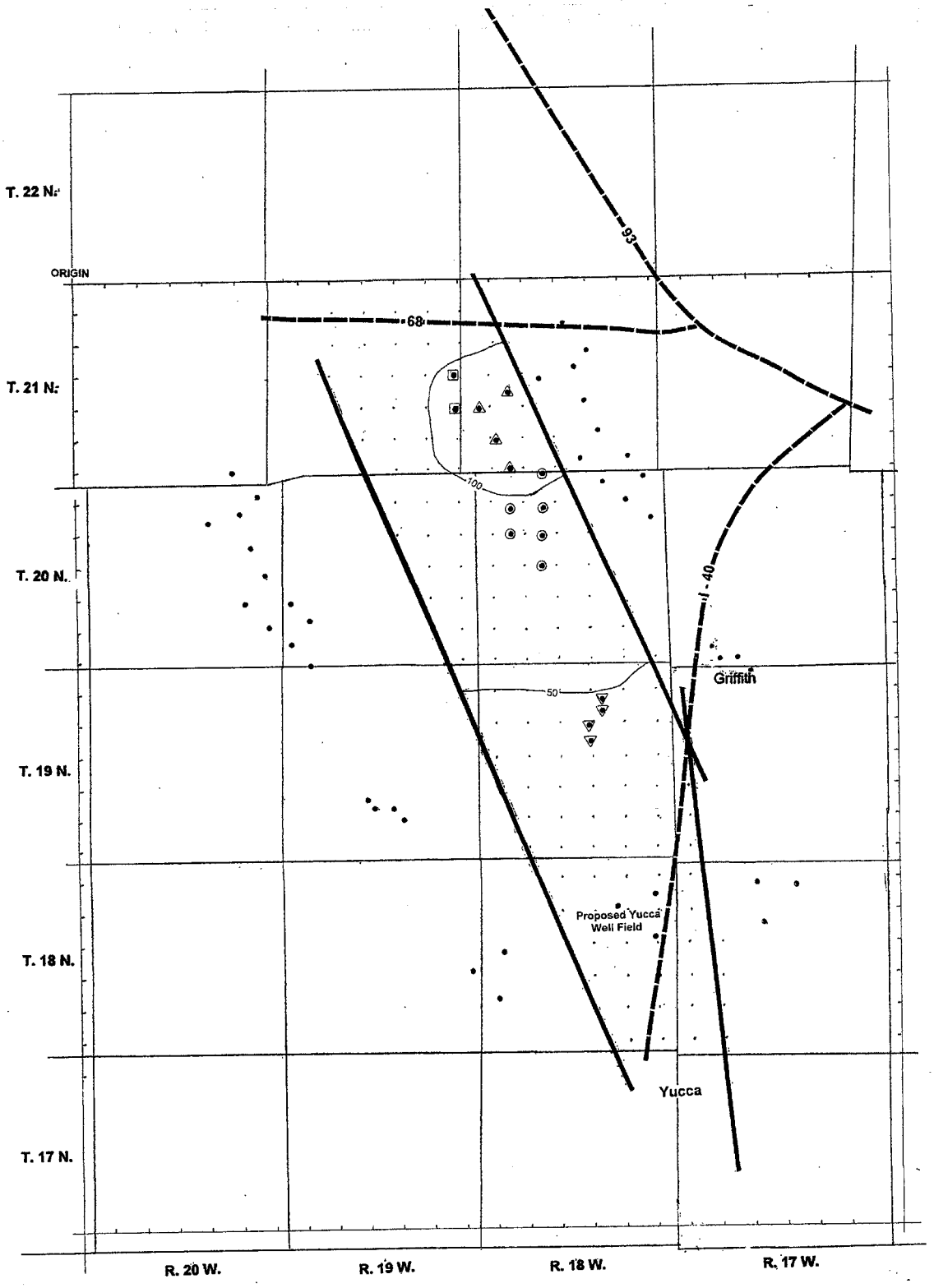
WHEN T = 46,000 gpd/ft and SY = .07

COMMITTED DEMAND:

GVID (1,400 ac/ft)
VALLEY PIONEER WATER COMPANY (2,811 ac/ft)
MINE CALL (3,000 ac/ft)

2007 - 2107

PLATE 1



Legend

- G.V.I.D. Wells
- Valley Pioneer Water Company Wells
- Rhodes Golden Valley South Wells
- I - 40 Corridor Wells
- Yucca (theoretical) Wells
- Hydrologic (Model) Boundaries
- Highways

N

0 1 2 3 4

Scale, miles

GOLDEN VALLEY IMPROVEMENT DISTRICT

WATER LEVEL DECLINES IN 100 YEARS

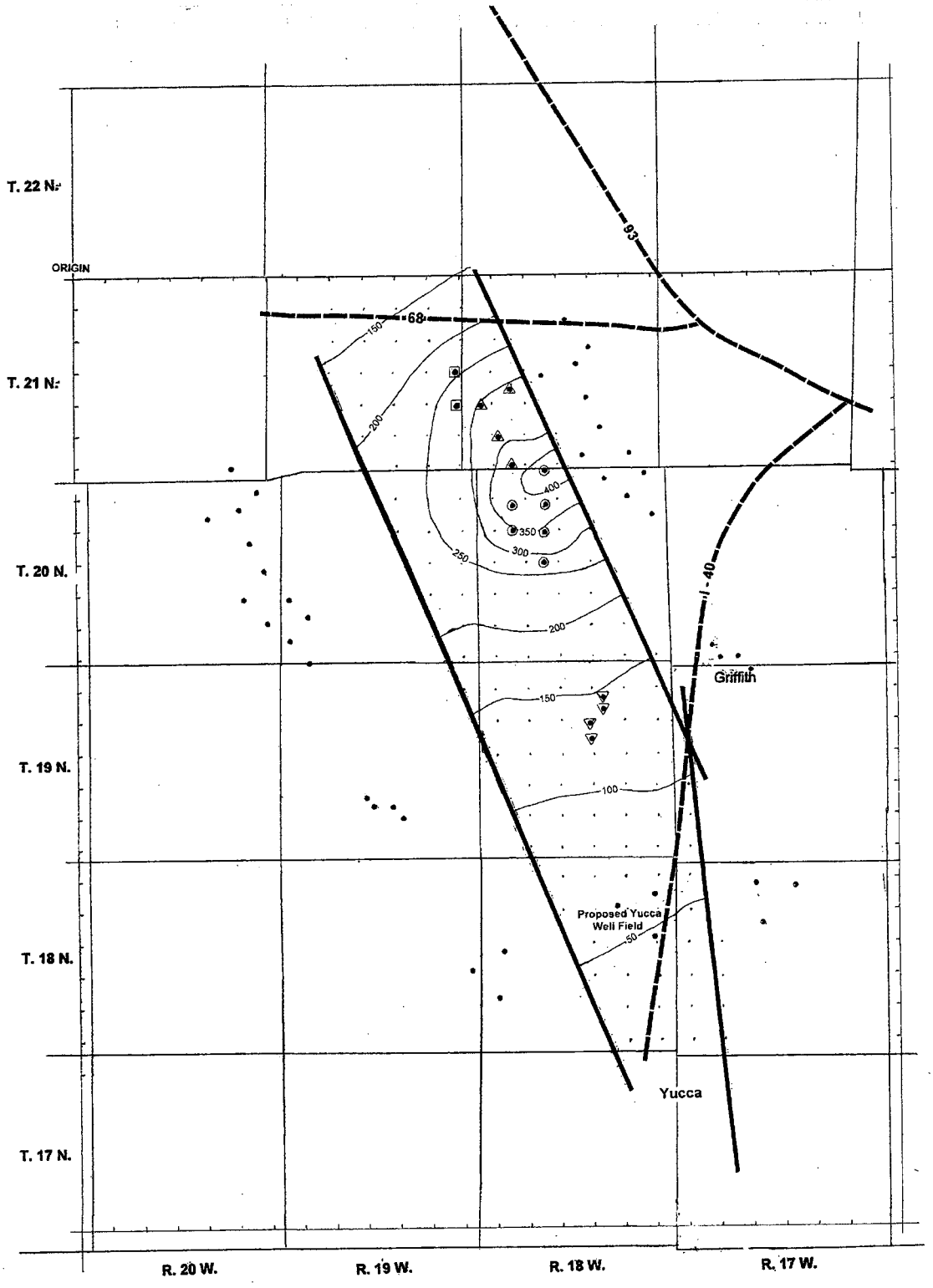
WHEN T = 46,000 gpd/ft and SY = .09

COMMITTED DEMAND:

GVID (1,400 ac/ft)
VALLEY PIONEER WATER COMPANY (2,811 ac/ft)
MINE CALL (3,000 ac/ft)

2007 - 2107

PLATE 2



Legend

- G.V.I.D. Wells
- Valley Pioneer Water Company Wells
- Rhodes Golden Valley South Wells
- I - 40 Corridor Wells
- Yucca (theoretical) Wells
- Hydrologic (Model) Boundaries
- Highways

N

0 1 2 3 4

Scale, miles

GOLDEN VALLEY IMPROVEMENT DISTRICT

WATER LEVEL DECLINES IN 100 YEARS

WHEN T = 46,000 gpd/ft and SY = .07

COMMITTED DEMAND:

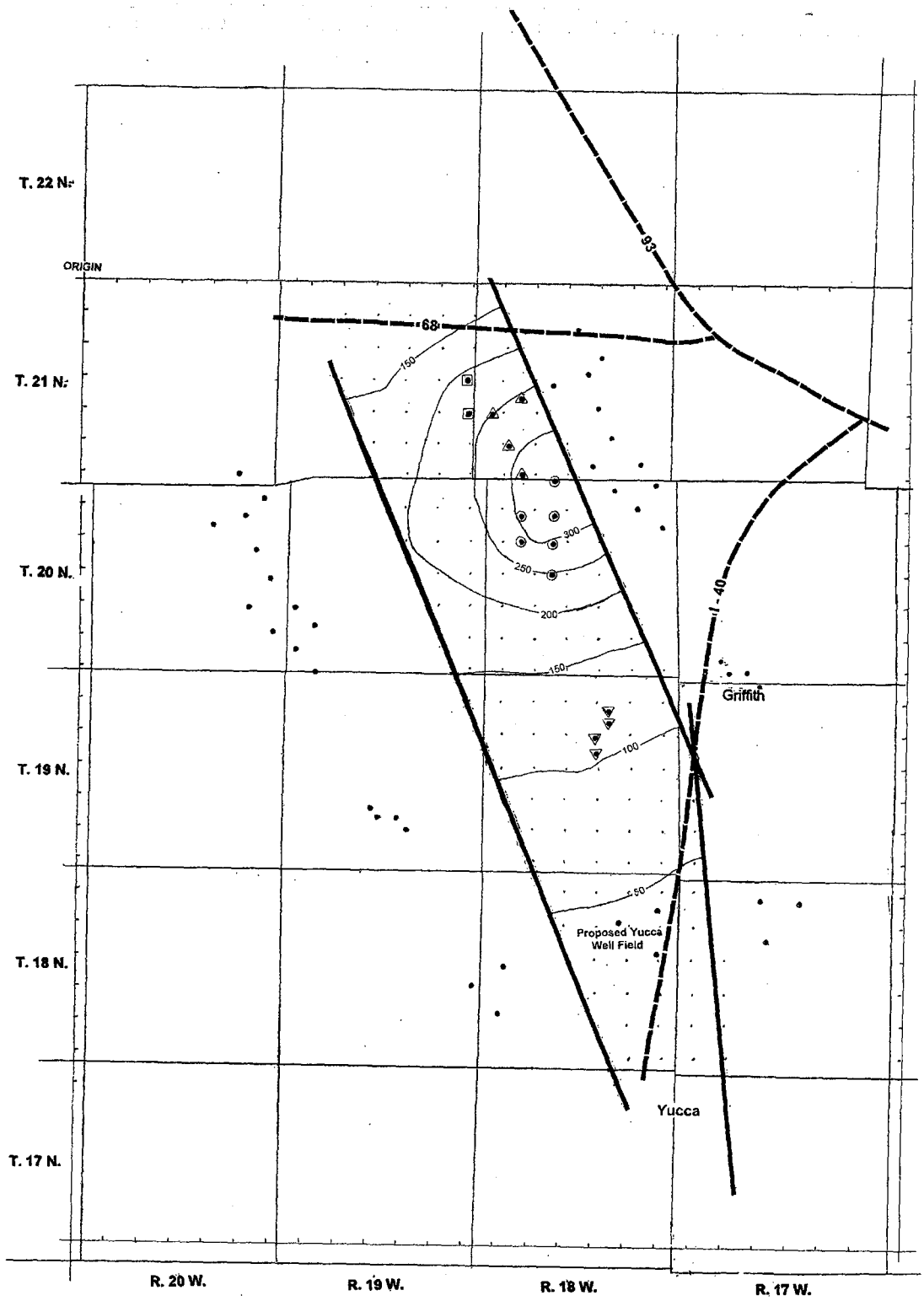
GVID (1,400 ac/ft)
VALLEY PIONEER WATER COMPANY (2,811 ac/ft)
MINE CALL (3,000 ac/ft)

REQUESTED DEMAND:

RHODES GOLDEN VALLEY SOUTH (9,000 ac/ft),

2007 - 2107

PLATE 3



Legend

- G.V.I.D. Wells
- Valley Pioneer Water Company Wells
- Rhodes Golden Valley South Wells
- I - 40 Corridor Wells
- Yucca (theoretical) Wells
- Hydrologic (Model) Boundaries
- Highways

N

0 1 2 3 4

Scale, miles

GOLDEN VALLEY IMPROVEMENT DISTRICT

WATER LEVEL DECLINES IN 100 YEARS

WHEN T = 46,000 gpd/ft and SY = .09

COMMITTED DEMAND:

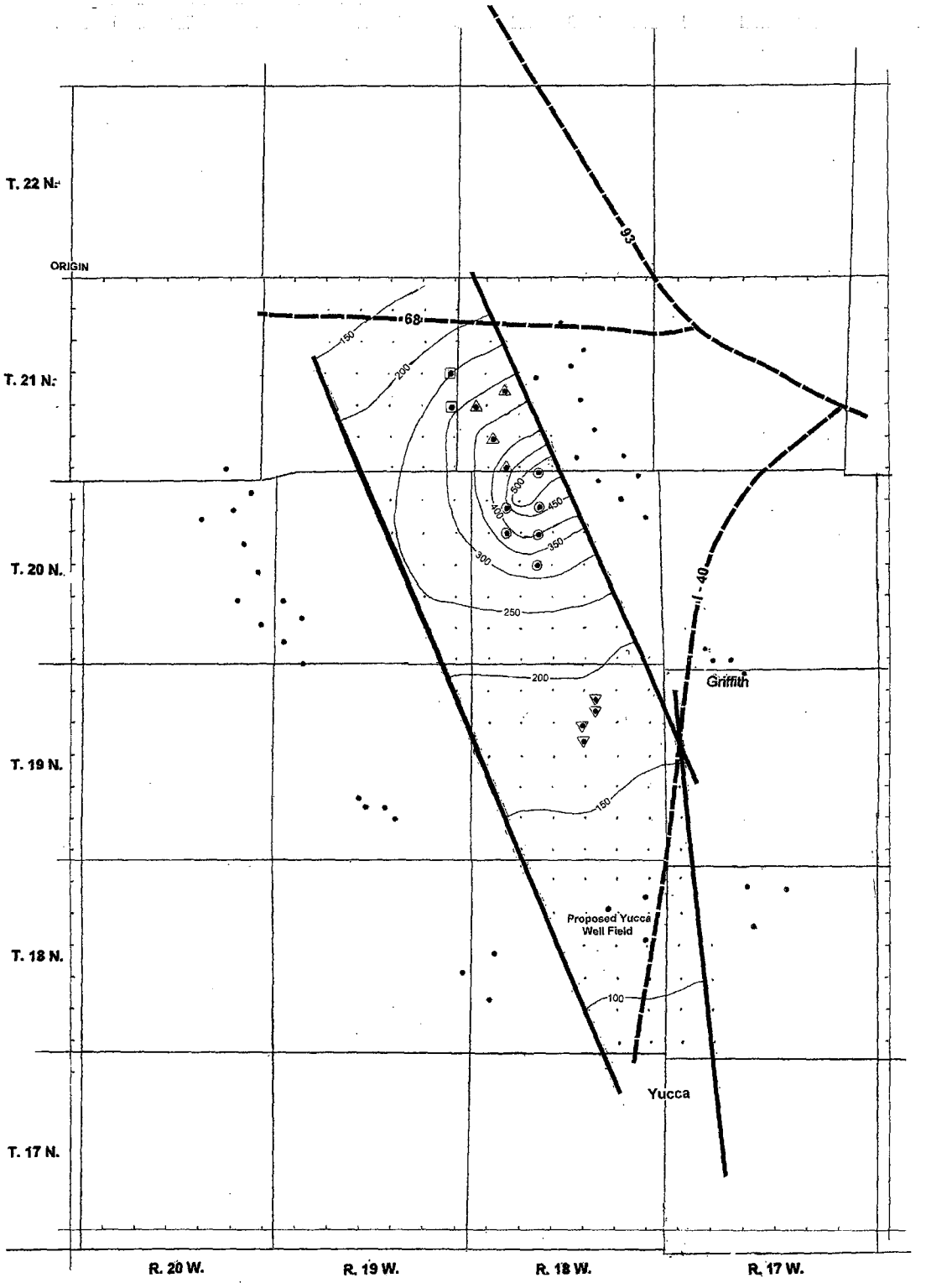
GVID (1,400 ac/ft)
VALLEY PIONEER WATER COMPANY (2,811 ac/ft)
MINE CALL (3,000 ac/ft)

REQUESTED DEMAND:

RHODES GOLDEN VALLEY SOUTH (9,000 ac/ft),

2007 - 2107

PLATE 4



Legend

- G.V.I.D. Wells
- Valley Pioneer Water Company Wells
- Rhodes Golden Valley South Wells
- I - 40 Corridor Wells
- Yucca (theoretical) Wells
- Hydrologic (Model) Boundaries
- Highways

N

0 1 2 3 4

Scale, miles

GOLDEN VALLEY IMPROVEMENT DISTRICT

WATER LEVEL DECLINES IN 100 YEARS

WHEN T = 46,000 gpd/ft and SY = .07

COMMITTED DEMAND:

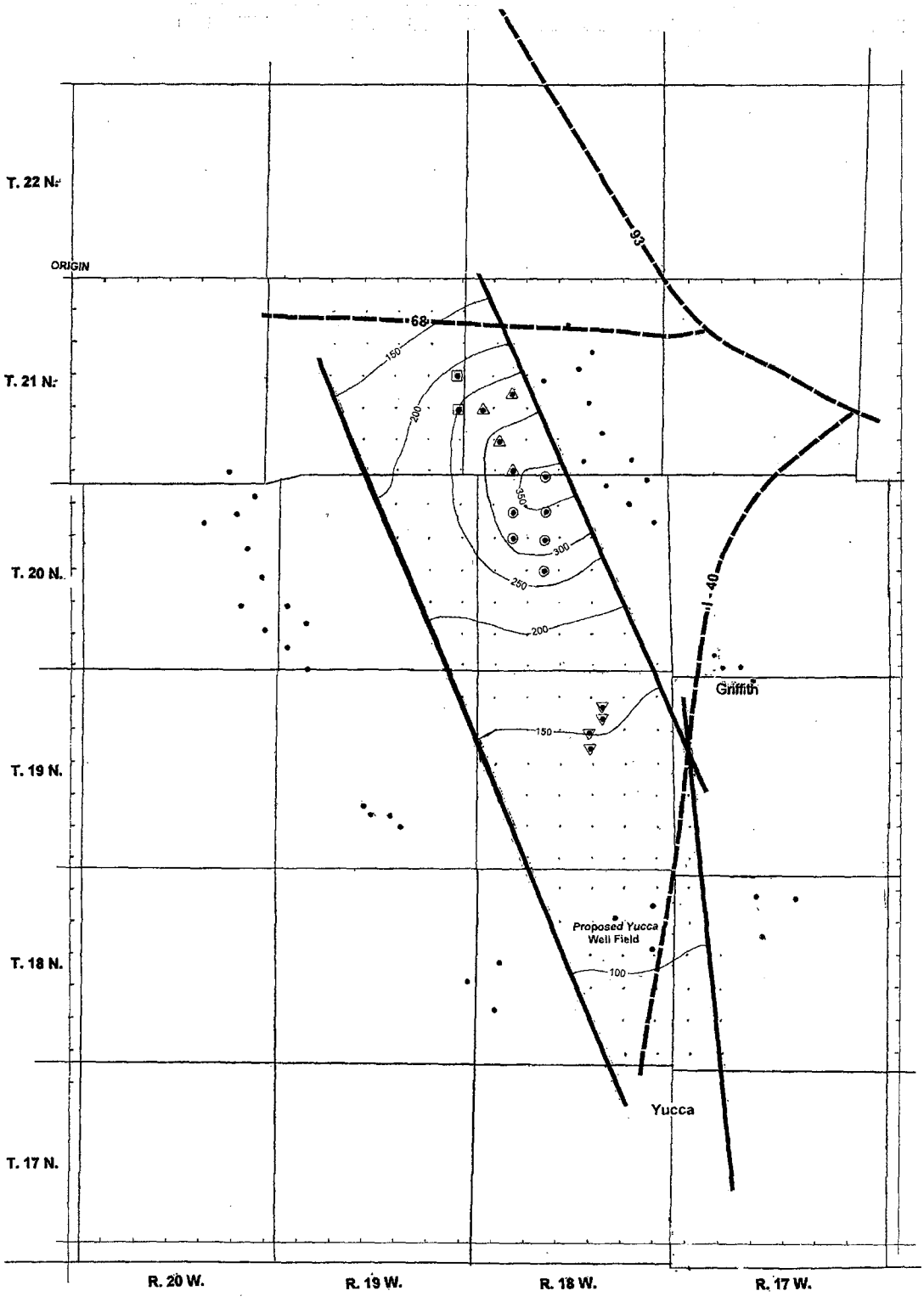
GVID (1,400 ac/ft)
VALLEY PIONEER WATER COMPANY (2,811 ac/ft)
MINE CALL (3,000 ac/ft)

REQUESTED DEMAND:

RHODES GOLDEN VALLEY SOUTH (9,000 ac/ft),
YUCCA [GVID] (4000 ac/ft)

2007 - 2107

PLATE 5



Legend

- G.V.I.D. Wells
- Valley Pioneer Water Company Wells
- Rhodes Golden Valley South Wells
- I - 40 Corridor Wells
- Yucca (theoretical) Wells
- Hydrologic (Model) Boundaries
- Highways

N

0 1 2 3 4
Scale, miles

GOLDEN VALLEY IMPROVEMENT DISTRICT

WATER LEVEL DECLINES IN 100 YEARS

WHEN T = 46,000 gpd/ft and SY = .09

COMMITTED DEMAND:

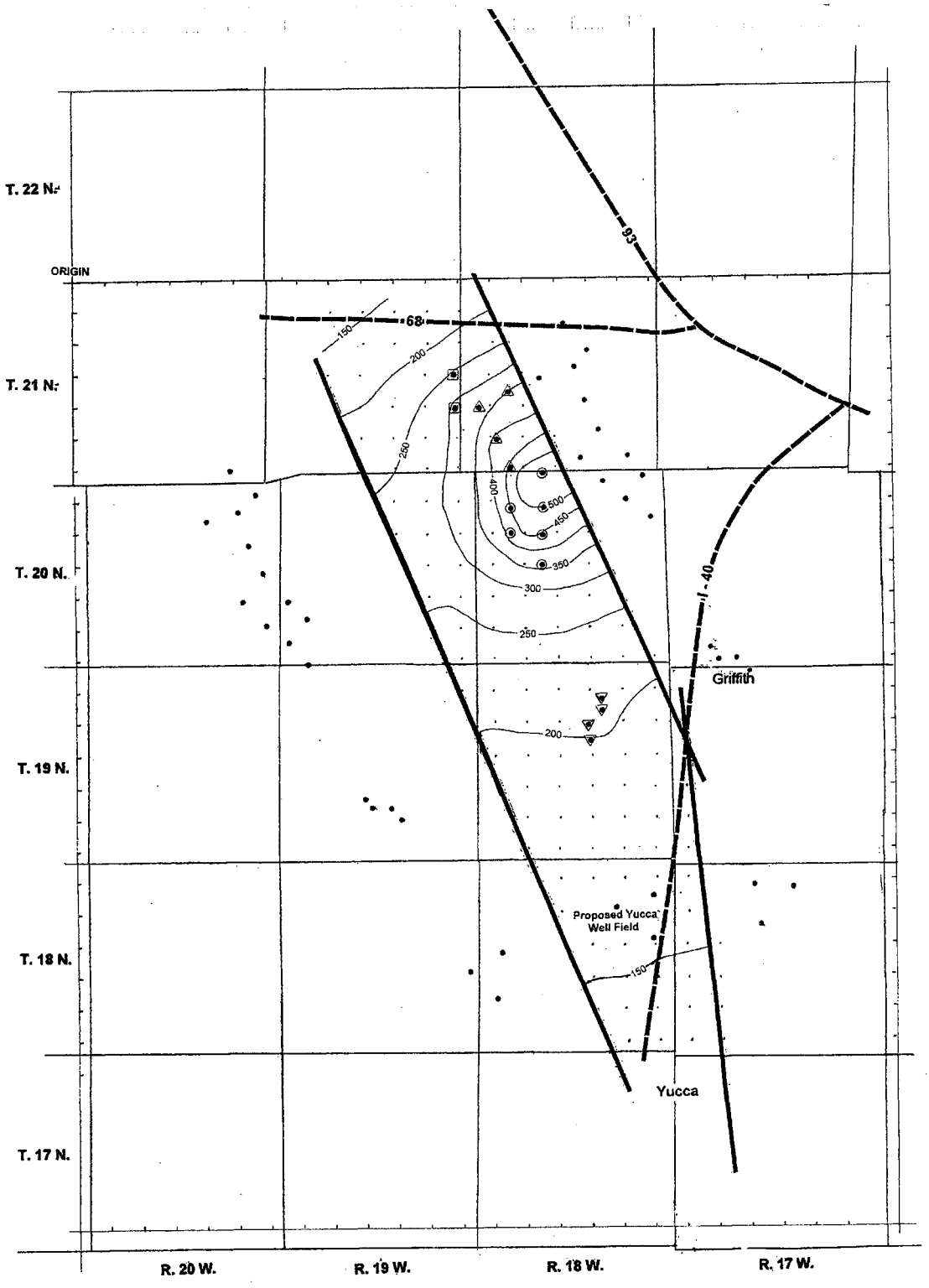
GVID (1,400 ac/ft)
VALLEY PIONEER WATER COMPANY (2,811 ac/ft)
MINE CALL (3,000 ac/ft)

REQUESTED DEMAND:

RHODES GOLDEN VALLEY SOUTH (9,000 ac/ft),
YUCCA [GVID] (4000 ac/ft)

2007 - 2107

PLATE 6



Legend

- G.V.I.D. Wells
- Valley Pioneer Water Company Wells
- Rhodes Golden Valley South Wells
- I - 40 Corridor Wells
- Yucca (theoretical) Wells
- Hydrologic (Model) Boundaries
- Highways

N

0 1 2 3 4

Scale, miles

GOLDEN VALLEY IMPROVEMENT DISTRICT

WATER LEVEL DECLINES IN 100 YEARS

WHEN T = 46,000 gpd/ft and SY = .07

COMMITTED DEMAND:

GVID (1,400 ac/ft)
VALLEY PIONEER WATER COMPANY (2,811 ac/ft)
MINE CALL (3,000 ac/ft)

REQUESTED DEMAND:

RHODES GOLDEN VALLEY SOUTH (9,000 ac/ft),
YUCCA [GVID] (6000 ac/ft)

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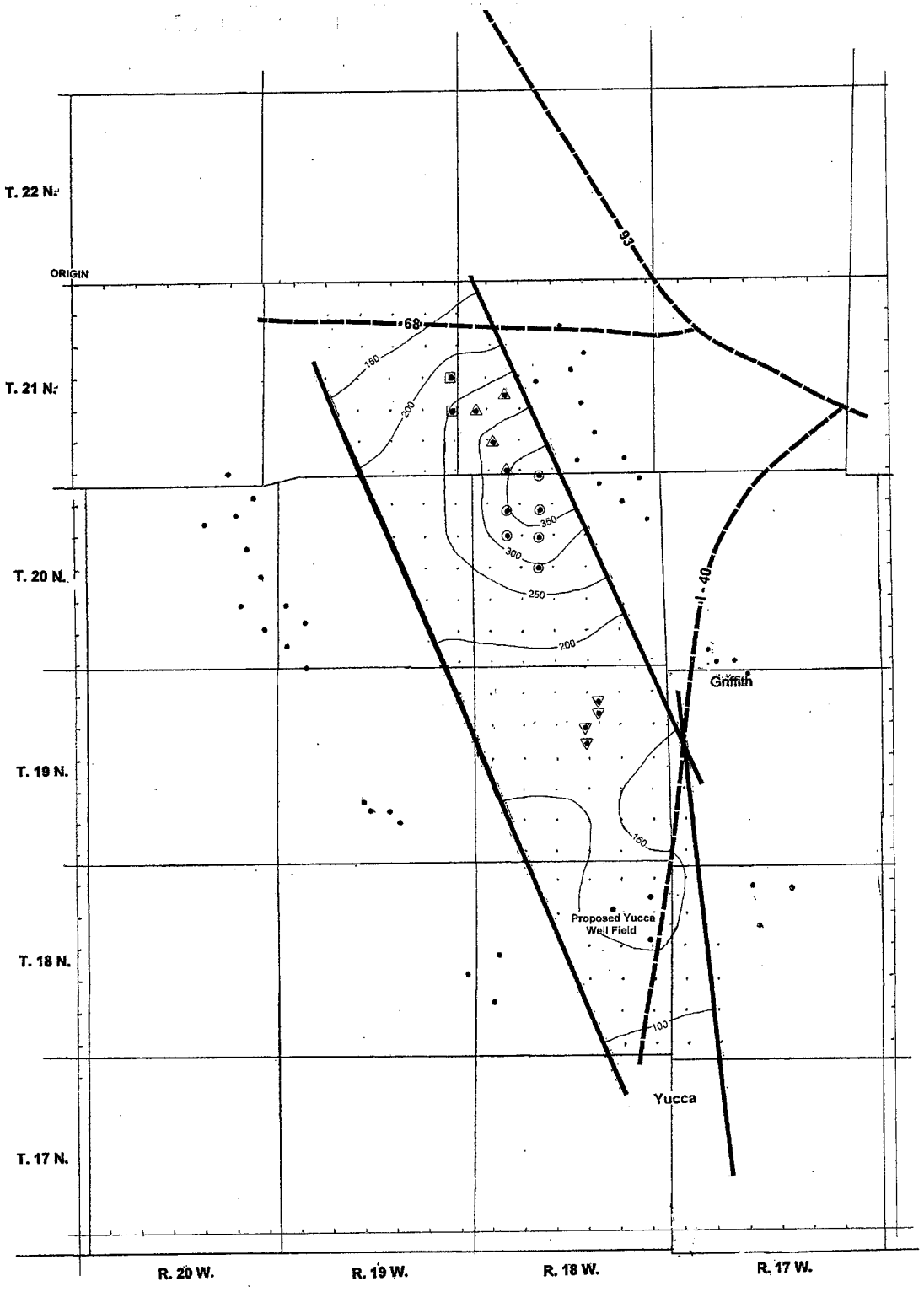
PLATE 7



Legend

- G.V.I.D. Wells
- Valley Pioneer Water Company Wells
- Rhodes Golden Valley South Wells
- I - 40 Corridor Wells
- Yucca (theoretical) Wells
- Hydrologic (Model) Boundaries
- Highways

N

0 1 2 3 4

Scale, miles

GOLDEN VALLEY IMPROVEMENT DISTRICT

WATER LEVEL DECLINES IN 100 YEARS

WHEN T = 46,000 gpd/ft and SY = .09

COMMITTED DEMAND:

GVID (1,400 ac/ft)
VALLEY PIONEER WATER COMPANY (2,811 ac/ft)
MINE CALL (3,000 ac/ft)

REQUESTED DEMAND:

RHODES GOLDEN VALLEY SOUTH (9,000 ac/ft),
YUCCA [GVID] (6000 ac/ft)

2007 - 2107

PLATE 8

2 million gallons per day for January, February and March.

The 35 year usage of 83,894 acre feet was then spread over the 100 year period of the simulated withdrawal yielding 839 ac/ft/yr.

The total I-40 Corridor well field then had a projected withdrawal of 1,239 acre feet per year.

The total volume of withdrawal was then apportioned to the number of wells operated in each entity.

Simulated Withdrawal from Basin

Withdrawal of ground water from the alluvial basin, used in the simulation model, was based on the complete build out as of January 1, 2007. The volume of withdrawal was the volume allocated by some form of an adequate water supply designation by the ADWR, plus the projected demand of the I-40 Industrial Corridor near Griffith and the 6,000 acre feet per year requested by virtue of this report and application.

The location of wells, ADWR I.D. Number and the committed volume of withdrawal, as of October 2006, from each well used in model are:

Present Designations or Demands:

Golden Valley Improvement District		1,400 ac/ft/yr
B(21-19)13ddd	55-530666	624,960 gpd
B(21-19)25aaa	55-530665	624,960 gpd
Valley Pioneer Water Company, including the Mine call		5,810 ac/ft/yr NO INFO
B(21-18)20dbb	55-623084	1,296,631 gpd
B(21-18)30bba	55-623082	1,296,631 gpd
B(21-18)32bbb	55-623083	1,296,631 gpd
B(21-18)32dcc	55-623081	1,296,631 gpd
I-40 Industrial Corridor	(100 year basis)	1,239 ac/ft/yr
B(19-18)15acc	55-574436	276,527 gpd
B(19-18)10cdd	55-571367 571357	276,527 gpd
B(19-18)10aaa	55-580149	276,527 gpd
B(19-18)10daa	55-574434	276,527 gpd
Golden Valley 5800		9,000 ac/ft/yr
B(20-18)4aaa		1,339,114 gpd
B(20-18)8bbb		1,339,114 gpd
B(20-18)8ccc		1,339,114 gpd

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Prepared for:

RHODES HOMES – ARIZONA LLC

[redacted]

23-401823.0000
GOLDEN VALLEY 5800

Prepared by:

ERROL L. MONTGOMERY & ASSOCIATES, INC.
CONSULTANTS IN HYDROGEOLOGY

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ERROL L. MONTGOMERY & ASSOCIATES, INC.

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Prepared for:
RHODES HOMES – ARIZONA LLC

SUMMARY AND CONCLUSIONS

The following summary and conclusions are based on compilation and review of hydrogeologic data for the study area and development and testing of an analytical model. Projections of 100-year impacts from pumping to supply the proposed development at the Golden Valley South Master Planned Community (the "Property") indicate the availability of 15,000 acre-feet per year (AF/yr) of good quality groundwater, which exceeds the projected water demand for the proposed development.

1. The parcels comprising the proposed development at Golden Valley South are identified as the "Property", and are located in a northern part of Sacramento Valley known as Golden Valley. The Property includes approximately 5,800 acres south of State Highway 68, west of Interstate Highway 40, and north of U.S. Highway 66 **(Figure 1)**. The proposed development is shown on the preliminary plat in

Attachment 2 of the Application and includes presently undeveloped desert land located in parts of 9 sections of land south from Shinarump Road (Sections 2, 3, 4, 8, 9, 10, 11, 14, and 16, Township 20 North, Range 18 West), and a quarter section of land north from Shinarump Road (southwest quarter of Section 34, Township 21 North, Range 18 West). Title reports demonstrating property ownership are given in Attachment 4 of the Application.

2. The Sacramento basin is a graben developed between the major, gently east-dipping Mockingbird Mine fault on the west and the west-dipping Cerbat Mountains fault on the east. The basin is filled with a thick sequence of alluvial deposits of Tertiary to Quaternary age that overlies fractured granitic, metamorphic, and volcanic bedrock units, and is interbedded with younger volcanic rocks at some locations. The bedrock units form the basal and lateral boundaries of the basin and yield small quantities of groundwater to wells, except where abundantly fractured. The basin-fill alluvial deposits comprise the principal groundwater aquifer; thickness of these deposits ranges from a featheredge at the mountain fronts to possibly more than 4,000 feet in the north part of the basin. The volume of groundwater in storage in the principal Sacramento Valley aquifer system far exceeds the annual volume of recharge and discharge of groundwater in the basin.

3. The alluvial basin-fill deposits in Sacramento Valley have been divided into three major units: younger alluvium; intermediate alluvium; and older alluvium (Gillespie and Bentley, 1971). The older alluvium unit is the principal aquifer for virtually all of the existing production water wells in the non-bedrock areas of Sacramento

Valley. The lower part of the unit lies below groundwater table and reported yield to wells ranges from a few gallons per minute (gpm) to more than 2,000 gpm; most reported yields are small due chiefly to the pump capacity selected for domestic or stock use and are not representative for production capacity of the unit. At well GV-1 [B(21-18)34dba], located immediately north of the Property **(Figure 1)**, depth to non-pumping groundwater level in the older alluvium unit was about 765 feet below land surface (bls) and sustainable yield of the well exceeded the maximum capacity of the test pump, which was about 2,500 gpm. Well records and geophysical data for the basin demonstrate that the principal aquifer in Sacramento Valley is extensive, thick, and contiguous throughout most of the basin, and provides a good source of adequate groundwater supply to the proposed Rhodes Homes development. Data indicate that depth to bedrock and thickness of the older alluvium unit increase from east to west across the Property and are maximum near the west boundary of the Property.

4. Groundwater in the older alluvium unit in the north part of Sacramento Valley generally moves from north to south, as shown on **Figure 1**, in the same direction as ephemeral surface water flow in Sacramento Wash. Groundwater and surface water flow exits the basin to the Colorado River valley near Topock, Arizona; groundwater also leaves the basin by pumping from wells. Altitude of groundwater level in spring 1990 ranged from 1,800 feet above mean sea level (msl) north of State Highway 68 to 1,500 feet msl at Yucca (Rascona, 1991). Average hydraulic gradient of groundwater movement across the Property at that time was about 0.002, or 10.4 feet per mile. Altitude of groundwater level measured in the older

alluvium unit was about 1,794 feet msl in June 2005 at well GV-1. Results of drilling for well GV-1 suggest that unconfined aquifer conditions occur in the Property area.

5. The current average depth to groundwater at the Property is estimated to be about 755 feet bls. Therefore, it is assumed that the available groundwater level drawdown above the 1,200-foot Arizona Department of Water Resources (ADWR) water adequacy criterion is 445 feet.

6. Results of laboratory chemical analysis and measurements of field water quality parameters for depth-specific samples and a composite well head sample obtained from Rhodes Homes well GV-1 [B(21-18)34dba] are summarized in **Table 2**. Results indicate that, although elevated concentrations of arsenic were detected in the groundwater sample obtained in the depth interval from 1,160 to 1,180 feet bls during pilot borehole testing, chemical quality of the composite well head sample obtained from the completed well at the end of the 24-hour pumping test is excellent and meets all requirements for a new source of public water supply as defined by Arizona Department of Environmental Quality (ADEQ).

7. Records for 440 wells within the study area were compiled from the ADWR "55" well registry, "35" well registry, and Groundwater Site Inventory databases **(Table 1)**. Historic pumping from wells in the study area is poorly documented, except for the Griffith Energy power plant wells, public water supply wells for Valley Pioneer's Water Company and Golden Valley County Improvement District No. 1 (GVCID), and anecdotal information for past use of the Mineral Park

wells. Records are poor for pumping for other domestic, industrial, irrigation, stock, and other small capacity uses.

8. Based on the current groundwater withdrawals at the large production wells in the area versus past withdrawals, it was considered appropriate to add a simulated regional decline of 1 foot per year (ft/yr) to the projected drawdown impact for the model to represent future pumping from active wells in the area. This 1 ft/yr regional decline is designed to simulate both the ongoing current demand of the area and increased future pumpage for Pioneer's Valley Water Company for additional committed demand they will likely serve in the future. Many of the pre-platted lots in Golden Valley lie within the service area for Valley Pioneer's Water Company or GVCID.

9. According to the Golden Valley Area Plan (Mohave County, 2002), there are several areas of Golden Valley South that have pre-1965 platted subdivisions. The purpose and intent of the GVCID is to provide future water and road improvements to those subdivisions through their current designation of water adequacy. It is reasonable to assume that the current and committed demand within the area of Golden Valley 5800 parcel, owned by Rhodes Homes, is sufficiently simulated by a 1 ft/yr ongoing regional decline rate over 100 years.

10. Based on pumping test data for wells in the Property area, the geometric mean hydraulic conductivity for the principal aquifer is calculated to be about 100 gallons per day per square foot (gpd/ft^2). Based on data obtained for well GV-1 and on geophysical data for the Property area, average saturated thickness of the aquifer at the

Property area is estimated to be more than 750 feet. To provide a conservatively small estimate of saturated aquifer thickness for modeling purposes, a value of 550 feet was used. Based on this information, an average aquifer transmissivity of 55,000 gallons per day per foot width of aquifer (gpd/ft) was used to simulate impacts of pumping for the model.

11. Gillespie and Bentley (1971) estimated that specific yield of the principal aquifer in Sacramento Valley ranges from 0.05 to 0.10. Results of drilling for well GV-1 suggest that unconfined aquifer conditions occur in the Property area. Therefore, a specific yield of 0.07 was used to simulate impacts of proposed pumping at the Property for the model.

12. Projected water demands were estimated for the proposed development based on the projected number of residential units and acreages for other land uses identified by Rhodes Homes. Types of residential lots include only single family; residential water demands include interior and exterior uses. Other water demands include: interior and exterior demands for commercial property and schools, and landscaping demands for right-of-ways, easements, and parks. In addition, water demands for construction water and for lost and unaccounted for water were included. The projected total water demand following build out is estimated to be about 14,714 AF/yr.

13. Projections of 100-year drawdown resulting from estimated groundwater pumping for water supply at the Property were made using the computer software "THWELLS" (van der Heijde, 1996). Based on depth to bedrock contours, groundwater level contours,

regional gravity survey data, and records for wells in the basin, two hydrologic barrier boundaries were simulated to represent the basin bounding faults along the east and west margins of the basin floor **(Figures 1 and 5)**. In addition, although available data do not support the existence of a hydrologic barrier boundary between the Sacramento and Detrital Valleys, such a boundary was added to the model to address concerns voiced by ADWR staff at a preliminary project meeting held on June 7, 2005.

14. **Table D-1 and Figure 5** show the simulated drawdown caused solely by the proposed pumping at the property; the regional groundwater level decline of 1 ft/yr (100 feet over 100 years of pumping) must be added to the drawdown shown. Maximum simulated groundwater level drawdown from all sources of pumping, including the regional groundwater level decline, is about 399 feet at Pumping Well 5 **(Table D-1)**, which is the sum of the simulated drawdown due to pumping at the property (299 feet) plus 100 feet of regional groundwater level decline. Therefore, the resulting maximum depth to water after 100 years at Pumping Well 5 is projected to be about 1,154 feet bls, which is the average current depth to groundwater at the Property of 755 feet bls plus the simulated drawdown of 399 feet.

15. Projected 100-year impacts of pumping for water supply for the proposed development indicate that less than 300 feet of additional drawdown will be required to meet the needs of the development, and sufficient groundwater is available to serve the development and meet all ADWR requirements.

ERROL L. MONTGOMERY & ASSOCIATES, INC.

July 2005
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Prepared for:
RHODES HOMES – ARIZONA LLC

INTRODUCTION

On behalf of RHODES HOMES – ARIZONA LLC ("Rhodes Homes"), Errol L. Montgomery & Associates, Inc. (M&A) has prepared this report to document results of review and analysis of hydrogeologic information for the vicinity of the proposed development identified as the Golden Valley South Master Planned Community in Mohave County, Arizona. The proposed development is referred to as the Rhodes Golden Valley 5800 site in some previous documents. The purpose of this review and analysis is to evaluate the potential for development of a 100-year groundwater supply to serve the proposed Golden Valley South development. This report includes a summary of available hydrogeologic data, calculation of water demands for the development based on projected land-use information provided by Rhodes Homes, development of an analytical model for the study area, and use of the model to project impacts of groundwater pumping for the 100-year water supply for the

proposed development. This report comprises Attachment 5 of the Application for Analysis of Water Adequacy being submitted to Arizona Department of Water Resources (ADWR).

DESCRIPTION OF STUDY AREA

The study area is located in the Mohave Desert, which is a transitional area separating the Great Basin Desert to the north and the Sonoran Desert to the south (Rascona, 1991). **Figure 1** is a location map for the study area. The parcels comprising the proposed Golden Valley South Master Planned Community are identified as the "Property", and are located in a northern part of Sacramento Valley known as Golden Valley. The Property includes approximately 5,800 acres (Stanley Consultants Inc., 2005) south of State Highway 68, west of Interstate Highway 40, and north of U.S. Highway 66 **(Figure 1)**. Title reports demonstrating property ownership are given in Attachment 4 of the Application.

The proposed development is shown on the preliminary plat in Attachment 2 of the Application and includes presently undeveloped desert land located in parts of 9 sections of land south from Shinarump Road (Sections 2, 3, 4, 8, 9, 10, 11, 14, and 16, Township 20 North, Range 18 West), and a quarter section of land north from Shinarump Road (southwest quarter of Section 34, Township 21 North, Range 18 West). This report describes water demands and impacts from development of the parcels currently owned by Rhodes Homes. Hydrogeologic conditions are summarized for the area shown on **Figure 1**, which is defined by the basin boundary on the north, east, and west, and by an arbitrary east-west boundary located south from Yucca, Arizona, approximately coinciding with the south boundary of Township 17 North. The study area comprises the entire northern part of Sacramento Valley.

HYDROGEOLOGIC CONDITIONS

Sacramento Valley has a semi-arid climate characterized by hot summers and mild winters; average annual precipitation ranges from about 7.6 inches at Yucca, in the south part of the study area, to about 10.5 inches at Kingman, northeast from the Property (Western Regional Climate Center, 2005). Streams in Sacramento Valley are generally ephemeral and flow only in direct response to storm water runoff events; therefore, groundwater is the only reliable source of water. The valley floor in the north part of Sacramento Valley consists of gently sloping, coalescing alluvial fans that extend from the mountain fronts on the west and east margins of the elongate basin and meet along the Sacramento Wash channel, which flows south through the basin and is tributary to the Colorado River. Sacramento Wash flows along the west boundary of the Property. The valley floor in the north part of Sacramento Valley slopes southward from an altitude of about 3,420 feet above mean sea level (msl) at the topographic divide with Detrital Valley about 1.5 miles southwest from Grasshopper Junction to about 1,700 feet msl near Yucca, Arizona. Maximum altitudes in the basin range from 5,216 feet msl near Mount Nutt in the Black Mountains on the west to 8,417 feet msl at Hualapai Peak in the Hualapai Mountains on the east. Groundwater and surface water flow exits the basin to the Colorado River valley near Topock, Arizona; altitude of land surface at Topock is about 460 feet msl. Groundwater also leaves the basin by pumping from wells.

A literature search was conducted to obtain published reports for the area that contain relevant hydrogeologic information. Sources of hydrogeologic information used for this study include publications and data files of the U.S. Geological Survey (USGS), ADWR, the Arizona Geological Survey, the Nevada Bureau of Mines and Geology, the Utah Geological Association, universities, and

private consultants. In addition, production water well GV-1 (ADWR registration number 55-901789) was constructed and tested for Rhodes Homes one-half mile north of the Property at state cadastral location (B-21-18)34dba. Data obtained from these sources include: 1) well construction details; 2) reported well pumping rates; 3) groundwater level data; 4) groundwater quality data; 5) lithologic, physical, and structural characteristics for geologic units; and 6) aquifer parameters and pumping test data.

An inventory of well records for the study area shown on **Figure 1** is given in **Table 1**. To focus on the aquifers in the study area that are important to water supply for the Property, **Table 1 and Figure 1** exclude wells located in the bedrock areas shown on **Figure 1**. The well numbering system for the State of Arizona is described in **Appendix A.** A lithologic log for new production water well GV-1 is given in **Appendix B.**

PREVIOUS INVESTIGATIONS

Literature reviewed and used for preparation of this summary hydrogeologic report is listed in the References Cited section. Previous investigations by Richard and others (2000) document geology of the mountain ranges that bound the groundwater basin in which the Property lies. Data for the groundwater system and hydrogeologic conditions beneath the floor of Sacramento Valley are available from results of drilling and testing selected wells in the basin. For the Property area, lithologic logs and pumping test results are available for deep wells constructed for the Mineral Park mining operations (Gillespie and Bentley, 1971), Golden Valley County Improvement District (GVCID) No. 1 (Manera, Inc., 1991), Griffith Energy, L.L.C. (Manera, Inc., 1999), and Rhodes Homes (this report). Gillespie and

others (1966), Gillespie and Bentley (1971), and Rascona (1991) provide groundwater basic data and analyses of the hydrogeologic system in the Property area.

A key aspect of the hydrogeologic conditions in Sacramento Valley is the complex structural geology of the region, which affects the geometry, boundaries, and lithology of the groundwater aquifers. Numerous studies have been published for the geologic evolution of the northern Colorado River extensional corridor in northwest Arizona and southern Nevada and the transition from the Colorado Plateau to the Basin and Range Physiographic Province. Faulds and others (2001) provide a particularly useful compilation and synthesis of the regional structural and geologic conditions that affect the Sacramento Valley groundwater system.

GEOLOGIC CONDITIONS

The Property is located in the north-central part of an elongate structural basin bounded on the east by the north-northwest-trending Cerbat Mountains and Hualapai Mountains, and on the west by the north-northwest-trending Black Mountains **(Figure 1)**. The Sacramento groundwater basin is further bounded on the north by a groundwater and surface water divide with Detrital Valley and on the south by the Mohave and McCracken Mountains. South of the study area, the northern and southern parts of Sacramento Valley coalesce and both surface water and groundwater exit the basin westward toward the Colorado River near Topock, Arizona. The entire basin is about 70 miles long from north to south and is an average of about 20 miles wide from east to west; total area of the basin is about 1,500 square miles (Rascona, 1991). The study area is underlain by Quaternary and Tertiary alluvial sediments that were deposited in the structural basin, which

encompasses the main part of Sacramento Valley. Extent of the alluvial basin is generally defined by fault-block mountain ranges, characteristic of the Basin-and-Range physiographic province.

The mountain ranges are composed chiefly of uplifted Precambrian metamorphic and igneous rocks that have been intruded by younger igneous rocks. The Cerbat Mountains to the northeast and the Hualapai Mountains to the east are composed primarily of Precambrian granitic igneous rocks and gneiss with some schist (Gillespie and Bentley, 1971). The Black Mountains to the west are composed primarily of Tertiary, and Cretaceous (?) and Tertiary volcanic rocks with some Precambrian metamorphic rocks (Gillespie and Bentley, 1971). The older volcanic rocks consist of a thick sequence of andesite and latite flows and tuff beds, and form the main mass of the Black Mountains (Gillespie and Bentley, 1971). The younger volcanic rocks consist of basalt flows, basaltic andesite flows and tuff, and rhyolite tuff and ignimbrites; these rocks crop out over large areas near Kingman, where they are the principal aquifer for the Kingman well field, and in the Black Mountains (Gillespie and Bentley, 1971). The younger volcanic rocks are interbedded with the older alluvium in the basin-fill deposits. The mountain ranges and alluvial basin are associated with a complex structural history of extensional faulting that occurred chiefly between 15 and 6 million years ago (Anderson and others, 1992).

The Sacramento Valley groundwater basin is filled with a thick sequence of alluvial deposits of Tertiary to Quaternary age that overlies fractured granitic, metamorphic, and volcanic bedrock units, and is interbedded with younger volcanic rocks at some locations. The bedrock units form the basal and lateral boundaries of the basin and yield small quantities of groundwater to wells, except where abundantly fractured. The basin-fill alluvial deposits comprise the principal groundwater aquifer; thickness of these deposits ranges from a featheredge at the

mountain fronts to possibly more than 4,000 feet in the north part of the basin (Gillespie and Bentley, 1971). Depth to bedrock contours, as defined by Oppenheimer and Sumner (1980), are shown on **Figure 1** for the north part of the basin. The alluvial basin-fill deposits in Sacramento Valley have been divided into three major units: younger alluvium; intermediate alluvium; and older alluvium (Gillespie and Bentley, 1971).

Younger Alluvium

The younger alluvium of Holocene age consists of unconsolidated gravel, sand, silt, and clay deposited on alluvial slopes and flood plains and in stream channels (Wilson and Owen-Joyce, 1994). The deposits chiefly contain fragments of granite, schist, gneiss, and volcanic rocks and range in thickness from a few feet to as much as 50 feet (Gillespie and Bentley, 1971). Where penetrated by well GV-1 near the Property **(Figure 1)**, the lithologic log suggests that younger alluvium may have been penetrated from land surface to a depth of 40 feet below land surface (bls) based on grain size distribution **(Appendix B)**. This unit is important for conveying recharge of storm water runoff to deeper units along stream channels, but generally is not important as a source of groundwater for wells in Sacramento Valley, except where it may be saturated in mountain stream channels.

Intermediate Alluvium

The intermediate alluvium may be of Pleistocene and Tertiary age and is an extensive near-surface deposit underlying the valley floor (Gillespie and Bentley, 1971). The deposits chiefly contain weakly to moderately consolidated fragments of granite, schist, gneiss, and volcanic rocks and range in thickness from 200 to 500

feet (Gillespie and Bentley, 1971). Where penetrated by well GV-1 near the Property **(Figure 1)**, the lithologic log suggests that the intermediate alluvium may have been penetrated from 40 to 400 feet bls based on grain size distribution and lithification **(Appendix B)**. This unit is important for conveying recharge of storm water runoff to deeper units along stream channels and mountain fronts, but occurs chiefly above the groundwater table and, therefore, is generally not important as a source of groundwater for wells in Sacramento Valley.

Older Alluvium

The older alluvium of Tertiary age was deposited in alluvial fans that extend from the surrounding mountain ranges into the valley floor and consists of weakly to moderately consolidated gravel, sand, silt, and clay (Wilson and Owen-Joyce, 1994). The mineralogy and rock type of the older alluvium sands and gravels are representative of the source rocks in the surrounding mountains that have shed into the basin by erosive processes. Where penetrated by well GV-1 near the Property, this unit consists chiefly of gravel, sand, and clay interbedded with lava flow rock and some tuff **(Appendix B)**.

Granitic bedrock was encountered in well GV-1 at a depth of 1,550 feet bls; therefore, if the upper contact of the unit is at 400 feet bls, thickness of the unit is 1,150 feet at well GV-1. Geophysical data indicate that depth to bedrock and thickness of the unit increases from east to west across the Property (Gillespie and Bentley, 1971; Oppenheimer and Sumner, 1980). Depth to bedrock at well GV-1 (1,550 feet bls) is about one-half the depth projected by Oppenheimer and Sumner (1980) (nearly 3,200 feet bls) **(Figure 1)**; however, data for other deep wells, such as the Christmas Tree wells by Santa Claus [well (B-22-18)4bbb with total depth of 2,510 feet bls and well (B-22-18)5dac with total depth of 2,437 feet bls **(Table 1)**] are consistent with the depth to bedrock contours of Oppenheimer and Sumner (1980).

A seismic refraction survey was conducted under USGS direction to measure thickness of the basin-fill alluvium along an east-west profile at the south boundary of the Property (Gillespie and Bentley, 1971). The USGS interpreted results of this survey to indicate that depth to bedrock increases from the east and west margins of the basin floor to a maximum depth of 4,400 feet bls about 1 mile due south of the westernmost boundary of the Property at the southwest corner of Section 8, Township 20 North, Range 18 West (Gillespie and Bentley, 1971). Depth to bedrock interpreted by USGS where well GV-1 is projected south orthogonally to the seismic profile is about 1,650 feet bls, which correlates well with the depth to bedrock at well GV-1 (1,550 feet bls). These relations indicate that depth to bedrock and thickness of the older alluvium unit increase from east to west across the Property and are maximum near the west boundary of the Property, as shown on **Figure 1**.

The older alluvium unit is the principal aquifer for virtually all of the existing production water wells in the non-bedrock areas of Sacramento Valley. The lower part of the unit lies below groundwater table and reported yield to wells ranges from a few gallons per minute (gpm) to more than 2,000 gpm **(Table 1)**; most reported yields are small due chiefly to the pump capacity selected for domestic or stock use and are not representative for production capacity of the unit. At well GV-1, located immediately north from the Property **(Figure 1)**, depth to non-pumping groundwater level in the older alluvium unit was about 765 feet bls and sustainable yield of the well exceeded the maximum capacity of the test pump, which was about 2,500 gpm.

GEOLOGIC STRUCTURAL FEATURES

Sacramento Valley lies in the northern Colorado River extensional corridor and the transition area from the Colorado Plateau to the Basin and Range

Physiographic Province. Extreme Cenozoic structural extension occurred in this region and was accompanied by extensive systems of high and low angle normal faults, listric normal faults, thrust faults, detachment faults, and strike-slip faults. The structural features of Sacramento Valley are classified in the Whipple domain, which comprises a system of east-dipping normal faults and west-tilted fault blocks (Faulds and others, 2001). This structural system is believed to be associated with abundant fracturing of bedrock and overlying lithified rock units.

The Sacramento basin is a graben developed between the major, gently east-dipping Mockingbird Mine fault on the west and the west-dipping Cerbat Mountains fault on the east (Faulds and others, 2001). These faults are associated with the model boundaries described later in this report.

Inspection of residual Bouguer anomaly gravity data for Sacramento Valley indicates that the low-gravity structural trough that is the basin graben extends north and south from the Rhodes Homes Property. These data, together with other well data and geophysical data for the basin, demonstrate that the principal aquifer in Sacramento Valley is extensive, thick, and contiguous throughout most of the basin, and provides a good source of adequate groundwater supply to the proposed Rhodes Homes development.

ADWR has raised the concern that an aquifer boundary may occur at the surface water divide between Sacramento and Detrital Valleys. The deep wells nearest to that area are the Christmas Tree wells near the town of Santa Claus **(Table 1; Figure 1)**, and include: Christmas Tree well no. 2 [(B-23-18)33cbc2], with a total depth of 2,132 feet bls and depth to water of 1,236 feet bls; Christmas Tree well no. 3 [(B-22-18)4bbb], with a total depth of 2,510 feet bls and depth to water of 1,207 feet bls; and Christmas Tree well no. 4 [(B-22-18)5dac], with a total depth of 2,437 feet bls and depth to water of 1,194 feet bls. The logs for these wells indicate

that bedrock was not encountered; these wells are within 4 miles of the surface water divide **(Figure 1)**. These data indicate there is a substantial saturated thickness of the principal aquifer near the divide and, in the absence of any recognized major fault crossing the basin between the wells and the divide, suggest that an aquifer boundary does not occur between the two basins.

AQUIFER HYDRAULIC PROPERTIES

Important aquifer hydraulic properties that control rate of groundwater movement and amount of groundwater storage in the aquifer include transmissivity, hydraulic conductivity, and specific yield or storage coefficient. Transmissivity is defined as the rate of groundwater movement under a 1:1 hydraulic gradient through a vertical section of an aquifer 1 foot wide and extending the full saturated thickness of the aquifer (Theis, 1935). Units for transmissivity are gallons per day per foot width of aquifer (gpd/ft). Transmissivity is a measure of the ability of an aquifer to transmit groundwater and is equal to the product of hydraulic conductivity and saturated thickness of the aquifer. Hydraulic conductivity is defined as the rate of groundwater movement, under a 1:1 hydraulic gradient, through a unit area of aquifer material (Heath, 1989). Hydraulic conductivity has units of gallons per day per square foot (gpd/ft^2). Hydraulic conductivity is also commonly expressed in units of feet per day (ft/day), which is gpd/ft^2 divided by 7.48 gallons per cubic foot. Specific yield is defined as the volume of water that would drain from a unit volume of aquifer material and is dimensionless; this term is applied to unconfined aquifers. Storage coefficient is defined as the volume of water released from storage in a unit prism of an aquifer when the hydraulic head is lowered a unit distance; this term is applied to confined aquifers (Heath, 1989).

A search of ADWR records, USGS publications, and consultants reports yielded little pumping test information for wells in the Sacramento Valley groundwater basin. However, the available data are for wells located at or near the Rhodes Homes Property. Construction details for wells in the ADWR well records for Sacramento are summarized in **Table 1**. In addition, a pumping test was conducted by M&A for the principal aquifer at new production water well GV-1, located immediately north from the Property **(Figure 1)**.

Well GV-1 Pumping Tests

From June 2 to June 12, 2005, a step-rate pumping test and a constant-rate aquifer test were conducted at well GV-1. During the tests, the following parameters were monitored: depth to water level; instantaneous discharge rate; total volume of groundwater pumped; discharge pressure; and water quality parameters. Discharge rate was monitored using a mechanical flow meter and an orifice plate and manometer. Depth to groundwater level in the pumped well was monitored using both an electronic transducer connected to a datalogger and an electric water level sounder. Depth to groundwater level monitored using the transducer was calibrated using an electrical sounder before and after testing operations. Drawdown measured using the transducers was generally the same as drawdown measured using the sounder. Transmissivity was calculated from aquifer test results using the Cooper-Jacob graphical method (Cooper and Jacob, 1946).

On June 2 and 9, 2005, a step-rate pumping test was conducted at well GV-1 to select a sustainable pumping rate for the subsequent 24-hour constant-rate aquifer test and to evaluate well efficiency. During the step-rate test, the well was pumped for five periods (steps) of 120 minutes. During each step, a constant discharge rate was maintained. However, near the end of the third step conducted on June 2, pumping was stopped at the request of Mohave County until a culvert

could be installed where the discharge water crossed Shinarump Road. The step test was resumed on June 9 after the culvert was installed and the third step was repeated. Discharge rate was increased for each subsequent step. At the end of the step-rate test, the pump was shut off and groundwater level was allowed to recover before conducting the aquifer test.

On June 10, 2005, a constant-rate aquifer test was conducted at well GV-1. Duration of the pumping period was 24 hours. A nearly constant discharge rate of about 2,020 gpm was maintained for the entire pumping period. All measurements for discharge rate were within 2 percent of the average pumping rate of 2,020 gpm. The pumping period was followed by a 24-hour recovery period. Results of the aquifer test are shown in **Figures 3 and 4**.

Pre-pumping depth to groundwater level was about 765 feet bls. Initial groundwater level drawdown was very rapid due to removal of water from wellbore storage. Subsequently, depth to groundwater level changed very slowly. Maximum drawdown after 24 hours of pumping was about 112 feet. Specific capacity was 18 gpm/ft after 24 hours of pumping.

Transmissivity calculated using the aquifer test data ranged from 200,000 gpd/ft for the pumping period to 700,000 gpd/ft for the recovery period. The transmissivity calculated for the recovery period is not affected by well efficiency or borehole "skin effects" due to non-laminar flow near the wellbore and, therefore, is considered to be more representative for the principal aquifer at the GV-1 location. However, to provide conservative modeling results for impact of pumping at the Property, the transmissivity calculated for the pumping period was used for estimating an average transmissivity for the basin.

Parameters Used for Model

Available data for aquifer hydraulic parameters reported for pumping tests conducted for the principal aquifer in the north part of Sacramento Valley are summarized as follows:

WELL IDENTIFIER	WELL NAME	TEST DATE	TRANSMISSIVITY (gpd/ft)	AVERAGE HYDRAULIC CONDUCTIVITY (gpd/ft^2)	REFERENCE
B(20-18)4 bbb	MP-5	Pre-1971	46,000	70	Gillespie and Bentley (1971)
B(21-18)32 dcc	MP-1	Pre-1971	35,000	70	Gillespie and Bentley (1971)
(B-21-18) 34dba	GV-1	2005	200,000	435	Montgomery & Associates
(B-19-18) 10cdd	#1	1999	76,000	115	Manera, Inc. (1999)
(B-21-19) 13ddd	GVCID-1 #1	1991	17,000	42	Manera, Inc. (1991)
(B-21-19) 25aaa	GVCID-1 #2	1991	37,000	106	Manera, Inc. (1991)

Based on these data, the geometric mean hydraulic conductivity is about 100 gpd/ft^2. Based on data obtained for well GV-1 and on geophysical data for the Property area, average saturated thickness of the aquifer at the Property area is estimated to be more than 750 feet. To provide a conservatively small estimate of saturated aquifer thickness for modeling purposes, a value of 550 feet was used. Based on this information, an average aquifer transmissivity of 55,000 gpd/ft was used to simulate impacts of pumping for the model.

Gillespie and Bentley (1971) estimated that specific yield of the principal aquifer in Sacramento Valley ranges from 0.05 to 0.10. Results of drilling for well GV-1 suggest that unconfined aquifer conditions occur in the Property area.

Therefore, a specific yield of 0.07 was used to simulate impacts of proposed pumping at the Property for the model.

OCCURRENCE AND MOVEMENT OF GROUNDWATER

Groundwater in the older alluvium unit in the north part of Sacramento Valley generally moves from north to south, as shown on **Figure 1**, in the same direction as ephemeral surface water flow in Sacramento Wash (Rascona, 1991). Altitude of groundwater level in spring 1990 ranged from 1,800 feet msl north of State Highway 68 to 1,500 feet msl at Yucca (Rascona, 1991). Average hydraulic gradient of groundwater movement across the Property at that time was about 0.002, or 10.4 feet per mile. Altitude of groundwater level measured in the older alluvium unit was about 1,794 feet msl in June 2005 at well GV-1 [(B-21-18)34dba], located immediately north of the Property **(Table 1)**.

The volume of groundwater in storage in the principal Sacramento Valley aquifer system far exceeds the annual volume of recharge and discharge of groundwater in the basin. Estimates for groundwater in storage and for recharge to the aquifer have been reported by several authors and range widely. These topics are not addressed herein because it is assumed that no recharge occurs for projections of drawdown impact from proposed pumping at the Rhodes Homes Property. This assumption is commonly made for water adequacy studies to provide conservatively large projections of impact.

DEPTH TO GROUNDWATER LEVEL

In November 1995, depth to groundwater in the principal aquifer in Sacramento Valley ranged from about 300 feet bls at Yucca [(B-17-18)12bca] in the south part of the basin to about 1,235 feet bls near Santa Claus [(B-23-18)33cbc2] in the north part of the basin **(Table 1)**.

Depth to groundwater in the principal aquifer in June 2005 at well GV-1 [(B-21-18)34dba], located immediately north of the Property, was 765 feet bls **(Table 1)**. Depth to groundwater in August 2004 at well (B-20-18)22aac, located immediately south of the Property, was about 744 feet bls. The current average depth to groundwater at the Property is estimated to be about 755 feet bls. Therefore, it is assumed that the available groundwater level drawdown above the 1,200-foot ADWR water adequacy criterion is 445 feet.

EXISTING WELLS AND CURRENT GROUNDWATER PUMPING

Records for 440 wells within the study area were compiled from the ADWR "55" well registry, "35" well registry, and Groundwater Site Inventory databases, and are summarized in **Table 1**. Wells within the study area are shown on **Figure 1**.

Reported pumping rates for wells in the Property area range from a few gpm to more than 2,000 gpm **(Table 1)**. Historic pumping from wells in the study area is poorly documented, except for the Griffith Energy power plant wells, public water supply wells for Valley Pioneer's Water Company and Golden Valley County Improvement District No. 1 (GVCID), and anecdotal information for past use of the

Mineral Park wells. Records are poor for pumping for other domestic, industrial, irrigation, stock, and other small capacity uses.

CHANGE IN GROUNDWATER LEVELS

A hydrograph of groundwater level altitude for selected wells across the north part of Sacramento Valley is shown on **Figure 2.** Groundwater levels during the last 40 years have not changed substantially for wells near or at the Property. Prior to 1990, groundwater pumped from the Duval/Cypress production wells to supply the Mineral Park Mine operations comprised the majority of groundwater withdrawals from the basin. After 1990, these wells were transferred to Valley Pioneer's Water Company and are presently used at a fraction of the rate used for the mine.

Three wells shown on **Figure 2** that are pertinent for evaluating rate of groundwater level change at the Property are:

1. well (B-20-18)22aac, located immediately south of the Property **(Figure 1)**;
2. Mineral Park Well No. 5 [(B-20-18)4bbb], located in the north part of the Property; and
3. Mineral Park Well No. 2 [(B-21-18)30abb], located about 3 miles northwest of the Property.

From 1965 to 1990, average rate of groundwater level ***decline*** was 0.29 feet per year (ft/yr) at well (B-20-18)22aac, 0.51 ft/yr at well (B-20-18)4bbb, and 1.15 ft/yr at well (B-21-18)30abb. From 1990 to 1995, average rate of groundwater level ***rise***

was 0.06 feet per year (ft/yr) at well (B-20-18)22aac, 0.20 ft/yr at well (B-20-18)4bbb, and 3.16 ft/yr at well (B-21-18)30abb.

Based on the current groundwater withdrawals at the large production wells in the area versus past withdrawals, it was considered appropriate to add a simulated regional decline of 1 ft/yr to the projected drawdown impact for the model to represent future pumping from active wells in the area. This 1 ft/yr regional decline is designed to simulate both the ongoing current demand of the area and increased future pumpage for Pioneer's Valley Water Company for additional committed demand they will likely serve in the future. Many of the pre-platted lots in Golden Valley lie within the service area for Valley Pioneer's Water Company or GVCID.

COMMITTED DEMAND

According to the Golden Valley Area Plan (Mohave County, 2002), there are several areas of Golden Valley South that have pre-1965 platted subdivisions. The purpose and intent of the GVCID is to provide future water and road improvements to those subdivisions through their current designation of water adequacy. It is reasonable to assume that the current and committed demand within the area of Golden Valley 5800 parcel, owned by Rhodes Homes, is sufficiently simulated by a 1 ft/yr ongoing regional decline rate over 100 years.

GROUNDWATER QUALITY

Data obtained from the Arizona Department of Environmental Quality (ADEQ) 1999 baseline study of ambient groundwater quality in the Sacramento Valley basin (ADEQ, 2001) are summarized in **Appendix C**. Results indicate that groundwater quality in the central parts of the basin generally meets U.S. Environmental Protection Agency (EPA) primary maximum contaminant levels (MCLs) for drinking water (EPA, 2002). Groundwater samples from selected wells at the margins of the basin have been found to contain elevated concentrations of nitrate, gross alpha, fluoride, and/or total dissolved solids.

Results of laboratory chemical analysis and measurements of field water quality parameters for depth-specific samples and a composite well head sample obtained from Rhodes Homes well GV-1 [B(21-18)34dba] are summarized in **Table 2**. Results indicate that, although elevated concentrations of arsenic were detected in the groundwater sample obtained in the depth interval from 1,160 to 1,180 feet bls during pilot borehole testing, chemical quality of the composite well head sample obtained from the completed well at the end of the 24-hour pumping test is excellent and meets all requirements for a new source of public water supply as defined by ADEQ.

A search of Internet on-line data files for locations of WQARF and Superfund sites designated by ADEQ did not indicate the presence of contaminant sites in the study area.

COLORADO RIVER ACCOUNTING SURFACE

Wilson and Owen-Joyce (1994, p. v) define the "accounting surface" that is administered by the U.S. Bureau of Reclamation for the Colorado River corridor as follows:

> "The accounting surface represents the elevation and slope of the unconfined static water table in the river aquifer outside the flood plain and the reservoirs of the Colorado River that would exist if the river were the only source of water to the river aquifer. The accounting surface was generated by using profiles of the Colorado River and water-surface elevations of reservoirs, lakes, marshes, and drainage ditches."

Further, Wilson and Owen-Joyce (1994, p. 6) establishes the following criteria to determine if wells impact the Colorado River subflow:

> **Wells that impact the river subflow:** "Wells that have a static water-level elevation equal to or below the accounting surface are presumed to yield water that will be replaced by water from the river."
>
> **Wells that do not impact the river subflow:** "Wells that have a static water-level elevation above the accounting surface are presumed to yield water that will be replaced by water from precipitation and inflow from tributary valleys."

There are several factors that ensure production wells for the proposed Rhodes Homes development will not impact the river subflow by these criteria. The Property lies outside the accounting surface for Sacramento Valley. In addition, altitude of the groundwater table in the older alluvium unit measured in wells **(Table 1)** at or near the Property are more than 1,200 feet above the accounting surface, as demonstrated below:

CADASTRAL LOCATION	WELL NAME	WELL DEPTH (feet, bls)	LAND SURFACE ALTITUDE (feet, msl)	GROUNDWATER LEVEL			ACCOUNT -ING SURFACE ALTITUDE (feet, msl)	FEET ABOVE ACCOUNT -ING SURFACE
				DATE MEASURED	DEPTH (feet, bls)	ALTITUDE (feet, msl)		
(B-20-18) 22aac	---	779	2,495	8/18/2004	743.9	1,751	455	1,296
(B-20-18) 4bbb	MP-5	1,350	2,524	11/9/1995	748.6	1,775	455	1,320
(B-21-18) 34dba	GV-1	1,320	2,559	6/10/2005	764.71	1,794	455	1,339

Lastly, in order to obtain a statement of adequate water supply from ADWR, a development can not draw down the water level in the aquifer below a depth of 1,200 feet without a variance. The accounting surface is more than 2,000 feet below land surface at the Property. Therefore, wells used to withdraw groundwater under an ADWR statement of adequate water supply for the proposed development are not wells that would impact the Colorado River, according to criteria established by Wilson and Owen-Joyce (1994).

PROJECTED 100-YEAR WATER DEMAND

Projected water demands were estimated for the proposed development based on the projected number of residential units and acreages for other land uses identified by Rhodes Homes. Types of residential lots include only single family; residential water demands include interior and exterior uses. Other water demands include: interior and exterior demands for commercial property and schools, and landscaping demands for right-of-ways, easements, and parks. In addition, water demands for construction water and for lost and unaccounted for water were included. The projected total water demand following build out is estimated to be about 14,714 acre-feet per year (AF/yr). Details for the basis of the estimated water demand are included in Attachment 1 of the Application for Analysis of Adequate Water Supply.

PROJECTED 100-YEAR IMPACTS FROM GROUNDWATER PUMPING

Projections of 100-year drawdown resulting from estimated groundwater pumping for water supply at the Property were made using the computer software "THWELLS" (van der Heijde, 1996). This software solves the Theis equation to compute drawdown for up to 100 wells and uses spatially uniform values for aquifer parameters. A correction to the Theis equation was applied for simulation of unconfined aquifer conditions. Data used in the THWELLS model are discussed below and are summarized in tabular form in **Appendix D**. **Table D-1** gives the "x" and "y" model coordinates for pumping wells and image wells, and the pumping rate simulated at each well location. Locations for wells included in the simulation are shown on **Figure 5**; the well locations represent sites for pumping wells in the target aquifer system and sites for image wells representing the effects of assumed hydrologic barrier boundaries.

Based on data obtained for well GV-1 and on geophysical data for the Property area, average saturated thickness of the aquifer at the Property area is estimated to be more than 750 feet. To provide a conservatively small estimate of saturated aquifer thickness for modeling purposes, a value of 550 feet was used.

Model transmissivity was assigned a value of 55,000 gpd/ft to represent an average value for the study area for the 100-year projection. The 55,000 gpd/ft value is the product of the conservatively small average saturated aquifer thickness assigned for the Property and the geometric mean of hydraulic conductivities calculated from pumping test data for the Property area (100 gpd/ft^2).

Based on depth to bedrock contours, groundwater level contours, regional gravity survey data, and records for wells in the basin, two hydrologic barrier

boundaries were simulated to represent the basin bounding faults along the east and west margins of the basin floor **(Figures 1 and 5)**. In addition, although available data do not support the existence of a hydrologic barrier boundary between the Sacramento and Detrital Valleys, such a boundary was added to the model to address concerns voiced by ADWR staff at a preliminary project meeting held on June 7, 2005.

The current average depth to groundwater at the Property is estimated to be about 755 feet bls. Therefore, it is assumed that the available groundwater level drawdown above the 1,200-foot ADWR water adequacy criterion is 445 feet.

Based on the current groundwater withdrawals at the large production wells in the area versus past withdrawals and change in groundwater levels over the last 40 years, it was considered appropriate to add a simulated regional decline of 1 ft/yr to the projected drawdown impact for the model to represent future pumping from active wells in the area.

CONCEPTUAL MODEL

The hydrologic features and pumping regimens for the conceptual groundwater model are summarized as follows:

- Barrier boundaries were assumed to be located east, west, and north from the Property, representing barriers to groundwater flow along the Black Mountains on the west, the Cerbat and Hualapai Mountains on the east, and a bedrock high hypothesized by ADWR at the surface water divide between the Sacramento and Detrital Valleys. These boundaries define an elongated triangle encompassing the Property

area. Locations for the barrier boundaries are shown on **Figures 1 and 5.**

- Image wells were simulated on the opposite side of each barrier boundary.
- Saturated thickness of the aquifer was assumed to be 550 feet.
- Aquifer parameters: Transmissivity (T) = 55,000 gpd/ft
  Specific Yield (S_y) = 0.07
- 10 pumping wells were simulated on the Property; each well was assigned a continuous pumping rate of 930 gpm for a total demand of 15,000 AF/yr **(Figure 5; Table D-1 in Appendix D).**
- 30 image wells were simulated in the model, and were each assigned a pumping rate of 930 gpm to represent production pumping effects **(Figure 5; Table D-1 in Appendix D).**
- Total simulation time = 100 years
- A total of 100 feet of additional drawdown was added to model results to simulate a regional decline of 1 ft/yr.

PROJECTION OF 100-YEAR GROUNDWATER LEVEL DRAWDOWN

Results of model projections for a 100-year pumping period and a total pumping rate of 15,000 AF/yr are summarized as follows:

- Simulations were conducted to project groundwater level drawdown for 100 years of pumping. Three barrier boundaries were simulated. Recharge was not included in the model projection.

- Simulations were conducted for a 100-year period. Pumping rates were based on projected future pumping rates.

- **Table D-1 and Figure 5** show the simulated drawdown caused solely by the proposed pumping at the property; the regional groundwater level decline of 1 ft/yr (100 feet over 100 years of pumping) must be added to the drawdown shown. Maximum simulated groundwater level drawdown from all sources of pumping, including the regional groundwater level decline, is about 399 feet at Pumping Well 5 **(Table D-1)**, which is the sum of the simulated drawdown due to pumping at the property (299 feet) plus 100 feet of regional groundwater level decline. Therefore, the resulting maximum depth to water after 100 years at Pumping Well 5 is projected to be about 1,154 feet bls, which is the average current depth to groundwater at the Property of 755 feet bls plus the simulated drawdown of 399 feet.

- A hydrograph of projected groundwater level drawdown for the 100-year pumping period at the point of maximum drawdown in the well field is shown on **Figure 6**. This hydrograph does not account for regional groundwater level decline.

- Projected 100-year impacts of pumping for water supply for the proposed development indicate that less than 300 feet of additional drawdown will be required to meet the needs of the development, and sufficient groundwater is available to serve the development and meet all ADWR requirements.

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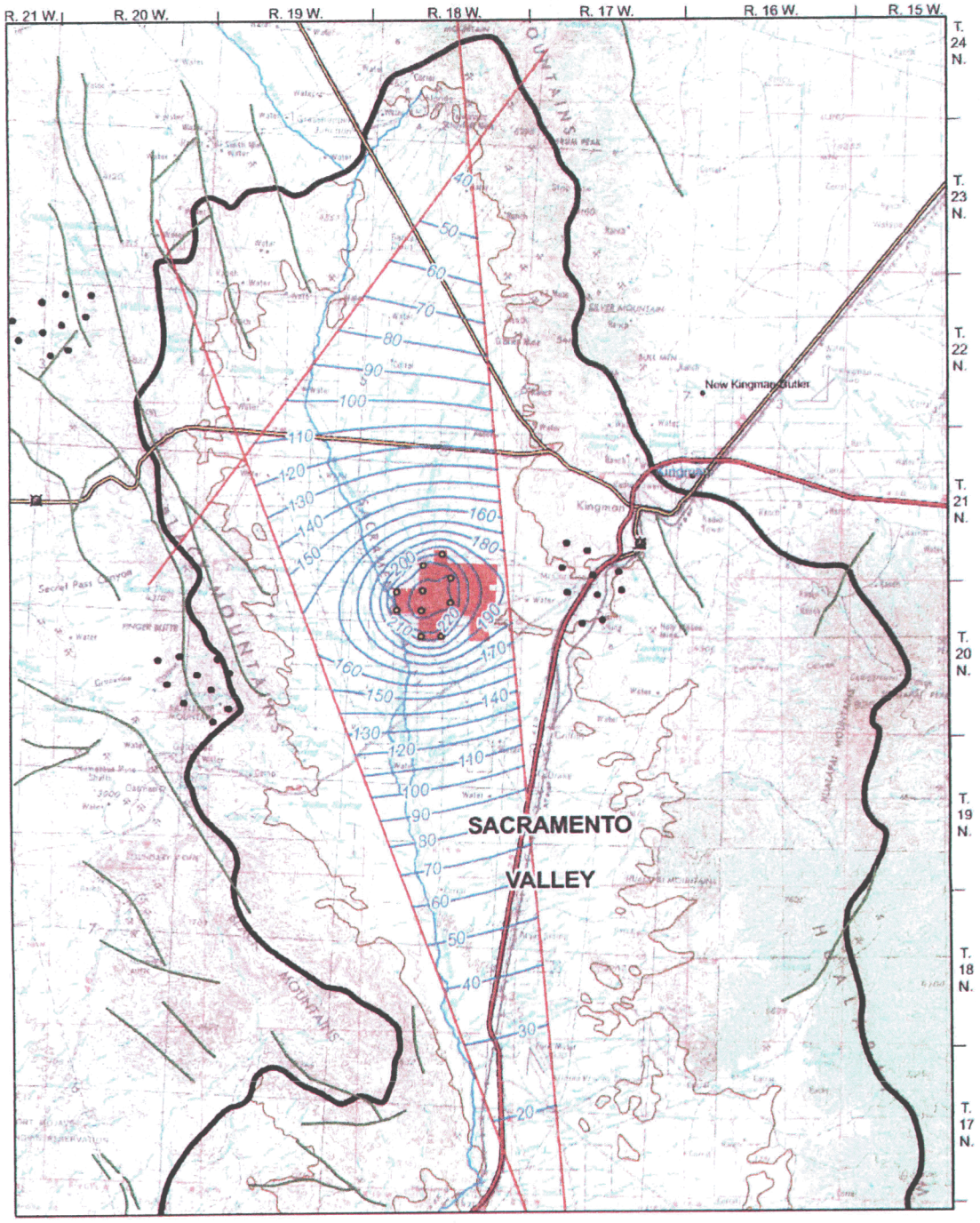

EXPLANATION

- Model Production Well
- Image Production Well
- Fault (Arizona Geological Survey Digital Information Series 08, Ver. 3.0)
- Bedrock Boundary (ADWR Hydrologic Map Series, Report No. 21, 1991)
- Boundary of Groundwater Basin (ADWR Hydrologic Map Series, Report No. 21, 1991)
- 100-Year Drawdown Contour, in feet: 15,000 Acre-Feet Per Year Pumped
- Hydrologic Model Boundary
- Golden Valley South Master Planned Community

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FIGURE 5. PROJECTED GROUNDWATER LEVEL DRAWDOWN RESULTING FROM PUMPING AT GOLDEN VALLEY SOUTH

GISDATA\Projects\440.21\SacramentoValleyBasin_model_new.mxd UTM NAD27 12July2005

ERROL L. MONTGOMERY & ASSOCIATES, INC.

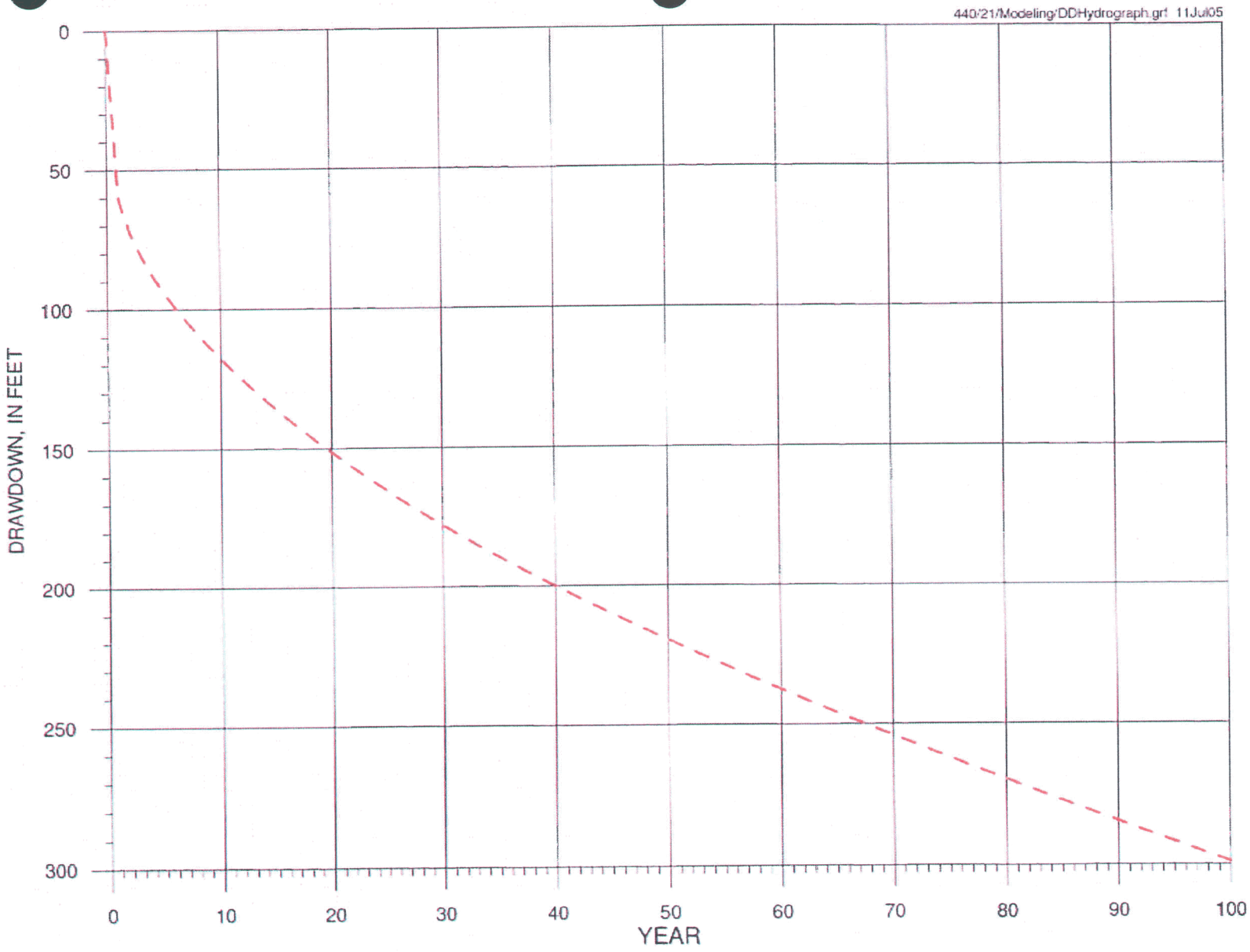

FIGURE 6. HYDROGRAPH OF GROUNDWATER LEVEL DRAWDOWN AT POINT OF MAXIMUM DRAWDOWN RESULTING FROM PUMPING 15,000 ACRE-FEET PER YEAR AT GOLDEN VALLEY SOUTH MASTER PLANNED COMMUNITY, MOHAVE COUNTY, ARIZONA

ERROL L. MONTGOMERY & ASSOCIATES, INC.

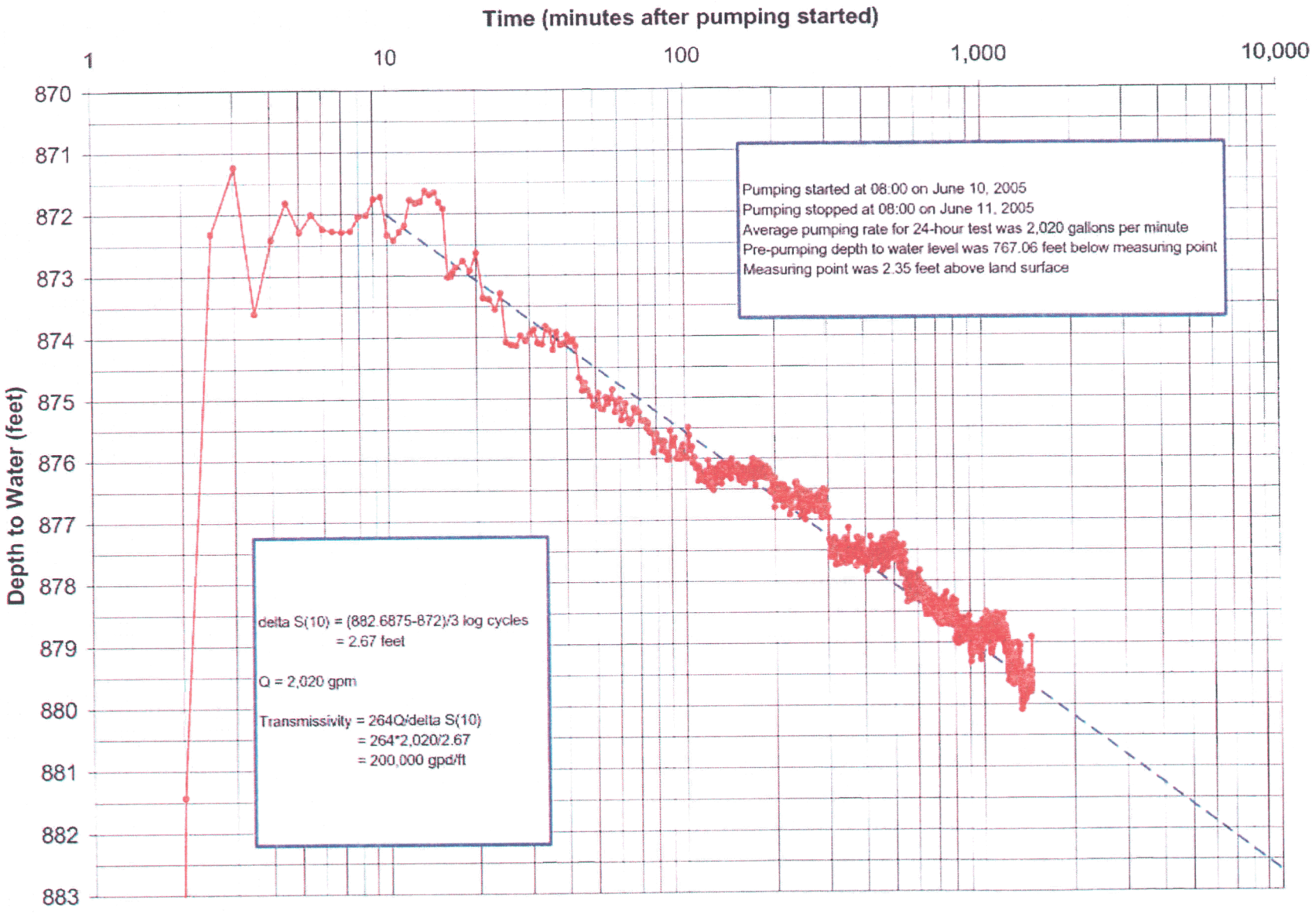

FIGURE 3. WATER LEVEL DRAWDOWN GRAPH FOR PUMPED WELL GV-1

ERROL L. MONTGOMERY & ASSOCIATES, INC.

ERROL L. MONTGOMERY & ASSOCIATES, INC.
CONSULTANTS IN HYDROGEOLOGY

7949 EAST ACOMA DRIVE, SUITE 100
SCOTTSDALE, ARIZONA 85260 (480) 948-7747
FAX: (480) 948-8737
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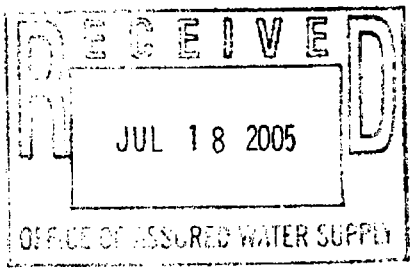
DENNIS G. HALL, P.G.
TODD KEAY, P.G.
JAMES S. DAVIS, P.G.
MICHAEL J. ROSKO, P.G.
CHARLES F. BARTER (1937-1999)
DANIEL S. WEBER, P.G.
LESLIE T. KATZ, P.G.

July 15, 2005



Mr. Doug Dunham
ARIZONA DEPARTMENT OF WATER RESOURCES
Office of Assured Water Supply
500 N. 3rd Street
Phoenix, Arizona 85004

Dear Mr. Dunham:

Enclosed please find the materials that Errol L. Montgomery & Associates, Inc., has prepared on behalf of American Land Management, LLC, in support of an Analysis of Water Adequacy for the Golden Valley South Master Planned Community in Mohave County, Arizona. The materials include copies of the following documents that we are submitting for your review and approval.

1) Application for Arizona Department of Water Resources (ADWR) Analysis of Water Adequacy

2) Hydrologic Study in Support of the Analysis of Water Adequacy

3) Copies of demand calculations for a lower density and maximum density development utilizing data from ADWR and Mohave County

4) Copies of the preliminary Planned Unit Development

5) A notice of intent to serve as yet incomplete since water company negotiations are underway with various potential providers

6) Ownership documents verifying ownership of all parcels listed in item 3 as belonging to American Land Management, LLC

Although we are aware that not having the water company information finalized can result in delays to a formal application, we do wish to proceed immediately with the Analysis of Water Adequacy.

If you have any questions or require clarification of any documents in the application, please do not hesitate to contact Greg Wallace or me.

Sincerely,

ERROL L. MONTGOMERY & ASSOCIATES, INC.

William R Victor

William R. Victor, P.G.

Enclosures (2 copies)

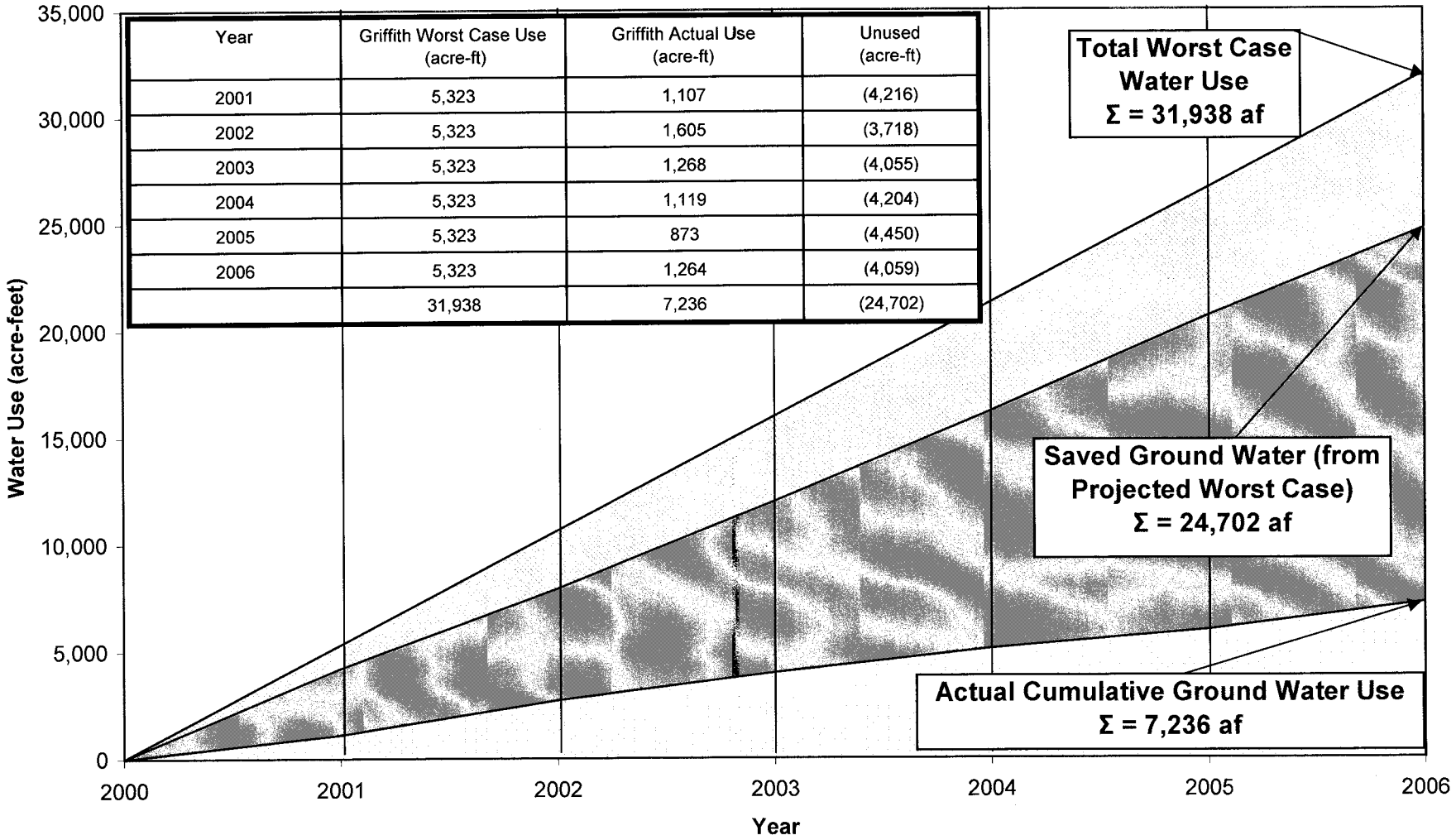
ATTACHMENT V

Griffith Power Plant, Actual versus Projected Cumulative Water Use, 2001 - 2006

Griffith Energy Project

Worst Case versus Actual Cumulative Water Use, 2001 - 2006

Year	Griffith Worst Case Use (acre-ft)	Griffith Actual Use (acre-ft)	Unused (acre-ft)
2001	5,323	1,107	(4,216)
2002	5,323	1,605	(3,718)
2003	5,323	1,268	(4,055)
2004	5,323	1,119	(4,204)
2005	5,323	873	(4,450)
2006	5,323	1,264	(4,059)
	31,938	7,236	(24,702)

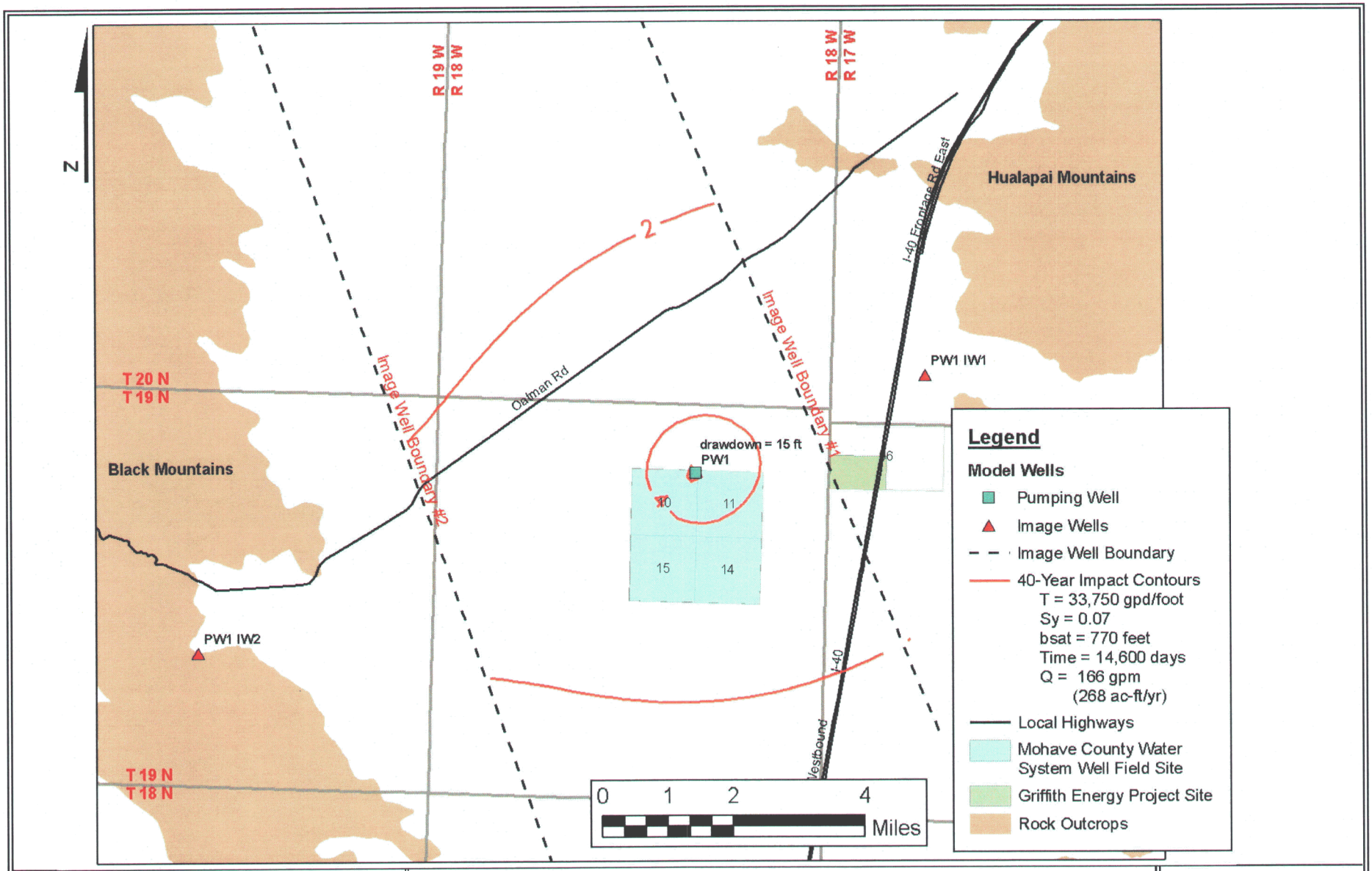


Monthly water usage - Griffith Power Plant

2006 Month	Gallons	2005 Month	Gallons	2004 Month	Gallons	2003 Month	Gallons	2002 Month	Gallons	2001 Month	Gallons
Jan-06	1,696,000	Jan-05	1,785,000	Jan-04	13,675,000	Jan-03	3,471,000	Jan-02	21,574,000	Jan-01	
Feb-06	706,000	Feb-05	1,496,000	Feb-04	27,805,000	Feb-03	20,431,000	Feb-02	45,932,000	Feb-01	
Mar-06	666,000	Mar-05	3,143,000	Mar-04	11,606,000	Mar-03	3,220,000	Mar-02	36,848,000	Mar-01	6,988,000
Apr-06	1,485,000	Apr-05	937,000	Apr-04	9,524,000	Apr-03	10,282,000	Apr-02	30,323,000	Apr-01	21,550,000
May-06	320,000	May-05	1,075,000	May-04	43,444,000	May-03	33,205,000	May-02	22,615,000	May-01	35,339,000
Jun-06	7,128,000	Jun-05	41,748,000	Jun-04	52,423,000	Jun-03	43,017,000	Jun-02	71,475,000	Jun-01	78,731,000
Jul-06	37,712,000	Jul-05	88,589,000	Jul-04	80,363,000	Jul-03	81,296,000	Jul-02	78,456,000	Jul-01	12,123,000
Aug-06	101,325,000	Aug-05	84,769,000	Aug-04	79,090,000	Aug-03	83,867,000	Aug-02	75,958,000	Aug-01	64,300,000
Sep-06	86,280,000	Sep-05	27,631,000	Sep-04	35,012,000	Sep-03	62,375,000	Sep-02	56,920,000	Sep-01	47,256,000
Oct-06	78,776,000	Oct-05	3,566,000	Oct-04	9,862,000	Oct-03	60,481,000	Oct-02	26,193,000	Oct-01	44,410,000
Nov-06	53,232,000	Nov-05	7,257,000	Nov-04	241,000	Nov-03	9,353,000	Nov-02	27,897,000	Nov-01	41,567,000
Dec-06	42,667,000	Dec-05	22,449,000	Dec-04	1,668,000	Dec-03	2,298,000	Dec-02	28,771,000	Dec-01	8,402,000
	411,993,000 GALLONS		284,445,000 GALLONS		364,713,000 GALLONS		413,296,000 GALLONS		522,962,000 GALLONS		360,666,000 GALLONS
	1,128,748 GPD		779,301 GPD		996,484 GPD		1,132,318 GPD		1,432,773 GPD		1,178,647 GPD
Jul-06	37,712,000	Jul-05	88,589,000	Jul-04	80,363,000	Jul-03	81,296,000	Jul-02	78,456,000	Jul-01	12,123,000
Aug-06	101,325,000	Aug-05	84,769,000	Aug-04	79,090,000	Aug-03	83,867,000	Aug-02	75,958,000	Aug-01	64,300,000
Sep-06	86,280,000	Sep-05	27,631,000	Sep-04	35,012,000	Sep-03	62,375,000	Sep-02	56,920,000	Sep-01	47,256,000
Oct-06	78,776,000	Oct-05	3,566,000	Oct-04	9,862,000	Oct-03	60,481,000	Oct-02	26,193,000	Oct-01	44,410,000
Nov-06	53,232,000	Nov-05	7,257,000	Nov-04	241,000	Nov-03	9,353,000	Nov-02	27,897,000	Nov-01	41,567,000
Dec-06	42,667,000	Dec-05	22,449,000	Dec-04	1,688,000	Dec-03	2,298,000	Dec-02	28,771,000	Dec-01	8,402,000
Jan-07		Jan-06	1,696,000	Jan-05	1,785,000	Jan-04	13,675,000	Jan-03	3,471,000	Jan-02	21,574,000
Feb-07		Feb-06	706,000	Feb-05	1,496,000	Feb-04	27,805,000	Feb-03	20,431,000	Feb-02	45,932,000
Mar-07		Mar-06	666,000	Mar-05	3,143,000	Mar-04	11,606,000	Mar-03	3,220,000	Mar-02	36,848,000
Apr-07		Apr-06	1,485,000	Apr-05	937,000	Apr-04	9,524,000	Apr-03	10,282,000	Apr-02	30,323,000
May-07		May-06	320,000	May-05	1,075,000	May-04	43,444,000	May-03	33,205,000	May-02	22,615,000
Jun-07		Jun-06	7,128,000	Jun-05	41,748,000	Jun-04	52,423,000	Jun-03	43,017,000	Jun-02	71,475,000
	399,992,000 GALLONS		246,262,000 GALLONS		256,440,000 GALLONS		458,147,000 GALLONS		407,821,000 GALLONS		446,825,000 GALLONS
/MONTH	66,665,333 GALLONS/MONTH		20,521,833 GALLONS/MONTH		21,370,000 GALLONS/MONTH		38,178,917 GALLONS/MONTH		33,985,083 GALLONS/MONTH		37,235,417 GALLONS/MONTH

ATTACHMENT VI

Figure 2 - NAEP Impact Analysis



Southwest Ground-water Consultants, Inc.

April 27, 2007 Project B.1476

NAEP IMPACT ANALYSIS

Mohave County Water System Well Field, Mohave County, Arizona

Figure 2

CALCULATION OF DRAWDOWN IN A HOMOGENEOUS, ISOTROPIC, CONFINED, LEAKY CONFINED OR UNCONFINED AQUIFER WITH MULTIPLE PRODUCTION AND INJECTION WELLS AND UNIFORM REGIONAL FLOW

NAEP Impact Analysis

********** INPUT DATA **********

UNCONFINED AQUIFER - THEIS EQUATION WITH JACOB'S CORRECTION

WATER TABLE CORRECTION APPLIED

AQUIFER THICKNESS = 770 [ft]
TRANSMISSIVITY = 33750 [gpd/ft]

STORAGE COEFFICIENT = .07

REGIONAL FLOW GRADIENT
(positive--downwards--in flow direction) = 0

REGIONAL FLOW DIRECTION
(horizontal angle in degrees
counter-clockwise from positive x-axis) = 0

REGIONAL FLOW OFFSET AT ORIGIN
(positive in downwards direction) = 0 [ft]

WATER TABLE CORRECTION APPLIED

AQUIFER THICKNESS = 770 [ft]

PUMPING/INJECTION WELL DATA

WELL NO. 1

X-COORDINATE	=	690352 [ft]
Y-COORDINATE	=	1.274154E+07 [ft]
PUMPING/INJECTION RATE	=	239040 [gpd]
TIME SINCE START PUMPING/INJECTION	=	14600 [day]

WELL NO. 2

X-COORDINATE	=	708931 [ft]
Y-COORDINATE	=	1.274927E+07 [ft]
PUMPING/INJECTION RATE	=	239040 [gpd]
TIME SINCE START PUMPING/INJECTION	=	14600 [day]

WELL NO. 3

X-COORDINATE	=	650185 [ft]
Y-COORDINATE	=	1.272723E+07 [ft]
PUMPING/INJECTION RATE	=	239040 [gpd]
TIME SINCE START PUMPING/INJECTION	=	14600 [day]

---------- Drawdown in [ft] ----------

Y [ft]	<- X [ft] ->					
	636109	637209	638309	639409	640509	641609
%12686183.00	0.379	0.388	0.396	0.404	0.412	0.420
%12687283.00	0.399	0.408	0.417	0.426	0.434	0.442
%12688383.00	0.420	0.429	0.439	0.448	0.457	0.466
%12689483.00	0.441	0.452	0.462	0.472	0.481	0.491
%12690583.00	0.464	0.475	0.486	0.496	0.507	0.517
%12691683.00	0.487	0.499	0.511	0.522	0.533	0.544
%12692783.00	0.512	0.524	0.537	0.549	0.561	0.572
%12693883.00	0.537	0.551	0.564	0.577	0.590	0.602
%12694983.00	0.564	0.578	0.593	0.607	0.620	0.633
%12696083.00	0.591	0.607	0.622	0.637	0.652	0.665
%12697183.00	0.620	0.637	0.653	0.669	0.685	0.699
%12698283.00	0.650	0.668	0.685	0.703	0.719	0.735
%12699383.00	0.681	0.700	0.719	0.737	0.755	0.772
%12700483.00	0.713	0.734	0.754	0.774	0.793	0.811
%12701583.00	0.746	0.769	0.790	0.811	0.832	0.852
%12702683.00	0.781	0.805	0.828	0.851	0.873	0.894
%12703783.00	0.817	0.842	0.867	0.892	0.916	0.939
%12704883.00	0.854	0.881	0.908	0.935	0.961	0.985
%12705983.00	0.892	0.921	0.951	0.979	1.007	1.034
%12707083.00	0.931	0.963	0.995	1.026	1.056	1.085
%12708183.00	0.971	1.006	1.040	1.074	1.107	1.138
%12709283.00	1.013	1.050	1.087	1.124	1.160	1.194
%12710383.00	1.055	1.096	1.136	1.175	1.215	1.253
%12711483.00	1.099	1.142	1.186	1.229	1.272	1.313
%12712583.00	1.142	1.190	1.237	1.284	1.331	1.377
%12713683.00	1.187	1.238	1.289	1.341	1.392	1.443
%12714783.00	1.231	1.286	1.342	1.399	1.456	1.512
%12715883.00	1.276	1.335	1.396	1.458	1.521	1.583
%12716983.00	1.319	1.384	1.450	1.518	1.587	1.657
%12718083.00	1.362	1.431	1.503	1.578	1.654	1.732
%12719183.00	1.403	1.477	1.555	1.636	1.721	1.807
%12720283.00	1.441	1.521	1.605	1.693	1.786	1.883
%12721383.00	1.477	1.561	1.651	1.747	1.849	1.956
%12722483.00	1.508	1.598	1.693	1.796	1.906	2.025
%12723583.00	1.535	1.629	1.729	1.838	1.957	2.086
%12724683.00	1.557	1.653	1.758	1.873	1.998	2.137
%12725783.00	1.572	1.671	1.779	1.897	2.028	2.174
%12726883.00	1.581	1.681	1.791	1.911	2.044	2.193
%12727983.00	1.583	1.684	1.793	1.913	2.046	2.195

Y [ft]	<- X [ft] ->					
	636109	637209	638309	639409	640509	641609
%12729083.00	1.579	1.678	1.786	1.904	2.034	2.178
%12730183.00	1.568	1.665	1.770	1.884	2.009	2.146
%12731283.00	1.551	1.645	1.746	1.855	1.973	2.101
%12732383.00	1.529	1.619	1.715	1.818	1.928	2.046
%12733483.00	1.503	1.589	1.679	1.775	1.877	1.984
%12734583.00	1.473	1.554	1.639	1.728	1.822	1.919
%12735683.00	1.440	1.516	1.596	1.678	1.764	1.852
%12736783.00	1.404	1.476	1.550	1.627	1.705	1.785
%12737883.00	1.367	1.434	1.503	1.574	1.646	1.719
%12738983.00	1.329	1.392	1.456	1.522	1.588	1.655
%12740083.00	1.290	1.349	1.409	1.470	1.531	1.592
%12741183.00	1.251	1.306	1.362	1.418	1.475	1.531
%12742283.00	1.212	1.263	1.316	1.368	1.421	1.473
%12743383.00	1.173	1.221	1.270	1.319	1.368	1.417
%12744483.00	1.134	1.180	1.226	1.272	1.318	1.363
%12745583.00	1.096	1.139	1.183	1.226	1.269	1.312
%12746683.00	1.059	1.100	1.141	1.181	1.222	1.262
%12747783.00	1.023	1.061	1.100	1.138	1.176	1.214
%12748883.00	0.987	1.024	1.060	1.096	1.133	1.169
%12749983.00	0.953	0.987	1.022	1.056	1.090	1.125
%12751083.00	0.919	0.952	0.984	1.017	1.050	1.082
%12752183.00	0.886	0.917	0.948	0.979	1.011	1.041
%12753283.00	0.854	0.884	0.913	0.943	0.973	1.002
%12754383.00	0.823	0.851	0.879	0.908	0.936	0.964
%12755483.00	0.793	0.820	0.847	0.874	0.901	0.928
%12756583.00	0.763	0.789	0.815	0.841	0.867	0.893
%12757683.00	0.735	0.759	0.784	0.809	0.834	0.859
%12758783.00	0.707	0.731	0.754	0.778	0.802	0.826
%12759883.00	0.680	0.703	0.726	0.748	0.771	0.794
%12760983.00	0.654	0.676	0.698	0.720	0.742	0.764
%12762083.00	0.629	0.650	0.671	0.692	0.713	0.734
%12763183.00	0.605	0.625	0.645	0.665	0.685	0.705
%12764283.00	0.581	0.600	0.619	0.638	0.658	0.678
%12765383.00	0.558	0.576	0.595	0.613	0.632	0.651
%12766483.00	0.536	0.553	0.571	0.589	0.607	0.625
%12767583.00	0.514	0.531	0.548	0.565	0.582	0.600
%12768683.00	0.494	0.510	0.526	0.542	0.559	0.575
%12769783.00	0.473	0.489	0.504	0.520	0.536	0.552
%12770883.00	0.454	0.469	0.483	0.498	0.514	0.529
%12771983.00	0.435	0.449	0.463	0.478	0.492	0.507

Y [ft]	<- X [ft] ->					
	636109	637209	638309	639409	640509	641609
%12773083.00	0.417	0.430	0.444	0.458	0.472	0.486
%12774183.00	0.399	0.412	0.425	0.438	0.452	0.465
%12775283.00	0.382	0.394	0.407	0.419	0.432	0.445

Y [ft]	<- X [ft] ->					
	642709	643809	644909	646009	647109	648209
%12686183.00	0.427	0.434	0.440	0.447	0.452	0.458
%12687283.00	0.450	0.457	0.464	0.471	0.477	0.483
%12688383.00	0.474	0.482	0.490	0.497	0.503	0.509
%12689483.00	0.500	0.508	0.516	0.523	0.530	0.537
%12690583.00	0.526	0.535	0.543	0.551	0.559	0.566
%12691683.00	0.554	0.563	0.572	0.581	0.589	0.596
%12692783.00	0.583	0.593	0.603	0.612	0.620	0.628
%12693883.00	0.613	0.624	0.635	0.644	0.653	0.661
%12694983.00	0.645	0.657	0.668	0.678	0.688	0.697
%12696083.00	0.679	0.691	0.703	0.714	0.724	0.733
%12697183.00	0.713	0.727	0.740	0.751	0.762	0.772
%12698283.00	0.750	0.764	0.778	0.791	0.802	0.813
%12699383.00	0.788	0.804	0.818	0.832	0.844	0.855
%12700483.00	0.829	0.845	0.861	0.875	0.888	0.900
%12701583.00	0.871	0.888	0.905	0.920	0.935	0.947
%12702683.00	0.915	0.934	0.952	0.968	0.983	0.997
%12703783.00	0.961	0.981	1.001	1.019	1.035	1.049
%12704883.00	1.009	1.031	1.052	1.072	1.089	1.105
%12705983.00	1.060	1.084	1.107	1.128	1.146	1.163
%12707083.00	1.113	1.139	1.164	1.187	1.207	1.225
%12708183.00	1.169	1.198	1.224	1.249	1.271	1.290
%12709283.00	1.227	1.259	1.288	1.315	1.339	1.360
%12710383.00	1.289	1.324	1.356	1.385	1.411	1.434
%12711483.00	1.354	1.392	1.427	1.460	1.488	1.513
%12712583.00	1.421	1.464	1.503	1.539	1.571	1.598
%12713683.00	1.492	1.540	1.584	1.624	1.659	1.689
%12714783.00	1.567	1.620	1.669	1.714	1.754	1.788
%12715883.00	1.645	1.704	1.760	1.812	1.857	1.895
%12716983.00	1.726	1.793	1.857	1.917	1.969	2.012
%12718083.00	1.810	1.887	1.961	2.030	2.091	2.141
%12719183.00	1.896	1.984	2.070	2.152	2.225	2.285
%12720283.00	1.983	2.085	2.186	2.284	2.373	2.447
%12721383.00	2.069	2.187	2.307	2.426	2.537	2.631
%12722483.00	2.152	2.287	2.430	2.576	2.719	2.845
%12723583.00	2.227	2.382	2.550	2.731	2.918	3.095
%12724683.00	2.291	2.464	2.658	2.879	3.126	3.388
%12725783.00	2.337	2.524	2.742	3.000	3.315	3.706

Y [ft]	<- X [ft] ->					
	642709	643809	644909	646009	647109	648209
%12726883.00	2.362	2.557	2.786	3.067	3.429	3.940
%12727983.00	2.363	2.556	2.784	3.059	3.410	3.888
%12729083.00	2.340	2.524	2.735	2.983	3.275	3.615
%12730183.00	2.298	2.466	2.653	2.861	3.088	3.316
%12731283.00	2.239	2.390	2.551	2.722	2.895	3.053
%12732383.00	2.171	2.303	2.441	2.581	2.715	2.832
%12733483.00	2.096	2.212	2.330	2.445	2.552	2.644
%12734583.00	2.019	2.121	2.222	2.319	2.407	2.482
%12735683.00	1.942	2.032	2.119	2.202	2.277	2.341
%12736783.00	1.866	1.945	2.022	2.095	2.160	2.216
%12737883.00	1.792	1.863	1.931	1.995	2.053	2.103
%12738983.00	1.721	1.785	1.846	1.904	1.956	2.002
%12740083.00	1.652	1.711	1.767	1.819	1.867	1.909
%12741183.00	1.587	1.640	1.692	1.740	1.784	1.824
%12742283.00	1.524	1.574	1.621	1.666	1.708	1.746
%12743383.00	1.465	1.511	1.555	1.597	1.636	1.672
%12744483.00	1.408	1.451	1.492	1.532	1.569	1.604
%12745583.00	1.353	1.394	1.433	1.471	1.506	1.540
%12746683.00	1.301	1.340	1.377	1.412	1.447	1.479
%12747783.00	1.251	1.288	1.323	1.357	1.390	1.422
%12748883.00	1.204	1.238	1.272	1.305	1.337	1.367
%12749983.00	1.158	1.191	1.223	1.255	1.285	1.315
%12751083.00	1.114	1.146	1.177	1.207	1.237	1.265
%12752183.00	1.072	1.102	1.132	1.161	1.190	1.218
%12753283.00	1.032	1.061	1.089	1.117	1.145	1.172
%12754383.00	0.992	1.020	1.048	1.075	1.102	1.129
%12755483.00	0.955	0.982	1.008	1.035	1.061	1.087
%12756583.00	0.919	0.944	0.970	0.996	1.021	1.046
%12757683.00	0.884	0.909	0.933	0.958	0.982	1.007
%12758783.00	0.850	0.874	0.898	0.922	0.945	0.969
%12759883.00	0.817	0.840	0.863	0.886	0.909	0.933
%12760983.00	0.786	0.808	0.830	0.852	0.875	0.897
%12762083.00	0.755	0.777	0.798	0.820	0.841	0.863
%12763183.00	0.726	0.746	0.767	0.788	0.809	0.830
%12764283.00	0.697	0.717	0.737	0.757	0.777	0.798
%12765383.00	0.670	0.689	0.708	0.727	0.747	0.767
%12766483.00	0.643	0.661	0.680	0.699	0.718	0.737
%12767583.00	0.617	0.635	0.653	0.671	0.689	0.708
%12768683.00	0.592	0.609	0.627	0.644	0.662	0.679
%12769783.00	0.568	0.584	0.601	0.618	0.635	0.652

Y [ft]	<- X [ft] ->					
	642709	643809	644909	646009	647109	648209
%12770883.00	0.545	0.560	0.576	0.593	0.609	0.625
%12771983.00	0.522	0.537	0.553	0.568	0.584	0.600
%12773083.00	0.500	0.515	0.530	0.545	0.560	0.575
%12774183.00	0.479	0.493	0.507	0.522	0.536	0.551
%12775283.00	0.459	0.472	0.486	0.499	0.513	0.528

Y [ft]	<- X [ft] ->					
	649309	650409	651509	652609	653709	654809
%12686183.00	0.463	0.467	0.471	0.475	0.478	0.481
%12687283.00	0.488	0.493	0.497	0.501	0.505	0.508
%12688383.00	0.515	0.520	0.525	0.529	0.532	0.535
%12689483.00	0.543	0.548	0.553	0.557	0.561	0.565
%12690583.00	0.572	0.578	0.583	0.588	0.592	0.595
%12691683.00	0.603	0.609	0.614	0.619	0.623	0.627
%12692783.00	0.635	0.642	0.647	0.652	0.657	0.660
%12693883.00	0.669	0.676	0.682	0.687	0.692	0.695
%12694983.00	0.705	0.712	0.718	0.724	0.728	0.732
%12696083.00	0.742	0.749	0.756	0.762	0.767	0.771
%12697183.00	0.781	0.789	0.796	0.802	0.807	0.811
%12698283.00	0.822	0.831	0.838	0.844	0.849	0.853
%12699383.00	0.865	0.874	0.882	0.888	0.894	0.898
%12700483.00	0.911	0.920	0.928	0.935	0.940	0.944
%12701583.00	0.959	0.968	0.977	0.984	0.989	0.993
%12702683.00	1.009	1.019	1.028	1.035	1.041	1.045
%12703783.00	1.062	1.073	1.082	1.089	1.095	1.099
%12704883.00	1.118	1.130	1.139	1.146	1.152	1.155
%12705983.00	1.177	1.189	1.199	1.207	1.212	1.215
%12707083.00	1.240	1.253	1.263	1.270	1.275	1.278
%12708183.00	1.307	1.320	1.330	1.338	1.342	1.344
%12709283.00	1.377	1.391	1.402	1.409	1.413	1.414
%12710383.00	1.453	1.467	1.478	1.485	1.488	1.488
%12711483.00	1.533	1.549	1.560	1.566	1.568	1.567
%12712583.00	1.620	1.636	1.647	1.653	1.654	1.650
%12713683.00	1.713	1.730	1.741	1.746	1.745	1.738
%12714783.00	1.814	1.832	1.843	1.846	1.842	1.832
%12715883.00	1.924	1.943	1.953	1.954	1.947	1.933
%12716983.00	2.045	2.065	2.075	2.072	2.060	2.040
%12718083.00	2.178	2.201	2.209	2.202	2.183	2.155
%12719183.00	2.329	2.353	2.358	2.345	2.317	2.278
%12720283.00	2.500	2.527	2.528	2.505	2.463	2.409
%12721383.00	2.698	2.730	2.723	2.684	2.622	2.547
%12722483.00	2.935	2.973	2.954	2.888	2.795	2.692
%12723583.00	3.229	3.279	3.234	3.120	2.979	2.837

Y [ft]	<- X [ft] ->					
	649309	650409	651509	652609	653709	654809
%12724683.00	3.611	3.692	3.584	3.379	3.164	2.972
%12725783.00	4.146	4.331	4.024	3.637	3.325	3.081
%12726883.00	4.818	5.773	4.442	3.809	3.418	3.142
%12727983.00	4.597	5.059	4.331	3.778	3.409	3.142
%12729083.00	3.954	4.085	3.884	3.580	3.307	3.084
%12730183.00	3.501	3.570	3.495	3.335	3.155	2.986
%12731283.00	3.172	3.221	3.192	3.105	2.989	2.868
%12732383.00	2.917	2.958	2.950	2.902	2.829	2.744
%12733483.00	2.711	2.747	2.751	2.726	2.680	2.623
%12734583.00	2.538	2.572	2.583	2.572	2.545	2.507
%12735683.00	2.390	2.422	2.437	2.437	2.423	2.399
%12736783.00	2.260	2.291	2.310	2.316	2.311	2.299
%12737883.00	2.144	2.175	2.196	2.207	2.210	2.206
%12738983.00	2.040	2.071	2.093	2.108	2.116	2.118
%12740083.00	1.946	1.976	2.000	2.017	2.029	2.037
%12741183.00	1.859	1.889	1.914	1.934	1.949	1.961
%12742283.00	1.779	1.809	1.835	1.856	1.874	1.889
%12743383.00	1.705	1.735	1.761	1.783	1.803	1.821
%12744483.00	1.636	1.665	1.692	1.715	1.737	1.756
%12745583.00	1.571	1.600	1.626	1.651	1.674	1.695
%12746683.00	1.510	1.538	1.565	1.590	1.614	1.636
%12747783.00	1.451	1.480	1.507	1.532	1.557	1.580
%12748883.00	1.396	1.424	1.451	1.477	1.502	1.526
%12749983.00	1.344	1.371	1.398	1.424	1.449	1.474
%12751083.00	1.293	1.321	1.347	1.373	1.399	1.424
%12752183.00	1.245	1.272	1.299	1.324	1.350	1.375
%12753283.00	1.199	1.226	1.252	1.277	1.303	1.328
%12754383.00	1.155	1.181	1.206	1.232	1.257	1.283
%12755483.00	1.112	1.138	1.163	1.188	1.213	1.238
%12756583.00	1.071	1.096	1.121	1.145	1.170	1.195
%12757683.00	1.031	1.056	1.080	1.104	1.129	1.153
%12758783.00	0.993	1.017	1.040	1.064	1.088	1.112
%12759883.00	0.956	0.979	1.002	1.025	1.049	1.073
%12760983.00	0.920	0.942	0.965	0.988	1.011	1.034
%12762083.00	0.885	0.907	0.929	0.951	0.974	0.996
%12763183.00	0.851	0.872	0.894	0.916	0.938	0.960
%12764283.00	0.818	0.839	0.860	0.881	0.902	0.924
%12765383.00	0.787	0.807	0.827	0.848	0.868	0.889
%12766483.00	0.756	0.775	0.795	0.815	0.835	0.856
%12767583.00	0.726	0.745	0.764	0.783	0.803	0.823

Y [ft]	<- X [ft] ->					
	649309	650409	651509	652609	653709	654809
%12768683.00	0.697	0.715	0.734	0.753	0.771	0.791
%12769783.00	0.669	0.687	0.705	0.723	0.741	0.760
%12770883.00	0.642	0.659	0.676	0.694	0.711	0.729
%12771983.00	0.616	0.632	0.649	0.666	0.683	0.700
%12773083.00	0.590	0.606	0.622	0.638	0.655	0.671
%12774183.00	0.566	0.581	0.596	0.612	0.628	0.644
%12775283.00	0.542	0.557	0.571	0.586	0.601	0.617

Y [ft]	<- X [ft] ->					
	655909	657009	658109	659209	660309	661409
%12686183.00	0.484	0.486	0.487	0.489	0.489	0.490
%12687283.00	0.510	0.512	0.514	0.515	0.516	0.517
%12688383.00	0.538	0.540	0.542	0.543	0.544	0.544
%12689483.00	0.567	0.569	0.571	0.572	0.573	0.574
%12690583.00	0.598	0.600	0.602	0.603	0.604	0.604
%12691683.00	0.630	0.632	0.634	0.635	0.636	0.636
%12692783.00	0.663	0.666	0.667	0.669	0.669	0.669
%12693883.00	0.698	0.701	0.702	0.704	0.704	0.704
%12694983.00	0.735	0.738	0.739	0.740	0.740	0.740
%12696083.00	0.774	0.776	0.778	0.778	0.779	0.778
%12697183.00	0.814	0.816	0.818	0.818	0.818	0.818
%12698283.00	0.856	0.859	0.860	0.860	0.860	0.859
%12699383.00	0.901	0.903	0.904	0.904	0.903	0.902
%12700483.00	0.947	0.949	0.950	0.950	0.948	0.947
%12701583.00	0.996	0.998	0.998	0.997	0.996	0.993
%12702683.00	1.047	1.048	1.048	1.047	1.045	1.042
%12703783.00	1.101	1.101	1.101	1.099	1.096	1.092
%12704883.00	1.157	1.157	1.156	1.153	1.149	1.145
%12705983.00	1.216	1.216	1.213	1.210	1.205	1.199
%12707083.00	1.278	1.277	1.274	1.269	1.263	1.256
%12708183.00	1.344	1.341	1.336	1.330	1.323	1.315
%12709283.00	1.413	1.408	1.402	1.394	1.385	1.375
%12710383.00	1.485	1.479	1.471	1.461	1.450	1.438
%12711483.00	1.562	1.553	1.543	1.531	1.517	1.503
%12712583.00	1.642	1.631	1.618	1.603	1.586	1.569
%12713683.00	1.727	1.713	1.696	1.678	1.658	1.637
%12714783.00	1.818	1.799	1.778	1.755	1.731	1.707
%12715883.00	1.913	1.889	1.863	1.835	1.806	1.778
%12716983.00	2.014	1.983	1.950	1.916	1.882	1.849
%12718083.00	2.120	2.081	2.040	1.999	1.959	1.920
%12719183.00	2.232	2.182	2.132	2.082	2.035	1.991
%12720283.00	2.348	2.285	2.224	2.165	2.110	2.059
%12721383.00	2.468	2.389	2.314	2.245	2.181	2.124

Y [ft]	<- X [ft] ->					
	655909	657009	658109	659209	660309	661409
%12722483.00	2.588	2.491	2.401	2.320	2.248	2.185
%12723583.00	2.704	2.585	2.480	2.388	2.308	2.239
%12724683.00	2.807	2.667	2.547	2.446	2.359	2.285
%12725783.00	2.887	2.729	2.599	2.490	2.399	2.322
%12726883.00	2.932	2.766	2.631	2.519	2.427	2.349
%12727983.00	2.937	2.774	2.641	2.532	2.441	2.365
%12729083.00	2.902	2.753	2.630	2.527	2.441	2.370
%12730183.00	2.837	2.709	2.600	2.508	2.430	2.364
%12731283.00	2.752	2.648	2.556	2.476	2.407	2.349
%12732383.00	2.658	2.576	2.501	2.434	2.376	2.326
%12733483.00	2.560	2.498	2.439	2.385	2.337	2.297
%12734583.00	2.463	2.418	2.373	2.331	2.294	2.262
%12735683.00	2.370	2.338	2.306	2.275	2.247	2.223
%12736783.00	2.281	2.260	2.238	2.217	2.198	2.182
%12737883.00	2.197	2.185	2.172	2.159	2.147	2.138
%12738983.00	2.117	2.112	2.107	2.101	2.096	2.093
%12740083.00	2.041	2.043	2.043	2.043	2.044	2.047
%12741183.00	1.969	1.976	1.982	1.987	1.993	2.000
%12742283.00	1.901	1.912	1.922	1.931	1.942	1.953
%12743383.00	1.836	1.850	1.864	1.877	1.891	1.906
%12744483.00	1.774	1.791	1.807	1.824	1.841	1.858
%12745583.00	1.715	1.734	1.753	1.771	1.791	1.811
%12746683.00	1.658	1.679	1.699	1.720	1.742	1.764
%12747783.00	1.603	1.625	1.647	1.670	1.693	1.717
%12748883.00	1.550	1.573	1.597	1.620	1.645	1.671
%12749983.00	1.498	1.523	1.547	1.572	1.598	1.624
%12751083.00	1.449	1.474	1.499	1.524	1.551	1.578
%12752183.00	1.400	1.426	1.451	1.477	1.504	1.532
%12753283.00	1.354	1.379	1.405	1.431	1.459	1.487
%12754383.00	1.308	1.334	1.360	1.386	1.413	1.442
%12755483.00	1.264	1.289	1.315	1.342	1.369	1.397
%12756583.00	1.220	1.246	1.272	1.298	1.325	1.353
%12757683.00	1.178	1.203	1.229	1.255	1.282	1.310
%12758783.00	1.137	1.162	1.187	1.213	1.240	1.267
%12759883.00	1.097	1.121	1.146	1.172	1.198	1.224
%12760983.00	1.058	1.082	1.106	1.131	1.157	1.183
%12762083.00	1.020	1.043	1.067	1.091	1.116	1.142
%12763183.00	0.982	1.005	1.029	1.052	1.077	1.102
%12764283.00	0.946	0.968	0.991	1.014	1.038	1.062
%12765383.00	0.911	0.932	0.955	0.977	1.000	1.024

Y [ft]	<- X [ft] ->					
	655909	657009	658109	659209	660309	661409
%12766483.00	0.876	0.897	0.919	0.941	0.963	0.986
%12767583.00	0.843	0.863	0.884	0.905	0.927	0.949
%12768683.00	0.810	0.830	0.850	0.871	0.891	0.913
%12769783.00	0.778	0.797	0.817	0.837	0.857	0.877
%12770883.00	0.747	0.766	0.785	0.804	0.823	0.843
%12771983.00	0.717	0.735	0.753	0.772	0.791	0.810
%12773083.00	0.688	0.705	0.723	0.741	0.759	0.777
%12774183.00	0.660	0.676	0.693	0.710	0.728	0.745
%12775283.00	0.633	0.648	0.664	0.681	0.697	0.714

Y [ft]	<- X [ft] ->					
	662509	663609	664709	665809	666909	668009
%12686183.00	0.490	0.490	0.489	0.489	0.488	0.486
%12687283.00	0.517	0.516	0.516	0.515	0.514	0.512
%12688383.00	0.544	0.544	0.543	0.542	0.541	0.539
%12689483.00	0.574	0.573	0.572	0.571	0.570	0.568
%12690583.00	0.604	0.603	0.602	0.601	0.599	0.597
%12691683.00	0.636	0.635	0.634	0.632	0.630	0.628
%12692783.00	0.669	0.668	0.667	0.665	0.663	0.660
%12693883.00	0.703	0.702	0.701	0.699	0.697	0.694
%12694983.00	0.739	0.738	0.736	0.734	0.732	0.729
%12696083.00	0.777	0.775	0.773	0.771	0.768	0.765
%12697183.00	0.816	0.814	0.812	0.809	0.806	0.803
%12698283.00	0.857	0.855	0.852	0.849	0.845	0.841
%12699383.00	0.900	0.897	0.894	0.890	0.886	0.882
%12700483.00	0.944	0.941	0.937	0.933	0.929	0.924
%12701583.00	0.990	0.986	0.982	0.977	0.972	0.967
%12702683.00	1.038	1.034	1.029	1.023	1.018	1.012
%12703783.00	1.088	1.083	1.077	1.071	1.064	1.058
%12704883.00	1.139	1.133	1.127	1.120	1.113	1.105
%12705983.00	1.193	1.186	1.178	1.170	1.162	1.154
%12707083.00	1.248	1.240	1.231	1.222	1.213	1.204
%12708183.00	1.305	1.296	1.286	1.276	1.266	1.256
%12709283.00	1.364	1.353	1.342	1.330	1.319	1.308
%12710383.00	1.425	1.412	1.399	1.386	1.374	1.362
%12711483.00	1.488	1.473	1.458	1.443	1.429	1.416
%12712583.00	1.552	1.534	1.518	1.501	1.486	1.471
%12713683.00	1.617	1.597	1.578	1.560	1.543	1.527
%12714783.00	1.683	1.661	1.639	1.619	1.600	1.582
%12715883.00	1.750	1.724	1.700	1.677	1.657	1.638
%12716983.00	1.818	1.788	1.761	1.736	1.713	1.693
%12718083.00	1.884	1.851	1.821	1.793	1.769	1.747
%12719183.00	1.950	1.913	1.879	1.849	1.823	1.800

Y [ft]	<- X [ft] ->					
	662509	663609	664709	665809	666909	668009
%12720283.00	2.013	1.972	1.935	1.903	1.876	1.852
%12721383.00	2.073	2.028	1.989	1.955	1.925	1.901
%12722483.00	2.129	2.080	2.038	2.003	1.973	1.947
%12723583.00	2.179	2.128	2.084	2.047	2.016	1.991
%12724683.00	2.222	2.169	2.124	2.086	2.055	2.031
%12725783.00	2.258	2.203	2.158	2.120	2.090	2.067
%12726883.00	2.284	2.230	2.186	2.149	2.121	2.099
%12727983.00	2.302	2.249	2.207	2.172	2.146	2.126
%12729083.00	2.310	2.261	2.221	2.189	2.165	2.148
%12730183.00	2.309	2.264	2.228	2.200	2.180	2.166
%12731283.00	2.301	2.261	2.230	2.206	2.189	2.179
%12732383.00	2.285	2.251	2.225	2.206	2.194	2.188
%12733483.00	2.263	2.235	2.215	2.201	2.193	2.192
%12734583.00	2.235	2.215	2.200	2.191	2.188	2.191
%12735683.00	2.204	2.189	2.180	2.177	2.179	2.186
%12736783.00	2.169	2.161	2.157	2.159	2.165	2.177
%12737883.00	2.132	2.129	2.131	2.137	2.148	2.164
%12738983.00	2.092	2.095	2.102	2.112	2.128	2.148
%12740083.00	2.051	2.059	2.070	2.085	2.104	2.128
%12741183.00	2.009	2.021	2.036	2.054	2.077	2.104
%12742283.00	1.966	1.982	2.000	2.022	2.048	2.077
%12743383.00	1.922	1.941	1.963	1.987	2.016	2.048
%12744483.00	1.878	1.900	1.924	1.951	1.981	2.015
%12745583.00	1.833	1.857	1.883	1.912	1.945	1.980
%12746683.00	1.788	1.814	1.842	1.873	1.906	1.943
%12747783.00	1.743	1.770	1.800	1.832	1.866	1.904
%12748883.00	1.697	1.726	1.756	1.789	1.825	1.863
%12749983.00	1.652	1.681	1.713	1.746	1.782	1.821
%12751083.00	1.606	1.637	1.668	1.702	1.738	1.777
%12752183.00	1.561	1.592	1.624	1.657	1.694	1.732
%12753283.00	1.516	1.546	1.579	1.612	1.648	1.686
%12754383.00	1.471	1.502	1.534	1.567	1.602	1.640
%12755483.00	1.426	1.457	1.488	1.521	1.556	1.593
%12756583.00	1.382	1.412	1.443	1.476	1.510	1.546
%12757683.00	1.338	1.368	1.399	1.430	1.464	1.498
%12758783.00	1.295	1.324	1.354	1.385	1.418	1.451
%12759883.00	1.252	1.280	1.310	1.340	1.372	1.404
%12760983.00	1.210	1.238	1.266	1.296	1.326	1.358
%12762083.00	1.168	1.195	1.223	1.252	1.281	1.312
%12763183.00	1.127	1.154	1.181	1.208	1.237	1.266

Y [ft]	<- X [ft] ->					
	662509	663609	664709	665809	666909	668009
%12764283.00	1.087	1.113	1.139	1.166	1.193	1.221
%12765383.00	1.048	1.072	1.098	1.124	1.150	1.177
%12766483.00	1.009	1.033	1.057	1.082	1.108	1.134
%12767583.00	0.971	0.994	1.018	1.042	1.066	1.091
%12768683.00	0.934	0.957	0.979	1.002	1.026	1.050
%12769783.00	0.898	0.920	0.942	0.964	0.986	1.009
%12770883.00	0.863	0.884	0.905	0.926	0.947	0.969
%12771983.00	0.829	0.849	0.869	0.889	0.910	0.931
%12773083.00	0.795	0.814	0.834	0.853	0.873	0.893
%12774183.00	0.763	0.781	0.799	0.818	0.837	0.856
%12775283.00	0.731	0.749	0.766	0.784	0.802	0.820

Y [ft]	<- X [ft] ->					
	669109	670209	671309	672409	673509	674609
%12686183.00	0.485	0.483	0.481	0.478	0.476	0.473
%12687283.00	0.510	0.509	0.506	0.504	0.501	0.499
%12688383.00	0.538	0.535	0.533	0.531	0.528	0.525
%12689483.00	0.566	0.564	0.561	0.558	0.555	0.552
%12690583.00	0.595	0.593	0.590	0.587	0.584	0.581
%12691683.00	0.626	0.623	0.620	0.617	0.614	0.610
%12692783.00	0.658	0.655	0.652	0.648	0.645	0.641
%12693883.00	0.691	0.688	0.685	0.681	0.677	0.673
%12694983.00	0.726	0.722	0.718	0.715	0.711	0.706
%12696083.00	0.761	0.758	0.754	0.750	0.745	0.741
%12697183.00	0.799	0.795	0.790	0.786	0.781	0.777
%12698283.00	0.837	0.833	0.828	0.824	0.819	0.814
%12699383.00	0.877	0.873	0.868	0.863	0.857	0.852
%12700483.00	0.919	0.914	0.908	0.903	0.897	0.892
%12701583.00	0.962	0.956	0.950	0.944	0.938	0.933
%12702683.00	1.006	1.000	0.993	0.987	0.981	0.975
%12703783.00	1.051	1.045	1.038	1.031	1.025	1.018
%12704883.00	1.098	1.091	1.084	1.077	1.070	1.063
%12705983.00	1.146	1.138	1.131	1.123	1.116	1.109
%12707083.00	1.196	1.187	1.179	1.171	1.163	1.156
%12708183.00	1.246	1.237	1.228	1.220	1.211	1.204
%12709283.00	1.298	1.288	1.278	1.269	1.261	1.253
%12710383.00	1.350	1.340	1.329	1.320	1.311	1.303
%12711483.00	1.404	1.392	1.381	1.371	1.362	1.354
%12712583.00	1.458	1.445	1.434	1.423	1.414	1.406
%12713683.00	1.512	1.499	1.487	1.476	1.467	1.458
%12714783.00	1.567	1.553	1.540	1.529	1.519	1.511
%12715883.00	1.621	1.606	1.593	1.582	1.573	1.564
%12716983.00	1.675	1.660	1.647	1.635	1.626	1.618

Y [ft]	<- X [ft] ->					
	669109	670209	671309	672409	673509	674609
%12718083.00	1.729	1.713	1.699	1.688	1.679	1.672
%12719183.00	1.781	1.765	1.751	1.740	1.732	1.725
%12720283.00	1.832	1.815	1.802	1.791	1.784	1.779
%12721383.00	1.881	1.864	1.851	1.842	1.835	1.831
%12722483.00	1.927	1.911	1.899	1.891	1.886	1.884
%12723583.00	1.971	1.956	1.945	1.938	1.935	1.935
%12724683.00	2.012	1.998	1.989	1.984	1.982	1.985
%12725783.00	2.049	2.037	2.030	2.027	2.028	2.033
%12726883.00	2.083	2.073	2.068	2.068	2.072	2.080
%12727983.00	2.112	2.105	2.103	2.106	2.113	2.125
%12729083.00	2.138	2.133	2.135	2.141	2.152	2.168
%12730183.00	2.159	2.158	2.163	2.173	2.188	2.209
%12731283.00	2.176	2.179	2.187	2.201	2.221	2.246
%12732383.00	2.188	2.195	2.208	2.226	2.250	2.280
%12733483.00	2.196	2.207	2.224	2.247	2.276	2.311
%12734583.00	2.200	2.215	2.237	2.264	2.297	2.337
%12735683.00	2.200	2.219	2.245	2.276	2.314	2.359
%12736783.00	2.195	2.218	2.248	2.284	2.326	2.376
%12737883.00	2.186	2.213	2.247	2.287	2.333	2.387
%12738983.00	2.173	2.204	2.241	2.285	2.335	2.393
%12740083.00	2.156	2.191	2.231	2.278	2.331	2.392
%12741183.00	2.136	2.173	2.216	2.265	2.321	2.385
%12742283.00	2.112	2.152	2.197	2.248	2.306	2.372
%12743383.00	2.084	2.126	2.173	2.226	2.285	2.352
%12744483.00	2.054	2.097	2.145	2.199	2.259	2.326
%12745583.00	2.020	2.065	2.114	2.168	2.228	2.295
%12746683.00	1.984	2.029	2.079	2.133	2.193	2.258
%12747783.00	1.946	1.991	2.040	2.094	2.153	2.217
%12748883.00	1.905	1.950	1.999	2.052	2.110	2.172
%12749983.00	1.862	1.907	1.955	2.008	2.064	2.124
%12751083.00	1.818	1.862	1.910	1.961	2.015	2.073
%12752183.00	1.773	1.816	1.862	1.912	1.964	2.020
%12753283.00	1.726	1.769	1.814	1.861	1.912	1.965
%12754383.00	1.679	1.720	1.764	1.810	1.859	1.910
%12755483.00	1.631	1.671	1.714	1.758	1.804	1.853
%12756583.00	1.583	1.622	1.663	1.705	1.750	1.796
%12757683.00	1.535	1.572	1.612	1.652	1.695	1.739
%12758783.00	1.486	1.523	1.560	1.600	1.640	1.682
%12759883.00	1.438	1.473	1.510	1.547	1.586	1.626
%12760983.00	1.390	1.424	1.459	1.495	1.532	1.569

Y [ft]	<- X [ft] ->					
	669109	670209	671309	672409	673509	674609
%12762083.00	1.343	1.376	1.409	1.443	1.478	1.514
%12763183.00	1.297	1.328	1.359	1.392	1.425	1.460
%12764283.00	1.250	1.280	1.311	1.342	1.374	1.406
%12765383.00	1.205	1.234	1.263	1.292	1.323	1.353
%12766483.00	1.161	1.188	1.216	1.244	1.273	1.302
%12767583.00	1.117	1.143	1.169	1.196	1.224	1.251
%12768683.00	1.074	1.099	1.124	1.150	1.176	1.202
%12769783.00	1.032	1.056	1.080	1.105	1.129	1.154
%12770883.00	0.992	1.014	1.037	1.060	1.084	1.107
%12771983.00	0.952	0.973	0.995	1.017	1.039	1.062
%12773083.00	0.913	0.934	0.954	0.975	0.996	1.018
%12774183.00	0.875	0.895	0.915	0.935	0.954	0.975
%12775283.00	0.839	0.857	0.876	0.895	0.914	0.933

Y [ft]	<- X [ft] ->					
	675709	676809	677909	679009	680109	681209
%12686183.00	0.471	0.468	0.465	0.461	0.458	0.454
%12687283.00	0.496	0.493	0.489	0.486	0.482	0.479
%12688383.00	0.522	0.518	0.515	0.511	0.508	0.504
%12689483.00	0.549	0.545	0.542	0.538	0.534	0.530
%12690583.00	0.577	0.574	0.570	0.566	0.562	0.557
%12691683.00	0.607	0.603	0.599	0.595	0.590	0.586
%12692783.00	0.637	0.633	0.629	0.625	0.620	0.616
%12693883.00	0.669	0.665	0.660	0.656	0.651	0.646
%12694983.00	0.702	0.698	0.693	0.688	0.683	0.678
%12696083.00	0.736	0.732	0.727	0.722	0.717	0.712
%12697183.00	0.772	0.767	0.762	0.757	0.751	0.746
%12698283.00	0.809	0.803	0.798	0.793	0.787	0.782
%12699383.00	0.847	0.841	0.836	0.830	0.825	0.819
%12700483.00	0.886	0.880	0.875	0.869	0.863	0.857
%12701583.00	0.927	0.921	0.915	0.909	0.903	0.897
%12702683.00	0.968	0.962	0.956	0.950	0.944	0.938
%12703783.00	1.012	1.005	0.999	0.993	0.986	0.980
%12704883.00	1.056	1.049	1.043	1.037	1.030	1.024
%12705983.00	1.102	1.095	1.088	1.082	1.075	1.069
%12707083.00	1.148	1.141	1.135	1.128	1.122	1.115
%12708183.00	1.196	1.189	1.182	1.176	1.170	1.163
%12709283.00	1.245	1.238	1.231	1.225	1.219	1.213
%12710383.00	1.295	1.288	1.281	1.275	1.269	1.263
%12711483.00	1.346	1.339	1.333	1.327	1.321	1.315
%12712583.00	1.398	1.391	1.385	1.379	1.374	1.369
%12713683.00	1.451	1.444	1.438	1.433	1.428	1.423
%12714783.00	1.504	1.498	1.492	1.488	1.484	1.480

Y [ft]	<- X [ft] ->					
	675709	676809	677909	679009	680109	681209
%12715883.00	1.558	1.552	1.547	1.544	1.540	1.537
%12716983.00	1.612	1.607	1.603	1.600	1.598	1.596
%12718083.00	1.666	1.662	1.660	1.658	1.657	1.657
%12719183.00	1.721	1.718	1.717	1.717	1.717	1.719
%12720283.00	1.776	1.774	1.775	1.776	1.779	1.782
%12721383.00	1.830	1.831	1.833	1.836	1.841	1.846
%12722483.00	1.884	1.887	1.891	1.897	1.905	1.912
%12723583.00	1.937	1.943	1.950	1.959	1.969	1.980
%12724683.00	1.990	1.998	2.009	2.021	2.034	2.049
%12725783.00	2.042	2.053	2.067	2.083	2.101	2.119
%12726883.00	2.092	2.107	2.125	2.146	2.168	2.191
%12727983.00	2.141	2.161	2.183	2.208	2.236	2.264
%12729083.00	2.188	2.212	2.240	2.271	2.304	2.338
%12730183.00	2.233	2.263	2.296	2.332	2.372	2.413
%12731283.00	2.276	2.311	2.350	2.393	2.439	2.489
%12732383.00	2.315	2.356	2.401	2.452	2.506	2.564
%12733483.00	2.351	2.398	2.450	2.508	2.571	2.639
%12734583.00	2.383	2.436	2.495	2.561	2.633	2.711
%12735683.00	2.411	2.469	2.535	2.609	2.690	2.780
%12736783.00	2.433	2.497	2.570	2.651	2.742	2.842
%12737883.00	2.449	2.519	2.597	2.686	2.785	2.896
%12738983.00	2.458	2.533	2.617	2.712	2.819	2.939
%12740083.00	2.461	2.539	2.628	2.727	2.840	2.968
%12741183.00	2.457	2.538	2.629	2.732	2.848	2.981
%12742283.00	2.445	2.527	2.620	2.724	2.842	2.976
%12743383.00	2.426	2.509	2.602	2.706	2.822	2.954
%12744483.00	2.400	2.483	2.574	2.676	2.789	2.916
%12745583.00	2.368	2.449	2.538	2.637	2.745	2.865
%12746683.00	2.330	2.409	2.495	2.589	2.692	2.803
%12747783.00	2.287	2.363	2.445	2.535	2.631	2.734
%12748883.00	2.240	2.312	2.391	2.475	2.565	2.660
%12749983.00	2.189	2.258	2.332	2.411	2.495	2.582
%12751083.00	2.135	2.201	2.271	2.345	2.422	2.502
%12752183.00	2.079	2.142	2.207	2.276	2.348	2.422
%12753283.00	2.022	2.081	2.143	2.207	2.273	2.342
%12754383.00	1.963	2.019	2.077	2.137	2.199	2.262
%12755483.00	1.904	1.957	2.011	2.067	2.125	2.183
%12756583.00	1.844	1.894	1.945	1.998	2.051	2.106
%12757683.00	1.785	1.832	1.880	1.929	1.979	2.030
%12758783.00	1.725	1.770	1.815	1.861	1.908	1.955

Y [ft]	<- X [ft] ->					
	675709	676809	677909	679009	680109	681209
%12759883.00	1.666	1.708	1.751	1.794	1.838	1.882
%12760983.00	1.608	1.648	1.688	1.729	1.770	1.811
%12762083.00	1.551	1.588	1.626	1.664	1.703	1.741
%12763183.00	1.494	1.530	1.565	1.601	1.638	1.674
%12764283.00	1.439	1.472	1.506	1.540	1.574	1.608
%12765383.00	1.384	1.416	1.448	1.480	1.512	1.543
%12766483.00	1.331	1.361	1.391	1.421	1.451	1.481
%12767583.00	1.279	1.307	1.336	1.364	1.392	1.420
%12768683.00	1.229	1.255	1.282	1.308	1.335	1.361
%12769783.00	1.179	1.204	1.229	1.255	1.280	1.304
%12770883.00	1.131	1.155	1.178	1.202	1.226	1.249
%12771983.00	1.084	1.107	1.129	1.151	1.173	1.195
%12773083.00	1.039	1.060	1.081	1.102	1.123	1.143
%12774183.00	0.995	1.015	1.035	1.054	1.074	1.093
%12775283.00	0.952	0.971	0.990	1.008	1.027	1.045

Y [ft]	<- X [ft] ->					
	682309	683409	684509	685609	686709	687809
%12686183.00	0.451	0.447	0.443	0.439	0.435	0.431
%12687283.00	0.475	0.471	0.467	0.463	0.458	0.454
%12688383.00	0.500	0.496	0.491	0.487	0.482	0.478
%12689483.00	0.526	0.522	0.517	0.513	0.508	0.503
%12690583.00	0.553	0.548	0.544	0.539	0.534	0.529
%12691683.00	0.581	0.577	0.572	0.567	0.562	0.556
%12692783.00	0.611	0.606	0.601	0.596	0.590	0.585
%12693883.00	0.641	0.636	0.631	0.626	0.620	0.614
%12694983.00	0.673	0.668	0.662	0.657	0.651	0.645
%12696083.00	0.706	0.701	0.695	0.689	0.683	0.677
%12697183.00	0.740	0.735	0.729	0.723	0.717	0.711
%12698283.00	0.776	0.770	0.764	0.758	0.752	0.745
%12699383.00	0.813	0.807	0.801	0.795	0.788	0.782
%12700483.00	0.851	0.845	0.839	0.832	0.826	0.819
%12701583.00	0.891	0.884	0.878	0.872	0.865	0.858
%12702683.00	0.932	0.925	0.919	0.912	0.905	0.898
%12703783.00	0.974	0.967	0.961	0.954	0.947	0.940
%12704883.00	1.018	1.011	1.004	0.998	0.991	0.984
%12705983.00	1.063	1.056	1.050	1.043	1.036	1.029
%12707083.00	1.109	1.103	1.096	1.090	1.083	1.075
%12708183.00	1.157	1.151	1.144	1.138	1.131	1.124
%12709283.00	1.207	1.200	1.194	1.188	1.181	1.174
%12710383.00	1.257	1.252	1.246	1.240	1.233	1.226
%12711483.00	1.310	1.304	1.299	1.293	1.287	1.280
%12712583.00	1.364	1.359	1.354	1.348	1.342	1.336

Y [ft]	<- X [ft] ->					
	682309	683409	684509	685609	686709	687809
%12713683.00	1.419	1.415	1.410	1.405	1.400	1.394
%12714783.00	1.476	1.472	1.469	1.464	1.460	1.455
%12715883.00	1.535	1.532	1.529	1.526	1.522	1.517
%12716983.00	1.595	1.593	1.591	1.589	1.586	1.582
%12718083.00	1.656	1.656	1.656	1.655	1.653	1.650
%12719183.00	1.720	1.721	1.722	1.722	1.722	1.720
%12720283.00	1.785	1.788	1.791	1.793	1.794	1.794
%12721383.00	1.852	1.857	1.862	1.866	1.869	1.870
%12722483.00	1.921	1.929	1.936	1.942	1.947	1.950
%12723583.00	1.991	2.002	2.012	2.021	2.029	2.034
%12724683.00	2.064	2.078	2.092	2.104	2.114	2.122
%12725783.00	2.138	2.157	2.174	2.190	2.204	2.215
%12726883.00	2.215	2.238	2.260	2.281	2.298	2.313
%12727983.00	2.293	2.322	2.350	2.376	2.398	2.416
%12729083.00	2.374	2.409	2.443	2.475	2.504	2.527
%12730183.00	2.456	2.499	2.541	2.580	2.616	2.645
%12731283.00	2.540	2.592	2.643	2.692	2.735	2.772
%12732383.00	2.625	2.687	2.749	2.809	2.864	2.910
%12733483.00	2.711	2.785	2.860	2.933	3.002	3.061
%12734583.00	2.795	2.883	2.974	3.065	3.151	3.227
%12735683.00	2.877	2.981	3.090	3.202	3.312	3.411
%12736783.00	2.953	3.074	3.205	3.344	3.484	3.617
%12737883.00	3.021	3.160	3.314	3.484	3.666	3.849
%12738983.00	3.076	3.232	3.409	3.613	3.845	4.102
%12740083.00	3.114	3.283	3.480	3.714	3.998	4.349
%12741183.00	3.132	3.309	3.517	3.769	4.085	4.510
%12742283.00	3.128	3.305	3.513	3.763	4.075	4.485
%12743383.00	3.103	3.273	3.470	3.701	3.975	4.300
%12744483.00	3.058	3.217	3.396	3.598	3.823	4.063
%12745583.00	2.997	3.142	3.301	3.473	3.654	3.833
%12746683.00	2.925	3.055	3.195	3.340	3.487	3.626
%12747783.00	2.845	2.962	3.084	3.208	3.329	3.442
%12748883.00	2.760	2.865	2.972	3.079	3.182	3.277
%12749983.00	2.673	2.767	2.862	2.955	3.045	3.127
%12751083.00	2.585	2.670	2.754	2.837	2.916	2.990
%12752183.00	2.498	2.574	2.650	2.725	2.796	2.862
%12753283.00	2.411	2.481	2.550	2.617	2.682	2.743
%12754383.00	2.326	2.390	2.453	2.515	2.574	2.630
%12755483.00	2.242	2.301	2.359	2.416	2.471	2.523
%12756583.00	2.160	2.215	2.268	2.321	2.372	2.420

Y [ft]	<- X [ft] ->					
	682309	683409	684509	685609	686709	687809
%12757683.00	2.080	2.131	2.180	2.229	2.277	2.322
%12758783.00	2.002	2.049	2.095	2.141	2.185	2.228
%12759883.00	1.926	1.970	2.013	2.055	2.097	2.136
%12760983.00	1.852	1.893	1.933	1.973	2.011	2.048
%12762083.00	1.780	1.818	1.856	1.893	1.928	1.963
%12763183.00	1.710	1.745	1.781	1.815	1.849	1.881
%12764283.00	1.641	1.675	1.708	1.740	1.771	1.802
%12765383.00	1.575	1.606	1.637	1.667	1.697	1.725
%12766483.00	1.511	1.540	1.569	1.597	1.624	1.651
%12767583.00	1.448	1.476	1.503	1.529	1.554	1.579
%12768683.00	1.388	1.413	1.438	1.463	1.487	1.510
%12769783.00	1.329	1.353	1.377	1.399	1.422	1.443
%12770883.00	1.272	1.295	1.317	1.338	1.359	1.379
%12771983.00	1.217	1.238	1.259	1.279	1.298	1.317
%12773083.00	1.164	1.184	1.203	1.222	1.240	1.257
%12774183.00	1.112	1.131	1.149	1.166	1.183	1.200
%12775283.00	1.063	1.080	1.097	1.113	1.129	1.144

Y [ft]	<- X [ft] ->					
	688909	690009	691109	692209	693309	694409
%12686183.00	0.426	0.422	0.417	0.412	0.408	0.403
%12687283.00	0.449	0.444	0.440	0.435	0.430	0.424
%12688383.00	0.473	0.468	0.463	0.458	0.453	0.447
%12689483.00	0.498	0.493	0.488	0.482	0.477	0.471
%12690583.00	0.524	0.519	0.513	0.507	0.502	0.496
%12691683.00	0.551	0.545	0.540	0.534	0.528	0.522
%12692783.00	0.579	0.573	0.568	0.561	0.555	0.549
%12693883.00	0.609	0.603	0.597	0.590	0.584	0.577
%12694983.00	0.639	0.633	0.627	0.620	0.613	0.606
%12696083.00	0.671	0.665	0.658	0.651	0.644	0.637
%12697183.00	0.704	0.698	0.691	0.684	0.677	0.669
%12698283.00	0.739	0.732	0.725	0.718	0.710	0.702
%12699383.00	0.775	0.768	0.760	0.753	0.745	0.737
%12700483.00	0.812	0.805	0.797	0.790	0.782	0.773
%12701583.00	0.851	0.843	0.836	0.828	0.819	0.811
%12702683.00	0.891	0.883	0.876	0.867	0.859	0.850
%12703783.00	0.933	0.925	0.917	0.909	0.900	0.891
%12704883.00	0.976	0.968	0.960	0.952	0.943	0.933
%12705983.00	1.021	1.013	1.005	0.996	0.987	0.978
%12707083.00	1.068	1.060	1.052	1.043	1.033	1.024
%12708183.00	1.116	1.108	1.100	1.091	1.082	1.072
%12709283.00	1.167	1.159	1.150	1.141	1.132	1.121
%12710383.00	1.219	1.211	1.203	1.194	1.184	1.173

Y [ft]	<- X [ft] ->					
	688909	690009	691109	692209	693309	694409
%12711483.00	1.273	1.265	1.257	1.248	1.238	1.228
%12712583.00	1.329	1.322	1.314	1.305	1.295	1.284
%12713683.00	1.388	1.381	1.373	1.364	1.354	1.343
%12714783.00	1.449	1.442	1.434	1.425	1.415	1.404
%12715883.00	1.512	1.505	1.498	1.489	1.479	1.468
%12716983.00	1.577	1.572	1.564	1.556	1.546	1.535
%12718083.00	1.646	1.641	1.634	1.626	1.616	1.605
%12719183.00	1.717	1.713	1.707	1.699	1.689	1.678
%12720283.00	1.792	1.788	1.783	1.775	1.766	1.754
%12721383.00	1.870	1.867	1.862	1.855	1.846	1.834
%12722483.00	1.951	1.950	1.946	1.940	1.930	1.918
%12723583.00	2.037	2.037	2.034	2.028	2.019	2.007
%12724683.00	2.127	2.129	2.127	2.121	2.112	2.100
%12725783.00	2.222	2.226	2.225	2.220	2.211	2.198
%12726883.00	2.323	2.329	2.329	2.325	2.316	2.302
%12727983.00	2.430	2.438	2.440	2.436	2.427	2.411
%12729083.00	2.544	2.555	2.559	2.555	2.545	2.528
%12730183.00	2.668	2.682	2.687	2.683	2.671	2.652
%12731283.00	2.801	2.819	2.826	2.821	2.807	2.784
%12732383.00	2.946	2.969	2.977	2.972	2.954	2.925
%12733483.00	3.106	3.135	3.145	3.137	3.113	3.076
%12734583.00	3.286	3.323	3.334	3.321	3.286	3.237
%12735683.00	3.490	3.538	3.550	3.527	3.477	3.409
%12736783.00	3.727	3.793	3.804	3.763	3.686	3.591
%12737883.00	4.009	4.109	4.115	4.037	3.913	3.777
%12738983.00	4.356	4.528	4.518	4.358	4.151	3.957
%12740083.00	4.778	5.161	5.088	4.712	4.372	4.110
%12741183.00	5.157	6.430	5.872	4.987	4.514	4.205
%12742283.00	5.071	5.885	5.625	4.945	4.511	4.219
%12743383.00	4.665	4.953	4.924	4.658	4.382	4.157
%12744483.00	4.290	4.443	4.456	4.349	4.196	4.045
%12745583.00	3.989	4.093	4.122	4.082	4.003	3.911
%12746683.00	3.744	3.825	3.862	3.856	3.821	3.772
%12747783.00	3.537	3.607	3.648	3.661	3.654	3.634
%12748883.00	3.358	3.422	3.465	3.490	3.500	3.501
%12749983.00	3.199	3.258	3.303	3.335	3.357	3.372
%12751083.00	3.055	3.111	3.157	3.193	3.222	3.246
%12752183.00	2.923	2.976	3.022	3.061	3.094	3.125
%12753283.00	2.799	2.850	2.895	2.935	2.972	3.006
%12754383.00	2.683	2.731	2.775	2.816	2.853	2.889

Y [ft]	<- X [ft] ->					
	688909	690009	691109	692209	693309	694409
%12755483.00	2.572	2.618	2.661	2.701	2.739	2.775
%12756583.00	2.467	2.511	2.552	2.591	2.628	2.663
%12757683.00	2.366	2.407	2.447	2.484	2.520	2.554
%12758783.00	2.269	2.308	2.345	2.381	2.415	2.447
%12759883.00	2.175	2.212	2.247	2.281	2.313	2.343
%12760983.00	2.084	2.119	2.152	2.184	2.214	2.243
%12762083.00	1.997	2.030	2.061	2.090	2.118	2.145
%12763183.00	1.913	1.943	1.972	2.000	2.026	2.050
%12764283.00	1.831	1.859	1.886	1.912	1.936	1.959
%12765383.00	1.752	1.779	1.804	1.828	1.850	1.871
%12766483.00	1.676	1.701	1.724	1.746	1.767	1.786
%12767583.00	1.603	1.626	1.647	1.668	1.686	1.704
%12768683.00	1.532	1.553	1.573	1.592	1.609	1.625
%12769783.00	1.464	1.483	1.502	1.519	1.535	1.550
%12770883.00	1.398	1.416	1.433	1.449	1.464	1.477
%12771983.00	1.335	1.352	1.367	1.382	1.396	1.408
%12773083.00	1.274	1.289	1.304	1.318	1.330	1.341
%12774183.00	1.215	1.229	1.243	1.256	1.267	1.277
%12775283.00	1.158	1.172	1.185	1.196	1.207	1.216

Y [ft]	<- X [ft] ->					
	695509	696609	697709	698809	699909	701009
%12686183.00	0.398	0.392	0.387	0.382	0.376	0.370
%12687283.00	0.419	0.414	0.408	0.402	0.396	0.391
%12688383.00	0.442	0.436	0.430	0.424	0.418	0.412
%12689483.00	0.465	0.459	0.453	0.447	0.440	0.434
%12690583.00	0.490	0.483	0.477	0.470	0.464	0.457
%12691683.00	0.515	0.509	0.502	0.495	0.488	0.481
%12692783.00	0.542	0.535	0.528	0.521	0.514	0.506
%12693883.00	0.570	0.563	0.556	0.548	0.540	0.533
%12694983.00	0.599	0.592	0.584	0.576	0.568	0.560
%12696083.00	0.630	0.622	0.614	0.606	0.597	0.589
%12697183.00	0.661	0.653	0.645	0.636	0.628	0.619
%12698283.00	0.694	0.686	0.677	0.668	0.659	0.650
%12699383.00	0.729	0.720	0.711	0.702	0.692	0.683
%12700483.00	0.765	0.756	0.746	0.737	0.727	0.716
%12701583.00	0.802	0.793	0.783	0.773	0.763	0.752
%12702683.00	0.841	0.831	0.821	0.811	0.800	0.789
%12703783.00	0.881	0.871	0.861	0.850	0.839	0.827
%12704883.00	0.924	0.913	0.903	0.891	0.880	0.867
%12705983.00	0.967	0.957	0.946	0.934	0.922	0.909
%12707083.00	1.013	1.002	0.991	0.979	0.966	0.953
%12708183.00	1.061	1.050	1.038	1.025	1.012	0.998

Y [ft]	<- X [ft] ->					
	695509	696609	697709	698809	699909	701009
%12709283.00	1.110	1.099	1.087	1.074	1.060	1.046
%12710383.00	1.162	1.150	1.138	1.124	1.110	1.095
%12711483.00	1.216	1.204	1.191	1.177	1.162	1.146
%12712583.00	1.272	1.260	1.246	1.232	1.216	1.200
%12713683.00	1.331	1.318	1.304	1.289	1.273	1.256
%12714783.00	1.392	1.378	1.364	1.348	1.332	1.314
%12715883.00	1.456	1.442	1.427	1.411	1.393	1.374
%12716983.00	1.522	1.508	1.492	1.475	1.457	1.438
%12718083.00	1.592	1.577	1.561	1.543	1.524	1.504
%12719183.00	1.664	1.649	1.633	1.614	1.594	1.572
%12720283.00	1.740	1.725	1.707	1.688	1.667	1.644
%12721383.00	1.820	1.804	1.786	1.765	1.743	1.719
%12722483.00	1.904	1.887	1.867	1.846	1.822	1.797
%12723583.00	1.992	1.974	1.953	1.930	1.905	1.878
%12724683.00	2.084	2.065	2.043	2.018	1.992	1.963
%12725783.00	2.181	2.161	2.137	2.111	2.082	2.051
%12726883.00	2.283	2.261	2.235	2.207	2.176	2.142
%12727983.00	2.391	2.367	2.339	2.307	2.274	2.238
%12729083.00	2.505	2.478	2.446	2.412	2.375	2.336
%12730183.00	2.626	2.594	2.559	2.521	2.480	2.438
%12731283.00	2.753	2.717	2.677	2.634	2.589	2.543
%12732383.00	2.888	2.845	2.799	2.750	2.701	2.651
%12733483.00	3.030	2.978	2.924	2.869	2.814	2.760
%12734583.00	3.179	3.116	3.052	2.990	2.929	2.871
%12735683.00	3.334	3.256	3.181	3.110	3.043	2.981
%12736783.00	3.492	3.396	3.308	3.227	3.155	3.089
%12737883.00	3.647	3.530	3.428	3.339	3.262	3.194
%12738983.00	3.791	3.652	3.536	3.440	3.360	3.293
%12740083.00	3.908	3.751	3.627	3.528	3.449	3.385
%12741183.00	3.984	3.820	3.694	3.598	3.524	3.467
%12742283.00	4.008	3.852	3.735	3.648	3.583	3.538
%12743383.00	3.982	3.849	3.749	3.676	3.626	3.596
%12744483.00	3.917	3.814	3.737	3.683	3.651	3.639
%12745583.00	3.826	3.756	3.704	3.671	3.658	3.666
%12746683.00	3.723	3.681	3.653	3.640	3.647	3.674
%12747783.00	3.612	3.595	3.587	3.593	3.616	3.661
%12748883.00	3.499	3.500	3.509	3.530	3.567	3.624
%12749983.00	3.384	3.399	3.421	3.453	3.499	3.564
%12751083.00	3.269	3.294	3.324	3.363	3.414	3.481
%12752183.00	3.154	3.185	3.220	3.262	3.315	3.380

Y [ft]	<- X [ft] ->					
	695509	696609	697709	698809	699909	701009
%12753283.00	3.039	3.073	3.111	3.154	3.205	3.264
%12754383.00	2.924	2.960	2.998	3.040	3.087	3.140
%12755483.00	2.810	2.846	2.883	2.922	2.965	3.011
%12756583.00	2.698	2.732	2.767	2.804	2.841	2.880
%12757683.00	2.587	2.620	2.652	2.685	2.718	2.750
%12758783.00	2.479	2.509	2.539	2.568	2.596	2.623
%12759883.00	2.373	2.401	2.428	2.454	2.478	2.500
%12760983.00	2.270	2.296	2.320	2.343	2.363	2.381
%12762083.00	2.170	2.193	2.215	2.235	2.252	2.267
%12763183.00	2.073	2.094	2.114	2.131	2.146	2.158
%12764283.00	1.980	1.999	2.016	2.031	2.044	2.054
%12765383.00	1.890	1.907	1.922	1.936	1.946	1.954
%12766483.00	1.803	1.819	1.832	1.844	1.853	1.859
%12767583.00	1.720	1.734	1.746	1.756	1.763	1.768
%12768683.00	1.640	1.652	1.663	1.672	1.678	1.682
%12769783.00	1.563	1.574	1.584	1.591	1.597	1.600
%12770883.00	1.489	1.499	1.508	1.514	1.519	1.521
%12771983.00	1.418	1.428	1.435	1.441	1.445	1.447
%12773083.00	1.351	1.359	1.366	1.371	1.374	1.375
%12774183.00	1.286	1.293	1.299	1.304	1.307	1.307
%12775283.00	1.224	1.231	1.236	1.240	1.242	1.243

Y [ft]	<- X [ft] ->					
	702109	703209	704309	705409	706509	707609
%12686183.00	0.365	0.359	0.353	0.347	0.341	0.334
%12687283.00	0.384	0.378	0.372	0.366	0.359	0.353
%12688383.00	0.405	0.399	0.392	0.386	0.379	0.372
%12689483.00	0.427	0.420	0.413	0.406	0.399	0.392
%12690583.00	0.450	0.443	0.435	0.428	0.420	0.413
%12691683.00	0.474	0.466	0.458	0.451	0.443	0.435
%12692783.00	0.499	0.491	0.483	0.474	0.466	0.458
%12693883.00	0.524	0.516	0.508	0.499	0.490	0.482
%12694983.00	0.552	0.543	0.534	0.525	0.516	0.507
%12696083.00	0.580	0.571	0.562	0.552	0.542	0.533
%12697183.00	0.609	0.600	0.590	0.580	0.570	0.560
%12698283.00	0.640	0.630	0.620	0.610	0.599	0.588
%12699383.00	0.672	0.662	0.651	0.640	0.629	0.618
%12700483.00	0.706	0.695	0.684	0.672	0.661	0.649
%12701583.00	0.741	0.730	0.718	0.706	0.693	0.681
%12702683.00	0.777	0.765	0.753	0.741	0.728	0.714
%12703783.00	0.815	0.803	0.790	0.777	0.763	0.749
%12704883.00	0.855	0.842	0.828	0.815	0.800	0.786
%12705983.00	0.896	0.883	0.868	0.854	0.839	0.824

Y [ft]	<- X [ft] ->					
	702109	703209	704309	705409	706509	707609
%12707083.00	0.939	0.925	0.910	0.895	0.879	0.863
%12708183.00	0.984	0.969	0.954	0.938	0.921	0.904
%12709283.00	1.031	1.015	0.999	0.982	0.965	0.947
%12710383.00	1.079	1.063	1.046	1.028	1.010	0.991
%12711483.00	1.130	1.113	1.095	1.076	1.057	1.038
%12712583.00	1.183	1.165	1.146	1.127	1.106	1.086
%12713683.00	1.238	1.219	1.199	1.179	1.158	1.136
%12714783.00	1.295	1.275	1.255	1.233	1.211	1.188
%12715883.00	1.355	1.334	1.312	1.290	1.266	1.242
%12716983.00	1.417	1.395	1.372	1.348	1.324	1.298
%12718083.00	1.482	1.459	1.435	1.410	1.383	1.356
%12719183.00	1.549	1.525	1.500	1.473	1.446	1.417
%12720283.00	1.620	1.594	1.567	1.539	1.510	1.480
%12721383.00	1.693	1.666	1.638	1.608	1.577	1.545
%12722483.00	1.770	1.741	1.711	1.679	1.647	1.613
%12723583.00	1.849	1.819	1.787	1.753	1.719	1.683
%12724683.00	1.932	1.900	1.866	1.830	1.794	1.756
%12725783.00	2.018	1.984	1.947	1.910	1.871	1.832
%12726883.00	2.107	2.071	2.032	1.993	1.952	1.910
%12727983.00	2.200	2.161	2.120	2.078	2.035	1.991
%12729083.00	2.296	2.254	2.211	2.167	2.121	2.074
%12730183.00	2.395	2.350	2.305	2.258	2.210	2.161
%12731283.00	2.497	2.449	2.401	2.352	2.302	2.250
%12732383.00	2.601	2.550	2.500	2.448	2.396	2.343
%12733483.00	2.707	2.654	2.601	2.548	2.494	2.438
%12734583.00	2.814	2.759	2.705	2.650	2.594	2.537
%12735683.00	2.922	2.865	2.810	2.755	2.699	2.640
%12736783.00	3.028	2.972	2.917	2.862	2.806	2.748
%12737883.00	3.133	3.078	3.025	2.973	2.919	2.861
%12738983.00	3.235	3.183	3.135	3.086	3.036	2.981
%12740083.00	3.332	3.287	3.246	3.205	3.160	3.109
%12741183.00	3.423	3.388	3.358	3.328	3.293	3.249
%12742283.00	3.507	3.486	3.472	3.458	3.438	3.404
%12743383.00	3.582	3.580	3.587	3.596	3.597	3.581
%12744483.00	3.645	3.667	3.702	3.742	3.777	3.789
%12745583.00	3.694	3.743	3.811	3.894	3.980	4.041
%12746683.00	3.725	3.801	3.907	4.044	4.205	4.360
%12747783.00	3.731	3.832	3.972	4.166	4.430	4.766
%12748883.00	3.707	3.824	3.988	4.220	4.568	5.158
%12749983.00	3.653	3.774	3.939	4.169	4.504	5.031

Y [ft]	<- X [ft] ->					
	702109	703209	704309	705409	706509	707609
%12751083.00	3.569	3.683	3.831	4.022	4.266	4.547
%12752183.00	3.460	3.560	3.681	3.823	3.978	4.114
%12753283.00	3.335	3.417	3.510	3.609	3.702	3.768
%12754383.00	3.199	3.264	3.333	3.399	3.454	3.484
%12755483.00	3.059	3.110	3.159	3.203	3.234	3.243
%12756583.00	2.919	2.958	2.992	3.020	3.036	3.034
%12757683.00	2.782	2.810	2.834	2.851	2.857	2.848
%12758783.00	2.648	2.669	2.685	2.694	2.694	2.681
%12759883.00	2.520	2.535	2.545	2.549	2.544	2.530
%12760983.00	2.396	2.407	2.413	2.413	2.406	2.390
%12762083.00	2.279	2.287	2.289	2.287	2.277	2.261
%12763183.00	2.167	2.172	2.173	2.168	2.158	2.141
%12764283.00	2.060	2.063	2.062	2.056	2.046	2.030
%12765383.00	1.959	1.960	1.958	1.952	1.941	1.925
%12766483.00	1.863	1.863	1.860	1.853	1.842	1.827
%12767583.00	1.771	1.770	1.766	1.759	1.748	1.734
%12768683.00	1.684	1.682	1.678	1.671	1.660	1.646
%12769783.00	1.601	1.599	1.594	1.587	1.577	1.563
%12770883.00	1.522	1.520	1.515	1.508	1.498	1.485
%12771983.00	1.446	1.444	1.439	1.432	1.423	1.411
%12773083.00	1.375	1.372	1.368	1.361	1.352	1.340
%12774183.00	1.307	1.304	1.299	1.293	1.284	1.273
%12775283.00	1.242	1.239	1.234	1.228	1.220	1.210

Y [ft]	<- X [ft] ->					
	708709	709809	710909	712009	713109	714209
%12686183.00	0.328	0.322	0.315	0.309	0.302	0.296
%12687283.00	0.346	0.339	0.332	0.326	0.319	0.312
%12688383.00	0.365	0.358	0.351	0.343	0.336	0.329
%12689483.00	0.384	0.377	0.369	0.362	0.354	0.346
%12690583.00	0.405	0.397	0.389	0.381	0.373	0.365
%12691683.00	0.427	0.418	0.410	0.401	0.393	0.384
%12692783.00	0.449	0.440	0.431	0.423	0.413	0.404
%12693883.00	0.472	0.463	0.454	0.445	0.435	0.425
%12694983.00	0.497	0.487	0.478	0.468	0.458	0.447
%12696083.00	0.523	0.512	0.502	0.492	0.481	0.470
%12697183.00	0.549	0.539	0.528	0.517	0.506	0.494
%12698283.00	0.577	0.566	0.554	0.543	0.531	0.519
%12699383.00	0.606	0.594	0.582	0.570	0.558	0.545
%12700483.00	0.636	0.624	0.611	0.598	0.585	0.572
%12701583.00	0.668	0.655	0.642	0.628	0.614	0.600
%12702683.00	0.701	0.687	0.673	0.659	0.644	0.630
%12703783.00	0.735	0.721	0.706	0.691	0.676	0.660

Y [ft]	<- X [ft] ->					
	708709	709809	710909	712009	713109	714209
%12704883.00	0.771	0.755	0.740	0.724	0.708	0.692
%12705983.00	0.808	0.792	0.775	0.759	0.742	0.725
%12707083.00	0.846	0.830	0.812	0.795	0.777	0.759
%12708183.00	0.887	0.869	0.851	0.832	0.813	0.794
%12709283.00	0.929	0.910	0.891	0.871	0.851	0.831
%12710383.00	0.972	0.952	0.932	0.912	0.891	0.870
%12711483.00	1.017	0.997	0.975	0.954	0.932	0.909
%12712583.00	1.064	1.042	1.020	0.997	0.974	0.951
%12713683.00	1.113	1.090	1.067	1.042	1.018	0.993
%12714783.00	1.164	1.140	1.115	1.089	1.064	1.037
%12715883.00	1.217	1.191	1.165	1.138	1.111	1.083
%12716983.00	1.272	1.245	1.217	1.189	1.160	1.131
%12718083.00	1.328	1.300	1.271	1.241	1.210	1.180
%12719183.00	1.388	1.357	1.326	1.295	1.263	1.231
%12720283.00	1.449	1.417	1.384	1.351	1.317	1.283
%12721383.00	1.512	1.479	1.444	1.409	1.373	1.337
%12722483.00	1.578	1.543	1.506	1.469	1.431	1.393
%12723583.00	1.647	1.609	1.571	1.531	1.491	1.451
%12724683.00	1.717	1.678	1.637	1.596	1.553	1.511
%12725783.00	1.791	1.749	1.706	1.662	1.618	1.572
%12726883.00	1.867	1.822	1.777	1.731	1.684	1.636
%12727983.00	1.945	1.898	1.851	1.802	1.752	1.702
%12729083.00	2.026	1.977	1.927	1.875	1.823	1.769
%12730183.00	2.110	2.059	2.005	1.951	1.896	1.839
%12731283.00	2.197	2.143	2.087	2.030	1.971	1.911
%12732383.00	2.287	2.230	2.172	2.111	2.049	1.986
%12733483.00	2.381	2.321	2.260	2.196	2.130	2.063
%12734583.00	2.478	2.416	2.352	2.284	2.215	2.143
%12735683.00	2.579	2.515	2.448	2.377	2.303	2.226
%12736783.00	2.686	2.619	2.549	2.473	2.394	2.312
%12737883.00	2.798	2.730	2.656	2.576	2.491	2.402
%12738983.00	2.918	2.848	2.770	2.684	2.593	2.496
%12740083.00	3.048	2.976	2.893	2.801	2.700	2.595
%12741183.00	3.191	3.117	3.029	2.927	2.815	2.697
%12742283.00	3.351	3.276	3.179	3.064	2.937	2.804
%12743383.00	3.537	3.459	3.349	3.215	3.067	2.913
%12744483.00	3.759	3.676	3.544	3.381	3.203	3.023
%12745583.00	4.039	3.946	3.774	3.562	3.341	3.129
%12746683.00	4.421	4.301	4.043	3.750	3.472	3.221
%12747783.00	5.021	4.803	4.338	3.919	3.574	3.287

Y [ft]	<- X [ft] ->					
	708709	709809	710909	712009	713109	714209
%12748883.00	6.381	5.449	4.552	4.012	3.622	3.314
%12749983.00	5.763	5.238	4.484	3.973	3.594	3.291
%12751083.00	4.724	4.560	4.186	3.814	3.495	3.223
%12752183.00	4.164	4.068	3.855	3.601	3.350	3.118
%12753283.00	3.775	3.703	3.561	3.379	3.185	2.993
%12754383.00	3.473	3.413	3.307	3.170	3.017	2.859
%12755483.00	3.224	3.171	3.087	2.979	2.855	2.723
%12756583.00	3.010	2.963	2.893	2.804	2.701	2.590
%12757683.00	2.823	2.780	2.720	2.644	2.558	2.463
%12758783.00	2.656	2.616	2.563	2.498	2.423	2.341
%12759883.00	2.504	2.468	2.420	2.363	2.298	2.226
%12760983.00	2.365	2.332	2.289	2.238	2.180	2.116
%12762083.00	2.238	2.206	2.167	2.122	2.070	2.013
%12763183.00	2.119	2.090	2.054	2.013	1.966	1.915
%12764283.00	2.008	1.981	1.948	1.911	1.869	1.822
%12765383.00	1.904	1.879	1.849	1.815	1.776	1.734
%12766483.00	1.807	1.784	1.756	1.724	1.689	1.651
%12767583.00	1.715	1.693	1.668	1.639	1.606	1.571
%12768683.00	1.629	1.608	1.585	1.558	1.528	1.496
%12769783.00	1.547	1.528	1.506	1.481	1.454	1.424
%12770883.00	1.470	1.452	1.431	1.408	1.383	1.355
%12771983.00	1.396	1.380	1.360	1.339	1.316	1.290
%12773083.00	1.327	1.311	1.293	1.273	1.252	1.228
%12774183.00	1.261	1.246	1.229	1.211	1.191	1.169
%12775283.00	1.198	1.184	1.168	1.151	1.132	1.112

Y [ft]	<- X [ft] ->					
	715309	716409	717509	718609	719709	720809
%12686183.00	0.289	0.282	0.276	0.269	0.262	0.255
%12687283.00	0.305	0.298	0.291	0.284	0.276	0.269
%12688383.00	0.321	0.314	0.306	0.299	0.291	0.284
%12689483.00	0.339	0.331	0.323	0.315	0.307	0.299
%12690583.00	0.357	0.348	0.340	0.332	0.323	0.315
%12691683.00	0.375	0.367	0.358	0.349	0.340	0.332
%12692783.00	0.395	0.386	0.377	0.367	0.358	0.349
%12693883.00	0.416	0.406	0.396	0.386	0.377	0.367
%12694983.00	0.437	0.427	0.417	0.406	0.396	0.386
%12696083.00	0.460	0.449	0.438	0.427	0.416	0.405
%12697183.00	0.483	0.472	0.460	0.448	0.437	0.425
%12698283.00	0.507	0.495	0.483	0.471	0.459	0.447
%12699383.00	0.533	0.520	0.507	0.494	0.481	0.469
%12700483.00	0.559	0.546	0.532	0.519	0.505	0.491
%12701583.00	0.586	0.572	0.558	0.544	0.529	0.515

Y [ft]	<- X [ft] ->					
	715309	716409	717509	718609	719709	720809
%12702683.00	0.615	0.600	0.585	0.570	0.555	0.540
%12703783.00	0.645	0.629	0.613	0.597	0.581	0.565
%12704883.00	0.675	0.659	0.642	0.626	0.609	0.592
%12705983.00	0.707	0.690	0.672	0.655	0.637	0.619
%12707083.00	0.741	0.722	0.704	0.685	0.667	0.648
%12708183.00	0.775	0.756	0.736	0.717	0.697	0.677
%12709283.00	0.811	0.791	0.770	0.749	0.729	0.708
%12710383.00	0.848	0.827	0.805	0.783	0.761	0.740
%12711483.00	0.887	0.864	0.841	0.818	0.795	0.772
%12712583.00	0.927	0.903	0.879	0.854	0.830	0.806
%12713683.00	0.968	0.943	0.917	0.892	0.866	0.841
%12714783.00	1.011	0.984	0.957	0.931	0.904	0.876
%12715883.00	1.055	1.027	0.999	0.970	0.942	0.913
%12716983.00	1.101	1.072	1.042	1.012	0.982	0.952
%12718083.00	1.149	1.117	1.086	1.054	1.022	0.991
%12719183.00	1.198	1.165	1.131	1.098	1.064	1.031
%12720283.00	1.248	1.213	1.178	1.143	1.108	1.072
%12721383.00	1.301	1.264	1.227	1.189	1.152	1.115
%12722483.00	1.355	1.316	1.276	1.237	1.198	1.159
%12723583.00	1.410	1.369	1.328	1.286	1.245	1.203
%12724683.00	1.468	1.424	1.380	1.337	1.293	1.249
%12725783.00	1.527	1.481	1.435	1.388	1.342	1.296
%12726883.00	1.588	1.539	1.490	1.441	1.392	1.344
%12727983.00	1.651	1.599	1.547	1.496	1.444	1.392
%12729083.00	1.715	1.661	1.606	1.551	1.496	1.442
%12730183.00	1.782	1.724	1.666	1.608	1.550	1.493
%12731283.00	1.851	1.789	1.728	1.666	1.605	1.544
%12732383.00	1.922	1.856	1.791	1.726	1.660	1.596
%12733483.00	1.995	1.925	1.856	1.786	1.717	1.648
%12734583.00	2.070	1.996	1.922	1.848	1.774	1.701
%12735683.00	2.148	2.069	1.989	1.910	1.831	1.754
%12736783.00	2.229	2.143	2.058	1.973	1.889	1.807
%12737883.00	2.312	2.220	2.128	2.036	1.947	1.859
%12738983.00	2.398	2.298	2.198	2.100	2.004	1.910
%12740083.00	2.486	2.377	2.269	2.162	2.059	1.960
%12741183.00	2.577	2.457	2.339	2.224	2.113	2.007
%12742283.00	2.669	2.536	2.407	2.282	2.163	2.050
%12743383.00	2.761	2.613	2.471	2.337	2.210	2.090
%12744483.00	2.850	2.685	2.530	2.385	2.250	2.124
%12745583.00	2.931	2.748	2.580	2.425	2.283	2.151

Y [ft]	<- X [ft] ->					
	715309	716409	717509	718609	719709	720809
%12746683.00	2.997	2.798	2.618	2.455	2.306	2.170
%12747783.00	3.042	2.829	2.641	2.472	2.319	2.180
%12748883.00	3.058	2.838	2.646	2.475	2.320	2.180
%12749983.00	3.039	2.822	2.632	2.462	2.309	2.170
%12751083.00	2.988	2.782	2.599	2.435	2.286	2.149
%12752183.00	2.909	2.720	2.549	2.394	2.251	2.120
%12753283.00	2.812	2.643	2.486	2.341	2.206	2.081
%12754383.00	2.703	2.554	2.412	2.279	2.154	2.036
%12755483.00	2.590	2.459	2.332	2.210	2.094	1.985
%12756583.00	2.476	2.360	2.247	2.137	2.031	1.929
%12757683.00	2.363	2.262	2.161	2.061	1.964	1.870
%12758783.00	2.254	2.164	2.074	1.984	1.895	1.809
%12759883.00	2.149	2.069	1.988	1.907	1.826	1.746
%12760983.00	2.048	1.977	1.904	1.830	1.756	1.683
%12762083.00	1.952	1.888	1.822	1.755	1.688	1.620
%12763183.00	1.860	1.802	1.743	1.682	1.620	1.558
%12764283.00	1.773	1.720	1.666	1.610	1.554	1.497
%12765383.00	1.689	1.642	1.592	1.541	1.489	1.437
%12766483.00	1.610	1.566	1.521	1.474	1.426	1.378
%12767583.00	1.534	1.494	1.452	1.409	1.365	1.320
%12768683.00	1.461	1.425	1.386	1.347	1.306	1.265
%12769783.00	1.392	1.358	1.323	1.286	1.249	1.211
%12770883.00	1.326	1.295	1.262	1.229	1.194	1.158
%12771983.00	1.263	1.234	1.204	1.173	1.141	1.108
%12773083.00	1.203	1.176	1.148	1.119	1.089	1.059
%12774183.00	1.145	1.121	1.095	1.068	1.040	1.012
%12775283.00	1.090	1.067	1.043	1.018	0.993	0.966

Y [ft]	<- X [ft] ->					
	721909	723009	724109	725209	726309	727409
%12686183.00	0.249	0.242	0.235	0.229	0.222	0.216
%12687283.00	0.262	0.255	0.248	0.241	0.234	0.227
%12688383.00	0.276	0.269	0.262	0.254	0.247	0.239
%12689483.00	0.291	0.283	0.275	0.268	0.260	0.252
%12690583.00	0.307	0.298	0.290	0.282	0.273	0.265
%12691683.00	0.323	0.314	0.305	0.296	0.288	0.279
%12692783.00	0.339	0.330	0.321	0.312	0.302	0.293
%12693883.00	0.357	0.347	0.337	0.328	0.318	0.308
%12694983.00	0.375	0.365	0.354	0.344	0.334	0.324
%12696083.00	0.394	0.383	0.372	0.361	0.351	0.340
%12697183.00	0.414	0.402	0.391	0.379	0.368	0.357
%12698283.00	0.434	0.422	0.410	0.398	0.386	0.374
%12699383.00	0.456	0.443	0.430	0.417	0.405	0.392

Y [ft]	<- X [ft] ->					
	721909	723009	724109	725209	726309	727409
%12700483.00	0.478	0.464	0.451	0.437	0.424	0.411
%12701583.00	0.501	0.486	0.472	0.458	0.444	0.430
%12702683.00	0.525	0.510	0.495	0.480	0.465	0.450
%12703783.00	0.549	0.534	0.518	0.502	0.486	0.471
%12704883.00	0.575	0.558	0.542	0.525	0.509	0.492
%12705983.00	0.602	0.584	0.566	0.549	0.532	0.514
%12707083.00	0.629	0.611	0.592	0.574	0.555	0.537
%12708183.00	0.658	0.638	0.619	0.599	0.580	0.561
%12709283.00	0.687	0.667	0.646	0.626	0.605	0.585
%12710383.00	0.718	0.696	0.674	0.653	0.631	0.610
%12711483.00	0.749	0.726	0.703	0.681	0.658	0.636
%12712583.00	0.782	0.757	0.733	0.709	0.686	0.662
%12713683.00	0.815	0.790	0.764	0.739	0.714	0.690
%12714783.00	0.850	0.823	0.796	0.770	0.743	0.718
%12715883.00	0.885	0.857	0.829	0.801	0.773	0.746
%12716983.00	0.922	0.892	0.862	0.833	0.804	0.775
%12718083.00	0.959	0.928	0.897	0.866	0.835	0.805
%12719183.00	0.998	0.965	0.932	0.899	0.867	0.836
%12720283.00	1.037	1.003	0.968	0.934	0.900	0.867
%12721383.00	1.078	1.041	1.005	0.969	0.934	0.899
%12722483.00	1.120	1.081	1.043	1.005	0.968	0.931
%12723583.00	1.162	1.121	1.081	1.041	1.002	0.964
%12724683.00	1.206	1.163	1.120	1.078	1.037	0.997
%12725783.00	1.250	1.205	1.160	1.116	1.073	1.030
%12726883.00	1.295	1.248	1.201	1.154	1.109	1.064
%12727983.00	1.341	1.291	1.241	1.193	1.145	1.098
%12729083.00	1.388	1.335	1.283	1.232	1.181	1.132
%12730183.00	1.436	1.380	1.325	1.271	1.218	1.166
%12731283.00	1.484	1.425	1.366	1.310	1.254	1.200
%12732383.00	1.532	1.470	1.408	1.349	1.290	1.234
%12733483.00	1.581	1.515	1.450	1.387	1.326	1.267
%12734583.00	1.630	1.560	1.492	1.426	1.361	1.299
%12735683.00	1.678	1.604	1.533	1.463	1.396	1.331
%12736783.00	1.726	1.648	1.573	1.500	1.429	1.362
%12737883.00	1.774	1.691	1.612	1.535	1.461	1.391
%12738983.00	1.820	1.732	1.649	1.568	1.492	1.418
%12740083.00	1.864	1.772	1.684	1.600	1.520	1.444
%12741183.00	1.905	1.808	1.716	1.629	1.546	1.467
%12742283.00	1.943	1.842	1.746	1.655	1.569	1.487
%12743383.00	1.977	1.871	1.771	1.677	1.588	1.505

Y [ft]	<- X [ft] ->					
	721909	723009	724109	725209	726309	727409
%12744483.00	2.006	1.896	1.792	1.696	1.604	1.519
%12745583.00	2.029	1.915	1.809	1.709	1.616	1.529
%12746683.00	2.044	1.928	1.819	1.719	1.624	1.536
%12747783.00	2.052	1.934	1.824	1.722	1.627	1.538
%12748883.00	2.051	1.933	1.823	1.721	1.626	1.536
%12749983.00	2.042	1.924	1.815	1.714	1.619	1.531
%12751083.00	2.024	1.909	1.801	1.701	1.608	1.520
%12752183.00	1.998	1.886	1.781	1.683	1.592	1.506
%12753283.00	1.965	1.857	1.756	1.661	1.572	1.488
%12754383.00	1.926	1.822	1.725	1.634	1.548	1.466
%12755483.00	1.881	1.783	1.690	1.603	1.520	1.441
%12756583.00	1.832	1.739	1.652	1.568	1.489	1.413
%12757683.00	1.780	1.693	1.610	1.531	1.455	1.383
%12758783.00	1.725	1.644	1.566	1.491	1.419	1.350
%12759883.00	1.668	1.593	1.520	1.449	1.381	1.316
%12760983.00	1.611	1.541	1.473	1.406	1.342	1.280
%12762083.00	1.554	1.489	1.425	1.363	1.302	1.243
%12763183.00	1.497	1.436	1.376	1.318	1.261	1.206
%12764283.00	1.440	1.384	1.328	1.273	1.220	1.168
%12765383.00	1.384	1.332	1.280	1.229	1.179	1.130
%12766483.00	1.329	1.280	1.232	1.184	1.137	1.091
%12767583.00	1.275	1.230	1.185	1.140	1.096	1.053
%12768683.00	1.223	1.181	1.139	1.097	1.056	1.015
%12769783.00	1.172	1.133	1.094	1.055	1.016	0.978
%12770883.00	1.122	1.086	1.049	1.013	0.977	0.941
%12771983.00	1.074	1.040	1.006	0.972	0.938	0.904
%12773083.00	1.028	0.996	0.964	0.932	0.900	0.869
%12774183.00	0.983	0.953	0.923	0.894	0.864	0.834
%12775283.00	0.939	0.912	0.884	0.856	0.828	0.800

Y [ft]	<- X [ft] ->					
	728509	729609	730709	731809	732909	734009
%12686183.00	0.209	0.203	0.196	0.190	0.184	0.178
%12687283.00	0.220	0.214	0.207	0.200	0.194	0.187
%12688383.00	0.232	0.225	0.218	0.211	0.204	0.197
%12689483.00	0.244	0.237	0.229	0.222	0.215	0.207
%12690583.00	0.257	0.249	0.241	0.233	0.226	0.218
%12691683.00	0.271	0.262	0.254	0.245	0.237	0.229
%12692783.00	0.284	0.275	0.267	0.258	0.249	0.241
%12693883.00	0.299	0.289	0.280	0.271	0.262	0.253
%12694983.00	0.314	0.304	0.294	0.284	0.275	0.265
%12696083.00	0.329	0.319	0.308	0.298	0.288	0.278
%12697183.00	0.345	0.334	0.323	0.313	0.302	0.291

Y [ft]	<- X [ft] ->					
	728509	729609	730709	731809	732909	734009
%12698283.00	0.362	0.351	0.339	0.328	0.316	0.305
%12699383.00	0.380	0.367	0.355	0.343	0.331	0.320
%12700483.00	0.398	0.385	0.372	0.359	0.347	0.334
%12701583.00	0.416	0.403	0.389	0.376	0.363	0.350
%12702683.00	0.436	0.421	0.407	0.393	0.379	0.365
%12703783.00	0.455	0.440	0.425	0.411	0.396	0.382
%12704883.00	0.476	0.460	0.444	0.429	0.414	0.399
%12705983.00	0.497	0.481	0.464	0.448	0.432	0.416
%12707083.00	0.519	0.502	0.484	0.467	0.450	0.434
%12708183.00	0.542	0.523	0.505	0.487	0.469	0.452
%12709283.00	0.565	0.546	0.526	0.507	0.489	0.471
%12710383.00	0.589	0.569	0.548	0.529	0.509	0.490
%12711483.00	0.614	0.592	0.571	0.550	0.529	0.509
%12712583.00	0.639	0.617	0.594	0.572	0.551	0.529
%12713683.00	0.665	0.641	0.618	0.595	0.572	0.550
%12714783.00	0.692	0.667	0.642	0.618	0.594	0.571
%12715883.00	0.719	0.693	0.667	0.642	0.617	0.592
%12716983.00	0.747	0.720	0.692	0.666	0.640	0.614
%12718083.00	0.776	0.747	0.718	0.690	0.663	0.636
%12719183.00	0.805	0.774	0.744	0.715	0.686	0.658
%12720283.00	0.834	0.802	0.771	0.740	0.710	0.681
%12721383.00	0.864	0.831	0.798	0.766	0.734	0.704
%12722483.00	0.895	0.860	0.825	0.792	0.759	0.727
%12723583.00	0.926	0.889	0.853	0.818	0.783	0.750
%12724683.00	0.957	0.919	0.881	0.844	0.808	0.773
%12725783.00	0.989	0.948	0.909	0.870	0.833	0.796
%12726883.00	1.021	0.978	0.937	0.897	0.857	0.820
%12727983.00	1.052	1.008	0.965	0.923	0.882	0.843
%12729083.00	1.084	1.038	0.993	0.949	0.906	0.865
%12730183.00	1.116	1.068	1.020	0.975	0.931	0.888
%12731283.00	1.148	1.097	1.048	1.000	0.954	0.910
%12732383.00	1.179	1.126	1.075	1.025	0.977	0.931
%12733483.00	1.210	1.154	1.101	1.049	1.000	0.952
%12734583.00	1.240	1.182	1.126	1.073	1.022	0.972
%12735683.00	1.269	1.209	1.151	1.096	1.043	0.992
%12736783.00	1.297	1.234	1.174	1.117	1.062	1.010
%12737883.00	1.323	1.258	1.196	1.137	1.081	1.027
%12738983.00	1.348	1.281	1.217	1.156	1.098	1.043
%12740083.00	1.371	1.302	1.236	1.173	1.114	1.057
%12741183.00	1.392	1.321	1.253	1.189	1.128	1.070

Y [ft]	<- X [ft] ->					
	728509	729609	730709	731809	732909	734009
%12742283.00	1.410	1.337	1.268	1.202	1.140	1.080
%12743383.00	1.425	1.351	1.280	1.213	1.150	1.090
%12744483.00	1.438	1.362	1.290	1.222	1.157	1.097
%12745583.00	1.447	1.370	1.297	1.228	1.163	1.102
%12746683.00	1.453	1.375	1.301	1.232	1.166	1.105
%12747783.00	1.455	1.376	1.303	1.233	1.167	1.105
%12748883.00	1.453	1.375	1.301	1.231	1.166	1.104
%12749983.00	1.448	1.370	1.296	1.227	1.162	1.100
%12751083.00	1.438	1.361	1.288	1.220	1.155	1.094
%12752183.00	1.425	1.349	1.278	1.210	1.146	1.086
%12753283.00	1.409	1.335	1.264	1.198	1.135	1.076
%12754383.00	1.389	1.317	1.248	1.184	1.122	1.064
%12755483.00	1.367	1.297	1.230	1.167	1.107	1.050
%12756583.00	1.342	1.274	1.209	1.148	1.089	1.034
%12757683.00	1.314	1.249	1.186	1.127	1.070	1.016
%12758783.00	1.285	1.222	1.162	1.104	1.050	0.998
%12759883.00	1.253	1.193	1.136	1.081	1.028	0.977
%12760983.00	1.221	1.163	1.108	1.055	1.005	0.956
%12762083.00	1.187	1.132	1.080	1.029	0.980	0.934
%12763183.00	1.152	1.100	1.050	1.002	0.955	0.911
%12764283.00	1.117	1.068	1.020	0.974	0.930	0.887
%12765383.00	1.082	1.035	0.990	0.946	0.904	0.863
%12766483.00	1.046	1.002	0.959	0.917	0.877	0.838
%12767583.00	1.010	0.969	0.928	0.889	0.850	0.813
%12768683.00	0.975	0.936	0.897	0.860	0.823	0.788
%12769783.00	0.940	0.903	0.866	0.831	0.796	0.762
%12770883.00	0.905	0.870	0.836	0.802	0.769	0.737
%12771983.00	0.871	0.838	0.806	0.774	0.742	0.712
%12773083.00	0.837	0.806	0.776	0.746	0.716	0.687
%12774183.00	0.804	0.775	0.746	0.718	0.690	0.662
%12775283.00	0.772	0.745	0.717	0.691	0.664	0.638

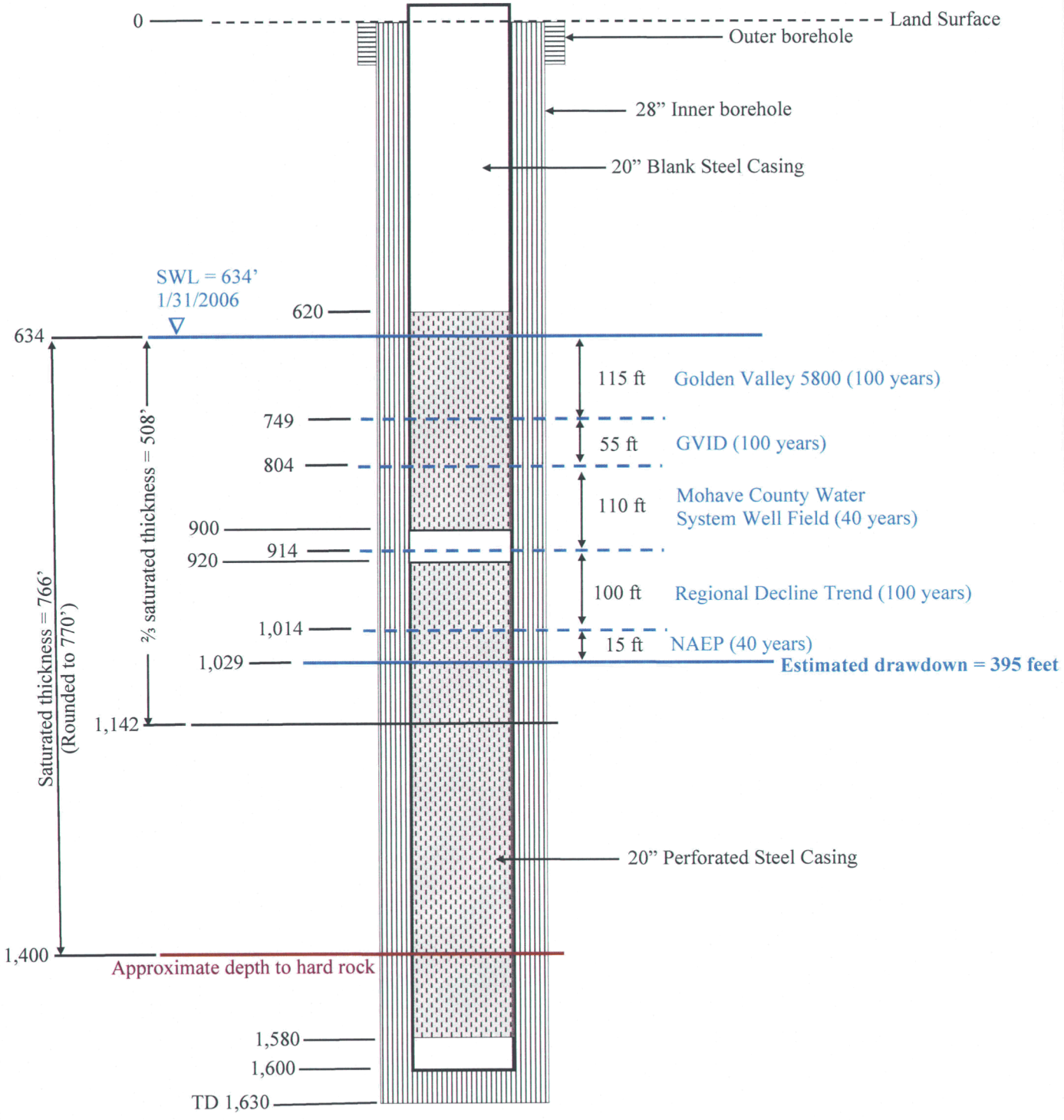
Y [ft]	<- X [ft] ->		
	735109	736209	737309
%12686183.00	0.172	0.166	0.160
%12687283.00	0.181	0.175	0.168
%12688383.00	0.190	0.184	0.177
%12689483.00	0.200	0.193	0.186
%12690583.00	0.211	0.203	0.196
%12691683.00	0.221	0.213	0.206
%12692783.00	0.232	0.224	0.216
%12693883.00	0.244	0.235	0.227
%12694983.00	0.256	0.247	0.238

Y [ft]	<- X [ft] ->		
	735109	736209	737309
%12696083.00	0.268	0.259	0.249
%12697183.00	0.281	0.271	0.261
%12698283.00	0.294	0.284	0.273
%12699383.00	0.308	0.297	0.286
%12700483.00	0.322	0.310	0.299
%12701583.00	0.337	0.324	0.312
%12702683.00	0.352	0.339	0.326
%12703783.00	0.368	0.354	0.340
%12704883.00	0.384	0.369	0.355
%12705983.00	0.400	0.385	0.370
%12707083.00	0.417	0.401	0.386
%12708183.00	0.435	0.418	0.402
%12709283.00	0.453	0.435	0.418
%12710383.00	0.471	0.452	0.434
%12711483.00	0.490	0.470	0.451
%12712583.00	0.509	0.489	0.469
%12713683.00	0.528	0.507	0.486
%12714783.00	0.548	0.526	0.504
%12715883.00	0.568	0.545	0.523
%12716983.00	0.589	0.565	0.541
%12718083.00	0.610	0.585	0.560
%12719183.00	0.631	0.605	0.579
%12720283.00	0.653	0.625	0.598
%12721383.00	0.674	0.645	0.617
%12722483.00	0.696	0.666	0.636
%12723583.00	0.718	0.686	0.656
%12724683.00	0.739	0.707	0.675
%12725783.00	0.761	0.727	0.694
%12726883.00	0.783	0.748	0.713
%12727983.00	0.805	0.768	0.732
%12729083.00	0.826	0.788	0.751
%12730183.00	0.847	0.807	0.769
%12731283.00	0.867	0.826	0.787
%12732383.00	0.887	0.845	0.804
%12733483.00	0.907	0.863	0.821
%12734583.00	0.925	0.880	0.837
%12735683.00	0.943	0.896	0.852
%12736783.00	0.960	0.912	0.866
%12737883.00	0.975	0.926	0.879
%12738983.00	0.990	0.939	0.892

Y [ft]	<- X [ft] ->		
	735109	736209	737309
%12740083.00	1.003	0.951	0.902
%12741183.00	1.014	0.962	0.912
%12742283.00	1.024	0.971	0.920
%12743383.00	1.033	0.978	0.927
%12744483.00	1.039	0.984	0.933
%12745583.00	1.043	0.988	0.936
%12746683.00	1.046	0.991	0.938
%12747783.00	1.047	0.991	0.939
%12748883.00	1.045	0.990	0.937
%12749983.00	1.042	0.987	0.934
%12751083.00	1.036	0.982	0.930
%12752183.00	1.029	0.975	0.924
%12753283.00	1.020	0.966	0.916
%12754383.00	1.008	0.956	0.906
%12755483.00	0.996	0.944	0.895
%12756583.00	0.981	0.931	0.883
%12757683.00	0.965	0.916	0.870
%12758783.00	0.948	0.900	0.855
%12759883.00	0.929	0.883	0.839
%12760983.00	0.910	0.865	0.822
%12762083.00	0.889	0.846	0.805
%12763183.00	0.868	0.826	0.786
%12764283.00	0.846	0.806	0.767
%12765383.00	0.823	0.785	0.748
%12766483.00	0.800	0.763	0.728
%12767583.00	0.777	0.742	0.708
%12768683.00	0.753	0.720	0.687
%12769783.00	0.729	0.698	0.667
%12770883.00	0.706	0.675	0.646
%12771983.00	0.682	0.653	0.625
%12773083.00	0.659	0.631	0.604
%12774183.00	0.636	0.609	0.584
%12775283.00	0.613	0.588	0.564

ATTACHMENT VII

Figure 3 – Estimated Drawdown at Production Well #8, 55-580149
B(19-18) 10aaa



-Drawing Not to Scale
-Casing Centralizers Every 80 feet

Southwest Ground-water Consultants, Inc.

June 21, 2007 **Project B.1476**

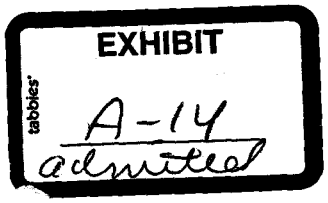
ESTIMATED DRAWDOWN AT PRODUCTION WELL 8
55-580149 B(19-18)10 aaa

Mohave County Water System Well Field, Arizona

Figure 3

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS
MIKE GLEASON, Chairman
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
KRISTIN K. MAYES
GARY PIERCE



IN THE MATTER OF THE APPLICATION OF NORTHERN ARIZONA ENERGY, LLC, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES 40-360.03 AND 40-360.06, FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING CONSTRUCTION OF A 175 MW NATURAL GAS-FIRED, SIMPLE CYCLE GENERATING FACILITY AND ASSOCIATED TRANSMISSION LINE INTERCONNECTING THE GENERATING FACILITY TO THE ADJACENT WESTERN AREA POWER ADMINISTRATION GRIFFITH SWITCHYARD, ALL LOCATED IN MOHAVE COUNTY APPROXIMATELY 9 MILES SOUTHWEST OF KINGMAN, ARIZONA.

DOCKET NO. L-00000FF-07-0134-00133

NOTICE OF FILING

Applicant, Northern Arizona Energy, LLC, hereby provides notice that it is filing herewith the following attached materials that will be used at the September 17 and 18, 2007 hearings:

A. Response 18 Update to Supplemental Information Package (one page).

B. Power Point Outline of Additional Testimony to be presented by Applicant (21 pages).

RESPECTFULLY SUBMITTED this 12th day of September, 2007.

MOYES STOREY, LTD.

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Original and Twenty-Eight (28) copies of the foregoing filed this 12th day of September 2007 with:

Docket Control
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Electronic copies of the foregoing were sent Via email this 12th day of September 2007 to:

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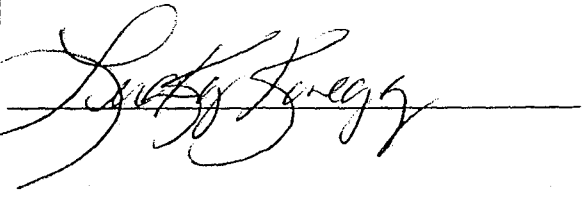


Northern Arizona Energy Project
Case No. 00133

Supplemental Information Package
Response 18 Update

18. Provide the capacity factor for the Griffith Energy Project over the prior twelve months.

Response 18 - Updated

During May 2006 through July 2006, the Griffith Energy Project was unavailable due to mechanical issues related to the steam turbine.

The monthly Capacity Factors for August 2006 through September 2007 were as follows:

Month	Capacity Factor
Aug 06	73.7%
Sept 06	67.7%
Oct 06	65.2%
Nov 06	45.1%
Dec 06	39.3%
Jan 07	27.2%
Feb 07	13.5%
Mar 07	0%
April 07	2.0%
May 07	40.2%
June 07	78.0%
July 07	78.2%
Aug 07	76.1%
Sept 07 (estimated)	~78%

Arizona Power Plant and Transmission Line Siting Committee

Public Hearing for the Northern Arizona Energy Project (NAEP)

Applicant Testimony

September 17-18, 2007

[redacted]

Presentation Overview

Opening Remarks	Jay Moyes
Status of Other Permits	Randy Schroeder
Electric Interconnection	Ali Amirali
Water Supply – Commercial	Dana Diller
Water Supply - Environmental	Steve Noel

Opening Remarks

Supplemental Filings and Procedural Matters

- Supplemental Package filed June 22, 2007
  - Draft Air Permit
  - Responses to May 1-2 Hearing Questions
  - Southwest Ground-water Consultants Report
- System Impact Study filed July 25, 2007
- Other Filings
  - Draft Environmental Assessment
  - Supplemental Information Package update
    - Response 18

Status of Other Permits

Status of Other Permits

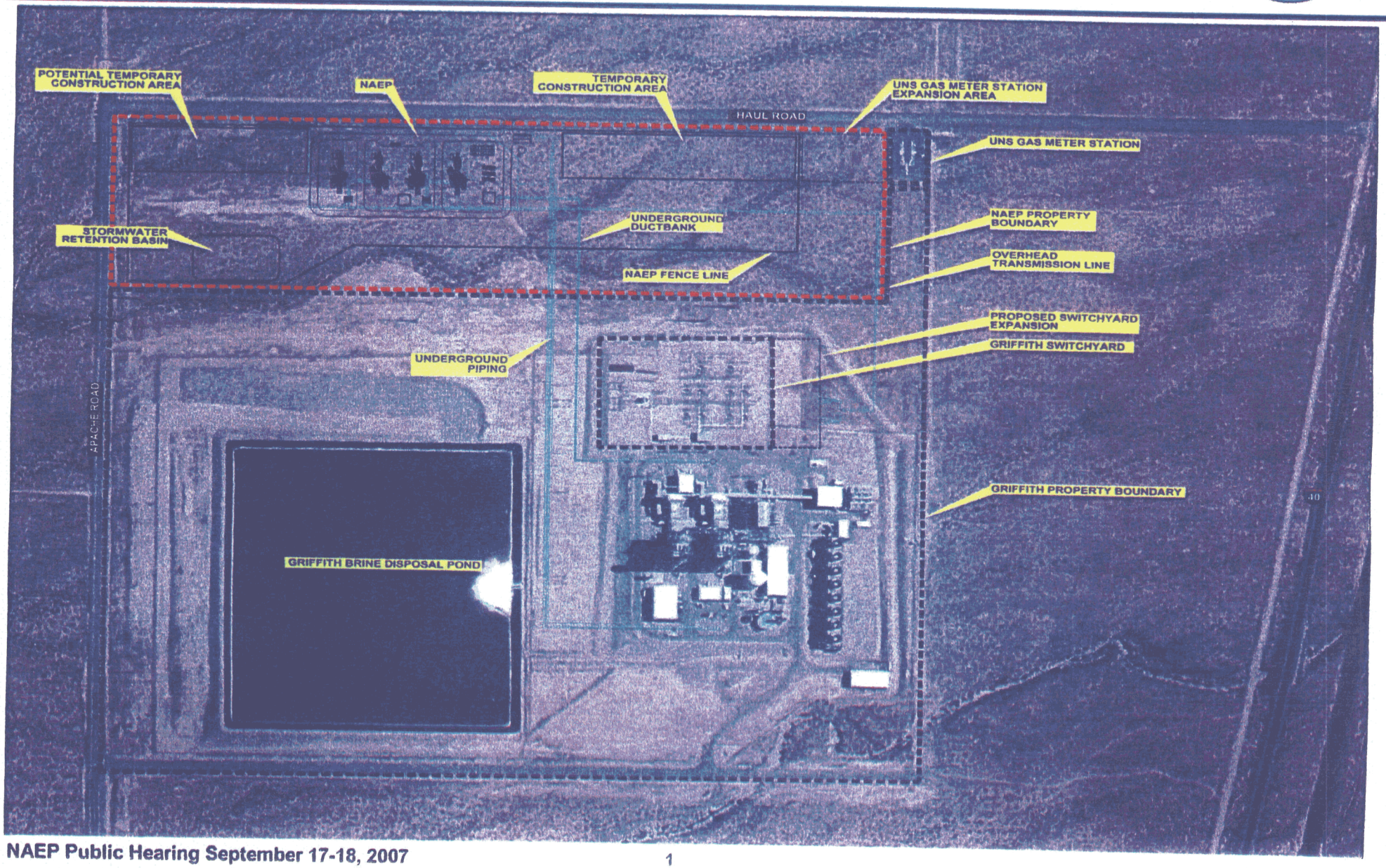
- **Air Quality Permits (Title V and Title IV)**
  - Draft Air Permit issued for public review on June 22, 2007
  - Public Hearing conducted by ADEQ in Kingman, AZ on July 25, 2007
    - No public comment received by ADEQ
  - Issued to EPA Region IX review on August 1, 2007
    - 45 day review period ends on September 15, 2007

- **Federal NEPA Environmental Assessment (EA)**
  - Draft EA released for comment
  - Remaining process and expected schedule

- **Griffith Aquifer Protection Permit Amendment**
  - ADEQ has completed amendment process

Electrical Interconnection

Aerial View of Project Site and Related Infrastructure



Electrical Interconnection

- Interconnect with Western 230 kV transmission system at the existing Griffith Switchyard located adjacent to the Project Property

- Interconnecting facilities consist of approximately twelve (12) structures (100 to 120 foot tubular steel poles) supporting conductor that connects the generator step up transformers (GSU) to the Griffith Switchyard and are all located within Project Site or adjacent Griffith property

- The transmission line will be approximately 2,657 feet long (located on Project Site and adjacent Griffith property)

- Approximately 1 acre expansion of Griffith Switchyard (within Griffith property) to add a new breaker-and-a-half bay consisting of three (3) new 230kV circuit breakers.

Large Scale Generation Interconnection Process

Interconnection Process with Western Area Power Administration (Western)

- Interconnection application filed with Western and deemed complete on September 28, 2006.
- WAPA conducted an Interconnection System Impact Study (per agreement dated December 4, 2006) to evaluate the Project as an energy resource. No firm transmission service request was made.
- System Impact Study was finalized and issued on July 25, 2007
    - Proposed final SIS was provided to ACC Staff on July 2, 2007 for advance review
- Facilities Study Agreement is in progress

System Impact Study Overview

- The System Impact Study (SIS) simulated
  - Power flow analysis
  - Post-transient power flow analysis
  - Transient stability analysis
  - Short circuit analysis
- WECC Reliability Criteria and NERC Planning Standards were employed
- Scenarios were developed to evaluate the impacts of the project on the transmission system under a variety of operating conditions
- All analyses were conducted under N-0, N-1, N-1-1 and N-2 conditions

System Impact Study Results

- Short Circuit Analysis – No Impacts
- Stability Analysis – No Impacts
- Power Flow Analysis Impact Results (All Cases)

Operating Condition	**N-0**	**N-1**	**N-1-1**	**N-2**
Liberty PST ***"by-passed"*** **(standard operating condition)**	None	None	2 contingencies	2 contingencies
Liberty PST flowing 450 MW ***southbound***	None	None	Not studied	Not studied
Liberty PST flowing 450 MW ***northbound***	None	2 contingencies (see mitigation below)	2 contingencies	2 contingencies

- Two N-1 contingencies with Liberty PST flowing 450 MW northbound cause overload on Western Davis – McConnico 230kV line
  - Outage of Peacock-Mead 345 kV line
  - Outage of Mead 345/230 kV transformer
- Contingencies to be mitigated with implementation of Western and WECC approved remedial action scheme (RAS) for generation limits
- With Liberty PST flowing 450 MW northbound and N-1 contingency, maximum generation curtailment is 75 MW

Liberty Phase Shifter Operation

- Standard transmission system configuration requires Liberty PST to be bypassed
- The device is required to preserve the contractual East of River rating
- Its primary use has diminished with the construction and operation of the Navajo Transmission System
- Infrequent historical operation of Liberty PST was primarily to enable transfer of Mojave energy <u>southbound</u> for SRP
  - Mojave currently not in operation (likely permanent shutdown)
  - Review of the past 9 month of Western operations log indicated that the Liberty PST was inserted only <u>*once*</u> to control flows on the transmission system.
- The transmission system impacts are <u>*only observed*</u> with 450 MW northbound flows on the Liberty PST when NAEP is in operation

Low Probability Outage Events

- *Contingencies that identified impacts associated with NAEP interconnection are low probability events.*

- *Probability of Liberty PST flowing 450 MW south-to-north and simultaneous N-1 contingency of the 345 kV Peacock-Mead line or 345/230 kV transformer under the worst load condition is extremely low.*

- *Identified N-1-1 and N-2 events are not common mode failures*

- *N-1-1 conditions allow opportunity for operator intervention*

Low Probability of Outage Events (cont'd)

The outage of a 345 kV line or a 345/230 kV transformer is a low probability event

Actual outage data provided by Western

	Total Number of years	Number of outages	Outages/Year
Peacock-Mead 345 kV line	7	5	0.7143
Mead 230/345 kV transformer	16	0 See Note 1	0.0000

Note 1: Western's search of the historic outage information did not indicated any unplanned outages of this transmformer

Industry data for transmission lne outages

Annual Line outage rate	per circuit			
	momentary		sustained	
	WECC	ECAR	WECC	ECAR
345kV	1.48	0.65	1.63	0.32

Industry data for transformer outages

Transformer outage rate	per device	
	WECC	MAPP
345/230kV Transformer	0.22	0.33

Probability Analysis

- *Occurrence of simultaneous outage of (1) Peacock – Mead 345 kV transmission line or (2) Mead 345/230 kV transformer plus the Liberty PST operational at 450 MW northbound is a very low probability.*

- **Using historic outage data provided by Western and Industry Averages:**
  - Annual probability of operation of Liberty PST (any direction) = (A) = 0.159817%
  - Annual probability of outage of Mead 345/230 kV transformer = (B) = 0.020091%
  - Annual probability of outage of Peacock-Mead 345 kV line = (C) = 0.065232%

- **Calculating Joint Probabilities**
  - Probability of Liberty PST operating and the outage of Mead transformer=A*B= 0.000032%
  - Probability of Liberty PST operating and the outage of Peacock-Mead line=A*C= 0.000104%

- **Total probability**
  - Annual probability Liberty PST operating and the outage of Mead Transformer OR Liberty PST operating and the outage of Peacock – Mead line = **(D) = 0.000136%**

Note: ***The probability of generation tripping at NAEP for either of these outage is even lower than the total probability number listed above because probability of Liberty PST operating and flowing power northbound when NAEP is on-line is MUCH SMALLER as compared to "D"***

Conclusion

- ***Studies indicated that no transmission system upgrades are required for the interconnection of NAEP to the Western transmission grid.***

- ***Operational solutions (such as operating procedures, flow based limits, generation tripping, etc) would be utilized to mitigate the potential transmission system impacts for low probability contingency events.***

- ***Operational solutions will be developed in operational studies conducted by Western, will satisfy Western and WECC reliability criteria, and will be in accordance with NERC Planning Standards.***

Water Supply - Commercial

Water Supply - Commercial

- Agreement reached with Mohave County on NAEP water supply from existing Mohave County water system.

- NAEP will be allocated 450 gpm contract capacity of the existing Griffith 4500 gpm contract capacity.

- On September 4, 2007, the Mohave County Board of Supervisors voted 3-0 to approve the agreements and the agreements have been subsequently executed by the parties.

Water Supply - Environmental

Water Supply - Environmental

- **Evaluated two annual water use cases:**
  - Expected case at 2500 operating hours: 160 acre-ft
  - Worst case at 5000 operating hours: 268 acre-ft

- **Approach to Aquifer Impact Analysis**
  - Saturated thickness and yield
  - Projected uses and pumped volumes

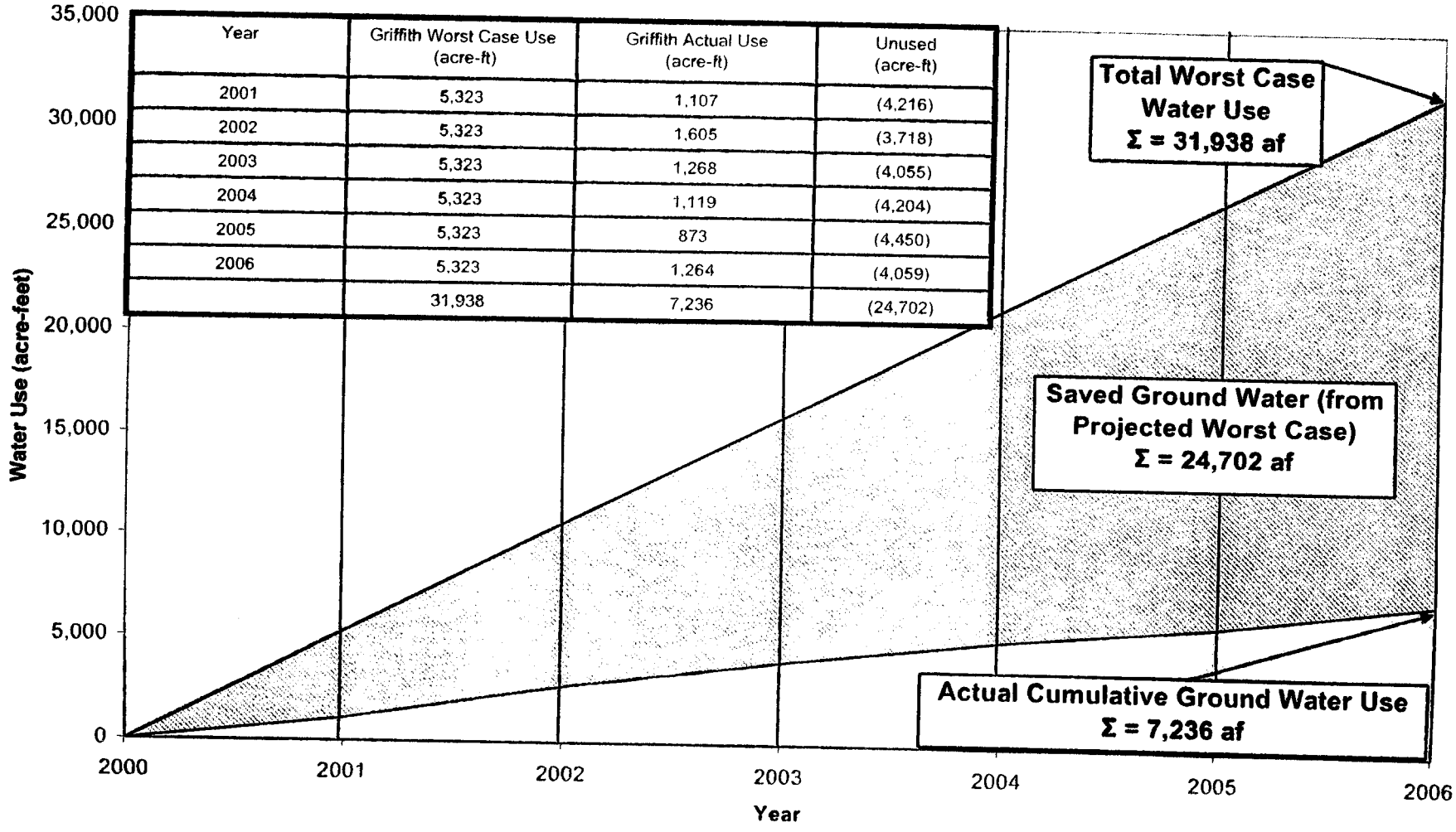
- **NAEP Aquifer Impact (Worst Case assumptions)**
  - Maximum projected drawdown of 15 feet after 40 years at the well field
  - Maximum pumping requirement is 10,720 acre-ft over 40 years
  - Maximum cumulative NAEP requirement is less than the 24,702 acre-ft of water savings experienced in the Mohave County water system from 2001 to 2006.

- **Finding of "insignificant impact" supported by ADWR**

Water Supply - Environmental

Griffith Energy Project
Worst Case versus Actual Cumulative Water Use, 2001 - 2006

Year	Griffith Worst Case Use (acre-ft)	Griffith Actual Use (acre-ft)	Unused (acre-ft)
2001	5,323	1,107	(4,216)
2002	5,323	1,605	(3,718)
2003	5,323	1,268	(4,055)
2004	5,323	1,119	(4,204)
2005	5,323	873	(4,450)
2006	5,323	1,264	(4,059)
	31,938	7,236	(24,702)



A-15

EXHIBIT
tables
A-15
admitted

Guiding Principles for
ACC Staff Determination of
Electric System Adequacy and Reliability

This document serves the dual purpose of providing the guiding principles for ACC Staff determination of electric system adequacy and reliability in the two areas of transmission and generation.

Transmission

A.R.S §40-360.02E obligates the Arizona Corporation Commission (ACC) to biennially make a determination of the adequacy and reliability of existing and planned transmission facilities in the state of Arizona. Current state statutes and ACC rules do not establish the basis upon which such a determination is to be made. Therefore, ACC Staff will use the following guiding principles to make the required adequacy and reliability determination until otherwise directed by state statues or ACC rules.

1. Transmission facilities will be evaluated using Western Systems Coordinating Council (WSCC), or its successor's, Reliability Criteria for System Planning and Minimum Operating Reliability Criteria.
2. Transmission planning and operating practices traditionally utilized by Arizona electric utilities will apply when more restrictive than WSCC criteria.
3. Compliance with A.C.C. R14-2-1609.B[1] will be established by analysis of power flow and transient stability simulation of single contingency outages (N-1) of generating units, EHV and local transmission lines of greater than 100 kV nominal system voltage, and associated transformers. Reliance on remedial action such as generator unit tripping or load shedding for single contingency outages will not be considered an acceptable means of compliance with this rule.

[1] R14-2-1609.B refers to the obligation of Utility Distribution Companies to assure that adequate transmission import capability and distribution system capacity are available to meet the load requirements of all distribution customers within their service area.

Generation

Pursuant to A.R.S. §40-360.07, the ACC must balance, in the broad public interest, the need for adequate, economical, and reliable supply of electric power with the desire to minimize the effect on the environment and ecology of the state when considering the siting of a power plant or transmission line. The laws of physics dictate that generation and transmission facilities are inextricably linked when considering the reliability of service to consumers. Therefore, it is appropriate that both components must be considered when siting a power plant. ACC Staff will use the following guiding principles to make the required adequacy and reliability determination for siting generation until otherwise directed by state statues or ACC rules.

The best utility practices historically exhibited in the evolution of Arizona's generation and transmission facilities should be continued in order to promote development of a robust energy market. Non-discriminatory access to transmission and fair and equitable business practices must also be maintained and the service reliability to which the state is accustomed must not be

compromised. Therefore, Staff support of power plant Certificate of Environmental Compatibility applications will be conditioned as set forth below.

ACC Staff support of power plant Certificate of Environmental Compatibility applications will be contingent upon the applicant providing, either in the application or at the hearing, evidence of items 1-3 below:

1. Two or more transmission lines must emanate from each power plant switchyard and interconnect with the existing transmission system. This plant interconnection must satisfy the single contingency outage criteria (N-1) without reliance on remedial action such as generator unit tripping or load shedding.
2. A power plant applicant must provide technical study evidence that sufficient transmission capacity exists to accommodate the plant and that it will not compromise the reliable operation of the interconnected transmission system.
3. All plants located inside a transmission import limited zone "must offer" all Electric Service Providers and Affected Utilities serving load in the constrained load zone, or their designated Scheduling Coordinators, sufficient energy to meet load requirements in excess of the transmission import limit.

ACC Staff support of power plant Certificate of Environmental Compatibility applications will further be contingent upon the Certificate of Environmental Compatibility being conditioned as provided in items 4-6 below:

4. The Certificate of Environmental Compatibility is conditioned upon the plant applicant submitting to the ACC an interconnection agreement with the transmission provider with whom they are interconnecting.
5. The Certificate of Environmental Compatibility is conditioned upon the plant applicant becoming a member of WSCC, or its successor, and filing a copy of its WSCC Reliability Criteria Agreement or Reliability Management System (RMS) Generator Agreement with the ACC.
6. The Certificate of Environmental Compatibility is conditioned upon the plant applicant becoming a member of the Southwest Reserve Sharing Group, or its successor, thereby making its units available for reserve sharing purposes.

Approved by:

Deborah R. Scott
Director
Utilities Division

This date: 2/8/00

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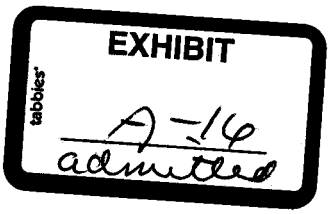

C

ARIZONA ADMINISTRATIVE CODE
TITLE 14. PUBLIC SERVICE CORPORATIONS; CORPORATIONS AND ASSOCIATIONS; SECURITIES REGULATION
CHAPTER 2. CORPORATION COMMISSION FIXED UTILITIES
ARTICLE 16. RETAIL ELECTRIC COMPETITION

Current through December 31, 2006 (Supp. 06-4)

R14-2-1609. Transmission and Distribution Access

A. The Affected Utilities shall provide nondiscriminatory open access to transmission and distribution facilities to serve all customers. No preference or priority shall be given to any distribution customer based on whether the customer is purchasing power under the Affected Utility's Standard Offer or in the competitive market. Any transmission capacity that is reserved for use by the retail customers of the Affected Utility's Utility Distribution Company shall be allocated among Standard Offer customers and competitive market customers on a pro-rata basis.

B. Utility Distribution Companies shall retain the obligation to assure that adequate transmission import capability is available to meet the load requirements of all distribution customers within their service areas. Utility Distribution Companies shall retain the obligation to assure that adequate distribution system capacity is available to meet the load requirements of all distribution customers within their service areas.

C. The Commission supports the development of Federal Energy Regulatory Commission-approved Regional Transmission Organization (RTO), an Independent System Operator (ISO) or, absent a Regional Transmission Organization or an Independent System Operator, an Arizona Independent Scheduling Administrator (AISA). The Commission believes that such organizations are necessary in order to provide nondiscriminatory retail access and to facilitate a robust and efficient electricity market.

D. Affected Utilities that own or operate Arizona transmission facilities shall form an Arizona Independent Scheduling Administrator that shall file with the Federal Energy Regulatory Commission within 60 days of this Commission's adoption of final rules herein, for approval of an Independent Scheduling Administrator having the following characteristics:

1. The Arizona Independent Scheduling Administrator shall calculate Available Transmission Capacity (ATC) for Arizona transmission facilities that belong to the Affected Utilities or other Arizona Independent Scheduling Administrator participants and shall develop and operate an overarching statewide OASIS.

2. The Arizona Independent Scheduling Administrator shall implement and oversee the nondiscriminatory application of operating protocols to ensure statewide consistency for transmission access. These operating protocols shall include, but are not limited to, protocols for determining transmission system transfer capabilities, committed uses of the transmission system, available transfer capabilities, Must-Run Generating Units, energy scheduling, and energy imbalances.

3. The Arizona Independent Scheduling Administrator shall provide dispute resolution processes that enable market participants to expeditiously resolve claims of discriminatory treatment in the reservation, scheduling, use, and curtailment of transmission services.

4. All requests (wholesale, Standard Offer retail, and competitive retail) for reservation and scheduling of the use of Arizona transmission facilities that belong to the Affected Utilities or other Arizona Independent Scheduling Administrator participants shall be made to, or through, the Arizona Independent Scheduling Administrator using a

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single, standardized procedure.

5. The Arizona Independent Scheduling Administrator shall implement a transmission planning process that includes all Arizona Independent Scheduling Administrator participants and aids in identifying the timing and key characteristics of required reinforcements to Arizona transmission facilities to assure that the future load requirements of all participants will be met.

E. If not previously filed, the Affected Utilities that own or operate Arizona transmission facilities shall file a proposed Arizona Independent Scheduling Administrator implementation plan with the Commission, through Docket Control, within 30 days of the Commission's adoption of final rules herein. The implementation plan shall address Arizona Independent Scheduling Administrator governance, incorporation, financing, and staffing; the acquisition of physical facilities and staff by the Arizona Independent Scheduling Administrator; the schedule for the phased development of Arizona Independent Scheduling Administrator functionality and proposed transition to a regional Independent System Operator or Regional Transmission Organization; contingency plans to ensure that critical functionality is in place no later than three months following adoption of final rules herein by the Commission; and any other significant issues related to the timely and successful implementation of the Arizona Independent Scheduling Administrator.

F. Each of the Affected Utilities shall make good faith efforts to develop a regional, multi-state Independent System Operator or Regional Transmission Organization, to which the Arizona Independent Scheduling Administrator should transfer its relevant assets and functions and characteristics as specified in R14-2-1609(D) as the Independent System Operator or Regional Transmission Organization becomes able to carry out those functions. Absent Federal Energy Regulatory Commission approval of an Arizona Independent Scheduling Administrator, the functions and characteristics as specified in R14-2-1609(D) will be assumed by the Independent System Operator or Regional Transmission Organization.

G. It is the intent of the Commission that prudently-incurred costs incurred by the Affected Utilities in the establishment and operation of the Arizona Independent Scheduling Administrator, and subsequently the Independent System Operator or Regional Transmission Organization, should be recovered from customers using the transmission system, including the Affected Utilities' wholesale customers, Standard Offer retail customers, and competitive retail customers on a nondiscriminatory basis through Federal Energy Regulatory Commission-regulated prices. Proposed rates for the recovery of such costs shall be filed with the Federal Energy Regulatory Commission and this Commission through Docket Control. In the event that the Federal Energy Regulatory Commission does not permit recovery of prudently incurred Independent Scheduling Administrator costs within 90 days of the date of making an application with the Federal Energy Regulatory Commission, the Commission may authorize Affected Utilities to recover such costs through a distribution surcharge.

H. The Commission supports the use of "Scheduling Coordinators" to provide aggregation of customers' schedules to the Independent Scheduling Administrator and the respective Control Area Operators simultaneously until the implementation of a regional Independent System Operator or Regional Transmission Organization, at which time the schedules will be submitted to the Independent System Operator or Regional Transmission Organization. The primary duties of Scheduling Coordinators are to:

1. Forecast their customers' load requirements;

2. Submit balanced schedules (that is, schedules for which total generation is equal to total load of the Scheduling Coordinator's customers plus appropriate transmission and distribution line losses) and North American Electric Reliability Council/Western Systems Coordinating Council tags;

3. Arrange for the acquisition of the necessary transmission and ancillary services;

4. Respond to contingencies and curtailments as directed by the Control Area Operators, Arizona Independent Scheduling Administrator, or Independent System Operator or Regional Transmission Organization;

5. Actively participate in the schedule checkout process and the settlement processes of the Control Area Operators,

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Arizona Independent Scheduling Administrator, or Independent System Operator or Regional Transmission Organization.

I. The Affected Utilities and Utility Distribution Companies shall provide services from the Must-Run Generating Units to Standard Offer Service retail customers and competitive retail customers on a comparable, nondiscriminatory basis at regulated prices. The Affected Utilities shall specify the obligations of the Must-Run Generating Units in appropriate sales contracts prior to any divestiture. Under auspices of the Arizona Independent Scheduling Administrator, the Affected Utilities and other stakeholders shall develop statewide protocols for pricing and availability of services from Must-Run Generating Units. These protocols shall be filed with Docket Control for Commission review and, when appropriate, approval, prior to being filed with the Federal Energy Regulatory Commission in conjunction with the Arizona Independent Scheduling Administrator tariff filing. Fixed Must-Run Generating Units costs are to be recovered through a regulated charge to end-use customers. This charge must be set by the Commission as part of the end-use customer distribution service charges.

J. The Affected Utilities and other stakeholders, under the auspices of the Arizona Independent Scheduling Administrator, shall identify statewide services to be settled on and develop fair and reasonable pricing mechanisms to assure a consistent and fair settlement process.

<General Materials (GM) - References, Annotations, or Tables>

HISTORICAL NOTE

Adopted effective December 26, 1996, under an exemption as determined by the Arizona Corporation Commission (Supp. 96-4). Amended by an emergency action effective August 10, 1998, pursuant to A.R.S. § 41-1026, in effect for a maximum of 180 days (Supp. 98-3). Emergency amendment replaced by exempt permanent amendment effective December 31, 1998 (Supp. 98-4). Section repealed; new Section R14-2-1609 renumbered from R14-2-1610 and amended by exempt rulemaking at 5 A.A.R. 3933, effective September 24, 1999 (Supp. 99-3). Amended by exempt rulemaking at 6 A.A.R. 4180, effective October 13, 2000 (Supp. 00-4).

Editor's Note: The Arizona Corporation Commission has determined that this section is exempt from the Attorney General approval provisions of the Arizona Administrative Procedure Act (A.R.S. § 41-1041) by a court order (State ex. rel. Corbin v. Arizona Corporation Commission, 174 Ariz. 216 848 P.2d 301 (App. 1992)).

A.A.C. R14-2-1609, **AZ ADC R14-2-1609**

AZ ADC R14-2-1609
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EXHIBIT
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Admitted

BEFORE THE ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF NORTHERN ARIZONA ENERGY, LLC, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES 40-360.03 AND 40-360.06, FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING CONSTRUCTION OF A 175 MW NATURAL GAS-FIRED, SIMPLE CYCLE GENERATING FACILITY AND ASSOCIATED TRANSMISSION LINE INTERCONNECTING THE GENERATING FACILITY TO THE ADJACENT WESTERN AREA POWER ADMINISTRATION GRIFFITH SWITCHYARD, ALL LOCATED IN MOHAVE COUNTY APPROXIMATELY 9 MILES SOUTHWEST OF KINGMAN, ARIZONA.	DOCKET NO. L-00000FF-07-0134-00133 Case No. 133 **APPLICANT'S NOTICE OF FILING SUPPLEMENTAL INFORMATION**

Applicant, Northern Arizona Energy, LLC, hereby provides notice that it is filing herewith Supplemental Information in response to requests by Chairman Woodall, Committee members or parties.

RESPECTFULLY SUBMITTED this 24th day of October, 2007.

MOYES STOREY, LTD.

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Northern Arizona Energy Project
Case No. 00133
October 2, 2007
Supplemental Information Package

Applicant's Responses to Questions and Data Requests from the Arizona Power Plant and Transmission Line Siting Committee and/or Intervenors at the September 17-18, 2007 Public Hearing in Phoenix, Arizona

1. Provide the output and heat rate degradation for a peaking power plant that does not use any water for inlet air cooling, combustion enhancement, or NOx control.

Question submitted by Mr. Haenichen, Siting Committee member

Response 1

The combustion turbine generators are air-cooled, therefore, "dry-cooling" is part of the Project design.

Water is consumed by the Project for three processes. The chiller module cools the inlet air temperature. The lower inlet air temperature increases output and improves efficiency. Secondly, water is injected into the combustion turbine to reduce NOx emissions by 70%. This represents 40% of the water use. Finally, Spray Inter-cooling technology (sometimes referred to as fogging) sprays micro-droplets of atomized water into the inter-stage air stream between the low pressure and high pressure compressors. The water is atomized to a droplet diameter of less than 20 microns by using inter-stage bleed air and special nozzles. As the droplets evaporate, the air temperature is reduced and the mass flow is increased. This results in greater power output and better fuel efficiency. Of the proposed water use by the Project, inlet air cooling consumes 45%, NOx control consumes 40% and SPRINT consumes the remaining 15% of the water. The effect of eliminating water use in the Project is presented in the following table.

High temperature day (113F)		Average Day (90F)	
Output (MW)	Heat Rate (btu/kwh)	Output (MW)	Heat Rate (btu/kwh)
- 81.9	+ 685	- 61.5	213
- 47%	*7.6%*	*- 35%*	*2.4%*

For a peaking plant with no water use, the capacity of the units decreases 47% during a high temperature day and 35% on an average ambient condition day. The heat rate increases; therefore, the fuel efficiency of the units decrease 7.6% on a high temperature day and 2.4% on an average ambient condition day.

2. **Provide information on the GE Spray-Intercooling or SPRINT technology**

Question submitted by Mr. Ehrhardt, Intervenor

Response 2

Information describing this GE technology is provided in Section 4.2.1 of the CEC Application and reads:

"Each CTG will also be provided with a SPRINT (SPRay INTer-cooling) system, which enhances the efficiency and output of the gas turbine engine by spraying micro-droplets of atomized water into the inter-stage air stream between the low pressure and high pressure compressors. The water is atomized to a droplet diameter of less than 20 microns by using inter-stage bleed air and special nozzles. As the droplets evaporate, the air temperature is reduced and the mass flow is increased. This results in greater power output and better fuel efficiency."

Applicant has also provided as **Attachment 1** a power point presentation from General Electric providing additional information on the SPRINT technology.

3. **Provide the Applicant's views on the definition of "Plant" in A.R.S. 40-360.06(9)**

Question submitted by Chairman Woodall

Response 3

In October, 2006, Applicant sought guidance on this issue from Commission Staff in a formal meeting with Staff, including the Director of the Utilities Division. Applicant subsequently complied with the Director's request to further clarify the questions regarding the applicability of A.R.S. 40-360 *et seq.* to various alternative proposed configurations and locations then under consideration for NAEP. However, Commission Chief Counsel later communicated to Applicant's counsel that Staff would not be providing any guidance or direction on this issue as Staff did not want to prejudge any potential Commission ruling on the matter. Consequently, in the absence of any guidance or direction from Staff, Applicant and its counsel and advisors considered the overall legal, political, and public interest factors and implications for the permit schedule for the Project. After weighing, (i) the public's interest in full disclosure and public participation and input with respect to such a project, (ii) Applicant's goal to construct NAEP as expeditiously as possible with minimum exposure to the delay and expense of unpredictable legal or regulatory challenges, and (iii) the legal protections that the CEC process offers , it was determined that the most prudent course of action by which to achieve an expeditious permit process and minimize the risk of unpredictable challenge to the Project was to submit the Application and seek a CEC for NAEP.

Applicant then met with each member of the Commission and/or his/her policy advisor and discussed the proposed project, in preparation for and in advance of filing its Application. Those meetings produced no direction or feedback inconsistent with Applicant's expressed decision to pursue a CEC through an Application pursuant to A.R.S. 40-360 *et seq.*

Having voluntarily submitted an Application requesting a CEC, which Application was duly referred to the Committee, and having presented substantial supportive testimony and other evidence, which has been heard and considered by the Committee, Applicant believes that the Committee and the Commission have the requisite jurisdiction to issue a CEC for this specific project, under these specific facts, without regard to whether, in the abstract, the definition of "Plant" would have mandated such Application.

Accordingly, this Applicant expresses no legal opinion regarding the interpretation, in the abstract, of A.R.S 40-360 (9) defining "Plant".

It does appear to Applicant, however, based upon the interest in this question expressed to Applicant by third parties, that some clarification by the Commission on this issue in the abstract would probably be welcomed by future potential applicants.

4. Provide Applicant's view on whether the Siting Committee should make a finding of need.

Question submitted by Chairman Woodall

Response 4

While the applicable statutes and rules do not appear to expressly call for a finding by the Committee regarding need for the subject proposed facilities, neither do they preclude such. Inasmuch as the Committee has heard testimony and reviewed evidence, in this case and generally in other such cases, regarding the role of and need for the specific proposed facilities in the overall electric supply picture, it would seem both appropriate and legal for the Committee to express some finding or conclusion regarding that question, if it has formed one at the end of the proceedings. But, it would appear that it is not necessary for the Committee to do so in order to comply with its statutory duty.

Pursuant to A.R.S. 40-360.07(B), upon timely request by a qualified party for review by the Commission of a Committee decision, the Commission, in arriving at its decision to either confirm, deny, modify or grant a certificate, is charged with balancing, "in the broad public interest, the need for an adequate, economical and reliable supply of electric power with the desire to minimize the effect thereof on the environment and ecology of this state." The antecedent of "thereof" in this statutory charge can only reasonably be construed to be "the need for an adequate, economical and reliable supply of electric power". If such review is requested in this case, the Commission will consider the broader question of the need for electric power generally, against which to balance the broad issue of the environmental impact of providing such power. In Applicant's view, the broad need for reliable electric power is a statutory presumption, given that the expectation of reliable electric service has become a "birthright" foundation of modern life in America. Nevertheless, to the extent that the Committee reaches a conclusion that NAEP would help satisfy that broader need for electric power, Applicant would think it helpful to the Commission for the Committee to express such as a finding in the Certificate.

5. **Provide hard copies of the following cases that were part of the System Impact Study (SIS) performed by Western Area Power Administration.**

   a. Base Case (N-0)
   b. Western generation at minimum and Nevada generation displaced by NAEP
   c. Western generation at maximum and NAEP meeting incremental regional load growth
   d. One N-1 case which results in overloading of Davis-McConnico 230 kV line, resulting in 75 MW of generation curtailment.

   With each case, provide a Summary Table showing MW level of Arizona generators in the case.

   Data Request submitted by Mr. Prem Bahl on Wednesday, September 19, 2007

   Response 5

   These cases cannot be provided in hard copy. Applicant offered to provide the electronic version of each case in the GE Powerflow model to Mr. Bahl; however, Mr. Bahl communicated that he does not have access to the GE Powerflow model. Applicant issued an excel spreadsheet that presented the information requested by Mr. Bahl via email on September 24, 2007 at 10:41am.

6. **Is it correct that the load growth was only 180 MW in the cases that reflected NAEP serving incremental regional load growth? If the load growth was only 180 MW why does the SIS indicate that 2008 loads were increased to 2013 loads?**

   Data Request submitted by Mr. Prem Bahl on Wednesday, September 19, 2007

   Response 6
   Only the UNS loads were increased to the 2013 levels. In other words, the UNS load is anticipated to grow by 180 MW by the year 2013 relative to 2008 load levels.

7. **In the SIS, please confirm that generation was increased proportionately in the whole system.**

   Data Request submitted by Mr. Prem Bahl on Wednesday, September 19, 2007

   Response 7
   Generation levels of the surrounding system were determined by the WECC system members.

8. **Provide Applicant's opinion of pages 23 (Advantages of Dry Cooling) and 24 (Disadvantages of Dry Cooling) of Document I-2 (submitted by Mr. Ehrhardt) titled "Power Plant Cooling Technology, Prepared for: Mohave County Public Land Use Committee, June 18, 2002".**

Request submitted by Mr. Smith, Siting Committee Member

Response 8

Document I-2 is a power point presentation prepared by Kevin A Davidson, AICP, Planner II, Mohave County Planning and Zoning Department, based on a separate presentation made at a symposium sponsored by the Air and Waste Management Association, San Diego Chapter (May 31/June 1, 2002).

Document I-2 addresses Wet and Dry cooling systems for combined cycle power plants. Cooling in this context is addressing heat rejection (page 3). All technology descriptions, pictures, and water use quantities depicted in this presentation address combined cycle technology (gas turbine, heat recovery steam generator, steam turbine generator and cooling towers), not a simple cycle gas turbine technology such as that proposed for the Northern Arizona Energy Project. Consequently, this document has no real relevance to NAEP.

Even though this document (I-2) is not relevant to NAEP for the reasons discussed above, the Applicant does provide the following comments on the advantages and disadvantages of dry-cooling as specifically requested by Siting Committee Member, Mr. Smith, even though they apply only to combined-cycle projects.

FROM THE DOCUMENT I-2:

Page 23: Advantages of Dry Cooling

- No Makeup Water for the cooling system
- Less expensive to maintain
- Do not require chemical additives or periodic cleaning
- Lesser cycle makeup water supply
- Conform with the environmental legislation on thermal pollution and blow-down disposal.
- Good performance in cold weather
- Permit power plants sitting (sic) near the fuel sources and the utility load-distribution center
- The reduction of the total water consumption runs approximately 90%

Applicant's comments on purported Advantages:

- Good performance in cold weather may be an advantage but not very applicable to the desert southwest environmental. "Good Performance" is a relative term when comparing dry and wet cooling. For a combined cycle facility, Wet Cooling has a performance advantage over Dry Cooling for all ambient conditions. This comparative advantage is significantly greater at the high ambient conditions that are typical for Griffith.

- Do not agree that dry cooling allows power plants to be sited near a fuel source and utility load-distribution centers as many factors determine beneficial siting locations including transmission infrastructure, air regulations, etc. There is no discussion of noise or the physical size constraints associated with mechanical chillers (many large fans) that would make it prohibited to be near residential properties
- Maintenance of water system vs mechanical chillers

Page 24: Disadvantages of Dry Cooling

- Lower power plant efficiency
- Lower performance in hot weather
- More expensive than wet towers
- Possibility of hot air recirculation reentering into the heat exchanges, decreasing cooling performance.
- The warm air leaving the dry-cooling system may be mixed into the gas turbine intake air, greatly reducing the performance of the whole combined cycle.

Applicant's comments on purported Disadvantages:

- The combination of (i) lower output in hot weather, (ii) lower fuel efficiency and (iiii) high capital cost, presents a major economic impact for any combined cycle project.
- Noise should be listed as a disadvantage. Enclosures can be included in the design to control sound; however, enclosures lower the efficiency of the fans and circulation, requiring higher horse-power motors to produce equivalent cooling. This further lowers output of the combined cycle unit.

GE Aeroderivative and Package Services

A GE Power Systems Business

LM6000 SPRINT™

For PC or Uprated PA Models

SPRINT™ Kit Details

Description

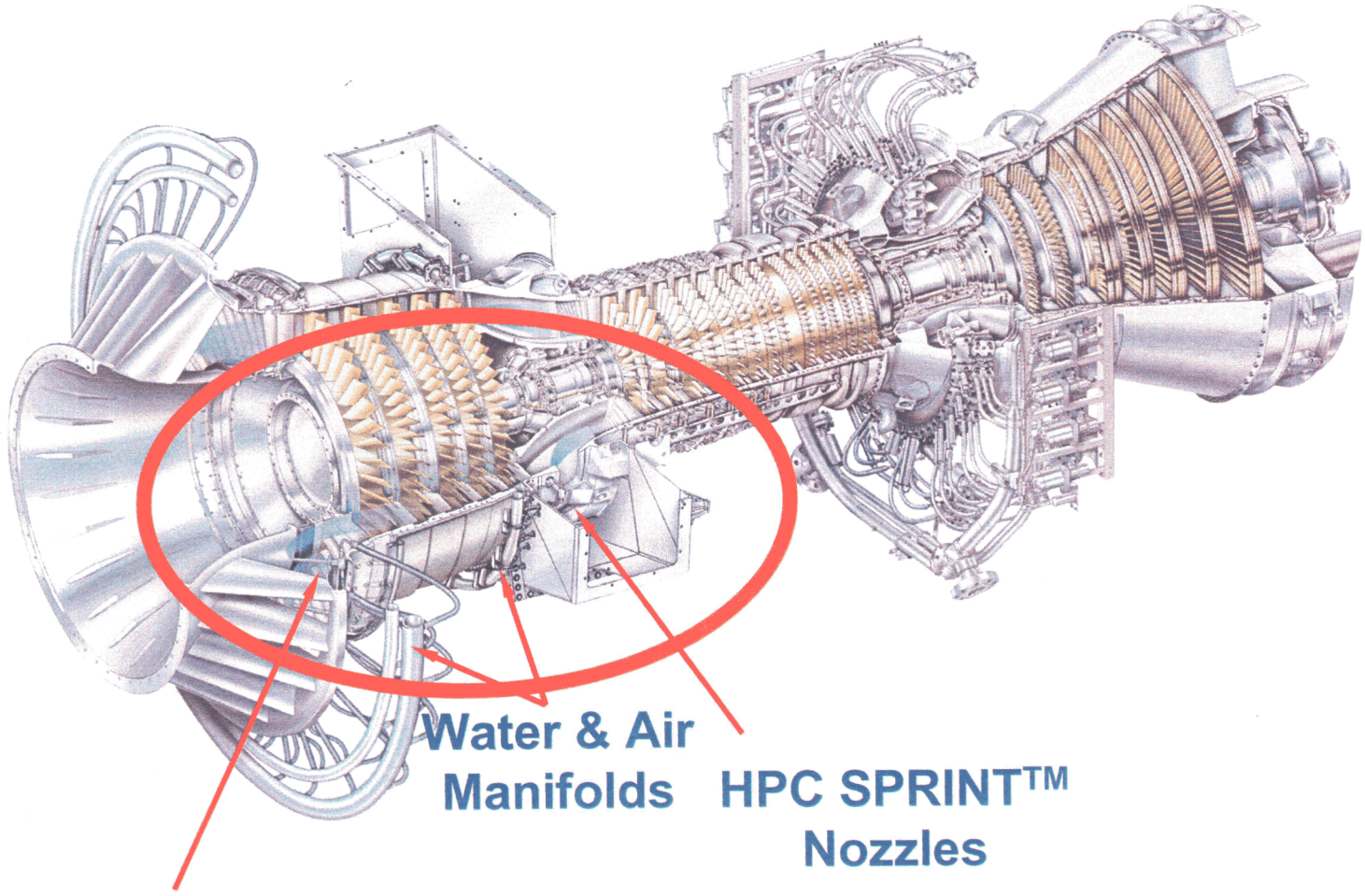
- SPRINT™ stands for **SPR**ay **INT**ercooling
- The SPRINT™ system increases power output by injecting water into the compressor
  - Allows engine to run at higher firing temperature—more power
  - Increases overall mass flow—more power

Operation

- Injection of water into the HPC (36F-45F)or LPC compressor (>45F)
- Water spray system operation at base load only

Sprint™ Features

Uses less than 5m³/hr of deionized water



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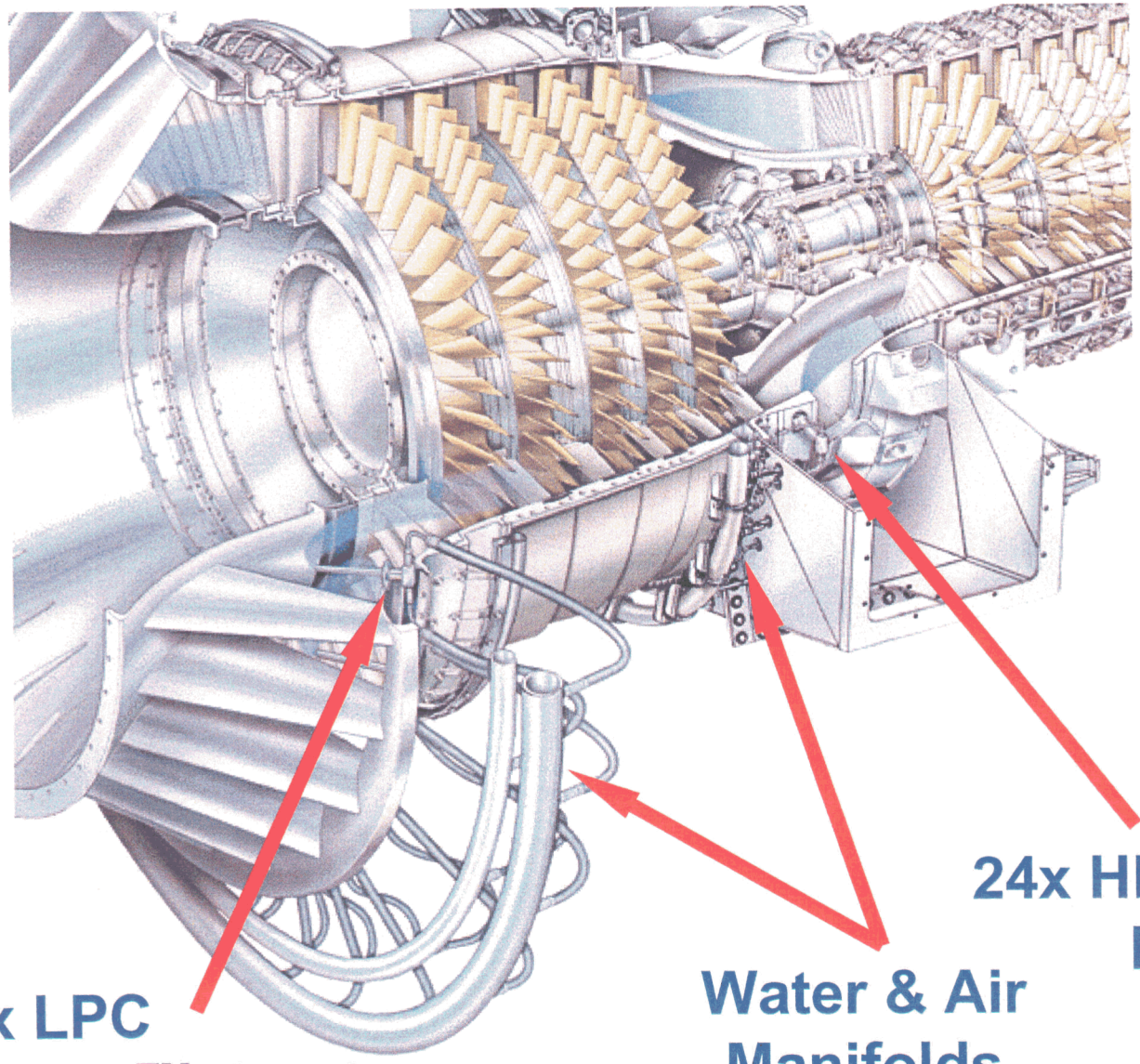
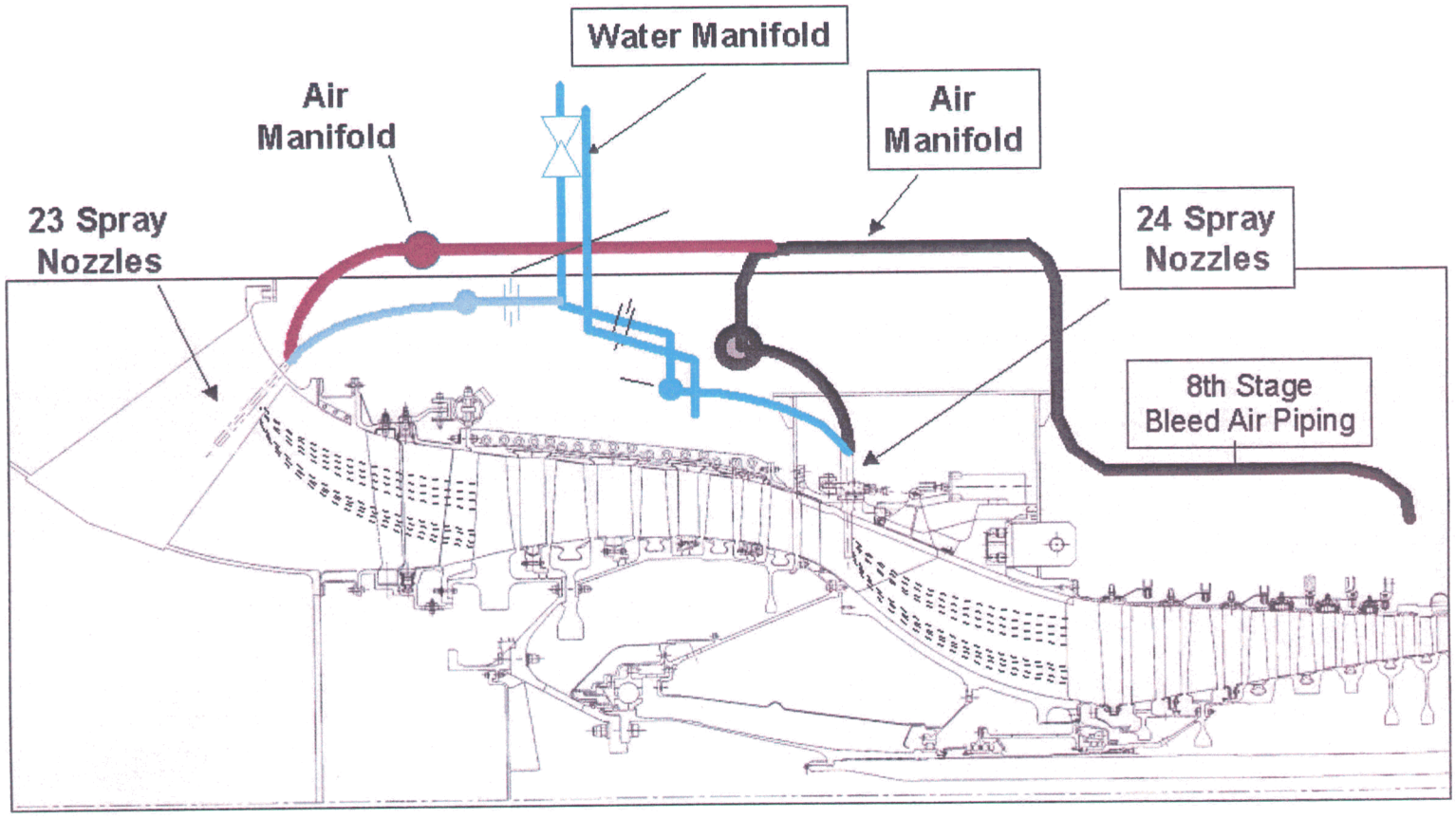


imagination at work

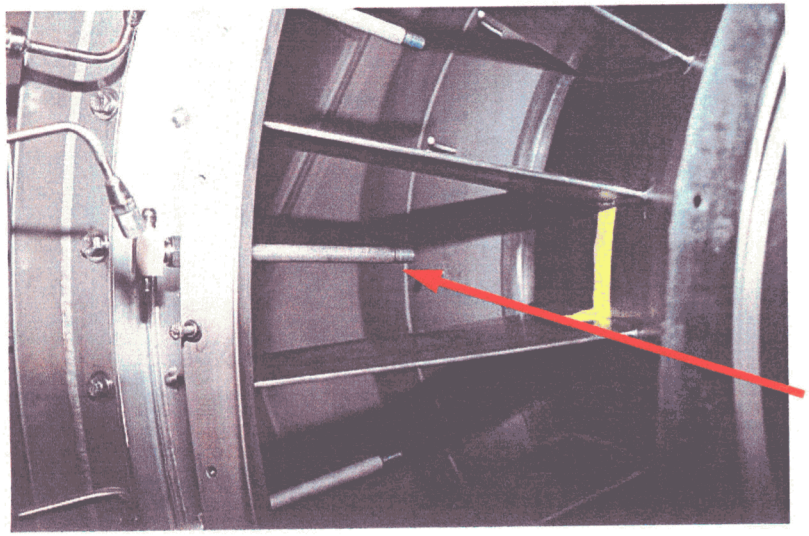
Enhanced SPRINT™ Cross-Section

GE Aero Energy Products

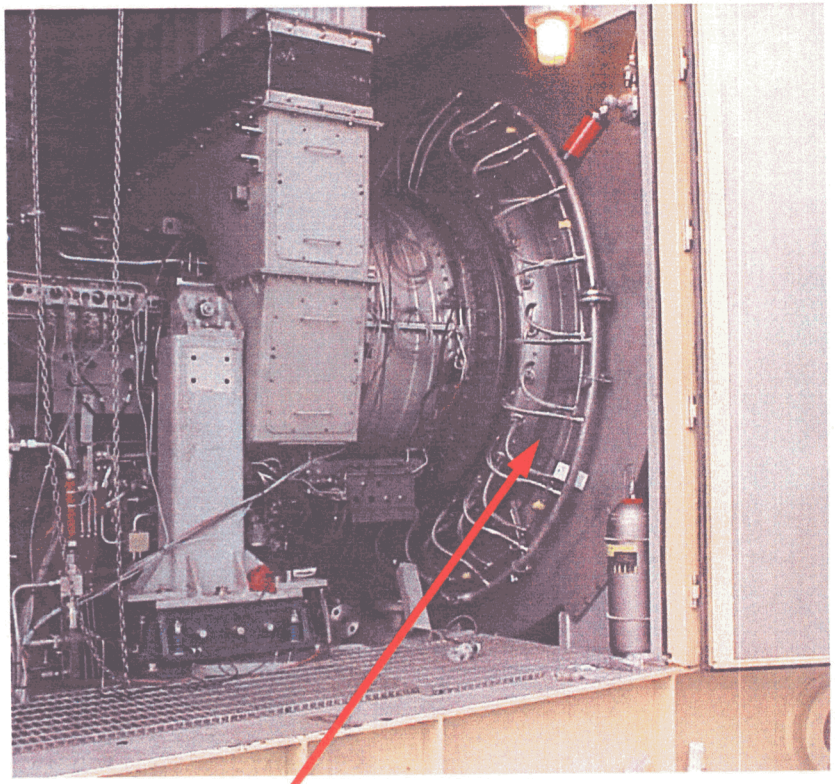


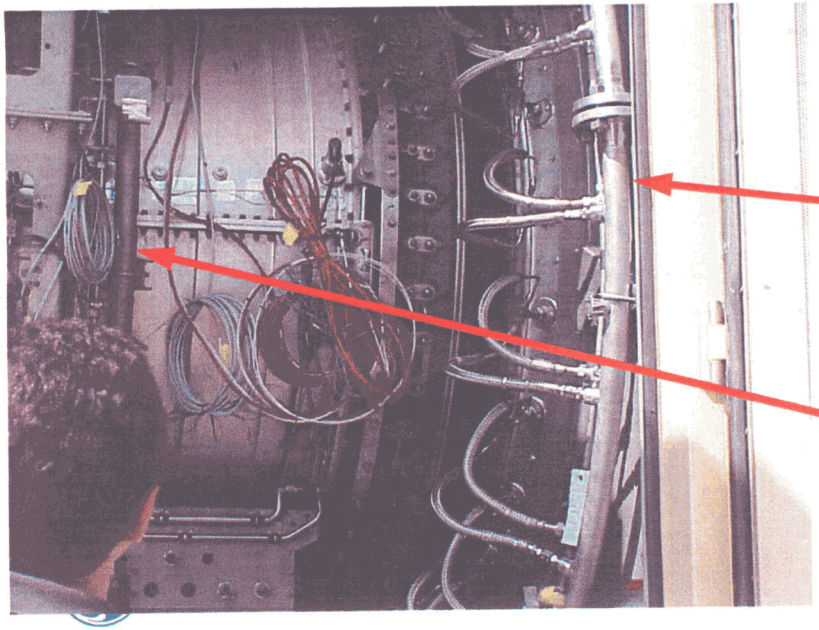
LM6000 Reliability . . . With Significantly More Power

Sprint™ System Components



LPC Inlet Nozzles





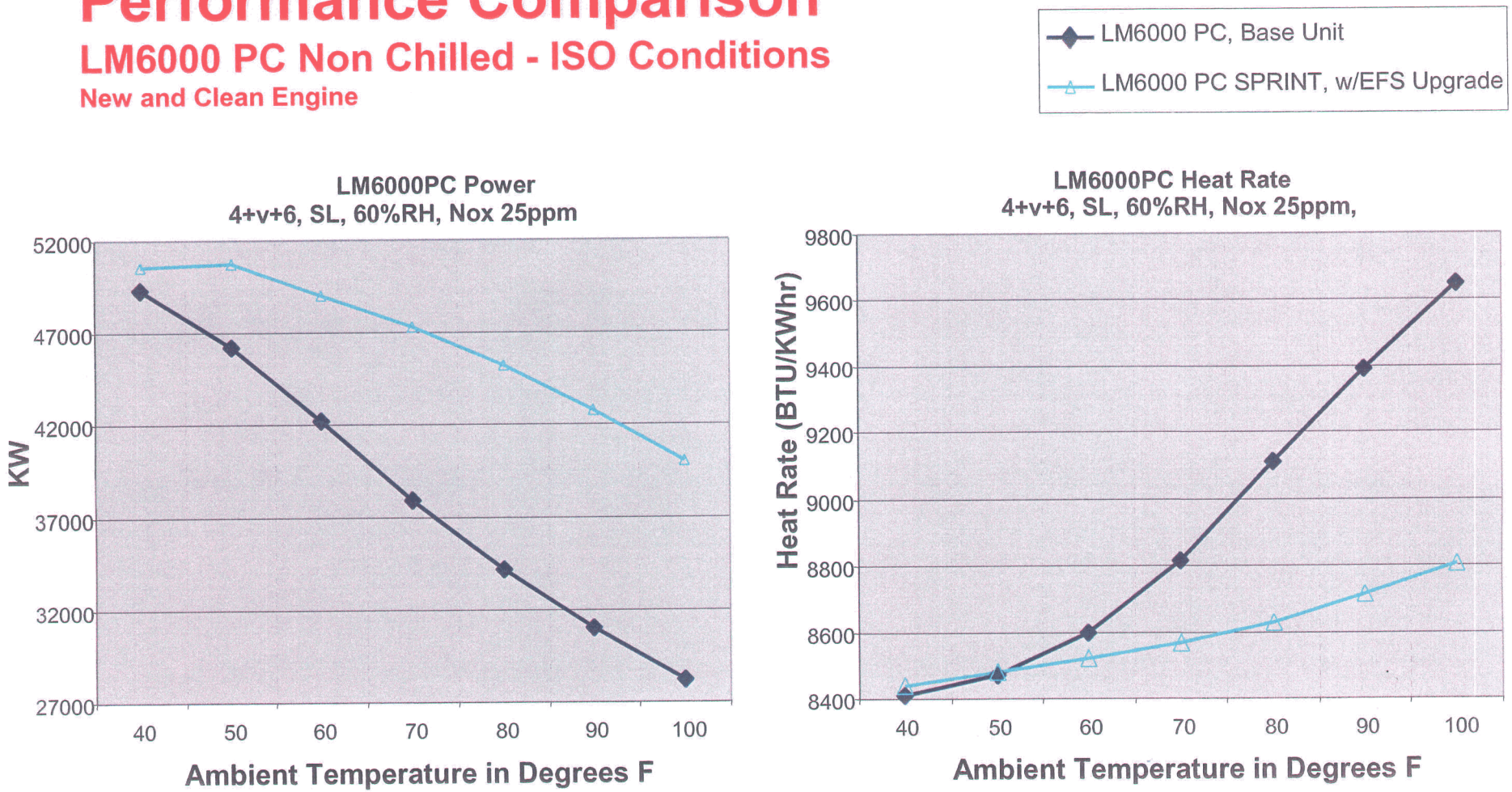
Sprint™ LPC Inlet Mist Spray Manifolds

Sprint™ HPC Inlet Mist Spray Manifolds

Performance Comparison

LM6000 PC Non Chilled - ISO Conditions

New and Clean Engine



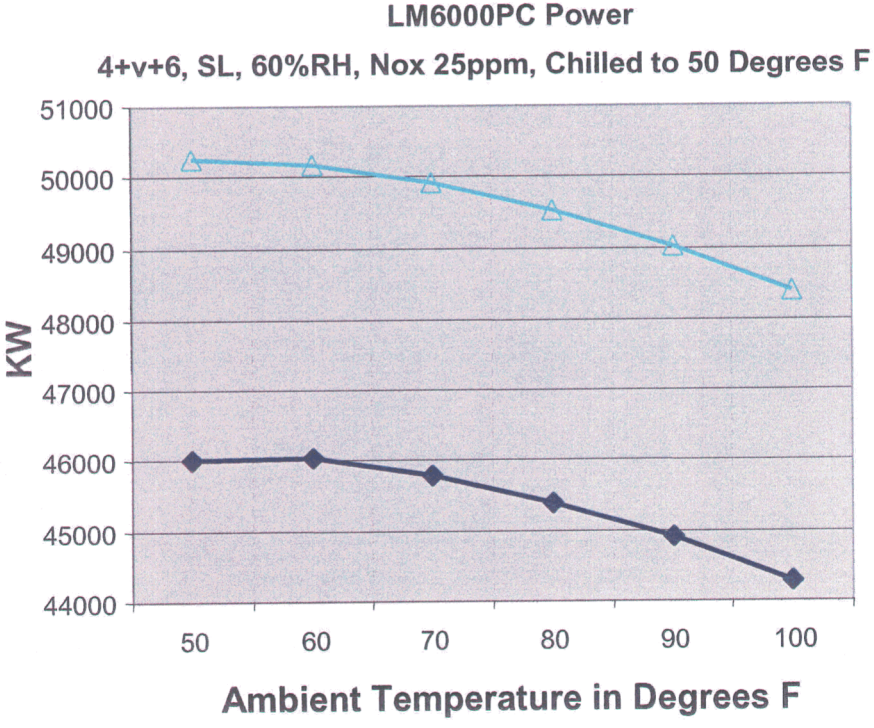
For Non Chilled Units SPRINT™ Uprate and EFS Upgrade Yields Average Power Increase of 9 MW Versus Base PC Units…With Heat Rate Improvement.

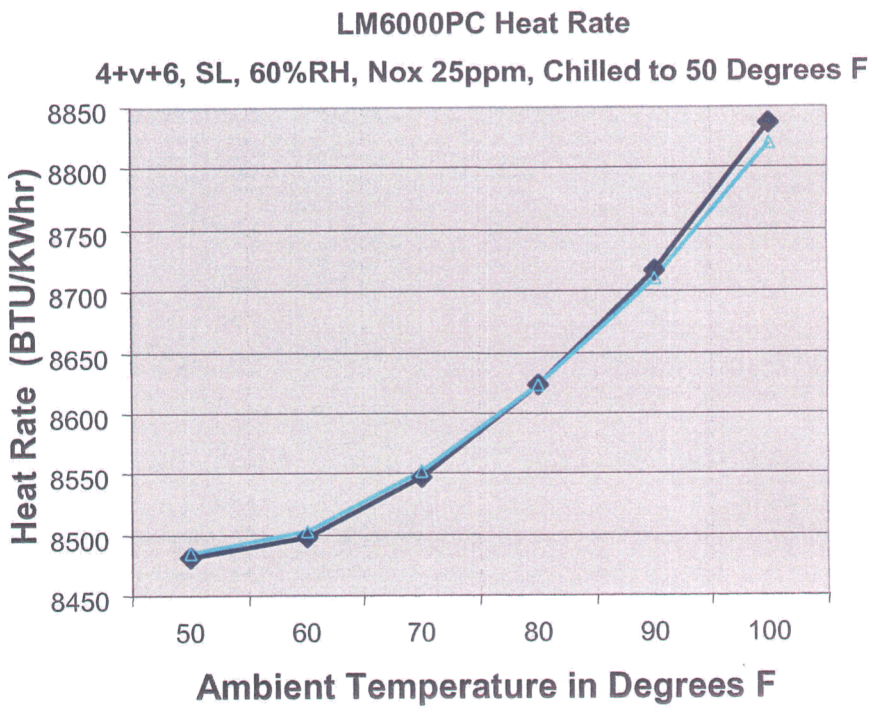
Performance Comparison

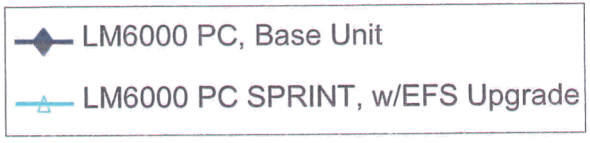
LM6000 PC Chilled to 50 Degrees F

New and Clean Engine

Note: Power and Heat Rate Adjusted for Parasitic Chiller Load







For Chilled Units SPRINT™ Uprate and EFS Upgrade Yields Average Power Increase of 4 MW Versus Base PC Units…with Slight Heat Rate Improvement.

EXHIBITS
L-00000FF-07-0134-00133

PART 1 OF 2
BAR CODE # 0000077686

To review Part 2 please see:

BAR CODE #0000068367

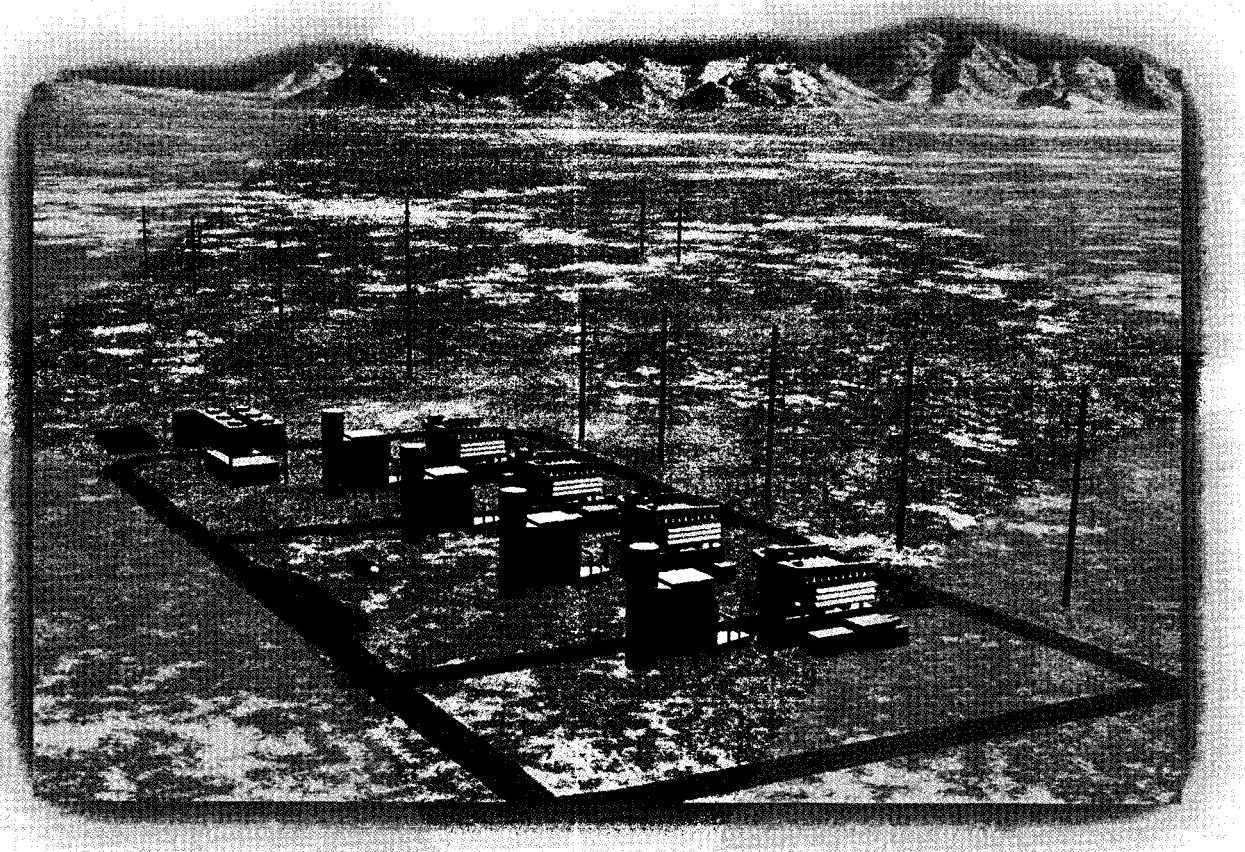
DOE/EA-1587

Draft Environmental Assessment for Pre-Approval Review

EXHIBIT
A-18
Admitted

for the Northern Arizona Energy Project

Mohave County, Arizona
September 2007



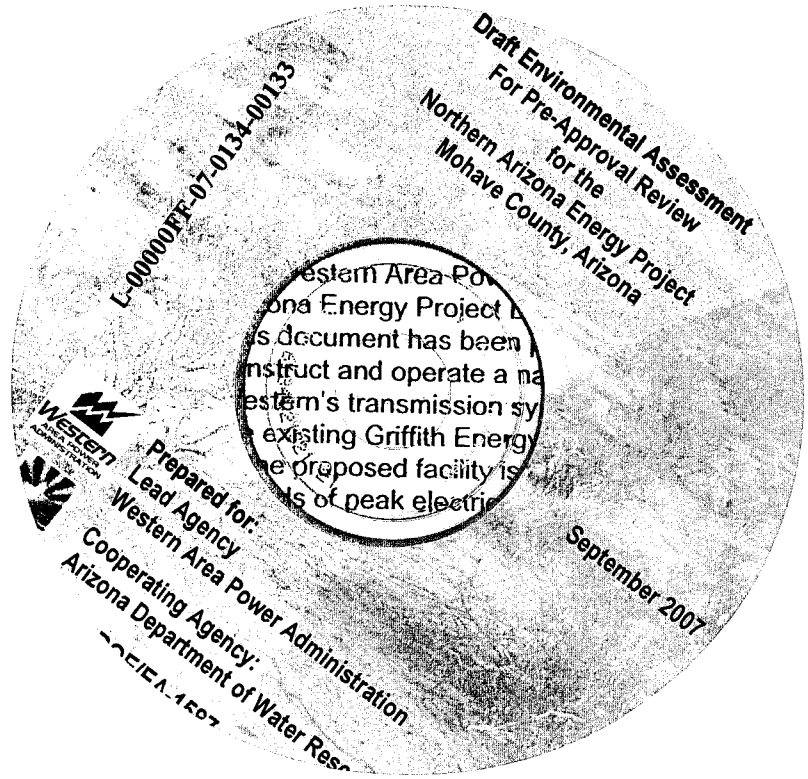
Prepared for:

Western AREA POWER ADMINISTRATION

Lead Agency:
Western Area Power Administration

Cooperating Agency:
Arizona Department of Water Resources

Docket Number
L-00000FF-07-0134-00133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for the
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September 2007
Prepared for:
Lead Agency
Western Area Power Administration
Cooperating Agency:
Arizona Department of Water Res
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Appendices

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ACRONYMS AND ABBREVIATIONS

The following is a list of acronyms used in this Environmental Assessment (EA). For the reader's convenience, they are redefined in each chapter the first time they are used. This section also includes a list of metric prefixes and a measurement conversion chart.

ACRONYMS and ABBREVIATIONS	
AAAQG	Arizona Ambient Air Quality Guidelines
AAC	Arizona Administrative Code
AADT	average annual daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ACC	Arizona Corporation Commission
ADEQ	Arizona Department of Environmental Quality
ADOSH	Arizona Division of Safety and Health
ADOT	Arizona Department of Transportation
ADT	Average Daily Traffic
ADWR	Arizona Department of Water Resources
afy	acre feet per year
AGFD	Arizona Game and Fish Department
APP	Aquifer Protection Permit
Applicant	Northern Arizona Energy, LLC
ASM	Arizona State Museum
ATSF	Atchison Topeka and Santa Fe
bcf	billion cubic feet
bcf/yr	billion cubic feet per year
bgs	below ground surface
BLM	Bureau of Land Management
BMP	best management practice
BNSF	Burlington Northern Santa Fe
BTU	British thermal unit
CAA	Clean Air Act
CEMS	continuous emissions monitor system
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide

ACRONYMS and ABBREVIATIONS

CO_2	carbon dioxide
CTG	combustion turbine generator
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DCS	distributed control system
DOE	Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
El Paso	El Paso Natural Gas Company
EPC	engineering, procurement, and construction
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FONSI	Finding of No Significant Impact
FR	Federal Register
GE	General Electric
gpd	gallons per day
gpd/ft	gallons per day per foot
gpm	gallons per minute
Griffith Energy	Griffith Energy Project
GSU	generator step-up
GVID	Golden Valley Irrigation District
HAP	Hazardous Air Pollutant
HHV	high heating value
HPS	high-pressure sodium
I-40	Interstate Highway 40
IES	Illuminating Engineering Society
KOP	Key Observation Point
KRMC	Kingman Regional Medical Center
kV	kilovolt
kWh	kilowatt hours

ACRONYMS and ABBREVIATIONS

lb/hr	Pounds per hour
LGIP	Large Generator Interconnection Procedures
LNG	liquefied natural gas
LOS	level of service
MACT	maximum achievable control technology
MCC	motor control center
MCEDA	Mohave County Economic Development Authority
MMBtu	Million British Thermal Units
mph	miles per hour
MSDS	Material Safety Data Sheet
msl	mean sea level
MW	megawatt
MWh	megawatt hours
MX	heavy industrial / manufacturing zone
NAAQS	National Ambient Air Quality Standards
NAEP	Northern Arizona Energy Project
NEPA	National Environmental Policy Act
NESHAP	national emission standards for hazardous air pollutant
NFPA	National Fire Protection Association
NH_3	aqueous ammonia
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_X	nitrogen oxide
NRCS	Natural Resources Conservation Service
NSPS	new source performance standards
NSR	New Source Review
NWP	Nationwide Permit
O_2	oxygen
O_3	ozone
O&M	operations and maintenance
ORV	off-road vehicle
OSHA	Occupational Safety and Health Administration
Pb	lead
PGA	Peak Ground Acceleration

ACRONYMS and ABBREVIATIONS

PM_{10} and $PM_{2.5}$	particulate matter less than 10 or 2.5 micrometers in diameter
ppm	parts per million
ppmdv	parts per million dry volume
Project	Northern Arizona Energy Project
PSD	Prevention of Significant Deterioration
psig	pounds per square inch guage
PWL	power level
Questar	Questar Corporation
RCRA	Resource Conservation and Recovery Act
RO	reverse osmosis
ROD	Record of Decision
ROI	Region of Influence
SARA	Superfund Amendments and Reauthorization Act
SCR	Selective Catalytic Reduction
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Office
SF_6	Sulfer hexafluoride
SLM	sound level meter
SO_2	sulfur dioxide
SOPs	standard operating procedures
SPCC	Spill Prevention Control and Countermeasure
SPRINT	SPRay INTer-cooling
TAP	toxic air pollutant
TCP	Traditional Cultural Property
TDS	total dissolve solids
tpy	tons per year
Transwestern	Transwestern Pipeline Company
UES	UniSource Energy Services
UPS	uninterrupted power supply
USACE	U.S. Army Corp of Engineers
USDA	U.S. Department of Agriculture
USDC	U.S. Department of Commerce
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service
V	volt

ACRONYMS and ABBREVIATIONS

VOC	volatile organic compound
VR	Visual Range
Western	Western Area Power Administration
$\mu g/m^3$	micrograms per cubic meter
YOS	Years of Service

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1.0 PROJECT OVERVIEW

Northern Arizona Energy, LLC (Applicant) proposes to construct and operate the Northern Arizona Energy Project (NAEP; Proposed Action), a natural gas-fired, simple cycle power plant, on private lands south of Kingman, Arizona. **Figure 1-1** shows the general project location of the Proposed Action within the State of Arizona. The Proposed Action would be located adjacent to the existing Griffith Energy Project (Griffith Energy) and would interconnect to Western Area Power Administration's (Western) system at the existing Griffith 230-kilovolt (kV) switchyard (Griffith Switchyard). **Figure 1-2** provides a more detailed view of the Proposed Action, which would consist of four General Electric (GE) LM6000 combustion turbine generators (CTGs) with a net generation capacity of 175 megawatts (MW) at design conditions. Power purchases by customers would be voluntary wholesale purchases, and all construction costs would be borne by the Applicant.

The Applicant applied to interconnect its proposed power plant with the Western transmission system at its Griffith Switchyard. Western, as a major transmission system owner, needs to evaluate the interconnection request and provide access to its transmission system if the request complies with existing policies, regulations, and laws. The proposed interconnection would integrate the power generated by the Proposed Action into the regional transmission grid and would allow the Applicant to supply power to the competitive electric wholesale market. Based on the application, Western's Proposed Action is to enter into an interconnection and construction agreement with the Applicant for the requested interconnections (the Federal Action), including modifying its Griffith Switchyard to accommodate the interconnection request.

1.1 ENVIRONMENTAL ASSESSMENT OVERVIEW

Before Western can agree to the interconnection, the National Environmental Policy Act (NEPA) the Council on Environmental Quality (CEQ) regulations and Department of Energy (DOE) NEPA Implementing Procedures must be satisfied. Western invited agencies with permitting responsibilities and special expertise to participate in this Environmental Assessment (EA) as cooperating agencies. Mohave County and the Arizona Department of Water Resources (ADWR) agreed to be cooperating agencies.

Western has prepared this EA to analyze the Proposed Action's expected impact on the human environment. The EA process provides the public and other interested parties an opportunity to review and provide input into the Proposed Action. After a comment period, the EA would be finalized and used to make Western's determination on whether or not to prepare and Environmental Impact Statement (EIS). Should Western determine that an EIS is necessary at any time in the course of preparing the EA, Western will use the issues and alternatives identified during scoping process in preparing the EIS, including all input and comments received during any public workshops or meetings held for the Proposed Action. If it is decided that an EIS will be prepared, Western would publish a Notice of Intent (NOI) in the Federal Register (FR).

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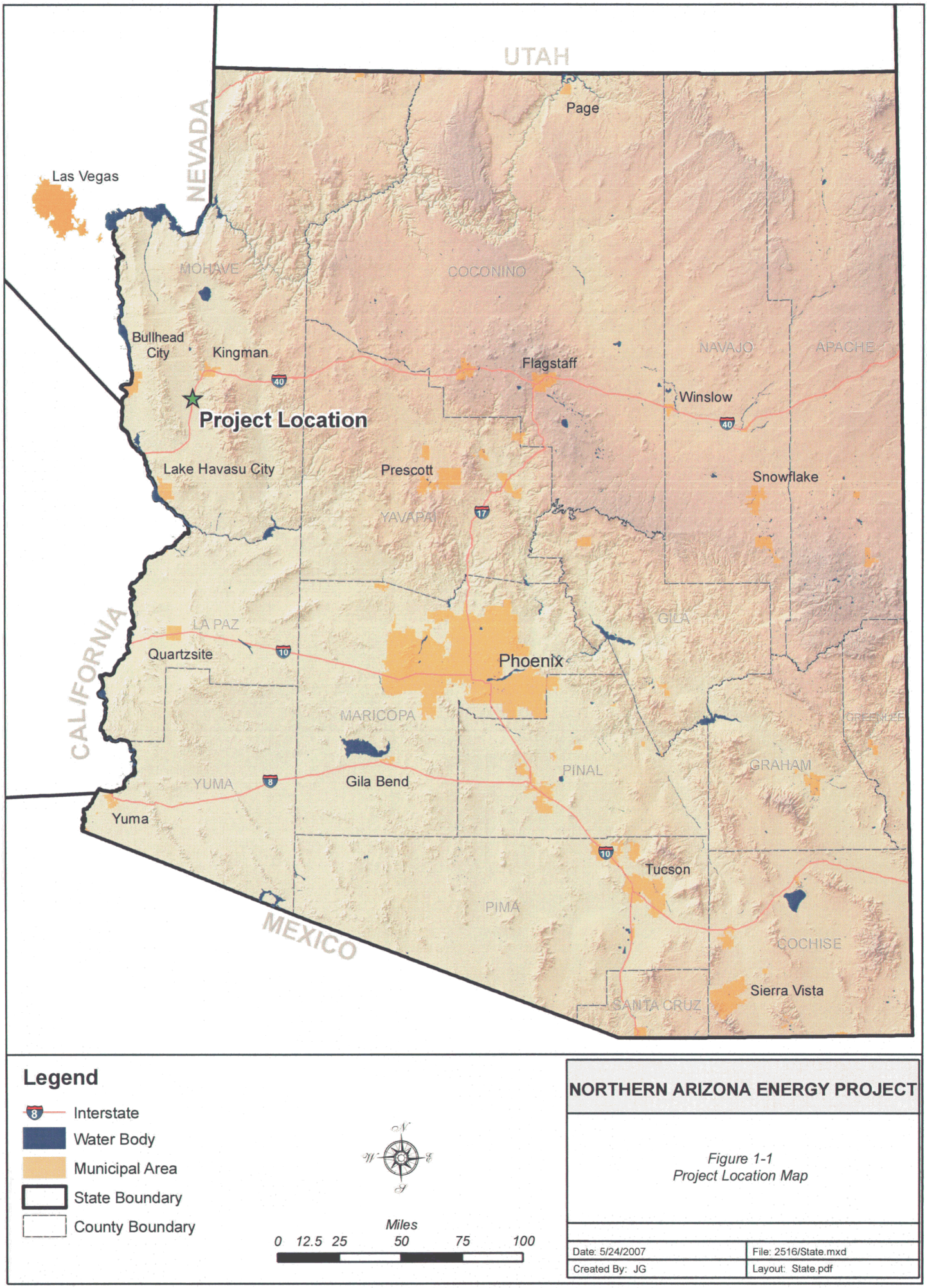
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Project Location
Lake Havasu City
Prescott
Snowflake
YAVAPAI
LA PAZ
Quartzsite
Phoenix
GILA
MARICOPA
GREENLEE
PINAL
GRAHAM
YUMA
Gila Bend
Yuma
Tucson
PIMA
COCHISE
Sierra Vista
SANTA CRUZ
Legend
Interstate
Water Body
Municipal Area
State Boundary
County Boundary
Miles
0 12.5 25 50 75 100
NORTHERN ARIZONA ENERGY PROJECT
Figure 1-1
Project Location Map
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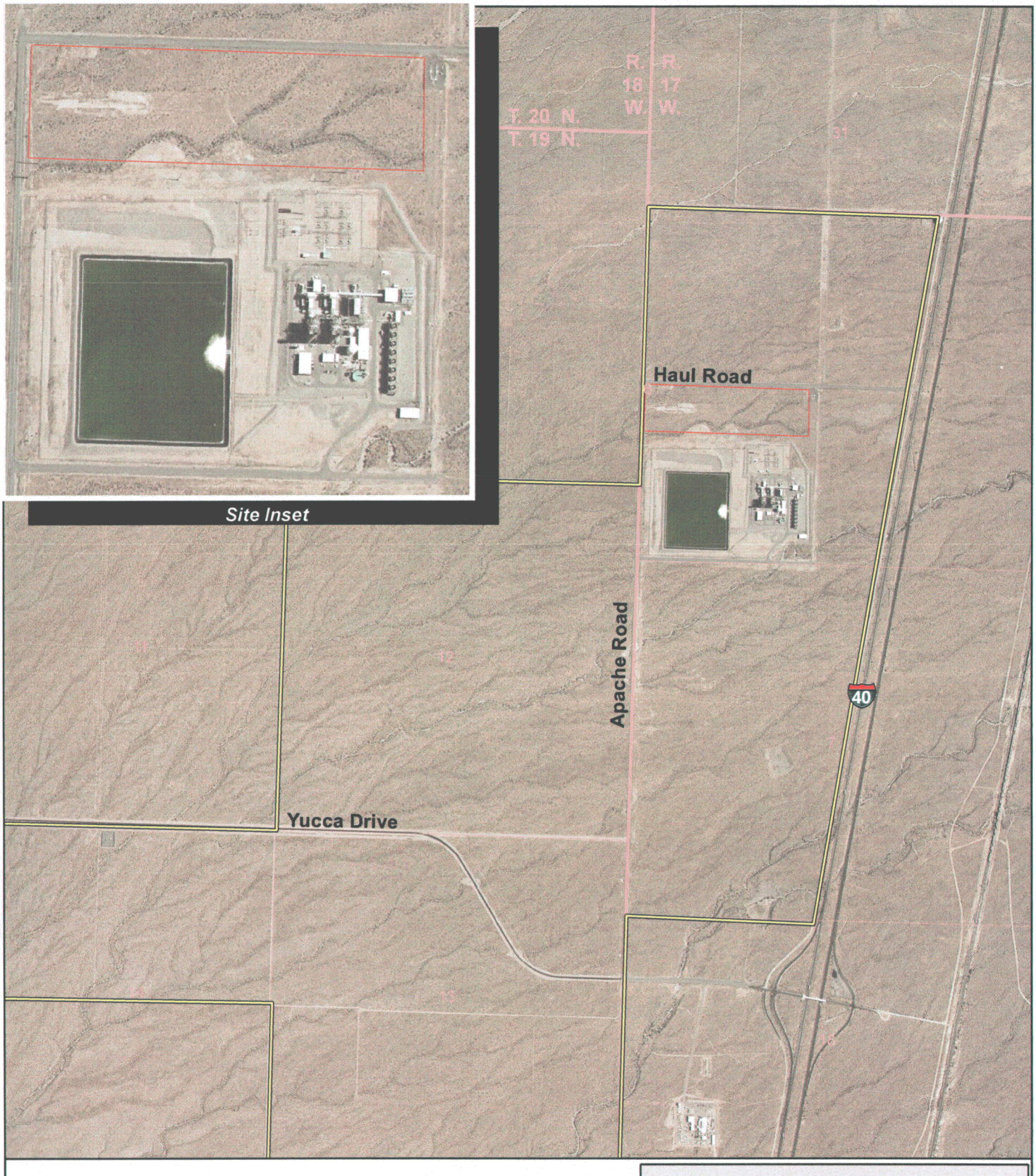

NORTHERN ARIZONA ENERGY PROJECT

Figure 1-2
Site Location

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
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DOE's NEPA implementing procedures require an EIS to be prepared for the addition of new generation resources greater than 50 average MW. Although the Proposed Action would be capable of producing 175 MW, its purpose is to provide electricity in time of peak demand, and would therefore operate intermittlently. Western based a determination to prepare an EA for the NAEP based on the Applicant's expectation that resource demand will be no more than the expected 2,500 hours per year and Applicant's willingness to limit the yearly electrical output of the proposed power plant to less than 50 average MW, or 437,991 megawatt hours (MWh). If this annual production threshold is exceeded, Western would open the breaker and take the units off-line until the start of the next annual period. The proposed power plant would then be operated within the stated production limits. Additionally, the Applicant may, at any time, pursue completion of an EIS to evaluate operation of the Proposed Action above the 50 average MW limit.

1.2 PURPOSE AND NEED

Western is a Federal power marketing agency under DOE that operates and maintains high-voltage transmission lines and associated facilities throughout the west. Western's mission is to market and trasmit power generated from Federal hydroelectric plants. Western's Open Access Transmission Service Tariff provides open access to Western's transmission service for entities such as the Applicant to supply power to their customer load areas.

Western provides these services through an interconnection if there is available capacity on the transmission line. The Applicant has requested an interconnection of the Proposed Action to Western's transmission system at the existing Griffith Switchyard.

When responding to the Need for Agency Action, Western must abide by the following:

- *Providing Transmission Service.* Western offers capacity on its transmission system to deliver electricity when such capacity is available under Western's Tariff. The Tariff complies with the Federal Energy Regulatory Commission's (FERC's) Final Order Nos. 888, 888A, 888B, and 888C, which are intended to ensure non-discriminatory transmission system access. Following FERC's Order Nos. 2003, 2003-A and 2003-B, Western submitted revisions to its non-jurisdictional Tariff on January 25, 2005 to FERC. The purpose of the filing was to revise certain terms of Western's original Tariff and to incorporate the Large Generator Interconnection Procedures (LGIP) and a Large Generator Interconnection Agreement. Western needs to respond to the interconnection and transmission service requests under the provisions of its revised Tariff.
- *Protect Transmission System Reliability and Service to Existing Customers.* Western's purpose is to ensure that existing transmission system reliability and service is not degraded. Western's LGIP provides for transmission and system studies to ensure that system reliability and service to existing customers is not adversely affected by new interconnections.
- *Consideration of the Applicant's Objectives.* Because the Statement of Purpose and Need affects the extent to which alternatives are considered reasonable, it is important to understand both Western's Purpose and Need and that of the Applicant.

More information about these requirements is available on Western's website, located at www.wapa.gov.

1.2.1 Purpose of the Proposed Action

The NAEP would supply power to load serving entities in Arizona and surrounding regions for the purpose of serving customers during periods of peak electricity demand. Currently, there are no generation units in operation dedicated to serving the peak demand of the Mohave County loads. The proposed power plant is capable of a rapid startup and can respond to fluctuations in electric demand within 10 minutes.

1.3 DECISIONS TO BE MADE

Western will use the information in this EA to support Federal decisions for the Proposed Action. Western will decide whether to enter into an interconnection agreement with the Applicant, and the best way to interconnect the Proposed Action into the Western transmission system, to provide the transmission service needed. When making its decision, Western will ensure consistency with its statutory responsibilities governing interconnections, will consider the environmental impacts of the Proposed Action, will ensure Western's ability to meet its current contractual obligations and customer needs, and will ensure that regional system reliability is maintained or improved.

1.4 PUBLIC PARTICIPATION

Western notified Federal, state, and local agencies; tribes; and affected landowners of its determination to prepare an EA and requested information on issues and concerns related to the Proposed Action. Informal consultation was completed with the U.S. Fish and Wildlife Service (USFWS) for endangered species compliance. Consultation was also undertaken with the Arizona State Historic Preservation Office (SHPO) and all tribes that might have interest in the area. A Class III Cultural Resource inventory was conducted with a monitor from the Hualapai Tribe, and the resulting Report was provided to the SHPO and those tribes that requested it.

Chapter 5.0. Persons and Agencies Consulted. provides a brief summary of scoping activities and a listing of the entities contacted during scoping.

1.5 AUTHORIZING ACTIONS

In addition to the Federal decisions by Western, several permits and approvals need to be obtained from other entities to construct and operate the NAEP. **Table 1-1** summarizes the primary approvals that would be required.

Table 1-1 Project List of Permits/Approvals

Agency	Permit/Approval
Arizona Corporation Commission (ACC)	Certificate of Environmental Compatibility (CEC)
Arizona Department of Agriculture	Native Plant Permit
Arizona Department of Environmental Quality (ADEQ)	Air Quality Permits
ADEQ	Hazardous Waste Permit
ADEQ	Stormwater Permits
Arizona State Historic Preservation Office	Concurrence or Agreement Document
Mohave County	Excavation/Grading Permit Septic Permit Permit for Temporary Construction Facilities Permit for Temporary Power Building Permits and Site Plan Water Service Agreement
US Army Corps of Engineers (USACE)	Nationwide 404 Permit, if required
US Environmental Protection Agency (EPA)	Air Quality Permits
EPA	Stormwater Permits
USFWS	Concurrence or Biological Opinion

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2.0 PROPOSED ACTION AND ALTERNATIVES

The Applicant is proposing to finance and construct a power plant on private lands south of Kingman, Arizona. This Proposed Action is known as the NAEP.

The proposed power plant would be a natural gas-fired, simple cycle power plant that would supply power to load-serving entities in Arizona and surrounding regions for the purpose of serving their customers during periods of peak electricity demand. The proposed power plant would be designed to produce 175 MW of net electrical output with a heat rate of 9,975 British Thermal Units/kilowatt hour (Btu/kWh) high heating value (HHV) based on the design condition ambient temperature of 90 degrees Fahrenheit (°F). The CTGs are capable of rapid startup, allowing the proposed power plant to respond to fluctuations in electric demand within ten minutes. The Applicant would limit the output of the proposed power plant to 50 average MW or less, or 437,991 MWh per year.

The proposed power plant would interconnect with the Western 230-kV system at the neighboring existing Griffith Switchyard via 2,745 feet of overhead double circuit transmission line that would be owned, operated, and maintained by the Applicant. There would be one generator step-up (GSU) transformer per CTG pair. Natural gas would be supplied to the proposed power plant through the existing UniSource Energy Services (UES) gas distribution facilities currently serving the Interstate 40 (I-40) Industrial Corridor. More detail on the gas interconnection is found in section 2.1.5.

2.1 PROPOSED ACTION DESCRIPTION

2.1.1 Power Plant Location and Description

The Proposed Action would be located in Mohave County Arizona, just west of I-40, approximately 1.7 miles north of the Griffith interchange, about 9 miles south of Kingman. It is approximately 110 miles southeast of Las Vegas, Nevada via Arizona Highway 93 and 200 miles northwest of Phoenix, Arizona. **Figure 1-1** shows the general project location of the Proposed Action within the State of Arizona. The Proposed Action would be located within the existing I-40 Industrial Corridor just north of the existing Griffith Energy facilities on a parcel of undeveloped land comprising essentially the north 700 feet of the north one-half of the southwest quarter of section 6, Township 19 North, Range 17 West, Gila & Salt River Base & Meridian, Mohave County, Arizona, as shown on **figure 1-2**.

The Proposed Action would be located on a 40-acre parcel of land (NAEP property) that is controlled by the Applicant. The NAEP property occupies the northernmost 700 feet of the original 160-acre parcel of land owned by Griffith Energy (Original Griffith Property). Within the NAEP property, approximately eight acres would be utilized to site the power plant equipment, stormwater retention basin, and interconnection facilities (proposed power plant).

The NAEP property is zoned heavy industrial/manufacturing (MX) by Mohave County. This zoning designation permits the siting of industrial facilities including electric generation facilities. No local land use permits, such as conditional use permits or special use permits, are

required by Mohave County, given the MX zoning of the NAEP property. The Applicant would be required to obtain approval of a site plan and building permits from Mohave County.

2.1.2 Site Layout and Arrangement

The overall site layout is shown on **figure 2-1**, which shows the locations and sizes of the equipment and improvements including access roads, the gas pipeline and meter station, the 230-kV transmission line, the Griffith Switchyard expansion area, the construction lay down area, and a retention basin for storm water management. A more detailed general arrangement of the proposed power plant is shown on **figure 2-2**.

A network of roads would surround the 8-acre power plant site for fire equipment and maintenance access. The area required for the Griffith Switchyard expansion would be one acre. The temporary construction area for contractor facilities, construction parking, and equipment and material lay down (temporary construction area) would be located in two designated areas, one west and one east of the proposed power plant. If the entire designated temporary construction area is utilized, a total of 6 acres would be used by the construction contractors. The remaining 32 acres of the NAEP property would be left undeveloped.

The proposed power plant equipment and facilities would be arranged for optimum use of the power plant site as well as to ensure operability and maintainability. Conceptual engineering has been conducted to define the specific equipment requirements and to confirm the suitability of the site.

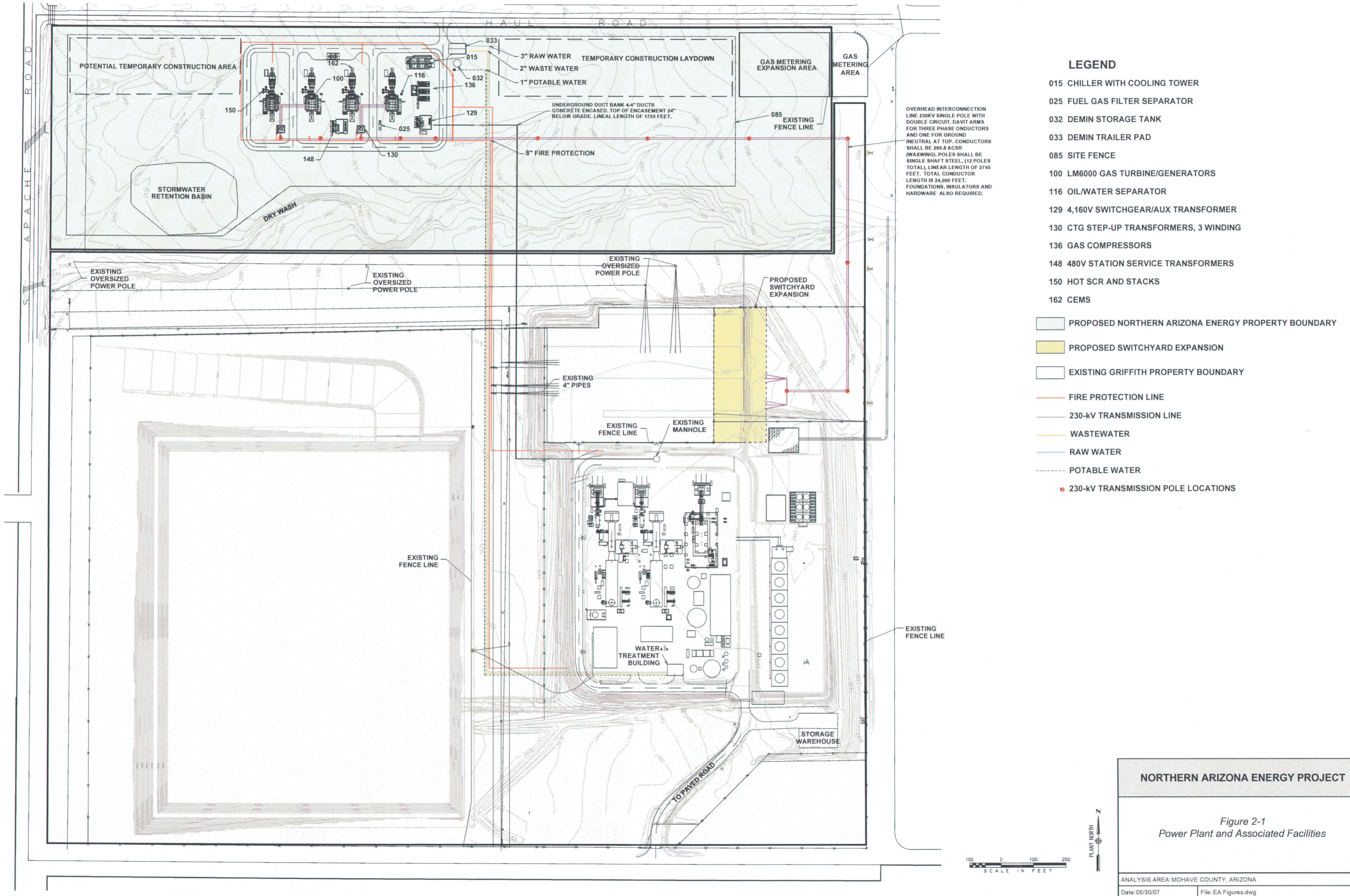
2.1.2.1 Site Access

Access to the proposed power plant would be via the Griffith interchange on I-40, which travels north-south near the Proposed Action. From the Griffith interchange, access to the proposed power plant would be west on Griffith Road, then approximately 1.7 miles north on South Apache Road, then east on Haul Road to the proposed power plant entrance. Access to the NAEP property would be controlled through a security gate at the proposed power plant entrance off of Haul Road.

A separate entrance from Haul Road would be utilized for construction access to the temporary construction area. A separate gate for construction personnel and equipment/material deliveries would allow access to the temporary construction area during the construction of the Proposed Action.

2.1.2.2 Interior Roads and Fencing

The finish surface on roadways and parking areas located within the proposed power plant would be gravel or as determined by section 26 of the Mohave County Zoning ordinance. Unpaved ground surfaces in and around the main equipment area would be covered with crushed stone or gravel. An eight-foot-tall, metal fabric security fence with barbed wire or razor wire on top would enclose the entire proposed power plant and temporary construction area.



LEGEND

- 015 CHILLER WITH COOLING TOWER
- 025 FUEL GAS FILTER SEPARATOR
- 032 DEMIN STORAGE TANK
- 033 DEMIN TRAILER PAD
- 085 SITE FENCE
- 100 LM6000 GAS TURBINE/GENERATORS
- 116 OIL/WATER SEPARATOR
- 129 4,160V SWITCHGEAR/AUX TRANSFORMER
- 130 CTG STEP-UP TRANSFORMERS, 3 WINDING
- 136 GAS COMPRESSORS
- 148 480V STATION SERVICE TRANSFORMERS
- 150 HOT SCR AND STACKS
- 162 CEMS

- PROPOSED NORTHERN ARIZONA ENERGY PROPERTY BOUNDARY
- PROPOSED SWITCHYARD EXPANSION
- EXISTING GRIFFITH PROPERTY BOUNDARY
- FIRE PROTECTION LINE
- 230-kV TRANSMISSION LINE
- WASTEWATER
- RAW WATER
- POTABLE WATER
- 230-kV TRANSMISSION POLE LOCATIONS

Source: Bibb Engineering

NORTHERN ARIZONA ENERGY PROJECT

Figure 2-1
Power Plant and Associated Facilities

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
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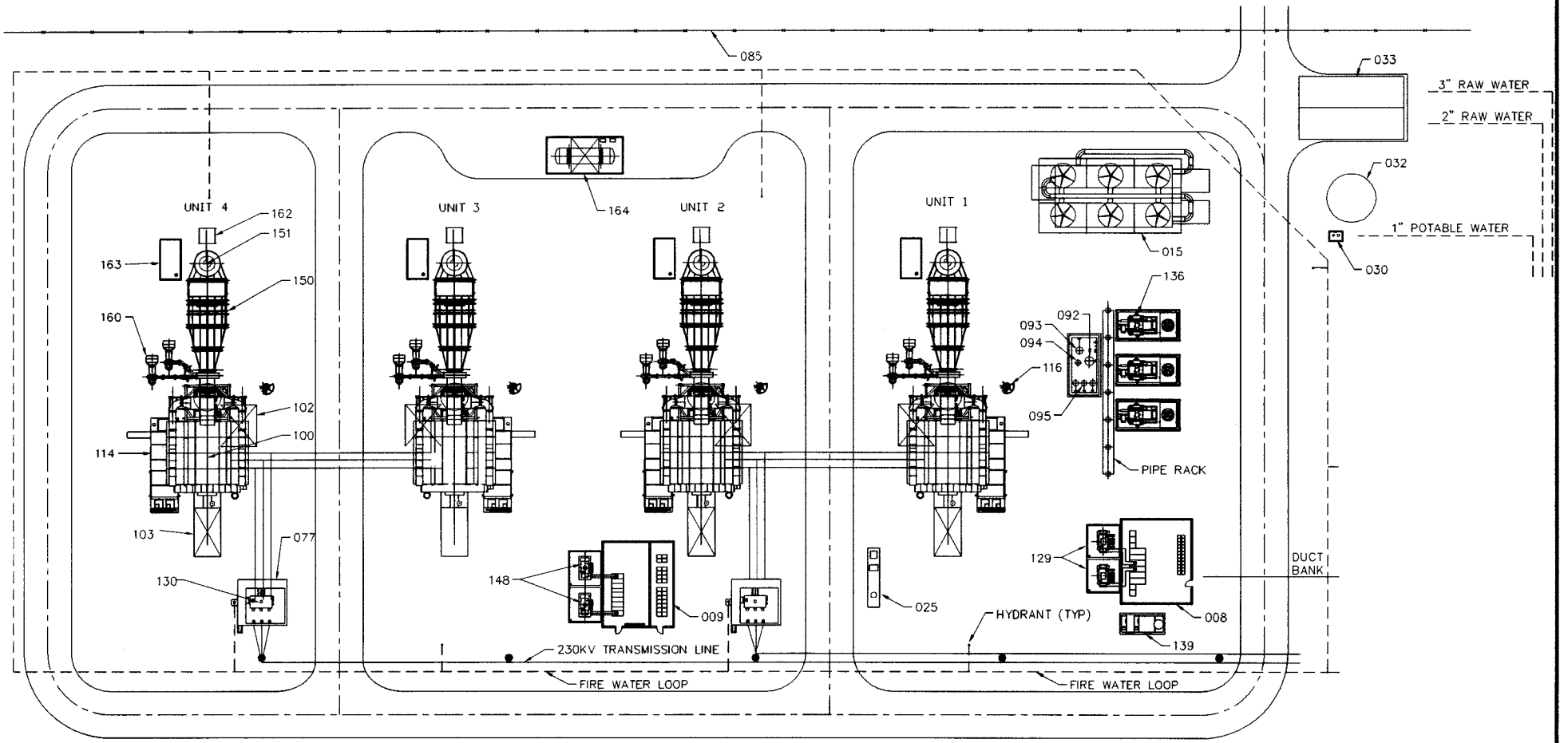
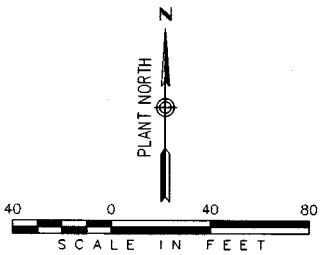
Drawn By: ETC	Layout: 001



008 4160V SWITCHGEAR AND MCC BUILDING
009 480V SWITCHGEAR AND MCC BUILDING
015 CHILLER WITH COOLING TOWER
025 OIL/WATER SEPARATOR
030 DEMIN WATER FORWARDING PUMPS
032 DEMIN STORAGE TANK
033 DEMIN TRAILER PAD
077 FIRE WALL
085 SITE FENCE
092 FUEL GAS ACCUMULATOR
093 NATURAL GAS INLET SCRUBBER
094 HYDROCARBON DRAIN TANK
095 DISCHARGE FILTER SCRUBBER
100 LM6000 GAS TURBINE/GENERATORS
102 TURBINE REMOVAL/MAINTENANCE AREA
103 GENERATOR ROTOR REMOVAL AREA
114 POWER CONTROL MODULE129
116 FUEL GAS FILTER SEPARATOR
129 AUXILIARY TRANSFORMER
130 CTG STEP-UP TRANSFORMER, 3 WINDING
136 GAS COMPRESSORS
139 AIR COMPRESSOR SKID
148 480V STATION SERVICE TRANSFORMERS
150 HOT SCR AND STACKS
151 STACK
160 SCR PURGE AIR/DILUTION AIR FANS
162 CEMS
163 AMMONIA VAPORIZATION SKID
164 AMMONIA STORAGE TANK AND UNLOADING AREA



NORTHERN ARIZONA ENERGY PROJECT

Figure 2-2
Site Layout of the Proposed Power Plant

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
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Drawn By: ETC	Layout: 001

Source: Bibb Engineering

2.1.2.3 Grading and Drainage

The proposed power plant slopes downgradient from northeast to southwest. The entire proposed power plant footprint containing the equipment would be raised to provide adequate drainage away from equipment and buildings to the stormwater retention basin as shown on **figure 2-3**. Excavated material from the stormwater retention basin may be used for structural fill depending on the suitability of the excavated material. Approved soil materials for structural fill would be imported, if required. Additionally, specialized granular material may need to be imported for road base and possible use below foundations. If so, this material would be purchased from a local supplier.

2.1.3 Power Plant Type and Processes

The proposed power plant would use four GE LM6000 PC SPRINT NxGen CTGs with inlet air chiller modules. Auxiliary equipment would include inlet air filters with chiller coils, mechanical chiller with cooling module, circulating water pumps, water treatment equipment, natural gas compressors, GSU and auxiliary transformers, and water storage tanks. The technical details of the proposed power plant components are described below.

2.1.3.1 Combustion Turbine Generator Equipment

The LM6000 combustion turbines are two-shaft gas turbine engines. These turbines are essentially the same as the CF6-80C2 engine, which is GE's high-thrust, high-efficiency aircraft engine. The CTGs would be housed in a metal enclosure to protect the units from the elements and reduce noise.

The CTGs would use state-of-the-art technology to efficiently burn clean natural gas with reduced nitrogen oxide (NO_x) and carbon monoxide (CO) emissions. Each CTG would be equipped with water injection to the combustors for reducing the production of NO_x. In addition, Selective Catalytic Reduction (SCR) systems would further reduce NO_x and CO with a combination of catalysts and injection of 19 percent aqueous ammonia.

Each CTG would also be provided with a SPRINT system, which enhances the efficiency and output of the gas turbine engine by spraying micro-droplets of atomized water into the inter-stage air stream between the low-pressure and high-pressure compressors. The water would be atomized to a droplet diameter of less than 20 microns by using interstage bleed air and special nozzles. As the droplets evaporate, the air temperature would be reduced and the mass flow increased. This would result in greater power output and better fuel efficiency.

2.1.3.2 Air Intake System

The air intake system would provide filtered air to the combustion turbine compressors. Mounted above each combustion turbine, the intake system would be equipped with a self-cleaning filter system to clean particulates from the air. The system would be provided with access for inspection and maintenance. Inlet air chilling would enhance gas turbine performance during times of high ambient air temperatures. The inlet chilling system would consist of heat exchanger coils located in the inlet air stream. Chilled water from a mechanical chiller would flow through the coils to cool the incoming air. This would result in increased electrical output and improved fuel efficiency for the units.

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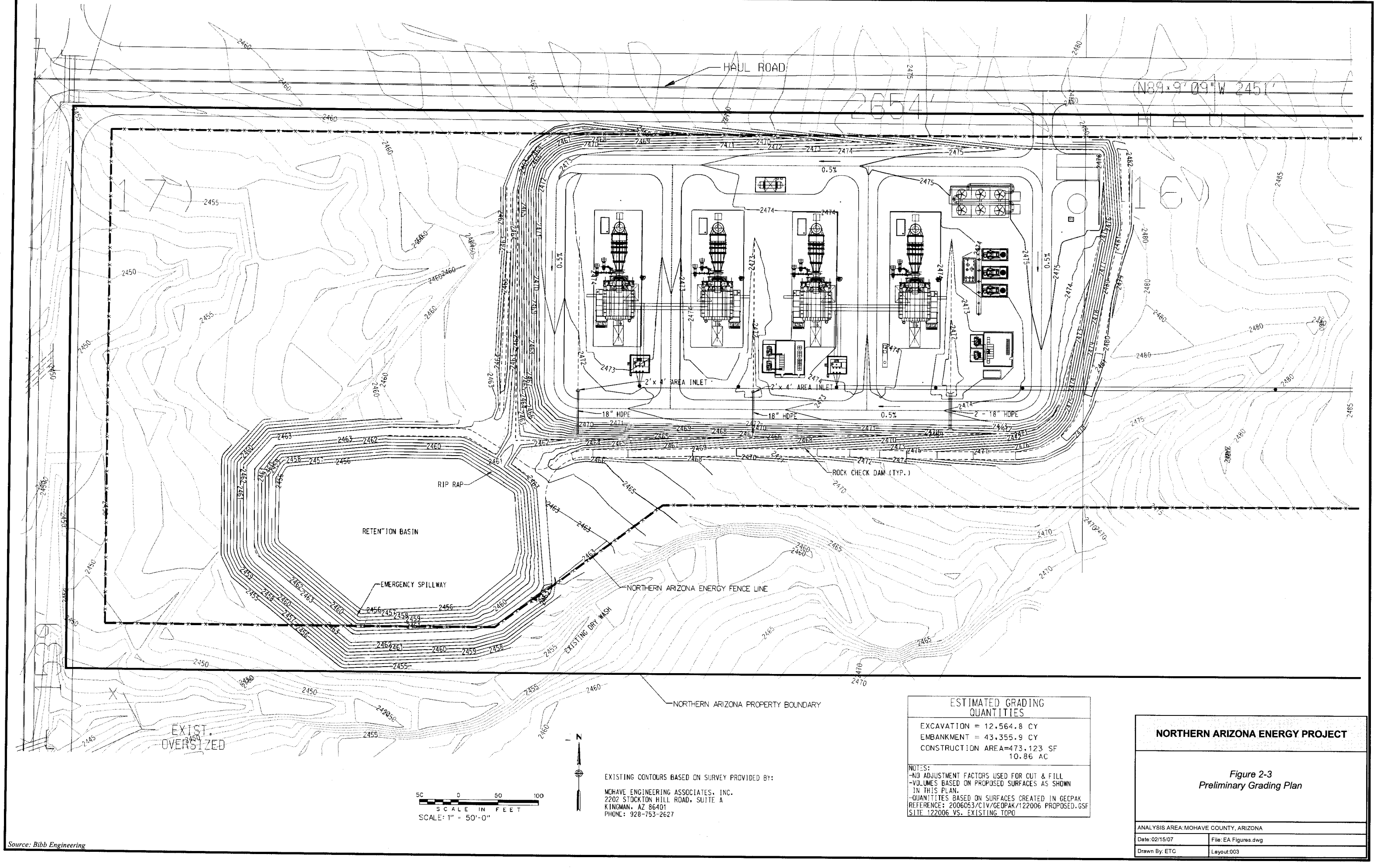

EXISTING CONTOURS BASED ON SURVEY PROVIDED BY:

MOHAVE ENGINEERING ASSOCIATES, INC.
2202 STOCKTON HILL ROAD, SUITE A
KINGMAN, AZ 86401
PHONE: 928-753-2627

ESTIMATED GRADING QUANTITIES	
EXCAVATION = 12,564.8 CY	
EMBANKMENT = 43,355.9 CY	
CONSTRUCTION AREA=473,123 SF	10.86 AC

NOTES:
-NO ADJUSTMENT FACTORS USED FOR CUT & FILL
-VOLUMES BASED ON PROPOSED SURFACES AS SHOWN IN THIS PLAN.
-QUANTITIES BASED ON SURFACES CREATED IN GEOPAK
REFERENCE: 2006053/CIV/GEOPAK/122006 PROPOSED.GSF
SITE 122006 VS. EXISTING TOPO

NORTHERN ARIZONA ENERGY PROJECT

Figure 2-3
Preliminary Grading Plan

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/15/07	File: EA Figures.dwg
Drawn By: ETC	Layout: 003

Source: Bibb Engineering

2.1.3.3 Emissions Control Equipment

The combustion gases would exit the turbine at approximately 830 °F and then pass through the SCR system for NO_x emission control and an oxidization catalyst for control of CO and volatile organic compound (VOC) emissions. The SCR system would be used in conjunction with ammonia injection for the control of NO_x emissions. A 19 percent aqueous ammonia (NH_3) solution would be injected into the CTG exhaust gas stream, which would pass over a catalyst bed to reduce the oxides of nitrogen to inert nitrogen. Diluted ammonia vapor would be injected into the exhaust gas stream via a grid of nozzles located upstream of the catalyst module. The subsequent chemical reaction on the catalyst would reduce NO_x to nitrogen and water. The SCR equipment would include a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors.

After passing through the SCR system, the exhaust gases would exit through the attached stack. Each of the four exhaust stacks would be 85 feet tall and 10 feet in diameter. The stacks would be equipped with continuous emissions monitor system (CEMS) and test connections for performance monitoring.

2.1.3.4 Instrumentation and Controls

GE would provide their standard digital process control system for each CTG. The balance of plant systems would be controlled by a distributed control system (DCS).

The DCS would interface with the control systems furnished by the CTG supplier to provide supervisory remote control capabilities as well as data acquisition, annunciation, and historical storage of CTG operating information. A fiber optic connection would be made between the NAEP and the control room at Griffith Energy from which the NAEP would be operated. The fiber line would be collocated with the water and wastewater lines.

2.1.3.5 Fuel System

High-pressure natural gas would be supplied to the proposed power plant from the existing UES gas distribution system located adjacent to the NAEP property. A metering station would be located east of the proposed power plant. From the metering station, gas would be piped to the gas conditioning and compressor equipment skids. The gas conditioning skids would filter gas particulates and drop out any moisture contained in the gas. The gas pipeline will be approximately 1,200 feet long and located entirely within the NAEP property.

2.1.3.6 CTG Cooling

The generators would be air-cooled. The lube oil for the CTGs would be cooled by a closed-loop water-glycol system with water-to-air (fin fan) coolers.

2.1.3.7 Inlet Air Chiller

The four CTG units would be served by one shared inlet air chiller system providing 6,500 nominal refrigeration tons of chilled water. The chiller system would be composed of two chillers arranged in a series configuration. Cooling for the chiller would be provided by a

cooling module located above the chiller skid. Refrigerant utilized for the chiller would be R-123.

2.1.3.8 Water Treatment

The water treatment facilities for the proposed power plant would be permanently provided by leased reverse osmosis (RO) and demineralization trailers to supply demineralized water to the CTGs.

The leased demineralizer trailers would be taken off site for regeneration, and all waste product contained in the trailer would be disposed of at off-site facilities by the vendor, in accordance with applicable regulations.

2.1.3.9 Interfaces and Shared Services

The Proposed Action would be integrated with several existing Griffith Energy systems. The integration between the two facilities is described in the following paragraphs.

2.1.3.9.1 Firewater

The existing firewater loop at Griffith Energy consists of an electric firewater pump with a diesel backup firewater pump. The firewater pumps discharge into an underground firewater loop that circles Griffith Energy and provides water to fire hydrants and the fire suppression systems. The existing firewater pumps are capable of supplying up to 1,500 gallons per minute (gpm) at 100 pounds per square inch gauge (psig) of water to the Griffith Energy firewater loop. Based on National Fire Protection Association (NFPA) standards, the proposed power plant firewater requirement is 500 gpm. This firewater flow requirement is significantly lower than the capability of the Griffith Energy firewater system. Therefore, the proposed power plant would be connected into the Griffith Energy firewater system by extending the firewater loop around the proposed power plant. Additional fire pumps and storage tanks would not required for the proposed power plant. The NFPA standards do not require protection for coincident events at the proposed power plant and at Griffith Energy.

The proposed power plant would not be located within a designated Fire District. A private company, Inland Valley Fire, serves Griffith Energy and the Arizona State Prison in Kingman 24 hours a day. The Inland Valley Fire equipment, which includes a fire truck, ambulance, and staff, is located in the vicinity. It is anticipated that NAEP would contract with Inland Valley Fire Company to provide fire protection.

2.1.3.9.2 Supply Water

The raw water supply to the proposed power plant would be pretreated by Griffith Energy. The process water interconnection would be located near the Griffith Energy cooling tower and would consist of a new pipe connection to existing Griffith Energy water supply piping. This water supply pipeline would be approximately 2,500 feet long and would be located entirely on NAEP and Griffith Energy property within the same corridor as the other interconnections with Griffith Energy. The water would be pumped from this location to the proposed power plant, as shown on **figure 2-1**.

2.1.3.9.3 Wastewater

Wastewater from the proposed power plant would be piped to the existing Griffith Energy wastewater recycling and treatment system to maximize water reuse and minimize the overall amount of wastewater produced. The final wastewater effluent would then be directed to the existing Griffith Energy brine disposal pond using existing equipment. The Griffith Energy brine disposal pond has sufficient storage and evaporating capacity. No additional environmental permits for the brine disposal pond are needed to accommodate both the proposed power plant's and Griffith Energy's wastewater over the design life of both projects. The proposed routing of the wastewater piping from the proposed power plant to Griffith Energy is shown on **figure 2-1**.

2.1.3.9.4 Electrical Grounding Systems

The existing grounding system at Griffith Energy and at the Griffith Switchyard is presently electrically interconnected as shown on **figure 2-4**. To minimize personnel hazards at the proposed power plant, a new buried ground grid in the proposed power plant area would be electrically interconnected with the existing Western and Griffith Energy grounding systems. The electrical interconnection is shown on **figure 2-5**.

2.1.4 Operations

2.1.4.1 Operations Management

The Proposed Action would provide electric power to the grid when other base load generation cannot meet system demands. This typically occurs during periods of peak system electrical load. As a peaking facility, the proposed power plant would have the ability to dispatch any combination of the four independent CTGs in an hourly and/or daily start-stop mode. Unit start times are short, with each CTG typically achieving full load output within 10 minutes of a unit start. Each CTG would be independently controlled from approximately 50 to 100 percent of full load.

The Applicant would contract with Griffith Energy for operations and maintenance (O&M) services. It is anticipated that existing Griffith O&M personnel would be increased by two to four individuals to support the proposed power plant operations and maintenance. Minor maintenance would be provided by existing Griffith O&M personnel, and major maintenance activities would be supported by contracted labor services or original equipment manufacturers' personnel.

The proposed power plant would be operated from the existing Griffith Energy control room. The combustion turbines and plant systems would incorporate state-of-the-art monitoring and control systems. The Proposed Action would be designed to operate independently of the operational status of Griffith Energy, although, to optimize operations efficiency, certain plant equipment (e.g., make-up water/wastewater processes and fire water systems) would be integrated with existing Griffith Energy systems and operations.

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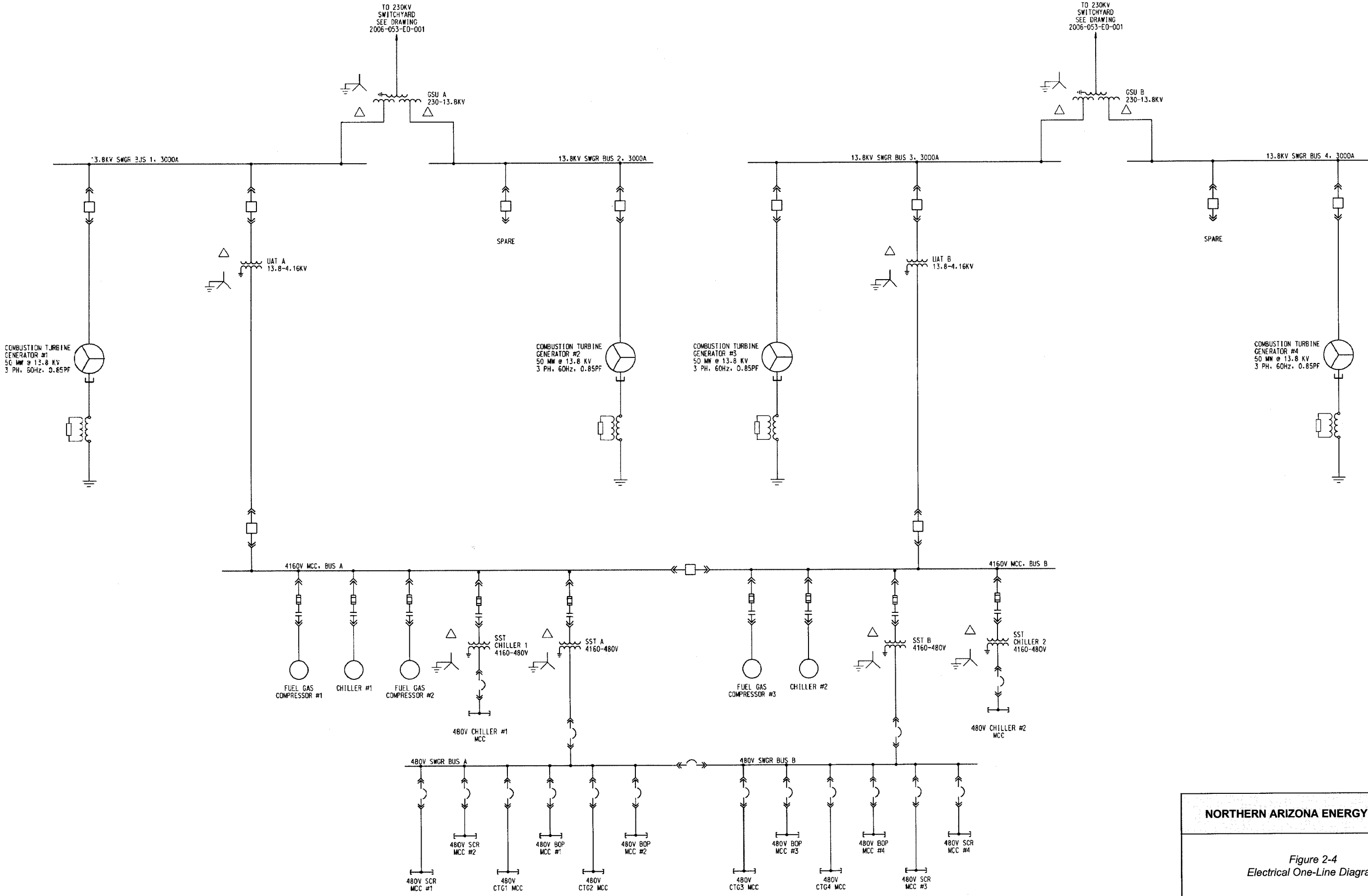
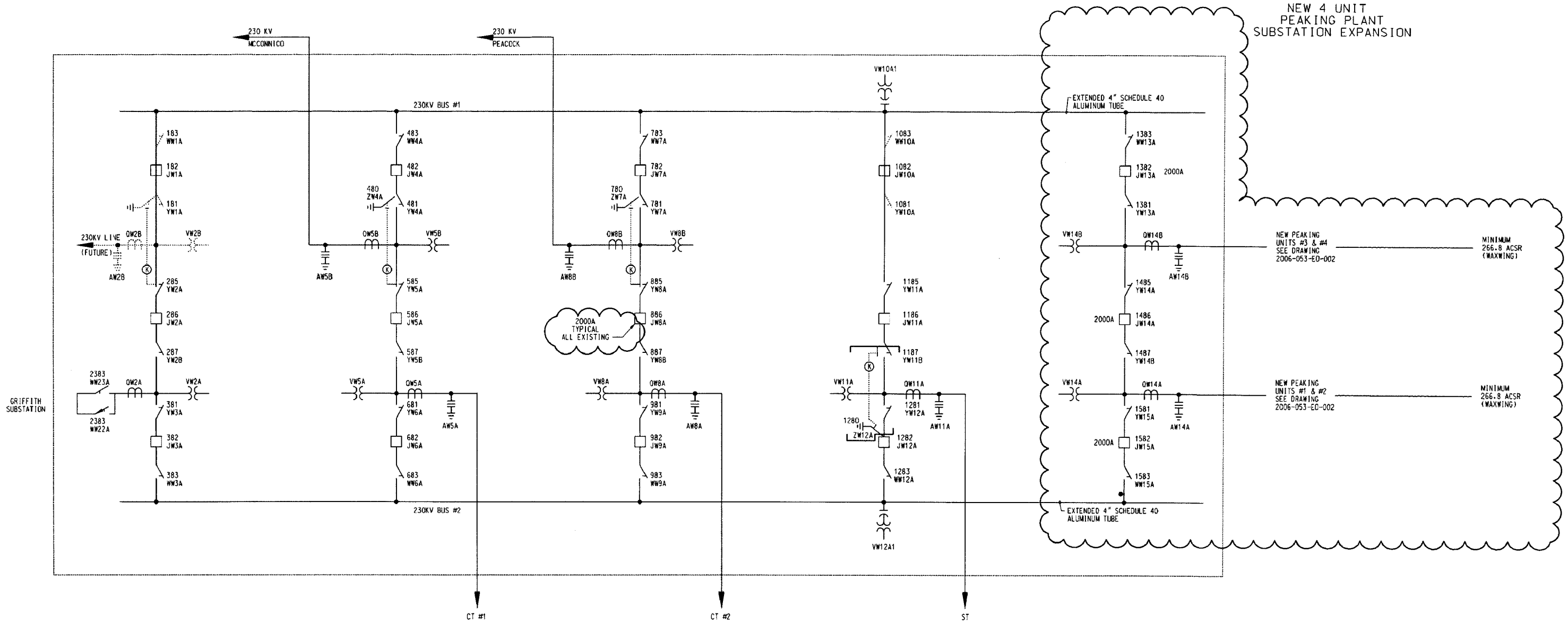


Source: Bibb Engineering

NORTHERN ARIZONA ENERGY PROJECT

Figure 2-4
Electrical One-Line Diagram

ANALYSIS AREA:MOHAVE COUNTY, ARIZONA	
Date:02/15/07	File: EA Figures.dwg
Drawn By: ETC	Layout:006



NORTHERN ARIZONA ENERGY PROJECT

Figure 2-5
Griffith Switchyard Interconnection
Electrical One-Line Diagram

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/15/07	File: EA Figures.dwg
Drawn By: ETC	Layout: 005

Source: Bibb Engineering

2.1.4.2 Operations

The Proposed Action could serve the peak load requirements of customers in Mohave County, other Arizona loads, and surrounding regional load centers. The proposed power plant's design performance is presented in **table 2-1**.

Table 2-1 Project Design Performance

Condition	Temperature (°F)	Net Plant Output (MW)	Net Plant Heat Rate (Btu/kWh) (HHV)
Design Basis	90	175.2	9,975
High Temperature Day	113	174.3	10,029
Average Ambient Conditions for Maximum 5,000 Annual Operating Hours	80	176.7	9,892

The amount of operating hours and startups for any individual simple cycle unit depends on (i) the location, (ii) the load profiles of the customer, (iii) fuel prices, and (iv) the general power market supply and demand conditions. A typical operating profile for a simple cycle turbine would be 1,500 to 3,000 operating hours and 150 to 250 startups per year. The actual annual operating hours and startups of the Proposed Action would be determined by the economic dispatch of each unit as determined by customer needs. To present a realistic worst-case estimate of environmental impacts given the simple cycle gas-fired technology proposed for this proposed power plant, nominal annual hours of 5,000 and 300 starts for each of the four units were evaluated.

2.1.4.3 Emissions Profile

The Applicant filed an application for an air permit with the ADEQ in March 2007. ADEQ issued proposed Air Quality Permit No. 43801 on June 19, 2007. The information contained in the proposed permit is summarized below.

The maximum allowable emission limits for the Proposed Action pursuant to ADEQ's permit are as follows:

- NO_x 25.0 parts per million dry volume (ppmdv) @ 15 percent oxygen (O_2)
- SO_2 0.060 lb/ Million British Thermal Units (MMBtu) heat input
- Ammonia slip 10.0 ppmdv @ 15 percent O_2

As discussed in section 2.1.3.3, the Proposed Action would control NO_x through water injection into the CTG and through the use of an SCR system. CO and VOC emissions would be controlled through the use of an oxidation catalyst. SO_2 and particulate matter with a diameter less than ten microns (PM_{10}) emissions would be controlled through the use of pipeline quality gas.

The Proposed Action would be operated within the annual emission limits required by ADEQ. The annual emission limits are summarized in section 4.3 – Air Quality, **table 4-2** of this document. In addition, the run-hours for the Proposed Action would also be limited by the 50 MW annual average required by Western and described in section 1.1.

2.1.5 Fuel System

High-pressure natural gas would be supplied to the proposed power plant from any combination of the El Paso Natural Gas Company (El Paso), Questar Corporation (Questar), and Transwestern Pipeline Company (Transwestern) natural gas interstate pipelines to the UES local gas distribution system located adjacent to the NAEP property. A new UES-owned metering station would be constructed adjacent to the existing UES metering station serving Griffith Energy, as shown on **figure 2-1**. From this new metering station, gas would be piped to the gas compressor and conditioning equipment skids. The gas conditioning skids would filter very small amounts of gas particulates and drop out moisture contained in the gas. The filters would be replaced periodically and disposed of appropriately. The natural gas system line pressure is expected to be 600 psig at the proposed power plant boundary. Gas compressors would increase the natural gas supply pressure for the CTGs to approximately 675 psig. Pressure reduction and control valves would be used to feed gas to the CTGs.

2.1.5.1 Fuel Gas Requirements

The Proposed Action would utilize an average of approximately 1,750 MMBtu HHV of gas per hour, 28,000 MMBtu per 16-hour day, and 42,000 MMBtu per 24-hour day. Assuming an expected 2,500 annual operating hours for each unit, the Proposed Action would utilize 4,375,000 MMBtu of gas per year.

2.1.5.2 Fuel Supply and Transportation

Natural gas would be delivered to the Proposed Action via two existing UES-owned and operated gas pipelines that interconnect with the El Paso, Questar, and Transwestern interstate pipelines and transport natural gas to the I-40 Industrial Corridor. Both pipelines terminate at an existing gas regulating/metering station located at the northeast corner of the Original Griffith Property.

The Proposed Action would interconnect with both UES laterals just upstream of the existing UES gas regulating/metering station. The two pipelines would be tied to a new gas metering station and would be routed to the Proposed Action via an approximate 1,000-foot gas pipeline shown on **figure 2-1**. The pipelines would be placed in an excavated trench located on the NAEP property. The trench would be backfilled after construction.

Fuel gas compressors would boost the pressure to 675 psig, and a fuel gas conditioning system would assure adequate gas quality prior to the gas being fed to the CTGs. The representative natural gas analysis, provided by El Paso and Transwestern, is shown on **table 2-2**. All gas interconnection facilities would be contained within the boundaries of the proposed power plant.

Each UES pipeline lateral would have a gas transportation capacity of a minimum of 6,250 MMBtu per hour or 150,000 MMBtu per day for a total UES system capacity of more than 12,500 MMBtu per hour or 242,000 MMBtu per day.

Table 2-2 Project Natural Gas Analysis	
Higher Heating Value	1,016.0 Btu/scf 22,667 Btu/lb
Lower Heating Value	915.5 Btu/scf 20,425 Btu/lb
Specific Gravity	0.5857
H-C Molar Ratio	3.9449
Inerts-HC Mass Ratio	0.0503
Molecular Weight	16.934
Spec. Heat (Cp), Btu/lb-F	0.5180
Water Vapor, lb/MMscf	< 7
Sulfur (total), grains/100scf	< 5
Hydrocarbon Dew Point, F	< 20
Temperature °F	40 to 120
Chemical Compounds	**Composition, Percent by Volume**
Methane	96.07
Ethane	1.49
Propane	0.33
Iso Butane	0.06
Norm Butane	0.06
Iso Pentane	0.02
Norm Pentane	0.01
Hexanes plus	0.03
Carbon Dioxide	1.69
Nitrogen	0.24
Hydrogen	0.00
Helium	0.00
Oxygen	0.00

2.1.6 Electrical Interconnection8

2.1.6.1 Electrical Systems

The Proposed Action would be designed to interconnect with the Western 230-kV transmission system at the neighboring existing Griffith Switchyard. The electrical one-line diagram for the Proposed Action is shown on **figure 2-4**.

2.1.6.1.1 Generator Output

Each CTG would have an associated 13.8-kV generator switchgear module. Each switchgear bus would have a generator circuit breaker, an auxiliary circuit breaker, and a direct connection to a three-winding GSU transformer. The Proposed Action would have two 230/13.8-kV three-winding GSUs, which would each be connected directly to two CTG switchgear buses. The high-voltage side of the GSU transformers would connect to the 230-kV Griffith Switchyard via overhead double circuit transmission lines.

2.1.6.1.2 Auxiliary Electric System

A 4,160-volt (V) electrical enclosure would house the 4,160V motor control center (MCC) along with two 480V MCCs. The 4,160V electrical enclosure would have two associated 13.8 to 4.16-

kV unit auxiliary transformers feeding the double-ended 4,160V MCC and two associated 4,160-480V station service transformers to feed the two 480V MCCs.

A 480V electrical enclosure would house the 480V switchgear DCS, battery, and uninterrupted power supply (UPS) system. The 480V electrical enclosure would have two associated 4,160-480V station service transformers to feed the double-ended 480V switchgear.

Power for starting the CTGs would be provided to the 480V level by back-feeding power from the Griffith Switchyard via the Proposed Action's GSUs and auxiliary transformers.

2.1.6.2 Electrical Interconnection Systems

The Proposed Action would connect to the Western 230-kV transmission system at the existing Griffith Switchyard. The Griffith Switchyard is owned and operated by Western. The electrical output of each generator would connect to the low-voltage winding of a GSU transformer used to convert generator output voltage of 13.8-kV to the transmission system voltage of 230-kV. The high-voltage side of the GSU transformers is connected to the 230-kV Griffith Switchyard via overhead double circuit transmission lines. The electrical one-line diagram of the Griffith Switchyard expansion to accommodate the Proposed Action is shown on **figure 2-5**.

2.1.6.2.1 Electric Interconnection Arrangement

The Applicant would construct an overhead 230-kV double circuit transmission line from the proposed power plant to Western's existing Griffith Switchyard, as shown on **figure 2-1**. The entire electric interconnection with the Western system occurs within the Original Griffith Property. Western would contract for all construction within the switchyard. The work would consist of expanding the existing switchyard by about 1 acre as shown on **figure 2-5**. The switchyard expansion would be deeded to Western ownership. The switchyard expansion would be designed in compliance with Federal, state, and local regulations and applicable industry standards and would be compatible with Western's interconnection standards and requirements.

Switchyard construction would involve site grading, installing gravel material, excavating for foundations and cable trenches, constructing foundations, installing switchyard equipment, and extending the chain-link security fence to enclose the expanded area.

The Griffith Switchyard consists of twelve 230-kV circuit breakers arranged in a breaker-and-a-half configuration. The interconnection of the new double circuit transmission line associated with the Proposed Action would require the addition of a new breaker-and-a-half bay consisting of three new 230-kV circuit breakers with associated isolation switches.

The construction sequence would begin with grading and installation of a copper ground mat, followed by foundations, and conduit and cable trenches using graders, backhoes, drill rigs, front end loaders, concrete trucks, boom trucks or cranes, and tractor trailer trucks for delivery of switchyard components. The final phase would involve installation of the electrical equipment graveling and fencing.

The switchyard would comply with Federal and state regulations for spill prevention, control, and countermeasures under the Resource Conservation and Recovery Act (RCRA). Sulfur

hexafluoride (SF_6) gas is considered one of the best insulating gases available for electric equipment. However, it is a potent greenhouse gas, and prevention of leaks is very important. There are no regulations established for SF_6 gas. Western recognizes this concern and is a voluntary participant in EPA's SF_6 Emission Reduction Partnership. As a participant, it is Western's goal to maintain SF_6 emission levels at less than 2 percent of system capacity.

2.1.6.2.2 Electric Interconnection Facilities

The Proposed Action's electric transmission lines, constructed on the NAEP property, would be constructed with double circuits on tubular steel poles, as shown on **figure 2-6**. The poles would be 100 to 120 feet tall with three arms on each side, approximately 17 feet apart to support the conductors and a smaller arm on each side above the conductor arms to support the overhead ground wires used for lightning protection.

2.1.7 Water Supply and Use

2.1.7.1 Water Use Requirements

The Proposed Action would minimize water consumption and wastewater generation by integrating with the water treatment and wastewater treatment equipment of Griffith Energy. Water uses would include pretreated water for makeup to the chiller cooling module, service water, and demineralized water for NO_x control and SPRINT power augmentation.

One design approach to minimize water use is to capture and recycle the condensate created by the CTG inlet air chillers. Depending on temperature and humidity, the condensate flow available from the inlet coils can be up to 25 gpm as shown on **figure 2-7**. This condensate is captured and utilized for the Proposed Action.

At design conditions, assuming that no chiller condensate is recovered, the maximum total raw water requirement would be 370 gpm, or 355,200 gallons per day (gpd), based on 16 hours of operation. With consideration of condensate recovery, the maximum total raw water requirement is 345 gpm, or 331,200 gpd, based on 16 hours of operation.

The Proposed Action water balance is presented in **figure 2-7** and indicates the various process water flow streams for an average operating day. **Table 2-3** lists the water and wastewater flows for several design conditions.

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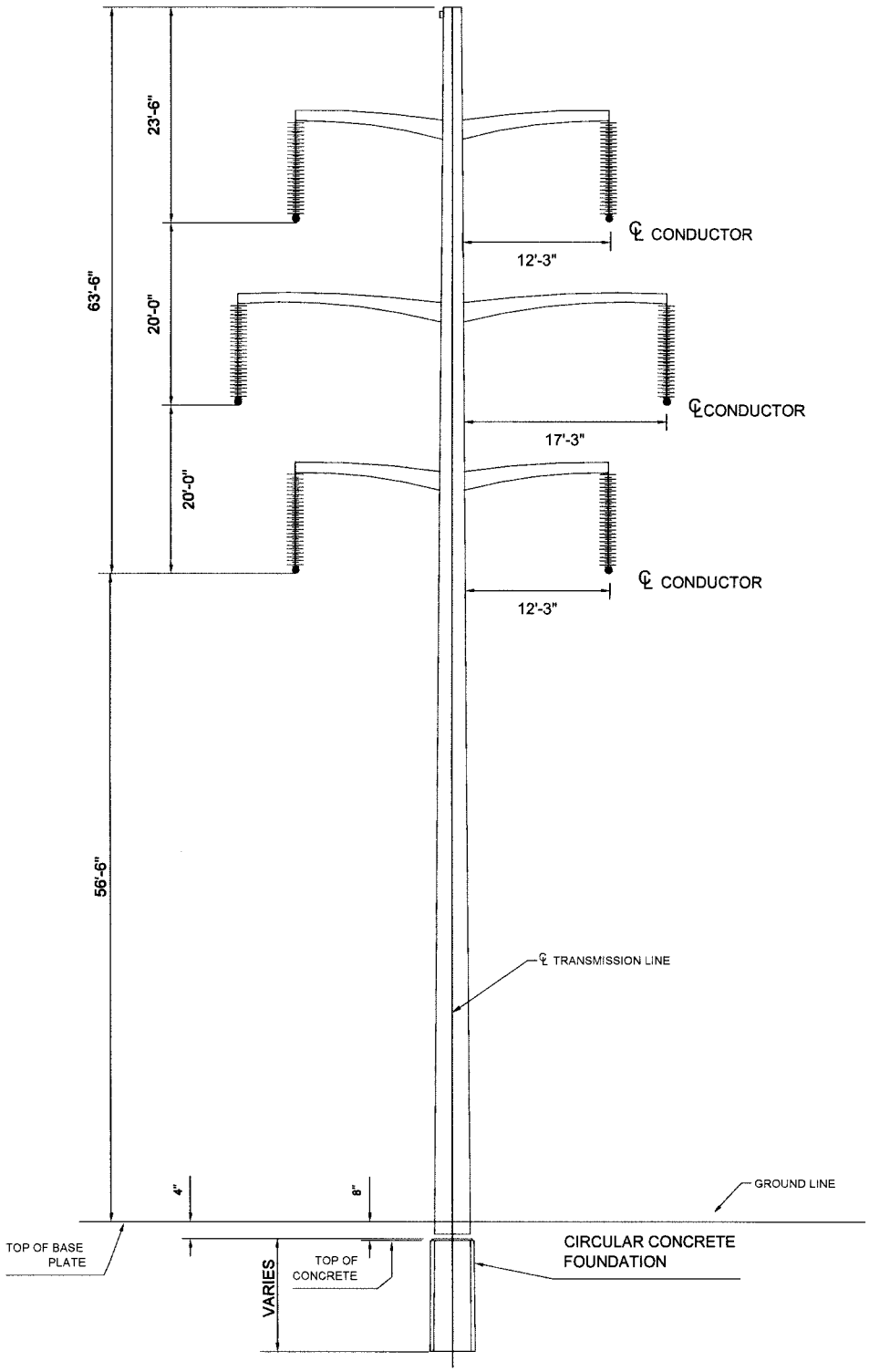

NORTHERN ARIZONA ENERGY PROJECT

Figure 2-6
Typical Transmission Structure

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/19/07	File: EA-Proposed Trans Structure.dwg
Drawn By: ETC	Layout: 001

Source: Griffith 1998a

Table 2-3 Daily and Annual Water Flows[1]

	Peak Day[2] 1,000 gpd	Summer Day[3] 1,000 gpd	Expected Year[4] Acre-ft/yr	Max Year[5] Acre-ft/yr
Raw Water Use				
Cooling Module Makeup	227	145	70	81
Demineralizer System	389	260	125	250
Service Water	4	3	1	3
Recovered Wastewater	(116)	(77)	(37)	(66)
Net Water Use	**504**	**331**	**159**	**268**
Wastewater Flows				
Cooling Module Blowdown	44	28	13	17
RO System Rejects	97	65	31	63
Plant Drains	4	3	1	3
Recovered Wastewater	(116)	(77)	(37)	(66)
Net Wastewater to Pond	**29**	**19**	**8**	**17**

Notes:
1) All flows are for four units operating at base load.
2) Peak Day is 24-hour operation with 12 hours at the peak temperature (113°F) and 12 hours at the design condition temperature (90°F).
3) Summer Day is 16 hours at the design condition temperature (90°F).
4) Expected year is based on 2,500 hours of operation per CTG at the design operating temperature (90°F).
5) Max Year is based on 5,000 hours of operation per CTG at the average operating temperature (80°F).

2.1.7.2 Source of Water

The existing I-40 Industrial Corridor Water System owned by Mohave County is capable of supplying a minimum of 5,000 gpm of water from the Sacramento Valley aquifer. The system consists of six groundwater wells approximately 1,200 to 1,400 feet in depth, a water pipeline collection and distribution system and a 1.3 million gallon storage tank located north of the Proposed Action.

At the design ambient temperature of 90 °F, about 345 gpm of raw water would be required for process water supply for the proposed power plant. Process water requirements would include makeup water to the chiller cooling module and water supply to the mobile water treatment equipment that would be used to make demineralized water for turbine injection for both NO_x control and SPRINT power augmentation.

To be conservative and to cover water needs for the proposed power plant during peak demand and high temperature days (plus design margin), the Applicant would contract for approximately 450 gpm (peak flow) of water.

Given the estimated 2,500 operating hours each year, NAEP would require approximately 160 acre-feet of groundwater each year. The Applicant would also include, for analysis purposes, a theoretical maximum operating hour case for a peaking facility of 5,000 hours per year. Under this theoretical maximum case, the proposed power plant would use approximately 268 acre-feet of water. Both annual use volumes are evaluated in the impact analysis in chapter 4.

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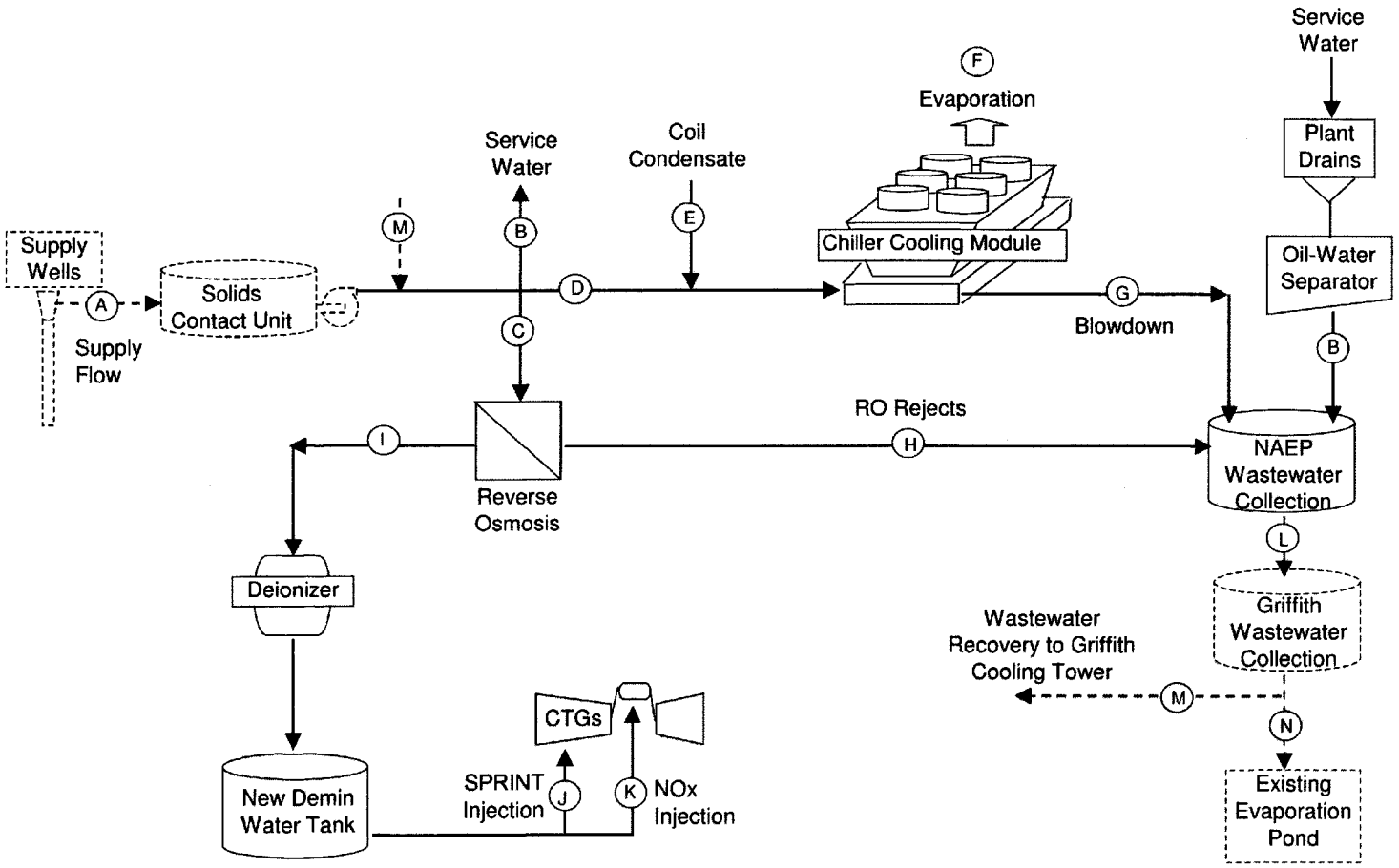

Notes:

1) Based on 4 x LM6000 PC Sprint
2) Using Griffith service water and Griffith waste water treatment
3) All Flows are displayed in GPM
4) NOx and Sprint Injection flows from GE performance estimates
5) Reverse Osmosis recovery rate 75%
6) Wastewater recovery rate 80%
7) Cooling Tower cycles of conc. 6.0

Temperatures:

Peak	113
Average Summer (Jun-Aug)	90
Average Operating (Apr-Oct)	80
Coldest Temperature:	25

Stream	Description	TEMPERATURE, F			
		113	90	80	25
A	Flow from the supply wells	380	345	290	179
B	Service water to NAEP wash-down hoses	3	3	3	3
C	Softened water to NAEP RO Trailer	271	271	271	223
D	Softened water to NAEP cooling module makeup	192	151	88	0
E	Inlet air coil condensate	25	25	25	0
F	NAEP cooling module evaporation	181	147	94	0
G	NAEP cooling module blowdown	36	29	19	0
H	NAEP RO system reject stream	68	68	68	56
I	Demineralizer trailer water flow	203	203	203	167
J	Demin water for SPRINT injection	63	63	63	0
K	Demin water for NOx injection	140	140	140	167
L	Wastewater flow to Griffith	107	100	90	59
M	Wastewater recovered by Griffith HERO ™	86	80	72	47
N	Wastewater flow to evaporation pond	21	20	18	12

NORTHERN ARIZONA ENERGY PROJECT

Figure 2-7
Water Balance Diagram

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA

Date: 02/15/07	File: EA Figures.dwg
Drawn By: ETC	Layout: 004

Source: Bibb Engineering

Groundwater would be pumped from the local Sacramento Valley aquifer and delivered to the Proposed Action. Mohave County and the Applicant have completed a new water interconnection and supply agreement for 450 gpm (peak flow). The water would be delivered to the proposed power plant through the existing Mohave County water system in the area. Through a revised water interconnection and supply agreement with Mohave County, Griffith has agreed to reduce its contracted peak flow quantity from 4,500 gpm to 3,900 gpm, making available 450 gpm for the proposed power plant and 150 gpm for other users. Griffith will hold the 600 gpm of water capacity as uncontracted reserve until such time as NAE has need for the water and the County requests the 150 gpm for other users.

2.1.7.3 Water Treatment

2.1.7.3.1 Inlet Air Chiller Module

The cooling module would provide heat rejection for the centrifugal chiller used to supply chilled water to the air inlet coils. Makeup water would be pre-treated water from Griffith Energy. The circulating water would be continuously treated and controlled in order to achieve approximately six cycles of concentration. The six-cycle limit is determined by the silica concentration of the water.

Makeup water would replace water lost from evaporation, drift, and blowdown. A chemical feed system would supply water-conditioning chemicals to the circulating water to minimize corrosion and control the formation of mineral scale and bio-fouling. Sulfuric acid would be fed into the circulating water system in proportion to makeup water flow for alkalinity reduction to control the scaling tendency of the circulating water. The acid feed equipment would consist of a bulk sulfuric acid storage tank and two full-capacity sulfuric acid metering pumps.

To further inhibit scale formation, an alkaline scale inhibitor solution would be fed into the circulating water system in an amount proportional to the circulating water blowdown flow. The scale inhibitor feed equipment would consist of a chemical solution bulk storage tank and two full-capacity scale inhibitor metering pumps.

To prevent bio-fouling in the circulating water system, a sodium hypochlorite solution would be fed into the system. The hypochlorite feed equipment would consist of a bulk storage tank and two full-capacity hypochlorite metering pumps, which would be provided for feeding either stabilized bromine or sodium bromide as supplemental biocides.

2.1.7.3.2 Demineralized Water

The water injected into the CTG for NO_x control and SPRINT power augmentation must be free of contaminants. Pretreated water from Griffith Energy would be filtered and further treated by RO trailers located on the proposed power plant. The product water from the RO trailers would be sent through demineralizer trailers and then to a demineralized water storage tank. The leased demineralizer trailers would be taken off site for regeneration, and all waste products would be disposed of off site by the trailer vendor at licensed commercial facilities in compliance with applicable regulations.

2.1.8 Wastewater and Stormwater

2.1.8.1 Process Wastewater

The Proposed Action process wastewater disposal would be integrated with the Griffith Energy wastewater system. The Proposed Action wastewater would be routed through the Griffith Energy wastewater recovery and treatment system via pipeline and process reject wastewater from that recycling system would be sent to the existing Griffith Energy brine disposal pond. This pipeline would be approximately 2,500 feet long and would be located entirely of NAEP and Griffith Energy property within the same corridor as the other interconnections with Griffith Energy.

There would be process wastewater streams from the Proposed Action's RO system and chiller module. The wastewater would be sent to the Griffith Energy wastewater treatment system where 80 percent of the water would be recovered and sent to the Griffith Energy cooling tower. This would leave 20 percent of the stream as the wastewater flow to the brine evaporation pond. As shown in **table 2-3**, the maximum daily peak flow to the pond while operating would be 29,000 gpd (20.1 gpm). However, the actual annual flow would average approximately 11 gpm based on the conservatively high operating assumptions presented above. Annual wastewater flows estimated for a typical expected year (based on 2,500 hours of operation) would be 8 acre-feet per year (afy), while the maximum annual flow (based on 5,000 operating hours) would be 17 afy. The Proposed Action would also generate a negligible waste stream from plant drains, consisting of equipment wash-down water and the minor condensation streams from the compressed air and CEMS. These drains would be directed to the oil/water separator and then discharged to the Griffith Energy wastewater system. Wastewater generated from CTG compressor washing would be collected in an underground tank before being trucked off site for disposal at a facility licensed to treat this type of wastewater.

2.1.8.2 Sanitary Waste

The Proposed Action personnel would utilize the existing Griffith Energy sanitary facilities with no increase in design capacity required for the additional personnel. During periodic major maintenance events, portable facilities would be provided to accommodate the additional maintenance workers.

2.1.8.3 Stormwater Management

The proposed power plant stormwater runoff would be routed to the west of the power generation equipment by means of swales, ditches, and sheet flow. However, where space restriction precludes the use of open ditches and channels, a series of pipes and inlets would be used. Culverts would be used to carry stormwater under on-site traffic areas. Stormwater runoff would discharge by gravity from the proposed power plant area to a 1-acre stormwater retention basin located to the west of the proposed power plant to prevent stormwater from leaving the NAEP property. The stormwater retention basin was designed to effectively handle a 100-year storm event. Off-site runoff would be routed around the proposed power plant using berms and ditches and into the stormwater retention basin. Stormwater runoff in the retention basin would be left to evaporate and/or infiltrate.

2.1.9 Project Auxiliaries

The Proposed Action auxiliary systems include fire protection, aqueous ammonia, compressed air, and lighting as described in the following paragraphs.

2.1.9.1 Fire Protection System

The Proposed Action includes an underground firewater loop interfaced with the Griffith Energy firewater system. There would be two connections to two different portions of the Griffith Energy firewater loop. The firewater supply network of pipelines would be approximately 5,700 feet long and would be located entirely on NAEP and Griffith Energy property with the same corridor as the other interconnections with Griffith Energy. The Proposed Action does not require on-site storage of firewater because it would be served from Griffith Energy.

The CTG enclosures would be protected by a carbon dioxide (CO_2)-based fire suppression system as supplied by the manufacturer, which includes heat and natural gas detection devices.

The oil-filled transformers would be isolated from adjacent equipment and structures using physical separation and/or firewalls. The auxiliary transformers would be supplied with dielectric fluids. Each transformer also would reside within a concrete containment area that serves to:

- Contain oil spills.
- Retain direct contact stormwater that could potentially come in contact with transformer oil.
- Retain firewater that could potentially come into contact with transformer oil.

The fire protection system would be designed per NFPA standards, utilizing equipment approved by Underwriter's Laboratories/Factory Mutual Research Corp.

2.1.9.2 Ammonia Receiving and Storage System

The aqueous ammonia system provides for the receipt, storage, and delivery of 19 percent aqueous ammonia to the SCRs to reduce NO_x emissions. Aqueous ammonia would be delivered to the proposed power plant via tanker trucks and deposited in an aboveground 10,000-gallon storage tank. Aqueous ammonia would then be pumped to each SCR, where it would be sprayed into the CTG exhaust flow upstream of the NO_x catalyst to reduce plant emissions. The Proposed Action's ammonia system would not be integrated with Griffith Energy.

2.1.9.3 Compressed Air

The compressed air system provides both service air and instrument air throughout the proposed power plant. Service air is used primarily for maintenance activities and the instrument air system is used for the operation of control systems, primarily pneumatic valves. Three compressors that can each provide 50 percent of the needed capacity (providing backup capacity if needed) would be provided for the Proposed Action. The existing compressed air system at Griffith Energy would not be integrated with the Proposed Action.

2.1.9.4 Lighting Systems

Outdoor area lighting for the Proposed Action would consist of efficient, high-pressure sodium (HPS) fixtures. They would be permanently mounted fixtures located throughout the facility; mounted on pendants, poles, stanchions, building columns, or walls; and providing access lighting for plant operations and maintenance. Outdoor lights would be automatically controlled by photocells with manual override capability.

The outdoor lighting system would be designed to provide nighttime lighting levels consistent with the Illuminating Engineering Society (IES) standards to allow basic operator movement throughout the proposed power plant. The Proposed Action would be located approximately 9 miles outside of any city limits. However, all outdoor lighting would conform to the regulations for the MX Zone in section 24 of the Mohave County Zoning Ordinance including all applicable provisions of sections 25, 26, and 27 of the Mohave County Outdoor Light Control (Dark Sky) Ordinance.

2.1.10 Construction

The proposed power plant would be constructed by a primary contractor who would perform the engineering, procurement, and construction (EPC) of the Proposed Action. The EPC contractor would typically be responsible for the complete detailed design of the Proposed Action; procurement of equipment and permanent materials; construction of all civil works, foundations and structures; and startup and checkout of the generation facility. Up to 6 acres of the Proposed Action would be dedicated as the temporary construction area and would serve as space for construction trailers and parking as well as a laydown and storage area for equipment and materials used by the EPC contractor.

The design and construction of the extension of the Griffith Switchyard would be performed by Western. The UES gas distribution system would be modified by UES to add a new gas metering facility for the Proposed Action. No modifications to the I-40 Industrial Corridor Water System would be required.

2.1.10.1 Project Cost

The cost of the Proposed Action is estimated to be in the range of $140 to $160 million. The cost includes the CTGs, gas compressors, transformers, chiller, gas, water and electric transmission interconnection facilities, and all ancillary balance of plant equipment as well as all civil works, construction labor, construction materials, and engineering. In addition, the Proposed Action cost includes the cost estimates for gas and electric interconnections performed by the interconnecting utilities and Applicant's costs for development, insurance, and financing.

2.1.10.2 Project Schedule

2.1.10.2.1 Engineering, Procurement and Construction Schedule

The field construction schedule from site mobilization to commercial operation for a four-unit simple cycle proposed power plant is typically 9 to 12 months. Depending on equipment fabrication and delivery durations, detailed engineering and procurement activities would be initiated up to 12 months in advance of site mobilization to assure that equipment deliveries

occur to support the construction schedule. Market conditions can impact both the equipment lead times and the construction labor availability and may extend EPC schedules. The key Proposed Action schedule milestones are presented in **table 2-4**.

Table 2-4 Anticipated Project Schedule

Action	Date
Submit Permit Applications	March 2007
All Permits Complete	October 2007
Onsite Construction Starts (earliest)*	Fourth Quarter 2007*
Commercial Operation (earliest)*	May 2008*

* Depending on market conditions

2.1.10.2.2 Potential Modified Construction Schedule

Depending on market conditions, the Proposed Action may be constructed in a two-phased construction sequence with two units being advanced to construction immediately upon the receipt of environmental approvals and completion of power purchase agreements and the second two units constructed when market conditions would support them.

2.1.10.3 Transportation

All equipment, permanent materials, and commodities for the Proposed Action would be transported to the site via state and interstate highways which are designed for an American Association of State Highway and Transportation Officials (AASHTO) truckload designation of HS20 (a national standardized truck that is intended to encompass most of the loads to which a bridge might be subjected). The roads and bridges can accommodate the heaviest anticipated equipment component for the Proposed Action. Heavy haul trucks with multiple axles would be employed to distribute loads, as required. All equipment and material deliveries would utilize the NAEP property construction or primary access from Haul Road.

2.1.10.3.1 Equipment and Materials

Truck deliveries of equipment and materials would occur from the initial construction notice to proceed through the entire duration of the Proposed Action. Initial truck deliveries would include haul trucks for importing engineered fill materials (such as gravel), as required, followed by concrete trucks for installation of major foundations, and deliveries of reinforcing steel. Piping materials for buried piping would be delivered to NAEP property early in the construction period corresponding to approximately the time frame for foundation installation. Deliveries of large major equipment would commence at about midpoint of the construction period.

2.1.10.4 Labor Force

The monthly construction labor force requirements for the Proposed Action are presented on **table 2-5**. This projection includes all personnel that would be required to complete construction of the Proposed Action including overall project and site management, laborers, skilled craft, and startup personnel. Skilled craft and laborers would be drawn from the local area with construction management and startup functions provided by relocated personnel from the EPC contracting firm.

After the construction only about two to four personnel would be needed for operations of the proposed power plant.

Table 2-5 Construction Workforce Project* Months After Construction Notice to Proceed

Month	1	2	3	4	5	6	7	8	9	10
Proposed Power Plant Workforce	34	80	115	132	138	138	132	115	80	34
Switchyard Expansion Workforce		10	30	30	10					
Total	**34**	**90**	**145**	**162**	**148**	**138**	**132**	**115**	**80**	**34**

* Includes construction management, laborers, skilled craft, and startup personnel.

2.2 ALTERNATIVES CONSIDERED BUT ELIMINATED

2.2.1 Alternative Sites

A site for a project of this type needed to have a combination of factors present – natural gas, transmission, the ability to be zoned appropriately, and available land. Alternate sites in northern Arizona were considered by the Applicant, but were dismissed because no alternative sites were found that met the following criteria.

- location within a designated industrial development area
- proximity to gas, transmission, and water infrastructure to limit off-site laterals and thereby reduce environmental impacts and costs
- proximity to rail and highways for transportation of equipment and materials
- developed site access roads

This evaluation resulted in the Applicant selecting a preferred site, which is the Proposed Action identified in this EA. The prime advantage of the preferred site was its location within the I-40 Industrial Corridor and existing zoning designation of MX, along with all infrastructure being available for physical interconnection within the NAEP property or the adjacent Griffith Energy property including gas lines, electric transmission, water supply, and transportation. In addition, rail access and I-40 offer superior transportation advantages; thus, other alternatives were eliminated from consideration.

2.2.2 Alternative Energy Technologies

Alternative energy technologies, such as wind and solar thermal, were suggested for consideration by some respondents during scoping. The NAEP is proposed to provide peaking power – additional power during times of peak electrical demand as discussed in section 1.2 – Purpose and Need. This type of energy resource needs to be available when needed on very short notice. Solar and wind technologies provide intermittent power (when the wind is blowing or the sun is shining) and cannot be effectively made available during times of peak demand. Consequently, these alternative energy technologies were not considered viable options for the Proposed Action.

2.3 NO ACTION ALTERNATIVE

NEPA and DOE guidelines, which guide Western's project environmental assessments, require consideration of a "No Action" Alternative. Under the No Action Alternative, Western would not grant permission to the Applicant to interconnect with Western's transmission system. Without the ability to interconnect to Western's transmission system, the Proposed Action would not be feasible and would not be built. If the Proposed Action is not built, the impacts associated with the construction and operation of the facility would not occur, and the current environmental conditions and impacts would not change. Likewise, this additional peaking resource would not be available to serve the customers of load-serving entities in Arizona and the surrounding region. However, the need for peaking power would remain, and other peaking facilities might be approved and constructed.

2.4 MITIGATION

Standard mitigative practices applicable to construction of the Proposed Action are provided to minimize impacts. **Table 2-6** presents a list of committed mitigation measures for the Proposed Action.

Table 2-6 Mitigation

1.	During construction and operations, supervisory staff would ensure that all activities are conducted under all applicable regulations, laws, and permits. This applies to all regulated activities associated with air emissions, wastewater discharges, stormwater discharges, water use, solid waste disposal, and other applicable areas.
2.	The limits of construction activities normally would be predetermined, with activity restricted to and confined within those limits. All construction vehicle movement would be restricted to predesignated access, contractor acquired access, or public roads.
3.	In construction areas where recontouring is not required, vegetation would be left in place wherever possible, and original contour would be maintained to avoid excessive root damage and allow for resprouting.
4.	Applicant would prepare an erosion control plan for construction. All construction would be conducted in a manner that would minimize disturbance to vegetation and drainage features. In construction areas where substantial ground disturbance has occurred, surface restoration would occur as indicated by Best Management Practices. Anticipated restoration methods normally would consist of contouring to near natural conditions, elimination of ruts, reseeding with a regionally native seed mixture, placement of erosion control measures, and other measures evaluated on a case-by-case basis.
5.	Excavated material or other construction materials shall not be stockpiled or deposited near or within the drainage features where they can be wasted away by high water or storm runoff or can in any way encroach upon the actual watercourse itself.
6.	Applicant would file a NOI to obtain coverage under Arizona's General Stormwater Discharge Permit No. 2 for stormwater runoff during construction and operation. A pollution prevention plan shall be prepared consistent with the general permit requirements.
7.	The Applicant would include in its Site Grading Plan measures to ensure that any archaeological discoveries are property protected. All construction supervisors would be instructed on the protection of cultural and ecological resources. Construction supervisors shall be familiar with specific procedures outlined in the Site Grading Plan that would be followed in case of an archaeological discovery. Inadvertent discoveries of human remains would be immediately reported to the Director of the Arizona State Museum as required by Arizona Revised Statute 41-865.
8.	Consideration of cultural resources would continue during ground disturbance phases of implementation. In consultation with State Historic Preservation Officer, specific mitigation measures would be developed

Table 2-6 Mitigation

	and implemented to mitigate any identified adverse impacts. These may include modifications to avoid adverse impacts, monitoring of construction activities, and data recovery studies. Native American tribes would be involved in these consultations to determine whether there are effective or practical ways of addressing impacts on Traditional Cultural Properties.
9.	All requirements of those entities having jurisdiction over air quality matters would be adhered to, and any permits needed for construction activities would be obtained. Open burning of construction trash would not occur unless allowed by appropriate jurisdictional authorities.
10.	Fugitive dust emissions would be minimized by using water trucks to moisten soil areas and by limiting vehicle use in construction areas. Oil or other petroleum products would not be used for dust control. All construction vehicles would adhere to posted speed limits and any speed limits enforced on the project site.
11.	During operations, Applicant would operate the proposed power plant in compliance with all conditions of the Title V air permit issued by the ADEQ.
12.	All construction waste, including trash and litter, garbage, other solid waste, petroleum wastes (other than used oil, which would be colleted by a licensed waste oil handling contractor), and other potentially hazardous wastes, would be sent to a disposal facility authorized to accept such wastes. Where possible, wastes would be recycled or reused.
13.	No non-biodegradable debris would be deposited on site. Slash and other biodegradable debris would be left in place or disposed of in accordance with agency requirements.
14.	Regulated materials, hazardous liquids, or wastes would not intentionally be released onto the ground or into drainage areas. If an accidental spill of hazardous materials occurs, the construction contractor or operator would mitigate the spill per applicable cleanup regulations.
15.	R-123 refrigerant from the chillers would be reclaimed with certified equipment operated by certified technicians if the materials are to be recycled or disposed.
16.	The Applicant would prepare a Spill Prevention, Control and Countermeasures (SPCC) Plan. The plan would identify any hazardous materials that would be used, precautions to prevent spills, and employee awareness training.
17.	Construction activities shall be performed by methods that would prevent entrance or accidental spillage of solid matter contaminants, debris, any other objectionable pollutants and wastes into dry watercourses. Such pollutants and waste include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, oil and other petroleum products, aggregate processing tailing, and mineral salts.
18.	Mitigation measures for biological resources developed in conjunction with Federal and state authorities would be adhered to.
19.	To mitigate visual impacts, fences would be maintained, entrances and roadways would be kept in good condition, and lighting impacts would be minimized by placing security lighting downward.
20.	All maintenance activities during operations would be conducted to minimize disturbance to vegetation and drainage features.
21.	Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments or other inefficient operating conditions shall not be operated until they are repaired or adjusted.
22.	The contractor shall make all necessary provisions in conformance with safety requirements for maintaining the flow of public traffic and shall conduct its construction operations to offer the least possible obstruction and inconvenience to public traffic.
23.	Upon completion of the work, including maintenance work and operation, all work areas except access roads shall be scarified or left in a condition which would facilitate natural revegetation, provide for proper drainage, and prevent erosion.

Sources: Griffith, 1998b; Exira, 2003; Western Construction Standard 13

3.0 AFFECTED ENVIRONMENT

This chapter describes the baseline condition of the general area that could be affected by the Proposed Action. Resources, ecosystems, and human communities are identified that could potentially be affected by implementation of Proposed Action described in chapter 2.

The study area used to describe the affected environment, or Region of Influence (ROI), varies depending on the resource being analyzed and the predicted locations of direct and indirect impacts from the Proposed Action. The ROI for some resources is the NAEP property and for other resources, a larger area may be analyzed (e.g., county or region). The baseline condition serves as a reference point for the evaluation of impacts presented in chapter 4. For ease of understanding the evaluation of impacts correlating chapters 3 and 4, this document has been prepared so that a resource described in chapter 3 has the same subsection number in chapter 4 (e.g., 3.2: Water Resources; 4.2: Water Resources).

3.1 GEOLOGY, SOILS AND SEISMICITY

This section describes the existing geologic, soil, and seismicity environment within the ROI. The regional geology is discussed to provide the reader with an understanding of the geologic setting of the area.

3.1.1 Geology

The Proposed Action is located within the Basin and Range physiographic province, which is characterized by north-south trending fault block mountain ranges separated by agraded desert plains (Thornbury, 1965). The Proposed Action lies within the northern portion of the Sacramento Valley, an agraded desert plain which drains to the south and is bordered by fault block mountains to the west (the Black Mountains) and east (the Hualapai Mountains). The elevation of the Sacramento Valley ranges from 3,500 feet above mean sea level (msl) on the north to 1,500 feet msl on the south end of the valley.

The Sacramento Valley is mantled by thick deposits of unconsolidated sand, gravel, cobbles, and boulders which date from late Pleistocene to recent times (Gillespie and Bentley, 1971). They have been deposited by ephemeral streams carrying weathered material from the Hualapai Mountains. These alluvial deposits are several hundred feet thick in the ROI and overlie Precambrian igneous and metamorphic bedrock.

The geology of the Proposed Action is characteristic of the gently sloping, alluvial outwash, valley sides of the Sacramento Valley. Elevations at the NAEP property range from 2,445 feet to about 2,506 feet, with a total site relief of approximately 60 feet and the land sloping to the southwest. The NAEP property is too flat to be affected by mass movements such as rockfall and landslides. Flash floods can occur in the numerous washes that cross the valley floor near the Proposed Action. A wash cuts across a portion of the southeastern corner of the NAEP property. Because the near-surface geology is made up of recent alluvial material, there is little or no potential for the presence of paleontological materials.

Numerous sand and gravel borrow pits, which are exploited for construction of roads and other projects, are present throughout the Sacramento Valley and near the Proposed Action. No active, inactive, or proposed mining operations would be affected by the Proposed Action. There are no significant coal, oil, or gas resources in the immediate area.

3.1.2 Soils

Soils at the NAEP property have been mapped by the Natural Resource Conservation Service (NRCS, 2006). Two soil mapping units have been identified at the NAEP property: Castaneda extremely gravelly loam and Mahon-Poachie complex, dry. Castaneda extremely gravelly loam covers 32 acres of the NAEP property, while the remaining 8 acres is made up of Mahon-Poachie complex, dry soil. Castaneda extremely gravelly loam formed on slopes of 1 to 7 percent from alluvium and/or colluvium derived from metamorphic rock. These are moderately deep soils which are not subject to flooding and have a moderate shrink-swell potential. These are well-drained soils with high runoff potential. The water erosion hazard is slight, and the wind erosion hazard is very slight (NRCS, 2006).

Mahon-Poachie complex, dry soils formed on slopes of 2 to 15 percent from alluvium derived from volcanic and mixed-rock sources. These are very deep soils that are not subject to flooding and have a low to moderate shrink-swell potential. These are well-drained soils with low to medium runoff potential. The wind and water erosion hazards are both low to moderate (NRCS, 2006).

3.1.3 Seismicity

The Proposed Action lies within seismic risk zone 2 (on a scale of 0 to 3, with 3 being the highest risk) (Algermissen, 1969). Earthquake intensities are discussed using the Modified Mercalli Intensity Scale which measures intensities from I to XII or more. Moderate damage occurs from earthquakes corresponding to an intensity of VII, which is the maximum impact that can be expected within the ROI.

Seismic hazard is commonly expressed in Peak Ground Acceleration (PGA) of percent gravity with 10 percent probability of exceedance in 50 years. The Proposed Action falls between 5 and 6 percent gravity, which represents very light potential for damages to structures from earthquake activity (USGS, 2002).

The National Earthquake Information Center database (USGS, 2006a) was searched to identify seismic events which have occurred within a 125-mile radius of the geographic center of the Proposed Action. Earthquake magnitudes are expressed on the Richtor Scale with magnitudes ranging from 1.0 to 12.0 or more. Earthquakes with magnitudes greater than 7.0 are considered to be major earthquakes. Between January 1, 1973, and December 31, 2006, 74 earthquakes of magnitude 3.5 to 9.9 occurred within the 125-mile radius.

Another database was searched for the same location for the period of record prior to 1972. The record for this period includes only events of magnitude 4.5 and greater. This search indicated that 17 earthquakes of magnitude 4.5 to 9.9 occurred within the 125-mile radius between 1916 and 1972 (USGS, 2006b).

The largest recorded earthquake in the area occurred in 1916. It had a magnitude of 6.1 and was centered about 109 miles to the west near Baker, California. The closest located recorded earthquake occurred in 1981, had a magnitude of 3.5, and was centered 56 miles northeast near Peach Springs, Arizona (USGS, 2006a, b).

3.2 WATER RESOURCES

3.2.1 Surface Water

The Sacramento Valley and adjacent uplands and mountains comprise an arid region without year-round streams. The Valley lies between the Hualapai Mountains to the east and the Black Mountains to the west. Elevations in the Sacramento Valley range from 3,500 feet msl (north) to 1,500 feet msl (south). Average annual precipitation ranges from approximately 7.65 inches per year in Yucca (located about 16 miles south of the proposed power plant) to approximately 10.9 inches per year in Kingman (located about 9 miles northeast of the proposed power plant). Consequently, water use in the Sacramento Valley is exclusively derived from groundwater sources.

Streams are ephemeral in the vicinity of the proposed power plant and flow only in response to storm events. There are two named washes, Griffith Wash and Black Rock Wash, and few unnamed washes in the vicinity of the proposed power plant. As the streams exit the mountain canyons, they flow southwest across highly dissected alluvial fans, which act as an infiltration sink. Stream channels diminish in size and dry up due to recharge of the alluvium and increased evaporation associated with higher temperatures at the lower elevations. The U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) indicates that the lake evaporation rate in the ROI is 82 inches per year, 71 percent of which occurs between May and October (NOAA, 1979).

A waters of the U.S. determination was completed on January 18, 2007 (Avant, 2007). Waters of the U.S. may include streams, ponds, lakes, ephemeral washes, and wetlands. Three of the ephemeral washes within the NAEP property were determined to be waters of the U.S. Widths of these washes varied from 1 to 2 feet to 4 to 8 feet.

Floodplain boundaries are determined by the Federal Emergency Management Agency (FEMA). FEMA designated 100-year floodplains within the vicinity of the Proposed Action (FEMA, 1998), and they are mapped on **figure 3-1**. The Proposed Action does not fall within a designated 100-year floodplain.

3.2.2 Groundwater

There are two major unconnected aquifers serving the region: the Hualapai and the Sacramento Valley aquifers. The Hualapai aquifer, located north and east of the Proposed Action, underlies the City of Kingman and is the primary water source for the city. The Sacramento Valley aquifer, which is currently the source of water for the I-40 Industrial Corridor and Griffith Energy, underlies the sparsely populated Sacramento Valley to the west and south of Kingman.

Water supply for the Proposed Action would be obtained from the Sacramento Valley aquifer as described in detail in section 2.1.7.2.

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Kingman

T. 21 N.
T. 20 N.
T. 20 N.
T. 19 N.

R. 18 W.
R. 17 W.

223

Shinarump Rd.
Aztec Rd.
Bacobi Rd.
Prescription Rd.
Garnet Rd.
Desert View Trl.
Tombstone Trl.
Sacramento Rd.
Centennial Rd.
Acquarius Rd.
Ash Dr.
Ramada Rd.
Oatman Highway (Historic 66)
Quartzite Rd.
Yuma Rd.
Dawson Dr.
Paradise Rd.
Geronimo Rd
Navajo Dr.
W. Yucca Dr.
Apache Rd.
Frontage Rd.

40

Northern Arizona Energy Project

Project Location

Legend

- I 40 Industrial Park Boundary
- Golden Valley Holdings
- Northern Arizona Energy Property Boundary
- FEMA 100 Year Floodplain

* Based on FEMA Q3 data, September, 1998.

N W E S

1 0.5 0 1

Miles

Transverse Mercator Projection
1983 North American Datum
Zone 12
Meters

NORTHERN ARIZONA ENERGY PROJECT

Figure 3-1
FEMA Designated
100 Year Floodplains

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516/Flood .MXD
Created By: JG	Layout: Flood PDF

The Sacramento Valley aquifer has an areal extent of approximately 310 square miles and is recharged by a surface drainage watershed of more than 1,500 square miles. The aquifer basin was formed by thrust block faulting which raised the Hualapai Mountains on the east and the Black Mountains on the west. The basin was subsequently filled with several thousand feet of Tertiary and Quaternary alluvial deposits, resulting in an unconfined aquifer of slightly consolidated sediments.

The Sacramento Valley aquifer is unconfined. Groundwater in the Sacramento Valley migrates from north to south along the axis of the valley and ultimately discharges into the Colorado River. The alluvial deposits range in thickness from zero feet along the basin margins to greater than 3,200 feet in the north-central portion of the basin. Depth to bedrock in the vicinity of the County Well Field is approximately 1,600 to 3,200 feet (SGC, 2007). The gradient ranges from 8 to 20 feet per mile, with gentler gradients to the north and steeper gradients to the south (Manera, 1998). The depth to groundwater ranges from 1,000 feet below the land surface on the north end of the Sacramento Valley to 300 feet below the land surface near Yucca. At the County Well Field, depth to groundwater ranges from approximately 530 to 630 feet below ground surface (bgs) (SGC, 2007).

Water levels at Sacramento Valley basin appear to be at equilibrium at present time (Manera, 2006). The fact that the water levels of 2006 are almost identical to those measured by Rascona (1991) and Pfaff and Clay (1981) and are similar to those reported by Gillespie and Bentley (1971), shows that few, if any, gross changes have occurred in the past 35 years.

SGC (2007) summarized and reviewed aquifer parameters including those from tests conducted by Manera Inc. at the County Well Field. Based on these tests, the transmissivity (the ability of the aquifer to transmit water) of the lower alluvial unit ranges from 17,000 to 200,000 gallons per day per foot (gpd/ft), and the specific yield (the amount of water a unit volume of saturated permeable rock will yield when drained by gravity) is approximately 0.07. The saturated thickness of the regional aquifer in the vicinity of the County Well Field was conservatively calculated to be 770 feet. Using a generally accepted rule that the practical recoverable volume (volume likely to be recovered from the aquifer) of groundwater is 66 percent of the total saturated thickness, a projected drawdown of 508 feet (770 feet x 66 percent), or recoverable depth to water of 1,142 feet bgs was estimated (SGC, 2007).

ADWR estimated an average transmissivity value of 33,750 gpd/ft, a specific yield of 0.07, and an average aquifer saturated thickness of only 435 feet in its review of the Golden Valley well field located 4 miles north of County Well Field (ADWR, 2006).

Groundwater in storage in the Sacramento Valley aquifer above 1,500 feet bgs has been estimated by Gillespie and Bentley (1971) to be in the range of 6.5 to 13 million acre-feet based on an average specific yield of 5 to 10 percent. ADWR estimated that there are 2.3 million acre-feet of water in storage in the Sacramento Valley aquifer above a depth of 1,200 feet bgs (ADWR, 1994).

Most of the recharge to the Sacramento Valley occurs as runoff of the Hualapai Mountains on the eastern side of the basin infiltrating into the alluvial deposits of the valley floor (Manera,

2006). Natural annual recharge of the aquifer has been estimated at 4,000 afy with discharge to the Colorado River west of Yucca equaling recharge (Gillespie and Bentley, 1971).

Estimates of annual groundwater outflow from the Sacramento Valley basin have ranged from less than 500 afy to as much as 10,000 afy (ADWR, 2007). In 1997, ADWR estimated groundwater outflow from the Sacramento Valley basin to be 1,200 afy based on water level data, aquifer test results, and geologic cross-sections across Sacramento Valley's groundwater outflow point near Topock, Arizona (ADWR, 2007).

Annual historic water use estimates have ranged from less than 500 afy to as much as 6,000 afy during the late 1960s and 1970s (Rascona, 1991; Tadayon, 2004). The high water use during 1960s and 1970s was due to withdrawals for mineral extraction and processing by the Cyprus Metals Company (Rascona, 1991). In 1989, the mine was placed on standby, and withdrawals for mining have decreased to about 300 afy (ADWR, 2007).

Current water use in Sacramento Valley is estimated at about 2,900 afy (Tadayon, 2004; SGC 2007). Water uses consist of about 1,500 afy for municipal/domestic use and about 1,400 afy of industrial pumpage (ADWR, 2007). Future pumpage in Sacramento Valley may exceed 30,000 afy if the planned developments reach full buildout, the mine becomes active again, and the Mohave County water system reaches its maximum capacity of 7,260 afy (ADWR, 2007).

Current and projected groundwater demand has been evaluated by SGC (2007) and adds up to 27,516 afy for the worst-case scenario. Details on groundwater demand are presented in SGC (2007) report. Study by SGC (2007) also evaluated pumping impacts of the Proposed Action on Sacramento Valley aquifer and the results of this study are presented in section 4.2.2.1.

The quality of the water in the Sacramento Valley aquifer is generally good. It is an alkaline, sodium to calcium-sodium bicarbonate water with high hardness, low sodium adsorption ratio, and low total dissolve solids (TDS) concentrations (Gillespie and Bentley, 1971). Concentrations of regulated constituents in the water do not exceed any drinking water standards.

3.3 CLIMATE AND AIR QUALITY

This section describes the affected environment for air resources. Factors that influence air quality include the local climate and meteorology and the types and magnitude of air pollutants.

3.3.1 Regional Climate and Meteorology

According to data from the Western Regional Climate Center (WRCC), the climate in the vicinity of the Proposed Action is moderate all year long with mild winter temperatures and cooler summers than other parts of the state (WRCC, 2007). Summer temperatures may go as high as 110 °F. In the winter, the lows may infrequently go down into the low 20s °F. The average daily temperature during winter (December through February) is 46 to 53 °F. The average annual low temperature is 54 °F, while the average annual high temperature is 81 °F. The average annual precipitation is 7.56 inches per year.

3.3.2 Existing Air Quality

The Clean Air Act (CAA) of 1970, 42 USC 7401 et seq., as amended in 1977 and 1990, and Title 40 of the Code of Federal Regulations (CFR) parts 50 through 99 are the basic Federal statutes and regulations governing air pollution in the United States. The CAA designates six criteria pollutants for which seven National Ambient Air Quality Standards (NAAQS) have been promulgated to protect human health and welfare. The criteria pollutants are:

- Sulfur oxides, measured as sulfur dioxide (SO_2);
- Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10});
- Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$);
- Carbon monoxide (CO);
- Ozone (O_3);
- Nitrogen dioxide (NO_2); and
- Lead (Pb).

The NAAQS are codified in 40 CFR part 50 and summarized in **table 3-1**. The Arizona ambient air quality standards for criteria pollutants are the same as the Federal standards.

Table 3-1 National Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard µg/m³	Secondary Standard µg/m³
SO_2	Annual[a]	80 (0.030 ppm)	-
	24-Hour[b]	365 (0.14 ppm)	-
	3-Hour[b]	-	1,300 (0.5 ppm)
PM_{10}	Annual[a]	-	-
	24-Hour[b]	150	
$PM_{2.5}$	Annual[a]	15	15
	24-Hour[b]	35	-
CO	8-Hour	10,000 (9 ppm)	None
	1-Hour[b]	40,000 (35 ppm)	None
Ozone	8- Hour[c]	157 (0.08 ppm)	157 (0.08 ppm)
NO_2	Annual[a]	100 (0.053 ppm)	100 (0.053 ppm)
Lead	Quarter[a]	1.5	1.5

µg/m³ = micrograms per cubic meter
ppm = parts per million
Notes:
[a] Arithmetic mean.
[b] Block average.
[c] Rolling average.
Source: National Ambient Air Quality Standards

Based on the NAAQS for each criteria pollutant, the EPA classifies airsheds throughout Mohave County as attainment areas and nonattainment areas. Attainment areas are airsheds that comply with NAAQS, while nonattainment areas are those that do not. A given area can be classified as both attainment and nonattainment because the NAAQS are pollutant-specific. Mohave County is currently classified as an attainment area for all criteria pollutants.

Arizona Department of Health Services established the Arizona Ambient Air Quality Guideline (AAAQG) values for various toxic air pollutants (TAPs) in 1992. New projects are required to compare modeled emission rates of potential TAPs to demonstrate compliance with the AAAQG values. **Table 3-2** lists the potential project TAPs and their respective AAAQG screening values.

Table 3-2 Arizona Ambient Air Quality Guideline Screening Values and Emission Thresholds

	Ambient Guidelines			Emission Thresholds	
Pollutant	1-Hour µg/m³	24-Hour µg/m³	Annual µg/m³	De Minimis (lb/hr)	De Minimis (lb/yr)
1,3-Butadiene	7.2	1.9	0.067	N/A	0.39
Acetaldehyde	2300	1400	0.5	N/A	5.3
Acrolein	6.7	2	-	0.013	0.129
Ammonia	-	140	-	N/A	N/A
Benzene	630	51	0.14	N/A	1.5
Ethylbenzene	4500	3500	-	14	6,442
Formaldehyde	20	12	0.08	N/A	0.9
Hexane	5300	1400	-	659	13,689
Naphthalene	630	400	-	N/A	0.35
POM[a]	-	-	-	N/A	0.013
Propylene Oxide	1500	400	2	N/A	N/A
Toluene	4700	3000	-	109	146,766
Xylene[b]	5500	3500	-	98	644

Key:
µg/m³ = micrograms per cubic meter
lb/yr = pounds per year
N/A = Not Applicable
[a] Polycyclic Organic Matter (selected compound: Benzo(a)pyrene)
[b] Mixed isomers

Source: Arizona Ambient Air Quality Guideline

ADEQ is the lead air permitting authority for the Proposed Action. ADEQ's air quality regulations are codified in Title 18 of the Arizona Administrative Code (AAC) chapter 2. They incorporate the Federal program requirements listed in 40 CFR parts 50 through 99 and establish permit review procedures for all facilities that can emit pollutants to the ambient air. Any new facility or modification to an existing facility is required to obtain an air quality permit prior to initiating construction. Facilities can trigger additional review by EPA if emissions exceed the major source thresholds listed in 40 CFR §52.21(b)(1)(i).

The pre-construction review process for new or modified major sources located in attainment areas is called New Source Review (NSR), which may include a Prevention of Significant Deterioration (PSD) review. This process is intended to keep new air emission sources from

causing existing air quality to deteriorate beyond acceptable levels. ADEQ has codified the NSR program and Federal PSD requirements in 18 AAC R18-2-401, et seq.

3.3.3 Other Applicable Requirements

40 CFR part 60 establishes new source performance standards (NSPS) for specific emission sources. ADEQ incorporates these emission standards by reference in 18 AAC R18-2-901, et seq. 40 CFR part 60 Subpart KKKK: Standards of Performance for Stationary Combustion Turbines.

40 CFR parts 61 and 63, as incorporated by reference in 18 AAC R18-2-1101, et seq., are the Federal emission standards that have been developed to address certain individual Hazardous Air Pollutants (HAPs) and HAP emissions from a variety of source categories. The individual HAP rules are found in 40 CFR part 61 and are typically referred to as the National Emission Standards for Hazardous Air Pollutants (NESHAPs).

The source category rules, commonly referred to as the maximum achievable control technology (MACT) standards (40 CFR part 63), apply to facilities that are classified as major sources of HAPs, and operate affected equipment as listed in each standard. A facility is a major source of HAPs if it emits any individual HAP in excess of 10 tons per year (tpy) or a combination of HAPs in excess of 25 tpy.

3.3.4 Visibility

Under the CAA, a "Federal Class I area" is defined as one in which visibility is protected more stringently than the NAAQS, including such areas as national parks, wilderness areas, and other areas of special significance. Arizona has 12 Federal Class I areas. The closest Class I area to the Proposed Action is the Grand Canyon National Park, which is about 200 miles to the northeast. The primary annual wind direction is to the southeast and northwest of the site. Two particulate samplers were located in the Grand Canyon and operated continuously between 1988 and 1998. The visibility indices for summer (visual range [VR] 75 miles) were higher than for the other seasons, followed by autumn (VR 90 miles), then spring (VR 95 miles), and finally winter (VR 100 miles). No significant seasonal trends were observed in any of the seasons over the period between 1988 and 1998.

3.4 BIOLOGICAL RESOURCES

The ROI varies depending on the resource being analyzed. In the case of biological resources, it is defined as the area of disturbance of the proposed action, as well as adjacent infrastructure. The existing infrastructure adjacent to the proposed action creates a baseline condition of disturbance to biological resources in the area. The resources described include vegetation, wildlife, and special status wildlife and vegetation. Surveys were previously conducted for Griffith Energy to determine the occurrence of wildlife and vegetation species in the ROI of the proposed power plant (Griffith, 1998b). Special status species were analyzed for occurrence in the ROI of the Proposed Action. Special status species include threatened, endangered, proposed, and candidate species (USFWS), Bureau of Land Management (BLM) sensitive species, and State of Arizona sensitive species.

3.4.1 Vegetation

The area surrounding the Proposed Action is located within a boundary area of five biological provinces (the Great Basin, Interior, Mojave, Semidesert, and Sonoran), each represented by one or more vegetation series. The distribution of these provinces is driven by biotic responses to precipitation, elevation, topography, exposure, soil type, and land use. Information regarding the existing vegetation was obtained from previous surveys for Griffith Energy adjacent to the Proposed Action (Griffith, 1998b).

The Proposed Action is within the Mojave Province, which is typically desert scrub community situated on west-facing alluvial fans. Except for a small portion of the northeast corner of the site that is disturbed, bard ground, the ROI is occupied by Sonoran creosote bush-bursage (Mac et al. 1998). **Table 3-3** shows a complete list of vegetation species that occur within the ROI of the Proposed Action (Griffith, 1998b).

Table 3-3 Checklist of Plants that May Occur Within ROI of the Proposed Action

Semi-Desert Grasslands	
Trees	
one-seed juniper	*Juniperus monosperma*
mesquite	*Prosopis juliflora*
Shrubs	
acacia	*Acacia spp*
desert hackberry	*Celtis pallida*
hopbush	*Dodonaea viscosa*
joint-fir	*Ephedra sp*
ocotillo	*Fouquieria splendens*
broom snakeweed	*Guierrezia sarothrae*
creosotebush	*Larrea tridentata*
groundsel	*Senecio spp.*
soaptree yucca	*Yucca elata*
Grasses and Forbs	
poverty three-awn	*Aristida divaricata*
sprucetop grama	*Bouteloua chondrosioides*
sideoats grama	*B. curtipendula*
black grama	*B. eriopoda*
blue grama	*B. gracilis*
hairy grama	*B. hirsuta*
broom grasses	*Bromus spp.*
buffalo grass	*Buchloe dactyloides*
cryptanth	*Cryptantha spp.*
plains lovegrass	*Eragrostis intermedia*
tanglehead	*Heteropogon contortus*
tobosa	*Hilaria mutica*
lupine	*Lupinus sp.*
wolftail	*Lycurus phleiodes*
bush muhly	*Muhlenbergia porteri*
vine mesquite grass	*Panicum obtussum*
little bluestem	*Schizachyrium scoparium*
bristlegrass	*Setaria sp.*
mallows	*Sphaeralcea spp.*
Wright sacaton	*Sporobolus wrightii*
buffalo grass	*Buchloe dactyloides*
Cactus	
hedgehog cactus	*Echinocereus sp.*

Table 3-3 Checklist of Plants that May Occur Within ROI of the Proposed Action	
Wright pincushion	*Mammillaria wrightii*
prickly pears/chollas	*Opuntia spp.*
tree cholla	*O. imbricata*
Engelman prickly pear	*O. phaeacantha*
XERORIPARIAN HABITAT	
Trees	
crucifixion thorn	*Canotia holacantha*
blue Paloverde	*Cercidium floridum*
smoketree	*Psorothamnus spinosus*
mesquite	*Prosopis spp.*
Shrubs	
white-thorn acacia	*Acacia consticta*
catclaw	*A. greggii*
desert broom	*Buccharis sarothroides*
anderson thornbush	*Lycium andersonii*
cheesebush or burrobush	*Hymenoclea salsola*
Grasses and Forbs	
sand verbena	*Abronia spp.*
milk vetch	*Astragalus spp.*
spiderling	*Boerhaavia spp.*
bromegrass	*Bromus rubens*
desert senna	*Cassia armata*
spurges	*Euphorbia spp.*
MOJAVE DESERTSCRUB	
Trees	
Joshua tree	*Yucca brevifolia*
Shrubs	
saltbush	*Atriplex spp.*
agave	*Agave spp.*
white bursage	*Ambrosia dumosa*
white brittlebush	*Encella farinosa*
joint-fir	*Ephedra funerea*
rough joint-fir	*E. nevadensis*
desert buckwheat	*Eriogonum deserticola*
desert trumpet	*E. inflatum*
hopsage	*Grayia spinosa*
snakeweed	*Gutierrezia microcephala*
burrobush	*Hymenoclea salsola*
little-leaved ratany	*Krameria parviflora*
creosotebush	*Larrea tridentata*
Anderson thornbush	*Lycium andersonnii*
spiny mendora	*Menodora spinescens*
trixis	*Trixis californica*
Mojave yucca	*Yucca schidigera*
Cactus	
desert coryphantha	*Coryphantha vivipera var. desertii*
Engelman hedgehog	*Echinocereus engelmanii*
mammillaria	*Mammillaria spp.*
chollas, prickly pears	*Opuntia spp.*
buckhorn cholla	*O. acanthocarpa*
silver cholla	*O. echinocarpa*
Mojave prickly pear	*O. erinacea*
Grasses and Forbs	
sand verbena	*Abronia spp.*
milk vetch	*Astragalus spp.*
three-awn	*Aristida spp.*

Table 3-3 Checklist of Plants that May Occur Within ROI of the Proposed Action	
spiderling	*Boerhaavia spp.*
bromegrass	*Bromus rubens*
desert senna	*Cassia armata*
spurges	*Euphorbia spp.*
sixweeks fescue	*Festucca octoflora*
big galleta	*Hilaria rigida*
bush muhly	*Muhlenbergia porteri*
Source: Griffith, 1998a	

3.4.1.1 Wetlands and Riparian

No wetlands occur within the ROI of the Proposed Action. Wetlands in this part of Mohave County are limited to relatively rare springs. As water issuing from springs most often evaporates, or is quickly absorbed into the subsurface or in the surrounding surface soil, the establishment of wetland vegetation is generally precluded (Avant, 2007).

There are dry washes in the ROI of the Proposed Action (**figure 1-2**) which flow only as high-energy runoff, but there are no riparian areas. Although the additional soil moisture during these brief periods is enough to allow the growth of drought-tolerant species like mesquite, the lack of residual soil moisture, the scouring of the high-energy flow of these ephemeral streams, and the sediment deposition on existing vegetation as waters recede prohibit the growth of most wetland and riparian plants (Griffith, 1998b).

3.4.2 Wildlife

Wildlife expected to occur in the ROI of the Proposed Action include big game, predators, small mammals, songbirds, raptors, and reptiles. Due to the limited amount of permanent water resources within the area, aquatic and amphibian species are not expected to be present. Several big game mammals occur in the area. Mule deer (*Odocoileus hemionus*) are the most widely distributed and abundant big game species within Arizona. Most of the ROI is within mule deer habitat. However, it is not a high-quality habitat because the existing infrastructure adjacent to the area of the proposed action discourages migration in the ROI (Griffith, 1998b).

Desert bighorn sheep (*Ovis canadensis nelsoni*) inhabit dry, desert mountain ranges within the Great Basin, Mojave, Sonora, and Chihuahuan Deserts. These sheep prefer foothills near rocky cliffs and when water is seasonally available. Generally, sheep inhabit a summer range near available water sources and a winter range that has good grazing habitat. Sheep are active during the day, with minimal activity during extreme temperatures, and inhabit the rough terrain associated with the canyons and cliffs within the Black Mountains west of the Sacramento Valley. They could occur in the ROI of the Proposed Action (Griffith, 1998b).

Antelope (*Antilocapra americana*) occur from the deserts to the grasslands of the high plateaus. They prefer areas of grasses and scattered shrubs with rolling hills and dissected hills and mesas (Hoffmeister 1986). Antelope are not anticipated to occur within the Proposed Action because the existing infrastructure adjacent to the area of the Proposed Action discourages migration in the ROI, although they do occur nearby at Goodwin Mesa, Hualapai Valley, Truxton and Dutch Flats, and Round Valley (Griffith, 1998b).

Predators in the region include kit fox (*Vulpes macrotis*), bobcat (*Felis rufus*), badger (*Taxidea taxus*), and coyote (*Canis latrans*). Mountain lions (*Felis concolor*) may also occur near the Proposed Action in areas where mule deer are abundant (Hoffmeister, 1986).

Numerous small and medium-sized mammal species occur in the ROI of the Proposed Action including desert shrew (*Notiosorex crawfordi*), antelope jackrabbit, (*Lepus alleni*), hooded skunk (*Mephitis macroura*), striped skunk (*Mephitis mephitis*), Harris' antelope squirrel (*Ammospermophilus harrisii*), and mesquite mouse (*Peromyscus merriami*). The following species may occur within ROI: Arizona pocket mouse (*Perognathus amplus*), desert kangaroo rat (*Dipodomys deserti*), and desert woodrat (*Neotoma lepida*) (Hoffmeister,1986).

Five bat species may occur in the ROI of the Proposed Action. These include the greater western mastiff bat (*Eumops perotis*), Mexican free-tailed bat (*Tadarida brasiliensis*), California myotis (*Myotis californicus*), Yuma myotis (*Myotis yumanensis*), and spotted bat (*Euderma maculata*). Their occurrence, however, is unlikely because it is not ideal habitat for bat species due to the existing adjacent infrastructure and lack of available water sources within the ROI (Griffith, 1998b).

Density and diversity of songbird species within the ROI of the Proposed Action vary by season. Typical species include rock doves (*Columba livia*), mourning doves (*Zenaida macroura*), lesser nighthawk (*Chordeiles acutipennis*), common poorwill (*Phalaenoptilus nuttallii*), yellow-shafted flicker (*Colaptes auratus*), ash-throated flycatcher (*Myiarchus cinerascens*), western kingbird (*Tyrannus verticalis*), common raven (*Corvus corax*), verdin (*Auriparus flaviceps*), cactus wren (*Campylorhynchus brunneicapillus*), black-tailed gnatcatcher (*Polioptila melanura*), phainopepla (*Phainopepla nitens*), and white-crowned sparrow (*Zonotrichia leucophrys*) (Griffith, 1998b).

Several raptor species are known to occur seasonally in the general area. Species include turkey vulture (*Cathartes aura*), golden eagle (*Aguila chrysactos*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and Harris' hawk (*Parabuteo unicinctus*). All of these species may breed in the ROI of the Proposed Action (Griffith, 1998b).

Reptile species known or expected to occur near the Proposed Action include desert iguana (*Dispsosaurus dorsali*), zebra-tailed lizard (*Callisaurus draconoides*), desert collared lizard (*Crotaphytus insularis*), western whiptail (*Cnemidophorus tigris*), gopher snake (*Pituophis melanoleucus*), common kingsnake (*Lampropeltis getulus*), speckled rattlesnake (*Crotalus mitchellii*), and Mojave rattlesnake (*Crotalus scutulatus*) (Griffith, 1998b). **Table 3-4** lists wildlife species that may be found in the area.

Table 3-4 List of Wildlife Which May Occur in the ROI of the Proposed Action

Birds	
eared grebe	*Podiceps nigricollis*
turkey vulture	*Cathartes aura*
Harris' hawk	*Parabuteo unicinctus*
red-tailed hawk	*Buteo jamaicensis*
American kestrel	*Falco sparverius*
Gambel's quail	*Callipepla gambelii*
killdeer	*Charadrius vociferus*
rock dove	*Columba livia*
white-winged dove	*Zenaida asiatica*

Table 3-4 List of Wildlife Which May Occur in the ROI of the Proposed Action	
mourning dove	*Z. macroura*
Inca dove	*Scardafella inca*
greater roadrunner	*Geococcyx californicus*
barn owl	*Tyto alba*
western screech-owl	*Otus kennicottii*
great horned owl	*Bubo virginianus*
lesser nighthawk	*Chordeiles acutipennis*
common poorwill	*Phalaenoptilus nuttallii*
white-throated swift	*Aeronautes saxatilis*
black-chinned hummingbird	*Archilochus alexandri*
Anna's hummingbird	*Calypte anna*
Costa's hummingbird	*Calypte costae*
Gila woodpecker	*Melanerpes uropygialis*
ladder-backed woodpecker	*Dendrocopos scalaris*
northern flicker	*Colaptes cafer*
gilded flicker	*C. auratus*
black phoebe	*Sayornis nigricans*
Say's phoebe	*S. saya*
ash-throated flycatcher	*Myiarchus cinerascens*
brown-crested flycatcher	*M. tyrannulus*
western kingbird	*Tyrannus verticalis*
horned lark	*Eremophila alpestris*
northern rough-winged swallow	*Stelgidopteryx serripennis*
common raven	*Corvus corax*
verdin	*Auriparus flaviceps*
cactus wren	*Campylorhynchus brunneicapillus*
rock wren	*Salpinctes obsoletus*
canyon wren	*Catherpes mexicanus*
Bewick's wren	*Troglodytes bewickii*
ruby-crowned kinglet	*Regulus calendula*
black-tailed gnatcatcher	*Polioptila melanura*
northern mockingbird	*Mimus polyglottos*
curve-billed thrasher	*Toxostoma curvirostre*
Leconte's thrasher	*T. lecontei*
phainopepla	*Phainopepla nitens*
loggerhead shrike	*Lanius ludovicianus*
European starling	*Sturnus vulgaris*
Bell's vireo	*Vireo bellii*
solitary vireo	*Vireo solitarius*
Wilson's warbler	*Wilsonia pusilla*
northern cardinal	*Cardinalis cardinalis*
pyrrhuloxia	*Cardinalis sinuatus*
green-tailed towhee	*Pipilo chlorurus*
canyon towhee	*Pipilo fuscus*
Brewer's sparrow	*Spizella breweri*
black-throated sparrow	*Aimophila bilineata*
white-crowned sparrow	*Zonotrichia leucophrys*
brown-headed cowbird	*Molothrus ater*
hooded oriole	*Icterus cucullatus*
Scott's oriole	*Icterus parisorum*
house finch	*Carpodacus mexicanus*
house sparrow	*Passer domesticus*

Table 3-4 List of Wildlife Which May Occur in the ROI of the Proposed Action	
Mammals	
desert shrew	*Notiosorex crawfordi*
California leaf-nosed bat	*Macrotus californicus*
lesser long-nosed bat	*Leptonycteris curosae yerbabuena*
Yuma myotis	*Myotis yumanensis*
cave myotis	*M. velifer*
California myotis	*M. californicus*
western pipistrelle	*Pipistrellus hesperus*
big brown bat	*Eptesicus fuscus*
southern yellow bat	*Lasiurus ega*
pallid bat	*Antrozous pallidus*
American free-tailed bat	*Tadarida brasiliensis*
pocketed free-tailed bat	*T. femorosacca*
desert cottontail	*Sylvilagus audubonii*
black-tailed jack rabbit	*Lepus californicus*
Harris' antelope squirrel	*Ammospermophilus harrisii*
rock squirrel	*Spermophilus variegatus*
round-tailed ground squirrel	*S. tereticaudus*
Botta's pocket gopher	*Thomomys bottae*
Arizona pocket mouse	*Perognathus amplus*
Bailey's pocket mouse	*P. baileyi*
rock pocket mouse	*P. intermedius*
desert pocket mouse	*P. penicillatus*
banner-tailed kangaroo rat	*Dipodomys spectabilis*
Merriam's kangaroo rat	*D. merriami*
desert kangaroo rat	*D. deserti*
western harvest mouse	*Reithrodontomys megalotis*
cactus mouse	*Peromyscus eremicus*
deer mouse	*P. maniculatus*
southern grasshopper mouse	*Onychomys torridus*
Arizona cotton rat	*Sigmodon arizonae*
white-throated wood rat	*Neotoma albigula*
desert wood rat	*N. lepida*
house mouse	*Mus musculus*
coyote	*Canis latrans*
kit fox	*Vulpes macrotis*
gray fox	*Urocyon cinereoargenteus*
badger	*Taxidea taxus*
western spotted skunk	*Spilogale gracilis*
mountain lion	*Felis concolor*
bobcat	*F. rufus*
collared peccary	*Tayassu tajacu*
mule deer	*Odocoileus hemionus*
Reptiles and amphibians	
Toads	
Couch's spadefoot toad	*Scaphiopus couchi*
southern spadefoot toad	*S. multipicatus*
Sonoran desert toad	*Bufo alvarius*
great plains toad	*B. cognatus*
Sonoran green toad	*B. debilis*
red-spotted toad	*B. punctatus*
Tortoises/turtles	

Table 3-4 List of Wildlife Which May Occur in the ROI of the Proposed Action	
desert tortoise	*Gopherus agassizi*
Lizards	
desert banded gecko	*Coleonyx variegatus*
chuckwalla	*Sauromalus obesus*
desert iguana	*Dipsosaurus dorsalis*
zebra-tailed lizard	*Callisaurus draconoides*
long-nosed leopard lizard	*Gambelia wislizenii*
desert spiny lizard	*Sceloporus magister*
side-blotched lizard	*Uta stansburiana*
desert horned lizard	*Phrynosoma platyrhinos*
regal horned lizard	*P. solare*
tree lizard	*Urosaurus ornatus*
long-tailed brush lizard	*U. graciosus*
collared lizard	*Crotaphytus collaris*
western whiptail	*Cnemidophorus tigris*
canyon spotted whiptail	*C. burti*
Gila monster	*Heloderma suspectum*
Snakes	
western blind snake	*Leptophlops humilis segregus*
spotted leaf-nosed snake	*Phyllorhynchus decurtatus*
saddled leaf-nosed snake	*P. brownii*
coachwhip sonoran whipsnake	*Masticophis flagellus M. bilineatus*
desert patch-nosed snake	*Salvadora hexalepis*
glossy snake	*Arizona elegans*
gopher snake	*Pituophis melanoleucus*
common kingsnake	*Lampropeltis getulus*
long-nosed snake	*Rhinocheilus lecontei marcianus*
ground snake	*Sonora semiannulate*
banded sand snake	*Chilomeniscus cinctus*
western shovel-nosed snake	*Chionactis occipitalis*
night snake	*Hypsiglena torquata*
southwestern black-headed snake	*Tantilla hobartsmithii*
Arizona coral snake	*Micruroides euryxanthus*
lyre snake	*Trimophodon biscutatus*
western diamondback rattlesnake	*Crotalus atrox*
speckled rattlesnake	*C. mitchelli*
Mojave rattlesnake	*C. scutulatus*
Source: Griffith, 1998a	

3.4.3 Special Status Plant Species

Nineteen special status plant species (those listed as endangered, threatened, proposed, or candidates for listing by the USFWS, or designated sensitive by Federal resource management agencies, as well as those of concern to the State of Arizona) may occur within the ROI of the Proposed Action. **Table 3-5** presents information regarding these special status species.

Table 3-5 Special Status Plant Species that May Occur within the ROI of the Proposed Action

Scientific name	Common name	Designation	Agency	Suitable Habitat in ROI of the Proposed Action
Astragalus holmgreniorum	Paradox milkvetch	sensitive	BLM	no
Astragalus newberryi var. *aquarii*	Aquarius (Newberry's) milkvetch	sensitive	BLM	yes
Cordylanthus nevinii	Nevin's birdsbeak	sensitive	BLM	yes
Cycladenia humilis ssp. jonesii	Jones' cycladenia	threatened	USFWS	no
Cynanchum utahense	Crownless (or Utah) milkweed vine	sensitive	BLM	yes
Fremontodendron californicum	California flannelbush	sensitive	BLM	yes
Mammillaria viridiflora	Varied fishhook cactus	salvage restricted	State of Arizona	no
Pediocactus peeblesianus var. fickeiseniae	Fickeisen plains cactus	Candidate and sensitive	USFWS and BLM	no
Pediocactus sileri	Siler pincushion cactus	threatened	USFWS	no
Penstemon albomarginatus	White-margined beardtongue	sensitive	BLM	yes
Penstemon bicolor ssp. *roseus*	Two-color beard-tongue	sensitive	BLM	yes
Petalonyx nitidus	Mojave sandpaper bush	sensitive	BLM	no
Phacelia parishii	Parish phacelia	sensitive	BLM	yes
Purshia glandulosa	Antelopebush	sensitive	BLM	no
Purshia subintegra	Arizona cliffrose	endangered	USFWS	no
Senna armata	Shrubby senna	sensitive	BLM	yes
Tetradymia argyraea	Striped horsebrush	sensitive	BLM	no
Tricardia watsonii	Three hearts	sensitive	BLM	yes

Source: Griffith, 1998b; USFWS, 2007

Species Potentially Occurring within the ROI

Suitable habitat for nine species is present within the ROI. These include white-margined beardtongue (*Penstemon albomarginatus*), two-color beard-tongue (*Penstemon bicolor* ssp. *roseus),* three hearts (*Tricardia watsonii*), Aquarius (Newberry's) milkvetch (*Astragalus newberryi* var. *aquarii*), Nevin's birdsbeak (*Cordylanthus nevinii*), California flannelbush (*Fremontodendron californicum*), crownless (or Utah) milkweed vine (*Cynanchum utahense*), Parish phacelia (*Phacelia parishii),* and shrubby senna (*Senna armata)* (Griffith, 1998b).

White-margined Beardtongue

This species is found at elevations ranging from 2,800 to 6,000 feet. The only known population of white-margined beardtongue in Arizona is located at Dutch Flat, approximately 25 miles southeast of the Proposed Action near Yucca, AZ. However, there is suitable habitat for this species to occur in the ROI of the Proposed Action (USDA, 2007).

Two-color Beardtongue

This species is found at elevations between 2,296 to 4,921 feet and is in the family Scrophulariaceae. This species is a perennial herb. There is suitable habitat for this species to occur in the ROI of the Proposed Action (USDA, 2007).

Three Hearts
This species is found in sandy or gravelly desert slopes and flats to elevations of 7,000 feet, often in creosotebush scrub, Joshua tree, and pinyon-juniper woodlands and deserts. This species has a blooming period from April to June. There is suitable habitat for this species to occur in the ROI of the Proposed Action (USDA, 2007).

Aquarius (Newberry's) Milkvetch
This species is a perennial found throughout the region at elevations of 2,000 to 7,000 feet. Flowers are pink-purple, sometimes pale, and 0.6 inch long. The pods are densely white-villous, spreading, sessile, ovoid, and incurved into a stiff, lateral compressed beak. The leathery valves are concealed by the dense, woolly coat. There is suitable habitat for this species to occur in the ROI of the Proposed Action (USDA, 2007).

Nevin's Birdsbeak
Nevin's birdsbeak grows on dry slopes at elevations from 5,000 to 8,000 feet and blooms from July to September. Nevin's birdsbeak is a slender, paniculately branched annual with bristly hairs on the stem and alternating leaves, the lower ones somewhat crowded and three-lobed, the upper linear and more segregated. There is suitable habitat for this species to occur in the ROI of the Proposed Action (USDA, 2007).

California Flannelbush
This species is found in chaparral, yellow pine forest, and pinyon-juniper woodland slopes at elevations between 1,312 and 6,561 feet. It has distinctive large yellow flowers. There is suitable habitat for this species to occur in the ROI of the Proposed Action (USDA, 2007).

Crownless (or Utah) Milkweed Vine
This species is found in creosotebush scrub habitat type and is in the family Asclepiadaceae. This species is a perennial herb confined to western North America. There is suitable habitat for this species to occur in the ROI of the Proposed Action (USDA, 2007).

Parish Phacelia
This species is often found in the western Mojave Desert. It is typically found in clay or alkaline soils and in dry lake margins at elevations of 2,700 to 4,000 feet. It has a flowering period from April to July. There is suitable habitat for this species to occur in the ROI of the Proposed Action (USDA, 2007).

Shrubby Senna
This species is found in sandy or gravelly washes at elevations of 650 to 3,250 feet. It has a flowering period from March to July (USDA, 2007). There is suitable habitat for this species to occur in the ROI of the Proposed Action.

Species Unlikely to Occur within the ROI

The following ten species were analyzed, but it was determined that they were unlikely to have suitable habitat in the ROI of the Proposed Action, and therefore are unlikely to occur.

Arizona Cliffrose (*Purshia subintegra)*
This species flowers have five white or yellow petals about 0.4 inch long. This species grows only on Tertiary limestone lakebed deposits. The distinctive white soil color of these deposits can be seen from a distance (USFWS, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Antelopebush (*Purshia glandulosa)*
This species is found on dry slopes, chaparral, Joshua tree woodlands, and pinyon-juniper woodlands at elevations ranging from 2,000 to 9,000 feet in north Transverse and east Peninsular Ranges and desert mountains. This species has a blooming period from April to June (USDA, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Siler Pincushion Cactus *(Pediocactus sileri*)
This species is a small, globose cactus with solitary, occasionally clustered, stems typically 4 inches tall (as tall as 18 inches), and spines that become white with age. Its flowers are yellow with purple veins, and bloom during March and April (USDA, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Fickeisen Plains Cactus (*Pediocactus peeblesianus var. fickeiseniae)*
This species is a candidate for listing with the USFWS and is listed as a sensitive species with the BLM. It is found in gravelly soils and is an unbranched cactus that retreats into the soil after flowering yellow flowers and fruiting. It is found at elevations from 4,000 to 5,000 feet in layers of Kaibob limestone on canyon margins (USFWS, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Jones' Cycladenia *(Cycladenia humilis ssp. jonesii)*
This species is a rhizomatous herb with round, somewhat succulent leaves and small rose-pink hairy flowers that bloom from mid-April to early June. The species can be found in Eriogonum-ephedra, mixed desert shrub and scattered pinyon-juniper communities at elevations ranging from 4,000 to 6,800 feet (USDA, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Mojave Sandpaper Bush *(Petalonyx nitidus)*
This species is found in creosotebush scrub, Joshua tree woodlands, and pinyon-juniper woodlands at elevations between 3,280 and 6,889 feet. This species is a dicot in the family Loasaceae and is a perennial herb (USDA, 2007). It is not anticipated to occur within the vicinity of the Proposed Action due to lack of suitable habitat.

Striped Horsebrush *(Tetradymia argyraea)*
This species is found in pinyon-juniper woodland at elevations of 4,500 to 6,900 feet, mostly in desert mountains. This species flowers from August to September with pale yellow flowers (USDA, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Paradox Milkvetch (*Astragalus holmgreniorum)*
This species is a stemless herbaceous perennial that produces small purple flowers in the spring. It has compound leaves (blue-green below and yellowish-green above) that arise directly from the root crown. This species inhabits areas just under limestone ridges and along draws in gravelly clay hills at elevations ranging from 2,700 to 2,800 feet (USDA, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Varied Fishhook Cactus (*Mammillaria viridiflora*)
This species is known to flower in the spring and fruit in the fall. It is found in semi-desert grasslands, interior chaparral, pinyon-juniper and oak woodlands, crevices, boulders, canyon sides, and gravelly igneous substrates at elevations from 5,600 to 6,500 feet (USDA, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

3.4.4 Special Status Wildlife Species

The USFWS, BLM, and the Arizona Game and Fish Department (AGFD) have identified the following threatened, endangered, and sensitive wildlife species that do occur or that may occur within the ROI of the Proposed Action shown on **table 3-6**.

Table 3-6 Special Status Wildlife Species May Occurring within the ROI of the Proposed Action

Scientific name	Common name	Designation	Agency	Suitable Habitat in ROI of the Proposed Action
Gila elegans	Bonytail chub	Endangered	USFWS	no
Gila cypha	Humpback chub	Endangered	USFWS	no
Gila seminuda	Virgin River chub	Endangered	USFWS	no
Plagopterus argentissimus	Woundfin	Endangered	USFWS	no
Xyrauchen texanus	Razorback sucker	Endangered	USFWS	no
Rana onca	Relict leopard frog	Candidate	USFWS	no
Gopherus agassizii mohavensis	Mojave Desert tortoise	Threatened	USFWS	no
Gopherus agassizii	Sonoran Desert tortoise	Sensitive	AGFD	yes
Lichanura trivirgata gracia	Rosy boa	Sensitive	BLM	no
Heloderma suspectum cinctum	Gila monster	Sensitive	BLM	yes
Accipiter gentilis	Northern goshawk	Sensitive	BLM	no
Charadrius montanus	Mountain plover	Sensitive	BLM	yes
Coccyzus americanus	Yellow-billed cuckoo	Candidate	USFWS	no
Empidonax traillii extimus	Southwestern willow flycatcher	Endangered	USFWS	no
Gymnops californianus	California condor	Endangered	USFWS	no
Haliaeetus leucocephalus	Bald eagle	Threatened	USFWS	no
Pelecanus occidentalis californicus	California Brown Pelican	Endangered	USFWS	no
Rallus longirostris yumanensis	Yuma clapper rail	Endangered	USFWS	no
Strix occidentalis lucida	Mexican spotted owl	Threatened	USFWS	no
Eumops perotis californicus	Greater western mastiff bat	Sensitive	AGFD	no
Microtus mexicanus hualpaiensis	Hualapai Mexican vole	Endangered	USFWS	no
Thomomys umbrinus	Hualapai Pocket gopher	Sensitive	BLM	yes

Source: Griffith, 1998b; USFWS, 2007

The Federal list includes 13 endangered and threatened wildlife species: Mojave desert tortoise (*Gopherus agassizii mohavensis*), Hualapai Mexican vole (*Microtus mexicanus hualpaiensis*),

bonytail chub (*Gila elegans*), humpback chub (*Gila cypha*), razorback sucker (*Xyrauchen texanus*), Virgin River chub (*Gila seminuda*), woundfin (*Plagopterus argentissimus*), California brown pelican (*Pelecanus occidentalis californicus*), bald eagle (*Haliaeetus leucocephalus*), California condor (*Gymnops californianus*), Mexican spotted owl (*Strix occidentalis lucida*), Southwestern willow flycatcher (*Empidonax traillii extimus*), and the Yuma clapper rail (*Rallus longirostris yumanensis*) (USFWS, 2007). Two candidate species are also on the list: relict leopard frog (*Rana onca*) and yellow-billed cuckoo (*Coccyzus americanus*). These species are listed in **table 3-6**.

The BLM has identified five species of special concern: the rosy boa (*Lichanura trivirgata gracia*), mountain plover (*Charadrius montanus*), northern goshawk (*Accipiter gentilis*), the Hualapai pocket gopher (*Thomomys umbrinus),* and the gila monster (*Heloderma suspectum cinctum*) (Griffith,1998b). Additionally, the AGFD has identified the Sonoran desert tortoise (*Gopherus agassizii)* and greater western mastiff bat (*Eumops perotis californicus*) as sensitive species that may occur in the ROI of the Proposed Action (Griffith ,1998b). These species are listed in **table 3-6**.

Species Potentially Occurring within the ROI

Rosy Boa
This snake occurs in rocky brush lands and desert areas. They are attracted to areas of permanent water, but water is not required for this species. The rosy boa feeds on small mammals and birds, usually at night (Griffith, 1998b). The rosy boa may occur in the ROI of the Proposed Action.

Gila Monster
The Gila monster inhabits lower slopes of mountains and nearby outwash plains in arid or semiarid areas. They frequently occur in canyon bottoms or arroyos with either permanent or intermittent water and irrigated lands or rocky areas containing scattered brush (Griffith, 1998b). The Gila monster may occur in the ROI of the Proposed Action.

Sonoran Desert Tortoise
The "Sonoran population" of the desert tortoise is defined as those occurring south and east of the Colorado River. This species occupies rocky and alluvial slopes of Mojave desert scrub and the Arizona Upland and Lower Colorado subdivisions of the Sonora Desert (Murray and Dickenson, 1996).

Desert tortoise populations began to decline in the 1970s due to disease; human-related mortality; predation; and habitat destruction, degradation, and fragmentation (Murray and Dickenson, 1996). As a result of these cumulative impacts, the tortoise was extirpated from large portions of its original range. Three categories (Categories I, II, and III) of desert tortoise habitat were designated by the BLM to set goals for the management of desert tortoise and its habitat based on several criteria. Management of Category I and II areas emphasize maintenance of viable desert tortoise populations in areas where all Category I and most Category II conflicts are resolvable. Category III habitats are generally characterized by lower densities of desert tortoise in areas where habitat has been degraded or where land ownership patterns interfere with effective management.

The BLM has designated areas of Category II and Category III Desert tortoise habitat in the ROI of the Proposed Action shown on **figure 3-2**. The designated areas are identified as the Hualapai Foothills (Category II), Rawhide Mountain/Dutch Flats (Category III), McConnico (Category III), and Hualapai North (Category III). These areas are all south and east of I-40. It is anticipated that tortoises may occur within these designated areas and it may occur in the ROI of the Proposed Action (Griffith, 1998b) even though the Proposed Action is not located within any of the designated habitat areas.

Mountain Plover
The mountain plover occurs on the high plains of the semi-desert regions of the West. It is known to breed in the spring and early summer from Colorado to Montana and can be found the rest of the year in California, and Arizona to a lesser extent. Plovers occur in areas of scattered sagebrush and intermittent patches of bunch grasses and cactus in disturbed areas (Griffith, 1998b). The mountain plover may occur in the ROI of the Proposed Action.

Hualapai Pocket Gopher
This species of pocket gopher is typically found in meadows with loose soils. It plays an important role in aeration of soil (Griffith, 1998b). It is considered a sensitive species by the BLM. It is possible that it could occur in the ROI of the Proposed Action.

Species Unlikely to Occur within the ROI

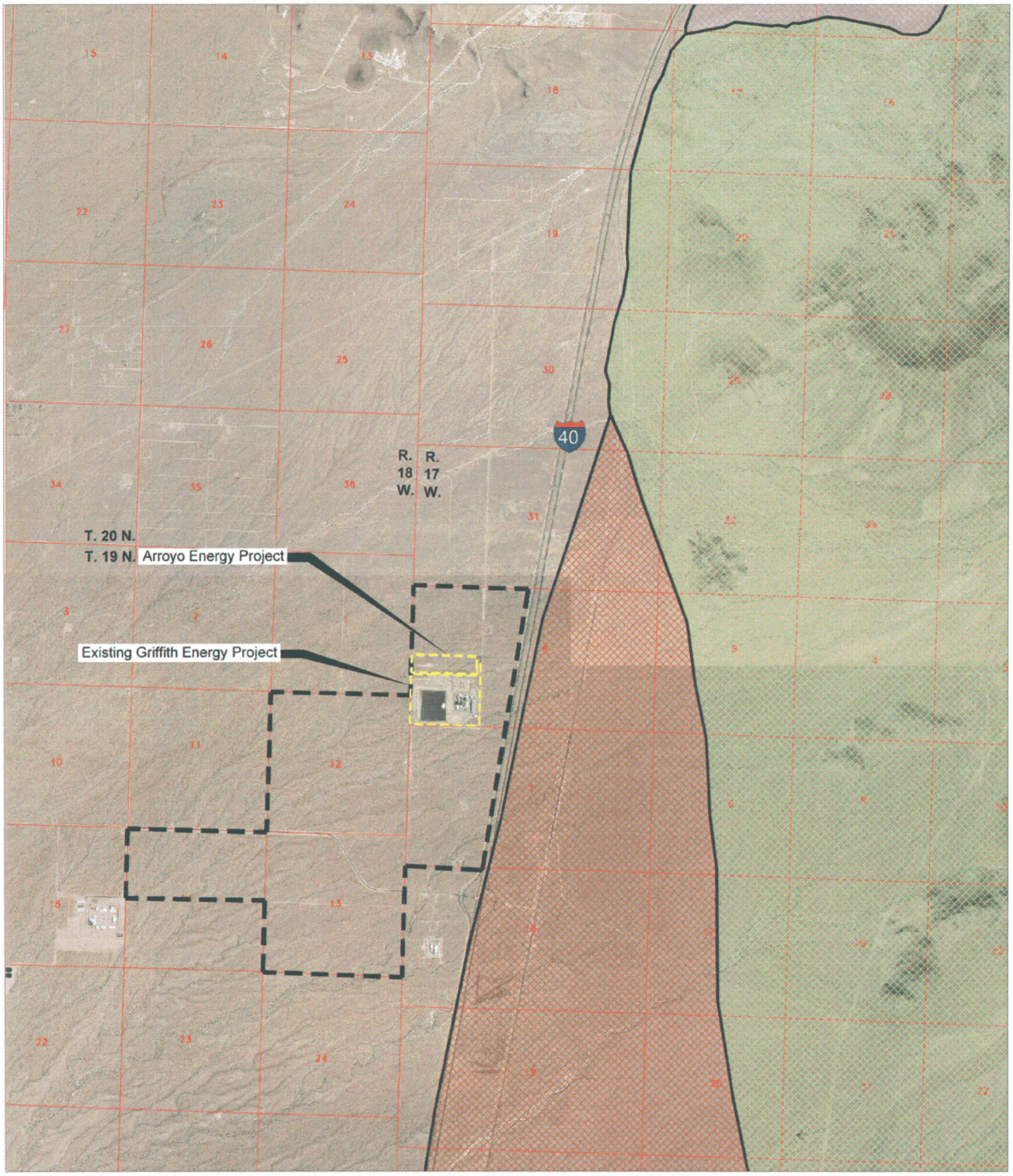
Bonytail Chub
The bonytail chub is associated with open water areas of large river channels. Based on the lack of aquatic habitat, the bonytail chub would not occur in the area (USFWS, 2007).

Humpback Chub
Humpback chub are associated with deep, swift waters such as those found in canyons. Based on the lack of aquatic habitat, the humpback chub would not occur in the area (USFWS, 2007).

Virgin River Chub
The Virgin River chub occurs within runs and pools over substrates of sand and sediment in physically and chemically unmodified areas of the Virgin River. The Proposed Action is outside the Virgin River Basin; therefore, this species does not occur in the area (USFWS, 2007).

Razorback Sucker
The razorback sucker occurs in both rivers and impoundments. Based on the lack of aquatic habitat, the razorback sucker would not occur in the area (USFWS, 2007).

Woundfin
The woundfin is found in the Virgin River within Arizona, Nevada, and Utah. The Proposed Action is outside the Virgin River Basin; therefore, it would not occur in the area (USFWS, 2007).



Legend

- I-40 Industrial Corridor Boundary

BLM Desert Tortoise Habitat Management Categories

- McConico III
- Hualapia Foothills II
- Rawhide Mountain / Dutch Flat III
- None

N W E S

0 1 2

Miles

Source: Griffith 1998b

ARROYO ENERGY PROJECT

Figure 3-2
Sonoran Desert Tortoise Habitat

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/13/07	File: EA-Desert Tort.dwg
Drawn By: ETC	Layout: 001

Relict Leopard Frog
This frog occurs in along the Colorado and Virgin Rivers on stream banks and wetlands at elevations of less than 2,000 feet (USFWS, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Mojave Desert Tortoise
The Mojave population of the desert tortoise is found north and west of the Colorado River. It was listed as "threatened" under the California State Endangered Species Act (ESA) in 1989 and the Federal ESA in 1990. A separate, genetically distinct population of desert tortoise has been identified south and east of the Colorado River in Arizona (Sonoran desert tortoise). The primary reasons for listing the Mojave population include deterioration and loss of habitat, collection for pets or other purposes, elevated levels of predation, disease, and the inadequacy of existing regulatory mechanisms to protect desert tortoises and their habitat. The USFWS has designated critical habitat in Arizona for the Mojave desert tortoise. This habitat is limited to extensive areas of mesas and steep talus slopes in parts of the Black Mountains. The designated critical habitat is more than 50 miles north of the Proposed Action. The Mojave desert tortoise does not occur within the area because it only occurs north and west of the Colorado River, and the Proposed Action is south and east of the Colorado River (USFWS, 2007).

California Brown Pelican
This subspecies is found on the Pacific Coast. It rarely migrates to Arizona (USFWS, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Bald Eagle
Although bald eagles may forage over or migrate through the region, no bald eagle nests or wintering roosts are known to occur within the ROI of the Proposed Action. Feeding areas, perches, and night roosts are fundamental elements of bald eagle winter range. Though eagles can fly as far as 15 miles to and from these elements, they occur primarily where all three elements are available in close proximity. Although eagle presence in winter is not necessarily related to open water, eagles usually occur near large rivers and lakes. Perches are an essential element in the bald eagles' selection of foraging areas. Roosts are areas used for sleeping and sheltering from winter storms (Griffith, 1998b). It is not anticipated to occur within the area due to lack of suitable habitat.

California Condor
The California condor is the largest bird in North America with a wingspan of up to 9 feet. Currently, 36 condors have been established into the wild at three sites in California and Arizona. Sixteen are located in the Los Padres National Forest in California; 15 at Vermillion Cliffs, Arizona; and five at Ventana/Big Sur in California. These populations are currently being studied by biologists. The Proposed Action is on the far edge of the species range (USFWS, 2007). It is not anticipated to occur within the area due to lack of suitable habitat.

Mexican Spotted Owl
The Mexican spotted owl typically nests and roosts in mixed coniferous forests (Ganey and Bald, 1989) or ponderosa pine-Gamble oak adjacent to riparian habitats or in canyons (USFWS, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Southwestern Willow Flycatcher
The flycatcher breeds in the United States but winters south of the United States. California, Arizona, and New Mexico comprise the majority of the historic and current range of the flycatcher. Flycatchers typically nest in cottonwood-willow associations along streams, rivers, or other wetland areas (Tibbets et al., 1994, USFWS, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Yuma Clapper Rail
The Yuma clapper rail inhabits dense cattail marshes along the Colorado River. Marsh habitat losses to river water diversion and damming of the Colorado River, dredging operations, mosquito abatement programs, and erosion control efforts have all reduced nesting habitat (Griffith, 1998b, USFWS, 2007). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Yellow-billed Cuckoo
This species occurs in large blocks of riparian woodlands at less than 6,500 feet in elevation (USFWS, 2007). It is not anticipated to occur within the area due to lack of suitable habitat.

Northern Goshawk
The northern goshawk inhabits forested regions of the Northern Hemisphere. This goshawk prefers coniferous forests, but would also inhabit deciduous and mixed forests from sea level to subalpine areas (Griffith, 1998b). It is not anticipated to occur within the ROI of the Proposed Action due to lack of suitable habitat.

Greater Western Mastiff Bat
The greater western mastiff bat roosts in crevices and shallow caves on cliffs and rock faces. Roosts typically have large openings below to allow the bats to drop several feet before exiting the roost. Females give birth to a single young any time between mid-June and mid-August (Hoffmeister, 1986). The greater western mastiff bat is not anticipated to occur within the ROI of the Proposed Action due to the lack of suitable habitat.

Hualapai Mexican Vole
This species is endangered and has been steadily disappearing from its habitat for the last 50 years. However, when it is seen, it is typically found in Northern Arizona including the Grand Canyon and the Flagstaff and Williams areas, which are approximately 115 miles east of the Proposed Action, and from Navajo Mountain in both Arizona and Southern Utah. This species is also found in the Defiance Plateau in Arizona, which is approximately 250 miles northeast of the Proposed Action. The Hualapai Mexican vole is associated with the ponderosa pine-Gambel oak habitat type. It is not anticipated to occur within the area due to lack of suitable habitat (USFWS, 2007).

3.5 CULTURAL RESOURCES

Based on previous inventories; archaeological and historical overviews; and theoretical contributions within anthropology, ethnology, and cultural geography, the NAEP property is expected to contain few prehistoric or historic cultural resources. Cultural resources in the open basin of the Sacramento Valley are expected to be widely distributed at low density and occur as either spatially narrow and linear or small and point-focused entities. Historic cultural resources

are likely to be more common east of the Proposed Action along the historic transportation corridors of Route 66 and the Atchison Topeka and Santa Fe (ATSF) Railway, and in the foothills of the Hualapai Mountains approximately 4 miles to the east.

The development of baseline data for the Proposed Action included a records search and literature review associated with areas within a 1-mile radius of the Proposed Action. Review of AZSITE records, ARCADIS files for Griffith Energy, and site cards and other records at the Arizona State Museum (ASM) and BLM Kingman Office identified four previous cultural resource studies and two formally recorded cultural resource sites within 1 mile of the Proposed Action. Three of the previous cultural resource investigations were for the existing Griffith Energy and associated utility corridors (Ezzo and Späth, 1998; Becker and Huber, 2001; Becker et al. 2001). The fourth investigation was a linear parcel to the northeast along I-40 (Breen, 2004). The two historic cultural resources were historic Route 66 (AZ I:15:156[ASM]), which has been overlain by I-40 in the vicinity of the Proposed Action, and a small historic debris scatter east of I-40 (AZ F:16:1[ASU]). Segments of the historic ATSF are also located east of the I-40 and west of the Hualapai Mountains.

A cultural resource inventory was completed for the 160-acre Griffith Energy property in the west half of the southwest quarter of section 6, T19N, R17W, for Griffith Energy (Ezzo and Späth, 1998). This included a reconnaissance of the NAEP property. The archaeological survey for the Griffith Energy property (as defined in Ezzo and Späth, 1998) identified no prehistoric or historic sites, despite favorable weather conditions, excellent ground surface visibility (95 to 100 percent), and the presence of such opportunities for enhanced subsurface visibility as erosional cuts, roadside ditches, and the backdirt of animal burrows. No areas of Holocene deposition that might contain buried cultural resources were observed, and it was concluded that no surface or subsurface cultural resources exist within the 160-acre parcel, which includes the Proposed Action. The Griffith Energy property inventory focused on the initially proposed plant site footprint and the remainder of the survey was at a reconnaissance level. Therefore, the NAEP property has been resurveyed (Jolly and Späth, 2007). An isolated grinding slick was documented, and no other cultural resources were found.

An ethnographic study of Griffith Energy was completed by the Hualapai Tribe (1999). They expressed no concerns about the Griffith Energy property. They were concerned about the potential for prehistoric camps and other sites in the Hualapai Mountains, the Peacock Mountains, and the foothills, which are all located outside the project area.

3.6 LAND USE AND RECREATION

This section describes the existing land ownership and land uses in the vicinity of the Proposed Action. Current and proposed land management plans and planned future land uses for the area are also described in this section.

3.6.1 Existing Land Ownership and Land Uses

The Proposed Action would be located on a 40-acre parcel of land just west of I-40, approximately 9 miles southwest of the City of Kingman and 1.7 miles north of the Griffith interchange in Mohave County, Arizona. The Proposed Action would be constructed on private lands within the county-designated I-40 Industrial Corridor just north of the existing Griffith

Energy facilities as shown on **figures 3-2** and **3-3**. The NAEP property is located within the Original Griffith Energy property that was approved for power generation by the Arizona Corporation Commission (Case No. 90, Docket L00000H-98-0090, Decision No. 61295). The NAEP property is currently undeveloped, vacant land.

The proposed power plant would be accessed by existing roads via the Griffith interchange on I-40, which travels north-south near the site. From the Griffith I-40 Interchange, access to the proposed power plant would be west on Griffith Road, then approximately 1.7 miles north on South Apache Road, then east on Haul Road to the site entrance. Public access to the site would be controlled through a security gate at the entrance off of Haul Road located along the north boundary of the NAEP property.

Applicable current and proposed land management plans in the vicinity of the Proposed Action include the original Mohave County General Plan (General Plan), adopted in 1995 and revised in 2003 (Mohave County, 1995); the 2005 Draft General Plan (Mohave County, 2005a); the 2002 Golden Valley Area Plan (Mohave County, 2002); and the Mohave County Zoning Ordinance (Mohave County, 2005b). The amended General Plan designated the I-40 Industrial Corridor; however, the Area Plan for the I-40 Industrial Corridor is not yet finalized. The Zoning Ordinance establishes zoning districts to implement land use controls for development.

The NAEP property is zoned MX. Land uses permitted within MX zoning include light and heavy industry and commercial and industrial uses appropriate to an industrial park such as manufacturing and warehouses. Any uses permitted in the commercial-manufacturing or general manufacturing zones are permitted uses in the MX zone without a zoning use permit. The MX zoning designation permits the development of industrial facilities including electric generation facilities. Existing industrial development in the vicinity of the Proposed Action includes the Praxair industrial gases and liquids facility about 2 miles south of the Proposed Action, existing transmission lines and utilities, I-40 and Route 66, the main line of the Burlington Northern Santa Fe (BNSF) Railway, and three transcontinental natural gas pipeline corridors (Transwestern, El Paso, and Questar).

Figure 3-4 is an aerial photograph showing the current land uses and zoning designations for the NAEP property and surrounding lands. As shown on the aerial photograph, the properties surrounding the I-40 Industrial Corridor are predominantly undeveloped vacant lands. These lands are privately owned and currently zoned for rural uses (primarily rangeland), residential subdivisions, commercial centers, residences, and infrastructure (roads, utilities).

BLM lands in the area are managed for multiple uses and provide for a variety of uses, including grazing and dispersed recreation, such as hunting and off-road vehicle (ORV) use. There are no BLM lands and associated grazing allotments or recreation areas within or adjacent to the Proposed Action. Potential impacts to recreation resources are discussed in the recreation section of this document.

Northern Arizona Energy Project

Project Location

Legend

- BLM Wilderness Area
- Municipal Area

Land Owner

- BLM
- Lake Mead N.R.A
- Parks & Recreation
- Private
- State Trust
- Havasu N.W.R.

5 2.5 0 5

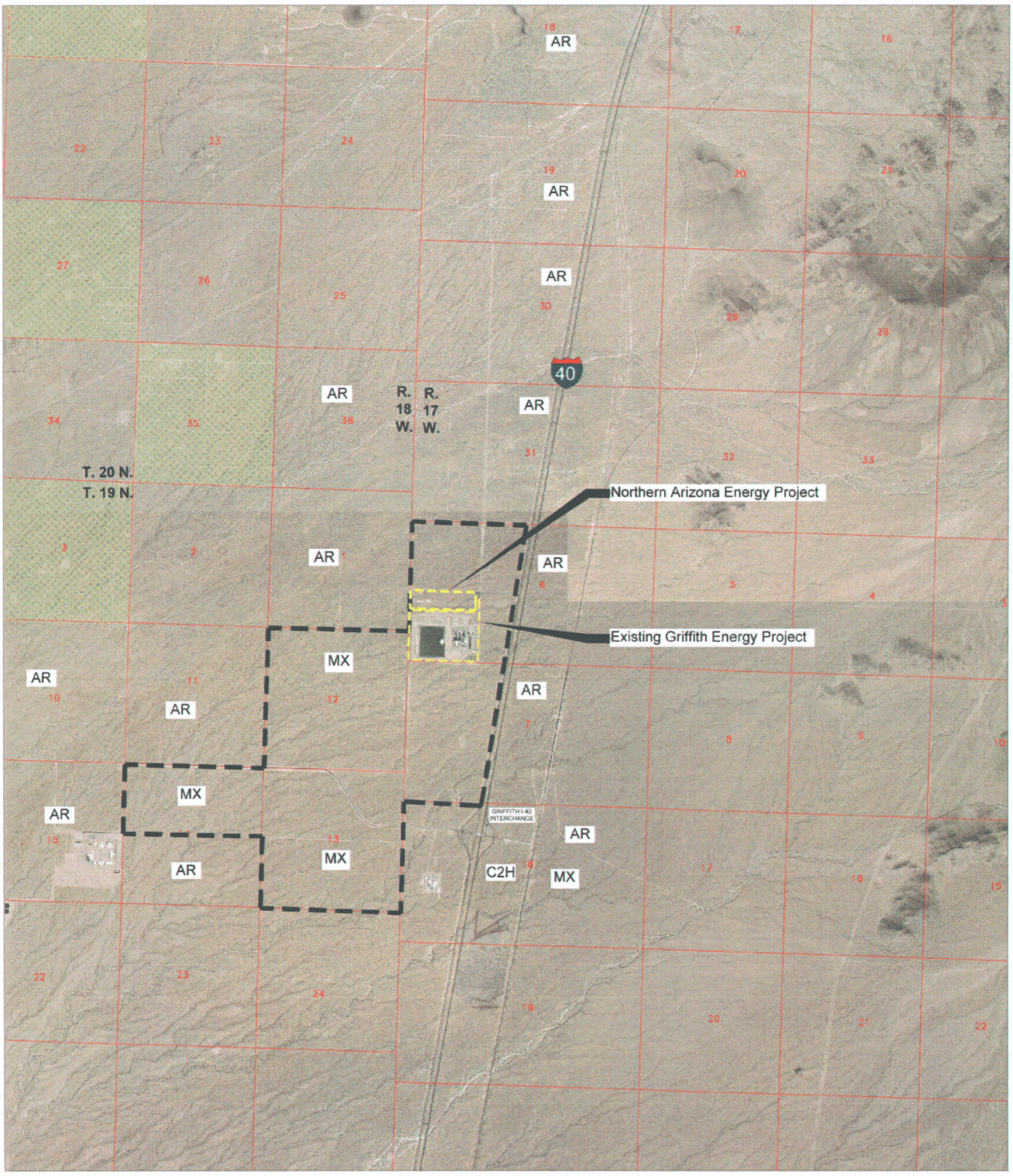
Miles

Sources: Williams, Prescott, Kingman, & Needles 1:250,000 USGS Quadrangles

NORTHERN ARIZONA ENERGY PROJECT

Figure 3-3
Project Area, Jurisdiction, and Land Status

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/22/2007	File: 2516/Regional_EA .MXD
Created By: JG	Layout: Regional_EA PDF



Legend

- Transitional Area
- Shrub and Brush Rangeland
- I-40 Industrial Corridor Boundary

Zoning Districts

AR	Agricultural Residential
MX	Heavy Manufacturing
C2H	Highway Commercial

N W E S

0 1 2

Miles

Source: Griffith 1998a

NORTHERN ARIZONA ENERGY PROJECT

Figure 3-4
Existing Land Use and Zoning

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA

Date: 02/15/07	File: EA- Ex. Landuse-Zoning.dwg
Drawn By: ETC	Layout: 001

3.6.2 Planned Land Uses

Planned land uses in the vicinity of the Proposed Action have been mapped by Mohave County in the General Plan and the 2002 Golden Valley Area Plan, a component of the General Plan as shown in **figure 3-4**. The planned land uses serve as a guide to land use development and to encourage land use patterns that are consistent with the goals of the General Plan, residents, and property owners. Planned land use categories in the General Plan include rural development areas, urban development areas, suburban development areas, and outlying communities. Detailed land use classes within each development area are described as follows:

Rural Development Areas - rural residential (lot sizes 5 acres or larger); rural industrial; public parks; public lands; non-residential uses such as neighborhood commercial, commercial recreation, light industrial, heavy industrial, and airport industrial.

Suburban Development Areas - suburban estates and suburban residential (lot sizes between 1 and 5 acres), public facilities, public parks, and public lands.

Urban Development Areas - low-, medium-, and high-density residential; neighborhood commercial; general commercial; commercial recreation; light industrial; and heavy industrial.

Outlying Communities –development within designated communities in the unincorporated portions of the county may be rural, suburban, or urban.

Based on the General Plan, the planned land use for the area around the Proposed Action is heavy industrial within the boundaries of the I-40 Industrial Corridor as shown on **figure 3-4**. The planned land uses within the I-40 Industrial Corridor also include light industry, manufacturing, and commercial. The I-40 Industrial Corridor between Kingman and Lake Havasu offers large industrial tracts to accommodate warehouse distribution and manufacturing firms that require direct highway access, rail access, and/or natural gas. Major planned developments within the I-40 Industrial Corridor include a Wal-Mart 880,000-square-foot distribution center and a Nutribiotechnologies, Inc. facility.

The planned land uses for the lands surrounding the I-40 Industrial Corridor include Rural Development, Suburban Development, and Urban Development Areas as shown on **figure 3-5**. One urban development area designated as General Commercial is located southwest of the City of Kingman along I-40, and a suburban development area is designated between the General Commercial Area and the I-40 Industrial Corridor.

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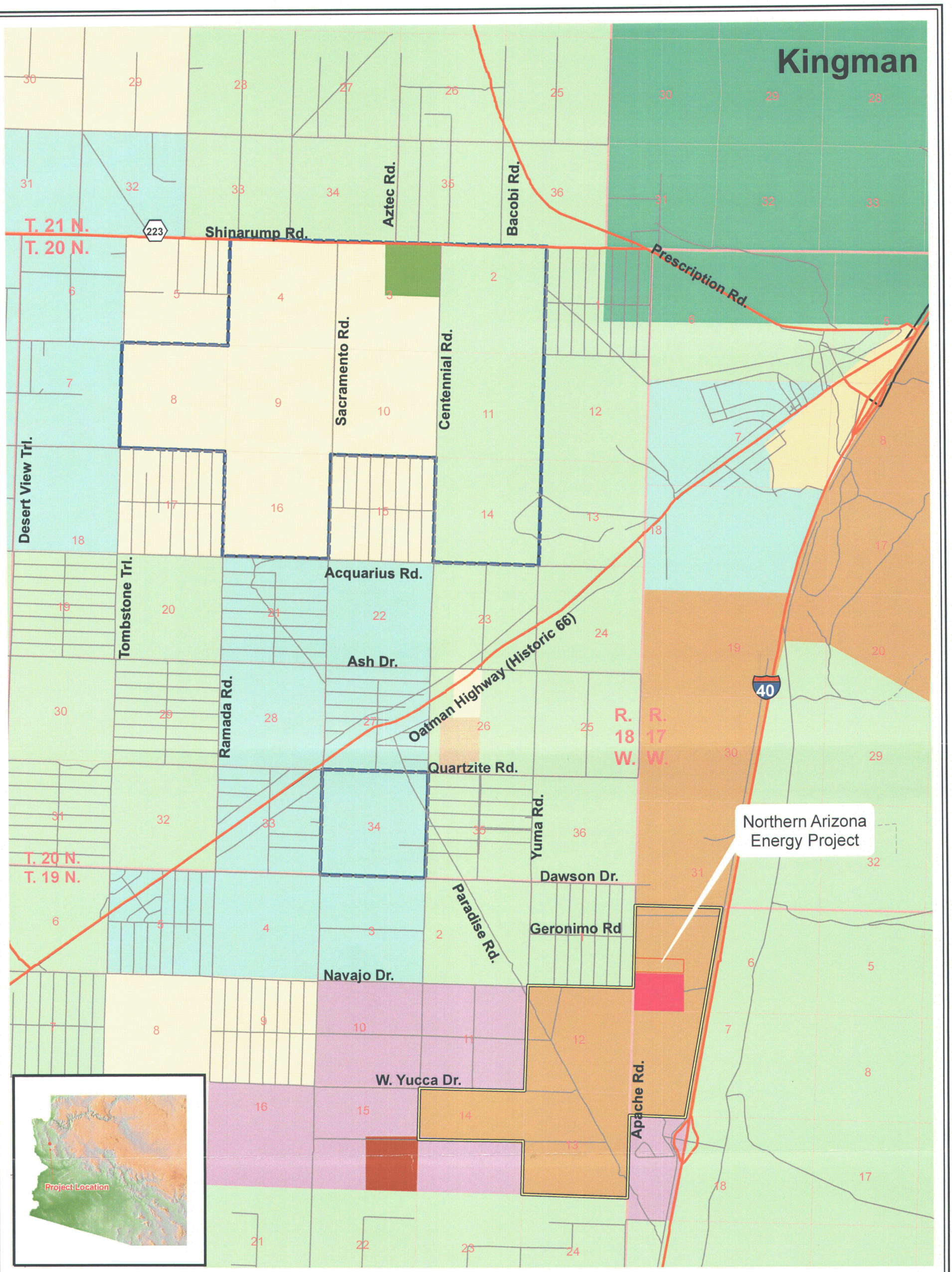

Legend

- Interstate/Highway
- Major Arterial
- Primitive Road/Trail
- Street
- Northern Arizona Energy Property Boundary
- I 40 Industrial Corridor Boundary
- Golden Valley Holdings

LandUse

- Corbat Foothills Recreation Area
- General Commercial
- Griffith
- Heavy Industrial
- Kingman Municipal
- Light Industrial
- Low Density Residential
- Prison
- Public Facilities
- Rural Development Area
- Suburban Development Area
- Urban Development Area

N W E S

1 0.5 0 1

Miles

Transverse Mercator Projection
1983 North American Datum
Zone 12
Meters

NORTHERN ARIZONA ENERGY PROJECT

Figure 3-5
Planned Land Use

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 3/1/2007	File: 2516/LU_EA.MXD
Created By: JG	Layout: LU_EA. PDF

Several areas near the Proposed Action have been platted for subdivision including Sacramento Ranchos, Golden Valley Ranchos, Paradise Acres, and Sacramento City. The section of land adjoining the western boundary of the NAEP property was subdivided in 1960 and zoned for the Sacramento Ranchos residential subdivision, but is currently undeveloped (Mohave County, 2007a). Golden Valley Ranchos is a proposed residential development located between Shinarump Road (County Highway 223) on the north, Aquarius Drive on the south, Yuma Road on the east, and Tombstone Trail on the west. The proposed Golden Valley South Area Plan (Rhodes, 2005) was prepared as an extension of the previously adopted Golden Valley Area Plan for land development south of Shinarump Road. Sacramento City is the platted section located approximately 2 miles northwest of the Proposed Action. There are currently no housing developments on the platted subdivisions in the vicinity of the Proposed Action as shown on **figure 3-3**.

3.6.3 Recreation

There are no identified plans for development of recreational facilities in the immediate vicinity of the Proposed Action. There is currently no developed recreation near the proposed power plant. No significant recreation occurs on or around the Proposed Action. Dispersed activities, such as hunting and ORV uses, do occur on public lands in the general area.

3.7 TRANSPORTATION

The proposed power plant is accessible via I-40, which bisects the county generally from east to west, although it runs north-south in the vicinity of the Proposed Action. The other major highways that traverse through Kingman include U.S. 93, State Route 66, and State Route 68. Mohave County is served by the BNSF railway, which owns the largest rail network in the United States with more than 31,000 route miles covering 27 states and two Canadian provinces. The BNSF railroad links Mohave County with deepwater ports on the west coast and the Gulf of Mexico, as well as inland points throughout the Midwest, Pacific Northwest, and Southeast. The rail line passes approximately 1 mile east of the Proposed Action.

I-40 is a major corridor for commuting in Mohave County, particularly in the City of Kingman. **Table 3-7** shows the annual average daily traffic (AADT) for the section of I-40 near the Proposed Action between Exit 26 to the Ford Proving Ground in Yuma and Exit 44 to McConnico Road, a distance of 18.15 miles. Traffic counts are also summarized for the 4.55-mile segment of I-40 between Exit 44 and Exit 48 within the southern portion of the City of Kingman. Exit 48 provides access to U.S. 93. **Table 3-7** shows that traffic fluctuated considerably between 2001 and 2005, and has decreased nearly 14 percent from 2001 to 2005 despite ongoing residential development in the vicinity of Kingman. This may have occurred because truck traffic has been re-routed to U.S. 95 instead of Hoover Dam since September 11, 2001 (Nevada Department of Transportation, 2002). Traffic counts for 2005 between Exit 44 and Exit 48 are significantly higher than traffic counts between Exit 26 to Exit 44, having increased steadily since 2001. This indicates that considerable traffic is diverted onto Oatman Road, which provides access to residential subdivisions, outdoor recreation opportunities, and tourist destinations.

Table 3-7 Annual Average Daily Traffic on I-40 Near Proposed Action		
	Vehicles Per Day	
Year	Exit 44 to Exit 48 (south City of Kingman)	Exit 26 to Exit 44
2001	11,600	13,800
2002	12,300	14,200
2003	14,900	13,500
2004	17,200	11,600
2005	15,700	11,900
Source: Arizona Department of Transportation, 2007		

Currently, public transportation serving the area includes Greyhound Bus Lines and Amtrak. Both travel on or near I-40 near the Proposed Action.

Table 3-8 presents the number of accidents that occurred on I-40 between 2004 and 2005 between mileposts 34 and 48 on I-40. The Griffith Interchange (Exit 37) is located at milepost 37. Milepost 48 is located at the I-40/I-94 interchange in Kingman. The McConnico exit is at milepost 44. The data in **table 3-8** do not show any direct correlation between accident rates and interchanges. The greatest number of accidents occurred north of the Griffith Interchange at milepost 48, which is within the Kingman municipal boundaries and has a higher annual average daily traffic count than I-40 mileposts to the south of the city.

Table 3-8 Number of Accidents on I-40 by Milepost from Kingman to South of Griffith Interchanges			
	Year		
Milepost	2003	2004	2005
34	4	2	1
35	2	1	2
36	0	3	1
37	0	4	1
38	0	0	1
39	3	2	5
40	2	1	2
41	3	4	2
42	0	5	0
43	1	2	3
44	2	3	2
45	1	2	0
46	0	4	4
47	2	5	4
48	3	9	5
Source: Arizona Department of Transportation, 2007			

Arizona Department of Transportation (ADOT) is preparing the I-40 Regional Transportation Profile, which includes the highway segment that is located just east of the Proposed Action. The purpose of the study is to identify the transportation system needs, deficiencies, and potential project solutions for the I-40 corridor and surrounding communities. The completed report should provide useful data or insights for transportation planning efforts on the highway near the Proposed Action.

3.7.1 Access Roads

Current access to the proposed power plant would be via Haul Road, located along the northern boundary of the NAEP property. The Haul Road is an unimproved, bladed road. The NAEP property also borders South Apache Road on the west; however, there is no planned direct site access from South Apache Road.

3.8 VISUAL RESOURCES

The Proposed Action would be located in a transition area between the Basin and Range and the Colorado Plateau physiographic provinces. The landscape of the general area is characterized by mountain ranges trending north-south with long, linear valleys between the ranges. Geologic formations provide a diverse, scenic terrain. The proposed power plant would lie within the Sacramento Valley, adjacent to the western and northern margins of the Hualapai Mountains. The valley consists of a broad, exposed, flat to undulating terrain that is sparsely vegetated with low-growing desert scrub. Much of the land in the valley outside of the City of Kingman is largely unmodified. These areas include lands under management by the BLM. The Hualapai Mountains to the east and the Black Mountains to the west provide a scenic backdrop to views of the valley.

The Proposed Action would be located on private lands approximately 0.25 mile west of I-40. The surrounding landscape, as seen from the highway, consists of sparsely vegetated, flat terrain backdropped by nearby mountains. The affected viewshed contains the location for the Proposed Action, the existing Griffith Energy facilities, and surrounding public and private lands that would provide a view of the Proposed Action. Distance and intervening landforms to the northeast of the site exclude existing and proposed residential development and the City of Kingman from the viewshed area. Field reconnaissance verified that the proposed facilities would not be visible from scenic highway corridors (Oatman Road) and existing and proposed residential developments in nearby Golden Valley.

The visual resources of the Proposed Action were identified from a variety of public sources and from field reconnaissance conducted during January 2007. The Mohave Land Use Plan and the Arizona BLM web site were reviewed to identify designated scenic resources and special management areas that contain scenic resources.

The factors that were evaluated in assessing the visual setting of the Proposed Action include scenic quality, viewer sensitivity, visibility, and viewer exposure. The assessment is similar to a visual resource inventory that would be conducted on public lands administered by the BLM; however, the factors are not used to develop Visual Resource Classes, which are categories assigned to public lands which serves two purposes: (1) an inventory tool that portrays the

relative value of the visual resources and (2) a management tool that portrays the visual management objectives. There are four BLM visual resource classes (I, II, III, and IV). The private lands that provide a setting for the Proposed Action are not managed with BLM Visual Resource Management classes.

The scenic quality of a setting is a measure of the visual appeal of a tract of land and is generally expressed as A, B, or C (highest to lowest) quality. Viewer sensitivity is a measurement of public concern for scenic quality. It is generally expressed as high, moderate, or low.

Visibility can differ substantially between view locations, depending on screening and the effect of the location of the visual change in the view. The smaller the degree of screening, the higher the visibility usually is and the greater the potential impact is likely to be. Distance zones, such as foreground, middleground, and background, are also considered in the visibility assessment.

Viewer exposure is the degree to which viewers are exposed to a view by (a) their distance from the feature or view in question, (b) the number of viewers, and (c) the duration of view. The impact of a given activity is greater when the view duration is for a longer period of time.

The scenic quality of the landscape within and surrounding the Proposed Action is low because the site is located within the I-40 Industrial Corridor. Scenic quality is also low because of the lack of variety and contrast in landform, vegetation, and interesting features, and because the characteristic landforms and desert vegetation are common throughout the affected viewshed and the surrounding desert landscape. The view and exposure is low because most viewers would be traveling at highway speeds on I-40, so the proposed power plant would be within the viewshed of motorists for a very brief period. The viewer sensitivity level is low for some viewers because the characteristic landscape is already dominated by the existing Griffith Energy facilities in the foreground distance zone.

High-quality landscapes occur primarily in the three wilderness areas that are within 10 miles of the Proposed Action: the Warm Springs Wilderness is located about 5 miles southwest, Mount Nutt Wilderness is situated nearly 10 miles west, and Wabayuma Peak Wilderness is about 5 miles southeast of the Proposed Action. The rugged peaks within each wilderness area provide a scenic backdrop to the valley as seen from viewpoints in much of the Sacramento Valley.

3.8.1 Key Observation Points

The selection of Key Observation Points (KOPs) is based on representative viewpoints as well as sensitive viewpoints of the Proposed Action. These would include communities and other residential areas, roads (particularly heavily traveled roads), recreation areas, and any other location used by a large number of people who would be sensitive to the appearance of and changes in the landscape.

Field reconnaissance determined the visibility of the Proposed Action from Oatman Highway (a Scenic Highway Corridor) and existing and proposed residential subdivisions located southeast of the City of Kingman in the vicinity of the Proposed Action. Residential development areas include the Golden Valley South subdivision. Existing residences are located in Golden Valley and Paradise Acres. The existing Griffith Energy facilities were not visible from any existing or

proposed residential developments, or from Oatman Road, so the Proposed Action would not be either.

The primary views of the Proposed Action would be from Federal, state, and local travel routes in close proximity to the NAEP property. Travel routes include I-40 and several county roads that access the proposed power plant from the highways. Local roads include South Apache Road along the west boundary of the NAEP property. South Apache Road provides access to West Dawson Drive and West Navajo Drive, which access residences to the west of the proposed power plant.

The nearest areas that provide recreational opportunities include municipal and private facilities in the City of Kingman. Dispersed recreation opportunities, such as hunting and OHV uses, are available on nearby BLM lands. Hiking and camping are also available in the three wilderness areas. The Proposed Action would be located within the background views as seen from the three wilderness areas, but would not easily be visible to the casual observer because of the distances of more than 5 miles. The nearby Praxair facility is visible from the wilderness areas only because the white color of the facility provides a strong contrast, as verified in field reconnaissance for the Griffith Energy Project. The existing Griffith Energy facilities are indistinct to potential viewers in the wilderness. They do not draw the attention of the casual observer because of the distance and because the facility is painted with colors that blend with the landscape so that color, line, form, texture, and scale contrasts with the landscape are low. The lighting at the existing Griffith Energy facilities are visible during periods of darkness from the surrounding wilderness areas, but to a similar degree as nearby industrial developments and passing motorists on I-40.

Nearby residential subdivisions include Paradise Acres and Golden Valley Ranchos northwest of the Proposed Action, and Sacramento Ranchos west of the NAEP property. Residential development is currently sparse in Paradise Acres, which was subdivided in 1961 (Mohave County, 2007a). The Golden Valley Ranchos, which was subdivided in 1959 (Mohave County, 2007a), is also currently sparse. There is no residential development in Sacramento Ranchos, which was subdivided in 1960 (Mohave County, 2007a) and is located west of Apache Road along the west boundary of the NAEP property. The residence nearest to the Proposed Action is in the northeast quarter of section 31, about 2.5 miles northwest of the Proposed Action in the Paradise Acres subdivision.

Five KOPs were selected to represent views of the Proposed Action from I-40 and nearby county roads that cross through undeveloped areas as shown on **figure 3-6**. There are currently no existing and proposed residential developments for these lands; however, there is potential for residential development in the future. The KOPs were selected to best represent people with a concern for visual quality who would view the proposed power plant.

KOP 1 is located 0.3 mile northeast of the northeast corner of the Proposed Action on southbound I-40. The view faces southeast toward Haul Road, the northeast corner of the NAEP property, and the existing Griffith Energy facilities, as shown in the photograph in **figure 3-7**. Haul Road is at the north boundary of the NAEP property.

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Kingman
T. 21 N.
T. 20 N.
T. 20 N.
T. 19 N.
R. 18 W.
R. 17 W.
223
40
Shinarump Rd.
Aztec Rd.
Bacobi Rd.
Prescription Rd.
Garner Rd.
Desert View Trl.
Tombstone Trl.
Sacramento Rd.
Centennial Rd.
Acquarius Rd.
Ash Dr.
Ramada Rd.
Oatman Highway (Historic 66)
Quartzite Rd.
Yuma Rd.
Dawson Dr.
Paradise Rd.
Geronimo Rd
Haul Rd.
Navajo Dr.
W. Yucca Dr.
Apache Rd.
Frontage Rd.
1
2
3
4
5
Northern Arizona Energy Project
Project Location

Legend

- I 40 Industrial Corridor Boundary
- Golden Valley Holdings
- Northern Arizona Energy Property Boundary
- Key Observation Point

N
W
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S

1 0.5 0 1

Miles

Transverse Mercator Projection
1983 North American Datum
Zone 12
Meters

NORTHERN ARIZONA ENERGY PROJECT

Figure 3-6
KOP Locations

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 5/30/2007	File: 2516/KOP_EA.MXD
Created By: JG	Layout: KOP_EA PDF

Existing Condition
Looking southwesterly from Interstate 40 down Haul Road at existing Griffith Energy Project.

Photo Simulation
Simulation of Northern Arizona Energy Project from Interstate 40 looking down Haul Road.

NORTHERN ARIZONA ENERGY PROJECT

Figure 3-7
Photo Simulation for
Key Observation Point 1

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516/EA-KOP-1 .MXD
Drawn By: EC	Layout: Figure 3-7 KOP 1.PDF

KOP 2 is located on the southeast corner of Haul Road and the north terminating end of South Apache Road about 0.2 mile from the northwest corner of the Proposed Action. The view faces southeast toward the west side of the NAEP property and the northwest side of the existing Griffith Energy facilities, shown in the photograph in **figure 3-8**.

KOP 3 is located on South Apache Road about 0.85 mile from the southwest corner of the NAEP property. The view faces northeast, providing a view of the existing Griffith Energy, as shown in the photograph in **figure 3-9**.

KOP 4 is located on Apache Road near Dawson Drive about 0.64 mile from the northwest corner of the NAEP property. The view faces southeast, providing a view of the existing Griffith Energy facilities with a scenic backdrop of the Hualapai Mountains, which are visible in the photograph in **figure 3-10**.

KOP 5 is at the Griffith Exit on I- 40 1.6 miles southeast of the proposed NAEP property. The KOP faces west-northwest and provides a view of the existing Griffith Energy as shown of **figure 3-11**. At this distance, the existing facilities are obvious, but are small in scale relative to the surrounding landscape. The Black Mountains are in the background distance zone as viewed from the KOP and provide some screening for the existing plant facilities.

3.8.2 County Scenic Resource Planning

The Mohave County General Plan has developed Scenic Resource Goals to preserve, protect, and enhance scenic routes and vistas that characterize the rural beauty of Mohave County. In order to implement these goals, key scenic routes through the county have been identified. The nearest scenic routes to the Proposed Action are I-40 north of the intersection of State Route 66 (Oatman Highway). Oatman Highway is part of historic Route 66, a National Back Country Byway. The Proposed Action and Griffith Energy are not within the viewshed of this key scenic route.

3.9 NOISE

This section describes the affected environment for noise resources.

3.9.1 Fundamentals of Sound

Discussions of environmental sound levels do not focus on pure tones. Commonly heard sounds have complex frequency and pressure characteristics. Correction factors for adjusting actual sound pressure levels to correspond with human hearing have been determined experimentally. A-weighted (dBA) correction factors are employed for measuring sound levels in ordinary environments. The A-weighted scale is used in most sound level (noise) ordinances and standards. The level of a sound from a source is measured using a Sound Level Meter (SLM) that includes an electrical filter corresponding to the A-weighted curve. The filter de-emphasizes the very low and very high frequencies of sound in a manner similar to the response of the human ear. The SLM performs calculations to determine the average sound level that is recorded at intervals (e.g., 1-minute) in the SLM's memory.

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Existing Condition
Looking southeast from intersection of Haul Road and Apache Road at existing Griffith Energy Project.

Photo Simulation
Simulation of Northern Arizona Energy Project from the intersection of Haul Road and Apache Road looking southeast.

NORTHERN ARIZONA ENERGY PROJECT

Figure 3-8
Photo Simulation for
Key Observation Point 2

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516/EA-KOP-2 .MXD
Drawn By: EC	Layout: Figure 3-8 KOP 2.PDF

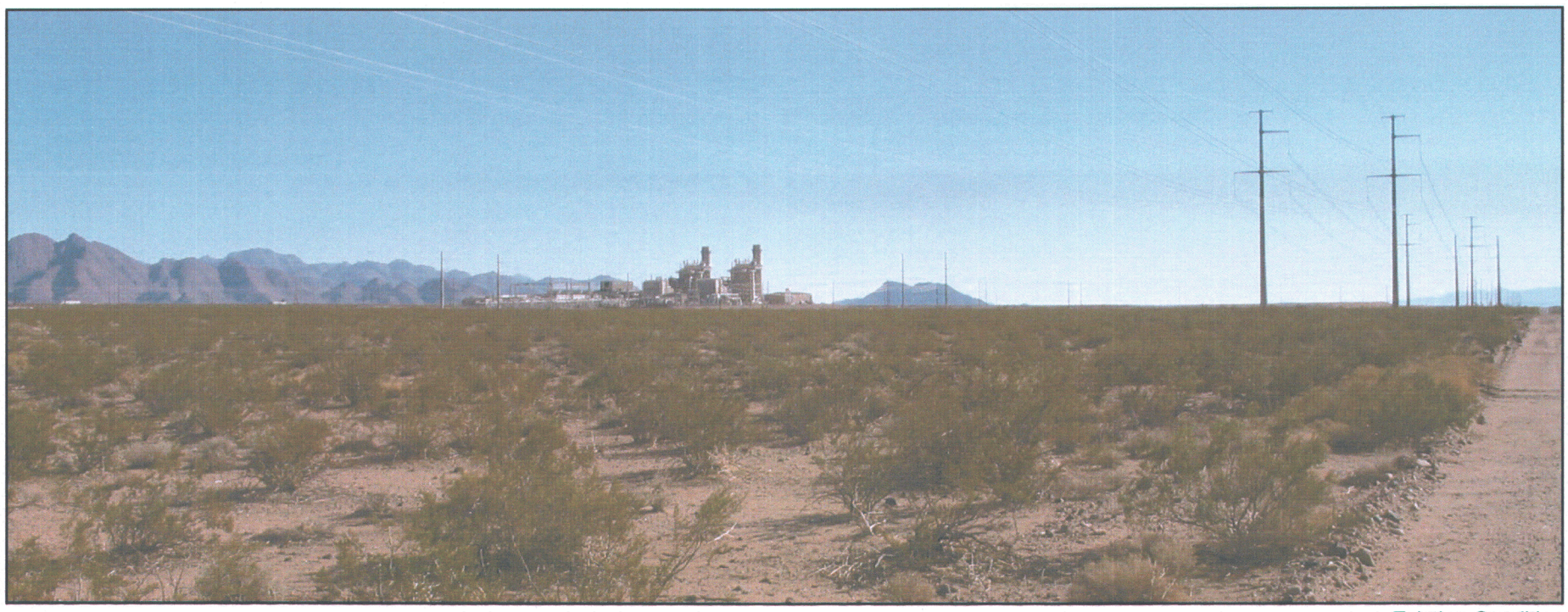
Existing Condition
Looking northeast from Apache Road at existing Griffith Energy Project.

Photo Simulation
Simulation of Northern Arizona Energy Project from Apache Road.

NORTHERN ARIZONA ENERGY PROJECT

Figure 3-9
Photo Simulation for
Key Observation Point 3

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516/EA-KOP-3 .MXD
Drawn By: EC	Layout: Figure 3-9 KOP 3.PDF



Existing Condition
Looking southeast down Apache Road near Dawson Drive at existing Griffith Energy Project.

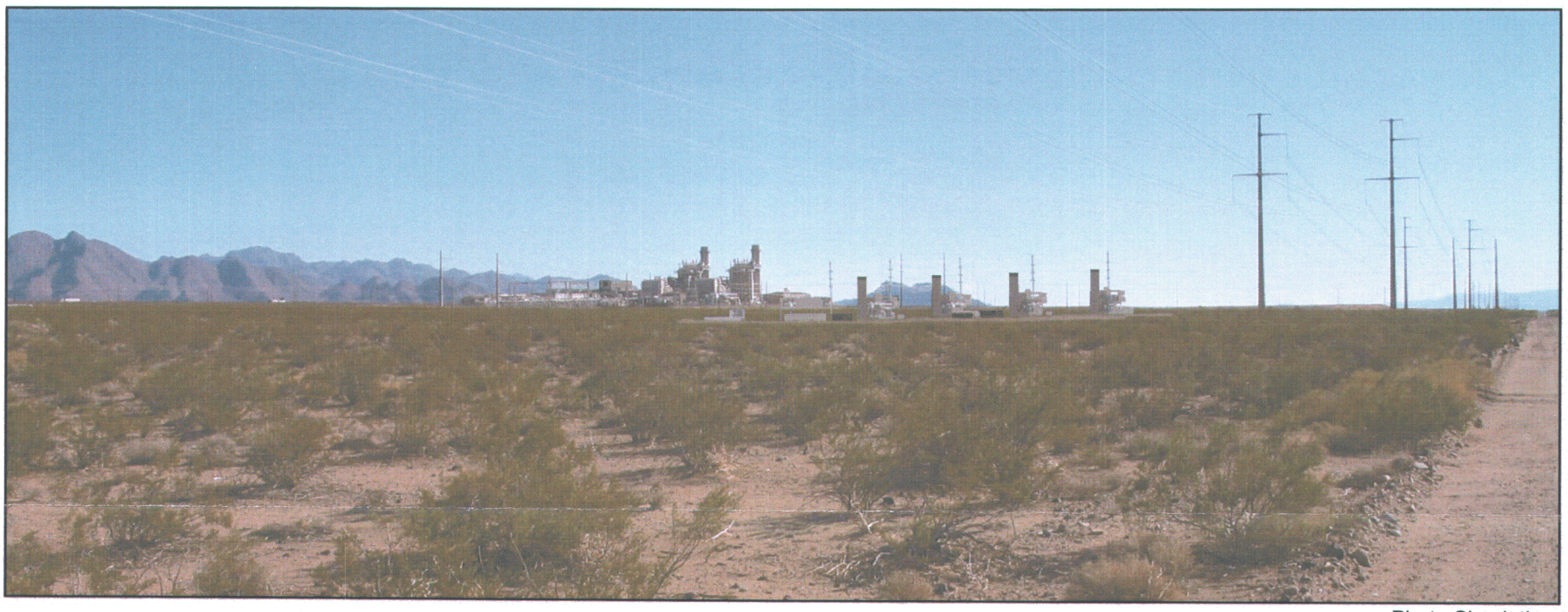


Photo Simulation
Simulation of Northern Arizona Energy Project down Apache Road near Dawson Drive.

NORTHERN ARIZONA ENERGY PROJECT

Figure 3-10
Photo Simulation for
Key Observation Point 4

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 02/12/2007	File: 2516/EA-KOP-4 .MXD
Drawn By: EC	Layout: Figure 3-10 KOP4.PDF

Existing Condition
Looking northwest from the Griffith Exit on Interstate 40 at existing Griffith Energy Project.

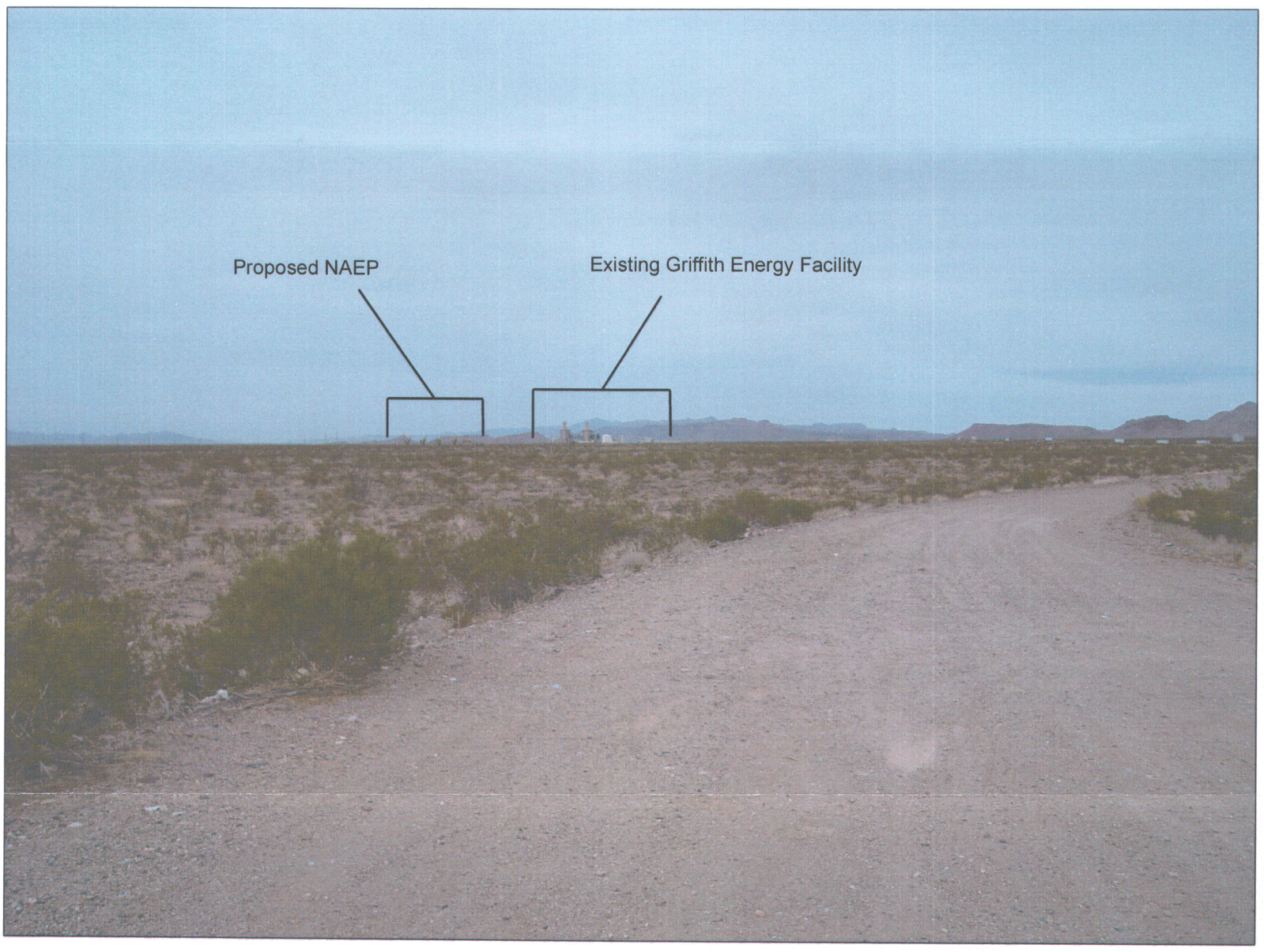


Photo Simulation
Simulation of Northern Arizona Energy Project from Interstate 40 at the Griffith exit ramp located approximately 1.6 miles from NAEP property.

NORTHERN ARIZONA ENERGY PROJECT

Figure 3-11
Photo Simulation for
Key Observation Point 5

ANALYSIS AREA: MOHAVE COUNTY, ARIZONA	
Date: 6/28/2007	File: 2516/EA-KOP-5_GriffithExit .MXD
Created By: JG	Layout: EA-KOP5_GriffithExit.PDF

Environmental sound levels are generally described and evaluated in the following ways:

- The equivalent sound pressure level (L_{eq}) is defined as the average sound level, on an energy basis, for a stated period of time (e.g., hourly) at a given location.
- The L_{dn} is the day/night sound level that was adopted by the EPA as a measure of community sound level exposure (Crocker and Kessler, 1982). EPA defines L_{dn} as the average A-weighted sound level for a 24-hour period. Nighttime sound levels (10:00 PM. to 7:00 AM.) are increased by a 10-decibel (dB) weighting factor to account for the public's sensitivity to nighttime sound levels when most people are sleeping. The daytime (7:00 AM to 10:00 PM) energy average sound level is added to a weighted (+10 dB) mean nighttime level. The EPA has accepted the L_{dn} as an environmental noise criterion.
- The EPA has established sound levels that are identified as protective of public health and welfare. EPA identified L_{dn} of 55 dB for residential areas as an outdoor sound level above which the public health and welfare would be affected (EPA, 1974).
- Typical day-night sound levels in urban areas range from 68 to 90 dB, suburban areas average 50 dB, and rural average 39 dB. **Table 3-9** lists the day-night average sound levels for various sources as defined by EPA.

Table 3-9 Examples of Outdoor Day-Night Average Sound Levels in dB Measured at Various Locations

Source	L_{dn} Sound Level (dB)
Apartment next to a freeway	87.5
Urban high-density apartment	78
Urban row housing on a major avenue	68
Wooded residential	51
Agricultural crop land	44
Rural residential	39
Wilderness ambient	35

Source: EPA, 1974

The nearest noise receptor (residence) to the Proposed Action is approximately 2.5 miles to the northwest. The adjacent lands to the west of the NAEP property are zoned by Mohave County for agricultural-residential use.

3.9.2 Existing Noise Sources

The ambient noise in the vicinity of the Proposed Action is almost totally dominated by the traffic noise from I-40 and trains on the BNSF Railway line. The ambient conditions also include the Griffith Energy facilities.

3.9.2.1 Vehicle traffic

In the original Griffith Energy facilities analysis, the average noise level from the traffic on I-40 was calculated using the Federal Highway Administration STAMINA Traffic Noise Prediction Model, version 2.0, and average daily traffic (ADT) in the vicinity of the Proposed Action for

1996. A review of recent ADT values for 2005 show that there has been little change in the local traffic volume; therefore, these estimates should still be valid today.

The STAMINA model was run using these traffic parameters and an average speed of 70 miles per hour (mph). The calculated noise levels at various distances from I-40 are shown on **table 3-10**. The noise from the traffic on I–40 was also calculated at a residence that is closest to the Griffith Energy facilities.

Table 3-10 Noise Levels from I-40 Traffic

Location	Noise (dBA)
400 feet from I-40	62
1,000 feet from I-40	57
2,000 feet from I-40	52
Griffith Energy west property line (South Apache Road)	57
Residence 2.5 miles northwest of Griffith Energy	20

Source: Griffith, 1998b

3.9.2.2 Trains

The precise noise levels from trains is a complex calculation that considers the train speed, the train length, the conditions of the wheels, and the condition of the track (Harris, 1991). Noise from trains has been measured (Harris, 1991) to range from 87 to 96 dBA at 100 feet from a track. A noise level of 92 dBA at 100 feet from the track was used to estimate the noise from trains on the BNSF Railway line. The noise level from a train, a linear source of noise, can be estimated using the following relationship:

$L_2 = L_1 - 10 * LOG (R_2/R_1.)$

Where: L_2 is the noise (dBA) at a distance R_2 from the source

L_1 is the noise measured at a distance R_1 from the source.

Applying the preceding equation and using a train source noise of 92 dBA measured at 100 feet from the track yields the following noise levels shown on **table 3-11** at the locations and distances from the BNSF Railway line in the vicinity of the Proposed Action.

Table 3-11 Noise Levels From Trains on the BNSF Railroad Line

Location	Distance from Track (feet)	Noise (dBA)
I-40	2,400	78
Griffith Energy east property line	5,000	75
Griffith Energy west property line (Apache Road)	5,800	74
400 feet west of Griffith Energy west property line	6,400	74
Residence 2.5 miles northwest of Griffith Energy	15,000	60

Source: Griffith, 1998b

3.9.2.3 Transmission Lines and Interconnections

The electrical effects of transmission lines are those associated with electric field, magnetic field, and corona. Electric and magnetic fields result in induced voltage on objects near the transmission line. Corona effects are manifested in audible noise, radio interference, and television interference. Noise and interference from the existing transmission lines in the area are not noticeable or are mostly minimal where residential and commercial development have occurred adjacent to the existing transmission lines.

3.9.2.4 Existing Griffith Energy

A typical gas-fired power plant generating 520 MW has a characteristic noise level of below 75 dBA at 400 feet from the buildings. This noise level varies somewhat depending on which side of the power plant the receptor is located. A receptor on the side of the plant with the switchyard or the cooling towers would experience somewhat higher noise levels at 400 feet than a receptor on any of the other sides of the plant.

3.10 SOCIOECONOMICS

This section describes the existing population, housing, labor and employment, taxes, and public utilities and services in the vicinity of the Proposed Action. The public utilities and services addressed include electricity and natural gas, urban/domestic water and wastewater, solid waste, educational system, health care, law enforcement, and fire protection as described in the following subsections.

For purposes of the socioeconomic analysis, Mohave County is defined as the ROI for socioeconomic issues related to the Proposed Action. The City of Kingman is the county seat and population center of the county. Mohave County also contains the incorporated Cities of Bullhead City, Colorado City, and Lake Havasu, along with several unincorporated cities.

3.10.1 Population

Mohave County was the fastest growing county in Arizona between 1990 and 2000, with a growth rate of approximately 66 percent (Mohave County, 2005a) as shown in **table 3-12**. Within the unincorporated areas of the county, the population increased by approximately 60 percent in the 1990s. The major cities in Mohave County also experienced significant population growth between 1990 and 2000, as shown in **table 3-12**. The populations of Kingman, Mohave County, and Arizona are expected to continue to increase between 2000 and 2010, as shown in **table 3-13**.

Residents of the Kingman area and Mohave County comprise a fairly homogenous population with a relatively low percentage of minorities. **Table 3-14** illustrates the ethnic distribution in the Kingman area and Mohave County.

Table 3-12 Historical Population Growth

Area	1990	2000	1990-2000 Percent Change
Mohave County (total)	93,497	155, 032	60
Unincorporated	31,519	61,535	51
Major communities:			
Kingman	13,208	20,069	66
Bullhead City	21,951	33,769	65
Colorado City	2,426	3,334	73
Lake Havasu	24,363	41,938	51

Source: Mohave County, 2005a

Table 3-13 Population Projections

Year	Kingman Area	Mohave County	Arizona
2000	37,110	147,529	4,632,875
2010	48,352	194,403	5,652,525

Source: Mohave County, 2005a

Table 3-14 2000 Mohave County and Kingman Ethnic Composition

Race	Mohave County (percent)	Kingman (percent)
White	90.1	89.9
African American	0.5	0.6
Native American	2.4	2.0
Asian or Pacific Islander	0.9	1.5
Other	4.0	3.4
Persons of Hispanic or Latino origins*	11.1	9.2

*Persons of Hispanic or Latino origins may be of any race.

Source: U.S. Census Bureau, 2000a

3.10.2 Housing

The existing housing availability was assessed for Mohave County, Kingman, Bullhead City, Colorado City, and Lake Havasu City.

Table 3-15 shows the total number of housing units in Mohave County for the years 2000 and 2005. Based on the U.S. Census estimates for 2005, there were approximately 94,768 total housing units in the county. An estimated 20,279 units (21.4 percent of the total units) were vacant (U.S. Census Bureau, 2000a). Based on the 2000 census, the vacancy rate for rental housing was 9.2 percent, and another 12.4 percent of the total housing units (9,956 units) were considered "seasonal" and intended for use only occasionally throughout the year (U.S. Census Bureau, 2000a). In 2005, the rental vacancy rate dropped to 3.0 percent (U.S. Census Bureau, 2005).

Table 3-15 Number of Housing Units		
Housing Types	**2000**	**2005 (estimate)**
Housing (Total Units)	80,062	94,768
Vacancy Rate	21.5%	21.4%
Number of Vacant Units	17,253	20,279
Sources: U.S. Census Bureau, 2000a and 2005		

Mohave County has some housing affordability issues, as do other counties in Arizona. In 1999, the median household income for Mohave County was $31,521 (Mohave County, 2005a). In 2000, the median home price in the county was $95,300 (U.S. Census Bureau, 2000a). In 2005, the median household income in the county had increased to $34,477. Most households in the county can afford to pay the median rent, but less than half of the county's households can afford the median priced home (Mohave County, 2005a). As shown in **table 3-16**, housing is generally more expensive in the western part of the county, particularly near Bullhead City.

Table 3-16 2000 Median Home Values and Rent by City		
Place	**Median Home Values**	**Median Monthly Rent**
Mohave County	$95,300	$559
Kingman	$87,500	$510
Bullhead City	$102,500	$591
Lake Havasu City	$99,200	$609
Colorado City	$99,200	$345
Source: Mohave County, 2005a		

3.10.3 Labor and Employment

In 2000, the total civilian labor force for Mohave County was 65,081 individuals, of which 7 percent were unemployed (U.S. Census Bureau, 2000a). In 2005, the estimated civilian work force was 78,828, of which 8.4 percent (or 6,655 individuals) were unemployed (U.S. Census Bureau, 2005).

3.10.4 Taxes

Arizona has a general sales tax of 5.6 percent, and Mohave County has a 0.25 percent general sales tax. In addition, the cities of Bullhead City, Kingman, Lake Havasu City, and Colorado City each have a city sales tax of 2 percent. Colorado City and Kingman have an additional 2 percent tax on hotel and motel stays (Arizona Department of Commerce, 2004). **Table 3-17** shows the real 2002 property tax rates for the major cities in the county.

Table 3-17 Real Property Tax Rates (dollars per $100 assessed valuation)				
	School	**City/Fire**	**Countywide**	**Total**
Kingman	4.91	0.30	4.18	9.39
Bullhead City	5.31	0.00	4.18	9.49
Lake Havasu City	6.53	0.80	4.18	11.51
Colorado City	6.86	0.00	4.18	11.04
Source: Arizona Department of Commerce, 2004				

Property taxes are an important source for locally based revenue. Secured and unsecured personal property and construction in progress are exempt from taxation. Property taxes are based on the assessed valuation of a property. In 2004, the county-wide property tax rate was $4.16 per $100 of assessed valuation, while Kingman's tax rate was $9.37 per $100 of assessed valuation (Arizona Department of Commerce, 2004).

Arizona has adopted a 4-year accelerated depreciation schedule for business property to encourage capital investment in the state. Corporate income tax in Arizona is a flat tax rate of 6.968 percent (Arizona Department of Commerce, 2004).

Legislation passed in 2000 in response to electrical deregulation in Arizona established a new property valuation method for real and personal property of electric generation properties. House Bill (HB) 2324 changed the taxation of electric generating plants from statutory formulas, which were applicable to regulated electric utilities, to a method that is similar to the way that all other business property is valued. The overall result of these changes has been to reduce the taxable value and accelerate the depreciation on generating plants (Arizona Utility Investors Association, 2000). HB 2657 modified the valuation of land used in operating electric generation facilities (Arizona State Legislature, 2007).

3.10.5 Public Utilities and Services

The following discussion summarizes the availability of public utilities and services within the vicinity of the Proposed Action, including electricity and natural gas, urban/domestic water and wastewater, solid waste, educational system, health care, law enforcement, and fire protection.

3.10.5.1 Electricity and Natural Gas

Both electricity and natural gas are provided to the area and the I-40 Industrial Corridor by UES. A Western 230-kV transmission system is currently located at the Griffith Switchyard.

There are two existing UES-owned and operated natural gas pipelines that interconnect with the El Paso, Questar, and Transwestern interstate pipelines and transport natural gas to the I-40 Industrial Corridor. Both pipelines currently terminate at an existing gas regulating/metering station located at the northeast corner of the original Griffith Energy property.

3.10.5.2 Urban/Domestic Water and Wastewater

There is no water system service to much of rural Mohave County. Most water for rural residents is supplied by individual and community wells and authorized suppliers (Mohave County, 2007b). An allotment of 18,500 afy has been transferred to the Mohave County Water Authority from the Colorado River (Kingman, 2007). However, groundwater wells account for most of the water consumed by residents in rural Mohave County.

3.10.5.3 Solid Waste Disposal

Mohave County currently operates two municipal solid waste landfills. There are currently no hazardous waste treatment, storage, or disposal facilities in Mohave County. There are

hazardous waste treatment and storage facilities in the Phoenix area that are regulated by the Arizona Department of Environmental Quality.

3.10.5.4 Educational System

Mohave County has eight school districts, with six districts in the principal population centers. Kingman has eight schools serving its residents. There were 7,300 students enrolled in Kingman schools in the spring of 2004 (Kingman, 2004). The NAEP property is located within an industrial and commercial area (I-40 Industrial Corridor), and there are no schools in the vicinity of the Proposed Action.

Mohave County Community College serves the residents of Mohave County and neighboring communities in California, Nevada, and Utah. The college has campuses in Bullhead City, Colorado City, Kingman, Lake Havasu City, and Fredonia.

3.10.5.5 Health Care

Mohave County is served by three major hospitals with additional clinics and extended care facilities strategically located throughout the county. Kingman currently has one general hospital, Kingman Regional Medical Center (KRMC). KRMC has a Department of Public Safety helicopter (Ranger 41), which provides highway medical evacuations and law enforcement (Arizona Department of Commerce, 2004). The other major hospitals in the county are the Western Regional Medical Center in Bullhead City and the Havasu Samaritan Regional Hospital in Lake Havasu City. There are no health care facilities near the Proposed Action.

3.10.5.6 Law Enforcement

The county is served by a sheriff's department and a police department in each of the major cities. The Mohave County Sheriffs Department has a total of 235 employees, including 127 officers in Kingman, and approximately 130 vehicles county-wide (Kingman, 2004).

3.10.5.7 Fire Protection

Seventeen fire districts operate in Mohave County (Mohave County, 2005b). The fire districts provide services to most of the county's urbanized areas. In addition to these districts, Lake Havasu City and Kingman each operate municipal fire districts. The nearest fire districts are District No 15 in Yucca, approximately 15 miles south of the NAEP property, and District No. 7 in Golden Valley, approximately 3 miles northwest of the NAEP property.

3.11 ENVIRONMENTAL JUSTICE

This section describes the existing minority and low-income populations in the vicinity of the Proposed Action. For the purposes of the environmental justice analysis, the ROI is defined as the census tract within which the Proposed Action is located because census data are not available for the NAEP property itself. The Proposed Action would be located approximately 9 miles southwest of the City of Kingman along I-40 in Mohave County, Arizona.

Environmental justice has been defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development,

implementation, and enforcement of environmental laws, regulations, and policies. Concern that minority and low-income populations might bear a disproportionate share of adverse health and environmental impacts led President Clinton to issue an Executive Order (EO) in 1994 to address these issues. Under EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Federal agencies are directed to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. When conducting NEPA evaluations, the Applicant incorporates environmental justice considerations into both its technical analyses and its public involvement program in accordance with EPA guidelines and the Council on CEQ regulations.

3.11.1 Minority Populations

For the purpose of this EA, "minority" refers to people who classified themselves when census data was gathered as Black or African American, Asian or Pacific Islander, American Indian or Alaskan Native, persons of Hispanic or Latino origins of any race, or other non-white races (CEQ, 1997). Because the Hispanic population can be either white or non-white, it is not possible to calculate minority population by adding racial minorities to the Hispanic population (an ethnic classification). Therefore, this EA includes as minorities all racial and ethnic groups other than non-Hispanic whites.

Demographic information from the U.S. Census Bureau was used to identify minority populations near the Proposed Action. Information on locations and numbers of minority populations was obtained from the 2000 census. Census data are reported on the level of the census tract, a geographic area that varies with size depending largely on population density (low population density census tracts generally cover larger geographical areas).

Table 3-18 shows the racial and ethnic characteristics of the census tract in which the Proposed Action is located. The number of minority individuals in this census tract represents a smaller percentage of the total population than the corresponding county-wide minority population; therefore, the area around the Proposed Action does not meet the criteria for identification as an area with minority populations.

Table 3-18 Census 2000 Racial and Ethnic Characteristics

	Arizona	Mohave County	Kingman	Census Tract of Proposed Action
Total Population	5,130,632	155,032	20,069	3,685
White	75.5%	90.1%	89.9%	90.7%
Black or African American - alone	3.1%	0.5%	0.6%	0.3%
American Indian or Alaska Native - alone	5.0%	2.4%	2.0%	2.6%
Asian	1.8%	0.8%	1.4%	0.4%
Native Hawaiian or Other Pacific Islander - alone	0.1%	0.1%	0.1%	0.2%
Some other race	11.6%	4.0%	3.4%	3.4%
Two or more races	2.9%	2.1%	2.5%	2.4%
Persons of Hispanic or Latino Origins	25.3%	11.1%	9.2%	6.3%

Source: U.S. Census Bureau, 2000a

3.11.2 Low-Income Populations

Environmental justice guidance defines low-income populations using statistical poverty thresholds as defined by the U.S. Census Bureau. Information on low-income populations was developed from 1999 incomes reported in the 2000 census. In 1999, the poverty-weighted average threshold for an individual in the United States was $8,501 (U.S. Census Bureau, 2000b). As shown in **table 3-19**, 13.9 percent of the individuals in both the State of Arizona and Mohave County are below the poverty level. In contrast, 17.7 percent of the individuals in the census tract containing the NAEP property are below the poverty level. In addition, the median household income in the census tract containing the NAEP property is approximately 13 percent lower than the county-wide median household income.

Table 3-19 Percent of Individuals Below Poverty Level in 1999

Indicators	Arizona	Mohave County	Kingman	Census Tract of Proposed Action
Individuals below the poverty level	13.9 %	13.9 %	11.6%	17.7%
Median Household Income	$40,558	$31,521	$34,086	$27,500

Source: U.S. Census Bureau, 2000a

Although the number of low income individuals in the census tract containing the NAEP property is 3.9 percent higher than the number of low-income individuals in the county, the areas surrounding the Proposed Action are not populated. The NAEP property is a designated commercial – industrial area, and no low-income populations reside nearby.

3.12 HEALTH AND SAFETY

This section describes the regional setting and regulatory considerations pertinent to occupational and public health and safety, hazardous materials, and wastes. Existing conditions and potential hazards associated with water quality, air quality, noise, traffic and transportation, and geologic conditions are discussed in their respective resource sections in this chapter.

3.12.1 Regional Setting

The Proposed Action is within the I-40 Industrial Corridor adjacent to the existing Griffith Energy facilities. Other industrial facilities in the vicinity of the Proposed Action include the existing Praxair facility located about 2 miles south. The Proposed Action is located near existing transmission lines and utilities, I-40, the mainline of the BNSF Railway, and three transcontinental natural gas pipeline corridors.

The NAEP property was historically undeveloped land. A Phase I Site Assessment was previously performed for the 160-acre original Griffith Energy property. Based on the results of the Phase I Site Assessment, no hazardous wastes or contamination were identified at the project property (Griffith, 1998a).

3.12.2 Regulatory Considerations

This section summarizes the laws, general policies, and regulations that are pertinent to the Proposed Action. Regulations pertaining to occupational and public health and safety, hazardous materials, and wastes are addressed.

3.12.2.1 Occupational Health and Safety

Occupational health and safety regulations are designed to protect employees. Occupational Safety and Health Administration (OSHA) regulations pertinent to the Proposed Action include 29 CFR 1910 (general industry standards) and 29 CFR 1926 (construction industry standards). In 1972, Arizona adopted OSHA's standards. The Arizona Division of Safety and Health (ADOSH) have an approved plan (29 CFR 1910) with the U.S. Department of Labor to retain jurisdiction over most occupational safety and health issues within Arizona.

3.12.2.2 Hazardous Materials and Wastes

The existing Federal statutes enacted to minimize risks to public health associated with hazardous materials and wastes include the RCRA, the Superfund Amendments and Reauthorization Act of 1986 (SARA), which amended the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or "Superfund") and the Federal Clean Air, Clean Water, and Safe Drinking Water Acts (CAA, CWA, and SDWA). Federal hazardous waste regulations are located in Title 4 of the CFR, parts 260 to 279, which are incorporated by AAC R-18-8-260 to 280. State regulations are located in Arizona Revised Statutes 49-901 through 49-944. Additional Federal and state regulations may apply.

Under CERCLA, listed hazardous substances are defined as the elements, chemical compounds, and hazardous wastes that appear in table 302.4, 40 CFR part 302, Designation, Reportable Quantities, and Notification. The reportable quantity for each listed hazardous substance is also provided in table 302.4. Spills or releases of reportable quantities that occur beyond the boundary of the facility must be reported to EPA and local agencies as required by section 101(14) of CERCLA.

Transportation of hazardous materials is addressed in Federal regulations (Title 49 CFR parts 171–180). Under Title 40 CFR parts 355, 370, and 372, facilities and operations that store significant amounts of chemicals must notify certain government agencies (including the EPA and state and local emergency response agencies. Additional agencies, such as the Coast Guard or U.S. Department of Transportation, must be notified in certain circumstances). The threshold volume (reportable quantity) for most chemicals is 10,000 pounds.

For facilities with an aboveground storage capacity of more than 1,320 gallons of oil or petroleum products, the Federal regulations (Title 40 CFR part 112) require an SPCC Plan. SPCC Plans establish procedures for the storage, handling, and response to spills of hazardous materials and would specifically address each chemical or hazardous material on site. The goal of the SPCC Plan is to prevent spills from leaving the site or reaching waterways including dry washes. All applicable reporting requirements mandated under SARA Title III must be met. All hazardous materials must be stored in structures that meet the requirements of Uniform Fire Code, Article 80. In addition, secondary containment adequate to hold the capacity of the largest

single container with sufficient freeboard for precipitation must be provided. On-site spill and fire response procedures require that a Hazardous Materials Inventory Statement and Management Plan is generally developed and submitted to responding fire departments.

RCRA regulates the generation, transport, and disposal of hazardous waste under the jurisdiction of EPA. In addition, RCRA sets forth a management framework for non-hazardous wastes.

3.13 INTENTIONAL DESTRUCTIVE ACTS

Intentional destructive acts, that is, acts of sabotage, terrorism, vandalism, and theft, sometimes occur at power utility facilities. Vandalism and thefts are most common, and recent increases in the prices of metal and other materials have accelerated thefts and destruction of Federal, state, and local utility property.

The Proposed Action is made up of many components. The proposed power plant would be fenced to restrict access to authorized workers. Security cameras and other specialized equipment would be in place to safeguard the area.

Overhead transmission conductors and the structures that carry them interconnecting the Griffith Switchyard to the proposed power plant are mostly within fenced areas. The conductors use the air as insulation. The structures and tension between conductors ensure that they are high enough above the ground to meet safety standards. Structures are constructed on footings in the ground and are difficult to dislodge.

While the likelihood for sabotage or terrorist acts on the Proposed Action is difficult to predict given the characteristics of the project, it is unlikely that such acts would occur. Even if such an act did occur, it would not have a significant impact on the transmission system or electrical service because the Proposed Action would not be an integral part of Western's main transmission system, and any impacts from sabotage or terrorist acts likely could be quickly isolated. In addition, the DOE, public and private utilities, and energy resource developers include the security measures mentioned above and others to help prevent such acts and to respond quickly if human or natural disasters occur.

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4.0 ENVIRONMENTAL CONSEQUENCES

This chapter evaluates the potential environmental consequences, or impacts, on the environment as a result of constructing and operating the Proposed Action. Chapter 3 described the environment that could be affected by construction and operation of the Proposed Action. All resources described in chapter 3 have the same section numbers in chapter 4 (e.g., 3.2: Water Resources, 4.2: Water Resources) to aid the reader.

Direct and indirect effects of the Proposed Action and No Action Alternative are identified for each resource area. Direct effects are "caused by the action and occur at the same time and place." Indirect effects are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." Indirect effects may include growth inducement and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8, CEQ Terminology and Index).

Mitigation identified early in the planning process is embedded as part of the Proposed Action and included in the description of the Proposed Action. Commitment to this mitigation occurred prior to the evaluation of environmental impacts; therefore, the impact levels identified integrate the effects of the committed mitigation. Additional mitigation may be proposed if the impacts identified from the proposal are found to still be significant. Additional mitigation measures, if any, are described for each affected resource area. The additional mitigation, when properly implemented, would further reduce, minimize, or eliminate impacts from construction and operation of the Proposed Action. Residual impacts after applying this additional mitigation are identified and the level of impact is reassessed.

Issues are concerns raised during scoping. Significance criteria are criteria applicable to the proposed action, which if met would result in a significant impact and cause an EIS to be prepared.

4.1 GEOLOGY AND SOILS

This section describes the potential effects to existing geologic and soil environment for both the Proposed Action and the No Action Alternative.

Issues

- Impacts to important geological features
- Loss of availability of a known mineral resources (e.g., sand and gravel) that would be of value to the region
- Indirect impacts, including property damages or human safety risks, associated with strong seismic ground-shaking or liquefaction
- Soil erosion and subsequent loss or mixing of soils

Significance Criteria

A significant impact on geology and mineral resources would result if the following were to occur from construction or operation of the Proposed Action:

- Soil loss or accelerated erosion due to disturbances that result in the formation of rills and/or gullies, or that result in sediment deposition in downgradient lands
- Structures fail or create hazards to adjacent property due to slope instability, effects of an earthquake, or adverse soil conditions (such as compressible, expansive, or corrosive soils)

4.1.1 Geology and Seismicity

4.1.1.1 Proposed Action

Construction of the proposed power plant would have little impact on the gently sloping topography located at the NAEP property.

Sand and gravel are the only known mineral resources present in the vicinity of the Proposed Action. The 40-acre NAEP property itself would no longer be available for mining of sand and gravel resources. However, this area represents a negligible percentage of the total sand and gravel resource within the Sacramento Valley.

It is estimated that the Proposed Action would consume 4,375,000 MMBtu of gas per year, based on an expected 2,500 annual operating hours for each unit. Natural gas would be sourced primarily from the San Juan and Permian supply basins in the Four Corners region and west Texas. Alternative supply sources would be Rocky Mountain reserves or liquefied natural gas (LNG). Natural gas from the San Juan and Permian basins would be transported to the proposed power plant through the existing TransWestern, El Paso, or Questar interstate pipelines to the UES distribution system that transports gas to the existing Griffith Energy.

Alternative gas supplies that were considered for the Proposed Action include gas from the Rocky Mountain region or LNG supplies delivered to the west coast. Gas from the Rocky Mountain region would be transported to the region on the Kern River pipeline. If LNG supplies would be used, they would be transported via the Baja Norte (from Baja, Mexico to United States/Mexican border) and North Baja pipeline west of Yuma, Arizona to the El Paso Natural Gas Pipeline at Erhenberg, Arizona. Neither of these supply options is currently available to be used by the proposed power plant.

Proved dry natural gas reserves in Texas were estimated at 56,507 billion cubic feet (bcf) as of December 31, 2005; proved reserves for the United States were 204,385 bcf as of the same date (Energy Information Administration 2005). Thus, annual consumption of dry natural gas by the Proposed Action would amount to 0.015 percent of the proved Texas reserves and 0.004 percent of the proved U.S. reserves. Impacts of the consumption of this natural gas on total proved reserves would be very small in comparison with the benefits of the power generated.

Although seismic risk in the vicinity of the proposed power plant is moderate, historically no large earthquakes have occurred close enough to the site to cause significant damage (USGS, 2006a, b). The thick alluvial deposits at the site should prove relatively stable during a small to moderate seismic event. The proposed power plant design would take local seismic risk into consideration to mitigate any potential damage. The potential for impacts from mass wasting is low because of the area's gentle slopes and location away from large drainages, which could be susceptible to flash floods or mud flows.

The Proposed Action would not impact important geological features and would result in minimal loss of mineral resources. Structure failures caused by earth movement are not anticipated because of the stable soils and gentle slopes.

4.1.1.2 No Action Alternative

Under the No Action Alternative, the proposed power plant would not be built; consequently, no associated new environmental consequences relative to geology or geologic hazards would occur.

4.1.2 Soils

A significant impact on soils would result if any of the following were to occur from construction or operation of the Proposed Action:

- Severe erosion due to disturbance of areas of steep slopes (greater than 20 percent)
- Compaction or mixing of soils that would alter revegetative growth
- Loss or alternation of soils that uniquely support threatened or endangered plant species, or contamination of soils that support an existing sensitive ecosystem

4.1.2.1 Proposed Action

The susceptibility of soil to erosion from wind or water varies and depends on soil texture and structure characteristics, topography, surface roughness, amount of vegetative cover, and climate. Water erosion occurs primarily on loose soils on moderate to steep slopes, whereas wind-induced erosion often occurs on dry, sandy soils where vegetation cover is sparse and difficult to maintain.

Construction activities would affect susceptibility of soil to erosion as well as productivity of soil. Increase in soil erosion would result from removal of the protective cover of vegetation, rendering the disturbed soils more susceptible to water erosion during heavy rainfall events. Wind erosion would also increase on areas disturbed during construction.

Clearing and grading activities may subject the NAEP property to erosion because of the removal of protective vegetation, disturbance of shallow soils on steeper slopes, and/or creation of graded cut-and-fill areas. Implementation of erosion control measures during construction would minimize effects of soil disturbance on soil productivity.

A loss of soil productivity would result from mixing the topsoil and subsoil layers during construction. Compaction of soils by construction equipment would inhibit natural revegetation. The potential for soil contamination from hazardous materials and petroleum products would increase during both construction and subsequent operation of the Proposed Action.

The soils that occur on the NAEP property have moderate to low shrink-swell potential. This characteristic can also be accommodated through appropriate engineering design, if necessary.

Although most site soils are classified as not highly susceptible to water and wind erosion, it could take several years to reestablish a protective cover of vegetation on disturbed soils. Low rainfall in the area, combined with the low productivity and the excessive gravel content of these soils, would make reclamation difficult without use of soil amendments and intensive management. Until vegetation is reestablished, erosion control measures, such as mulching, silt fences, and staked hay bales, would be used to substantially reduce water erosion problems.

The Proposed Action would not result in severe erosion or damage to soils that support threatened or endangered species.

4.1.2.2 No Action Alternative

Under the No Action Alternative, no new potential impacts on soil resources would result from construction of the proposed power plant. Soil erosion at the NAEP property would continue at current rates under the current management activities. Soil loss or accelerated erosion due to construction disturbances and the potential formation of rills and/or gullies, or that result in sediment deposition in downgradient lands, would not occur as a result of the Proposed Action.

4.2 WATER RESOURCES

This section describes the potential effects to water resources within the vicinity of the Proposed Action.

Issues

- Discharges of contaminants or significant quantities of sediment into waters or watercourses
- Substantial depletions of surface or groundwater resources
- Substantial alterations in the normal flow of a water body
- Substantial alterations in normal drainage patterns and runoff
- Placement of structures within a 100-year flood hazard area that would impede or redirect flood flows
- Violation of any local, state, or Federal groundwater use regulations

Significance Criteria

A significant impact on surface water would result if any of the following were to occur from construction or operation of the Proposed Action:

- Contamination of surface water from erosion, storm water runoff, or wastewater discharge that would result in a violation of Federal and/or state water quality standards
- Alteration of the existing drainage pattern of the site or area that would result in off-site erosion or siltation, resulting in adverse effects to adjacent properties
- Surface water impacts that would violate section 404 of the CWA or other applicable surface water regulations including state-established standards for designated uses

4.2.1 Surface Water

4.2.1.1 Proposed Action

Surface water would not be used to meet the proposed power plant's water supply needs. The Proposed Action would not be constructed within any designated 100-year floodplains. Construction and operation of the Proposed Action would not change drainage patterns.

The construction of two underground pipelines would result in a temporary impact to two of the washes determined to be waters of the U.S. Construction would occur at two locations within each wash for a total impact of 240 square feet. Once the pipelines are installed, all areas within the washes would be returned to their original grade as much as possible. Approximately 50 feet of the beginning of the third wash determined to be waters of the U.S. is located within the UES gas meter station expansion area. Construction within the expansion area would permanently impact 100 square feet of the wash. The wash within the temporary construction area would be avoided; therefore, no impacts to waters of the U.S. would occur at this location. No other construction activities have been identified that would impact waters of the U.S. The total impact to waters of the U.S. from construction and operation of the Proposed Action includes 240 square feet (0.006 acre) temporarily impacted and 100 square feet (0.002 acre) permanently impacted. Work within these washes would not change drainage patterns.

The USACE regulates the placement of dredge or fill material into jurisdictional waters of the U.S. under section 404 of the CWA. The USACE concurred with the determination that the proposed work impacting waters of the U.S. meets the requirements of Nationwide Permit (NWP) 12. NWP 12 is conditionally certified for water quality by the ADEQ under section 401 of the CWA.

All stormwater and wastewater would be retained on site or removed for disposal to a licensed facility. Only the wastewater generated from the CTG compressor washing would be collected in an underground tank before it is trucked off-site for disposal at a licensed facility.

On-site and off-site stormwater runoff would be routed to the stormwater retention basin by means of swales, ditches, berms, and/or sheet flow. However, where space restriction precludes

the use of open ditches and channels, a series of pipes and inlets would be used. Culverts would be used to convey stormwater under on-site traffic areas.

The storage and use of fuel, lubricants, and other fluids during the construction and operation phase would be managed so spills or leaks of hazardous fluids would be minimized or avoided by restricting the location of refueling activities away from washes and by requiring immediate cleanup of spills and leaks of hazardous materials. In addition, this would be addressed in a site-specific spill plan developed for the Proposed Action.

Wastewater generated by the proposed power plant would be sent to the Griffith Energy wastewater treatment system. Eighty percent of the water would be recovered and sent to the Griffith Energy cooling tower. The remaining 20 percent would be directed to the existing Griffith Energy 25-acre brine disposal pond, which is lined with a virtually impermeable geosynthetic liner. The pond is designed with adequate storage to contain the solids that remain after evaporation. There are no plans to remove material from the pond, reducing the potential for a breach of the liner. The existing Griffith Energy brine disposal pond would require an amended Aquifer Protection Permit (APP) from the ADEQ to acknowledge the receipt of wastewater from the NAEP. The APP would still require monitoring at downgradient existing monitoring wells to ensure that there would be no migration of poor quality waters from the existing Griffith Energy brine disposal pond.

The Proposed Action would not contaminate surface water, and no Federal and/or state water quality standards would be violated. The existing drainage pattern would not be altered or cause off-site erosion or siltation or adverse effects to adjacent properties. Impacts to the ephemeral washes would not violate sections 401 and 404 of the CWA.

4.2.1.2 No Action Alternative

Under the No Action Alternative, the proposed power plant would not be built; consequently, no new environmental consequences relative to surface water would occur. No construction would occur within any of the washes. There would be no contamination of surface water, no alteration of existing drainage patterns, and no violation of sections 401 and 404 of the CWA.

4.2.2 Groundwater

A significant impact on groundwater would result if any the following were to occur from construction or operation of the Proposed Action:

- Groundwater quality degradation that causes groundwater quality to exceed state or Federal standards
- Groundwater depletion or interference with groundwater recharge that adversely affects existing or proposed uses of the groundwater aquifer
- Groundwater withdrawal that results in ground subsidence

4.2.2.1 Proposed Action

Impacts from Groundwater Withdrawals

Water for the Proposed Action would be obtained from Sacramento Valley aquifer. The pumping of groundwater and the delivery to the Proposed Action are described in section 2.1.7.2. The estimated total raw water requirement for the Proposed Action is 160 afy (at the expected 2,500 operating hours) and 268 afy at the theoretical worst-case operating profile of 5,000 operating hours per year.

Several studies have modeled groundwater withdrawal effects on the Sacramento Valley Aquifer. In a 1998 Report, Manera analyzed the potential impacts on the Sacramento Valley Aquifer using the "probable" and the "worst-case" water demand scenarios from construction and operation of Griffith Energy. Prior to the construction of Griffith Energy, the expected probable annual water requirement for Griffith Energy was 3,060 afy. The estimated maximum annual water requirement for Griffith Energy was 5,323 afy (or 3,300 gpm for 8760 hours per year). Both the probable and the worst case were evaluated for impacts, and both quantities were shown to not impact the aquifer or other users (Manera, 1998).

Due to the electric power market conditions between 2001 and 2006, the annual operating hours and actual water demand for the Griffith Energy resulted in annual pumping volumes that were considerably less than the estimated scenarios (SGC, 2007).

An additional study by Manera (2006) evaluated the estimated current water use and potential of the Sacramento Valley Aquifer to meet Griffith Energy's demand. Even though this report assumes much lower water use volumes for Griffith Energy than has been contracted for and previously assessed, this study also concluded that the Sacramento Valley Aquifer is capable of yielding the needed volumes for Griffith Energy, as well as other applicants and water rights holders (Manera, 2006).

The study by SGC (2007) evaluated pumping impacts of the Proposed Action on Sacramento Valley Aquifer. ADWR approved aquifer parameters and the computer program THEWELLS were utilized to simulate impacts from pumping at "worst-case" rate of 268 afy. More detailed description of analysis assumptions and conclusions is provided in the SGC 2007 report.

The study (SGC, 2007) projected drawdown caused by the Proposed Action's worst-case scenario at 15 feet after 40 years of continuous pumping. Based on Manera's (1998) study, Griffith Energy's withdrawals over 40 years would result in drawdown of 110 feet for the "worst-case" and 70 feet for the "probable" pumping volume. However, the actual annual pumping volumes and consequent drawdowns have been less than projected. Consequently, combining the projected 15 feet of drawdown from the Proposed Action's "worst-case" scenario with actual drawdown likely results in total impact that is still less than Manera's (1998) previously projected impacts of 110 feet (SGC, 2007). No additional impact on the Sacramento Valley aquifer would be realized from the Proposed Action.

SGC (2007) also evaluated cumulative aquifer impacts at the County Well Field using "worst-case" annual pumping for the Proposed Action (40 years), Griffith Energy (40 years), the Golden Valley 5800 (100 years), and the Golden Valley Irrigation District (GVID) projects (100 years),

as well as accounting for the regional decline trend. Based on their analysis, the projected cumulative aquifer drawdown was 395 feet. This projected drawdown is less than the 508 feet that comprises the saturated thickness' recoverable volume (66 percent of 770 feet). Thus, even after considering the projected "worst-case" demand of all other major groundwater pumping, the aquifer still has additional pumping capacity at the County Well Field (SGC, 2007).

Additionally, ADWR (2007) assessed impacts to water resources from NAEP pumping with respect to overall impacts on water supplies in Mohave County and impacts to existing and planned developments in Mohave County. ADWR well impact analysis of NAEP pumpage predicted maximum drawdown of 15 feet after 40 years of pumping at the maximum projected withdrawal rate of 270 afy. A drawdown of 4 feet would be expected to occur at approximately 0.75 mile, and drawdown of 1 foot would be expected at approximately 6.7 miles from the pumping well (ADWR, 2007). Details of this analysis are attached in **appendix A**.

Results of the ADWR well impact analysis indicate that the existing Mohave County well field, which supplies the county industrial park, and the Golden Valley development supply wells would be most affected by the withdrawals for NAEP. However, ADWR concludes that the drawdowns would be small enough and will probably have insignificant impacts on water supplies for these developments (ADWR, 2007).

Based on the comparison of the expected annual volume of water used by the NAEP to the estimated annual recharge for the Sacramento Valley Groundwater basin, ADWR concluded that NAEP may potentially have a small impact on the annual water budget for the basin; however, the expected NAEP water use probably falls within the range of uncertainty of the ADWR recharge estimate (ADWR, 2007).

The estimated total water use over the life expectancy of the NAEP represents less than 1 percent of estimated groundwater in storage in the basin and therefore indicates that any impacts to overall water supplies in the basin will be insignificant (ADWR, 2007). The ADWR impact analysis report is attached in **appendix A**.

Impacts to Groundwater Quality

The storage and use of fuel, lubricants, and other fluids during the construction and operation phase would be managed to minimize or avoid spills or leaks of hazardous fluids by restricting the locations of refueling activities and by requiring immediate cleanup of spills and leaks of hazardous materials. In addition, this would be addressed in a site-specific spill plan developed for the Proposed Action. The plan would identify any hazardous materials that would be used, precautions to prevent spills, and employee awareness training.

Oil and diesel fuel would be stored in clearly marked tanks on-site which would be provided with secondary containment structures. Construction equipment would be maintained regularly, and the source of any leaks would be identified and repaired. Any soil contaminated by fuel or oil spills would be removed and disposed by a contractor to an approved disposal site. Lubricating oils, acids for equipment cleaning, and concrete curing compounds are potentially hazardous wastes which may be associated with construction activities. These would be placed in containers within secondary containment structures on site and disposed of at a licensed

treatment and/or disposal facility in accordance with local or state regulations and in compliance with manufacturers' recommendations. Paint containers would be tightly sealed to prevent leaks or spills. Excess paint would not be discharged to the stormwater system, but would be disposed of consistent with manufacturers' recommendations and according to applicable governmental regulations.

The process wastewater disposal from the proposed power plant would be integrated with the existing Griffith Energy wastewater system.

Subsidence Impacts

As a condition of the original permit for Griffith Energy, subsidence monitoring has been conducted at the location of the wellfield in the Sacramento Valley. This monitoring has shown that no subsidence has taken place as a result of pumping water from this location. In addition, because of the local geology in this area, no future subsidence is expected to occur due to implementation of the Proposed Action.

Summary of Impacts to Groundwater

The Proposed Acton would not degrade groundwater quality. The groundwater withdrawal rates from the Proposed Action, including the worst-case scenario, would not affect existing or proposed future uses of the Sacramento Valley Aquifer. Groundwater withdrawal would not cause ground subsidence.

4.2.2.2 No Action Alternative

No construction would occur under the No Action Alternative. Without the proposed power plant, there would be no change to Griffith Energy's contracted groundwater supply and no new well construction. The No Action Alternative would not degrade water quality, deplete or interfere with existing or proposed future uses of the Sacramento Valley Aquifer, or cause ground subsidence.

4.3 AIR QUALITY

This section describes the impacts to air resources for both the Proposed Action and No Action Alternative.

Issues

- Significant increase of any criteria pollutant for which the Proposed Action region is in non-attainment under an applicable local, state, or Federal ambient air quality standard
- Violation of an ambient air quality standard for any criteria pollutant for which the Proposed Action region is in attainment under an applicable local, state, or Federal ambient air quality standard
- Violation of any air quality standard or air quality-related value guideline at any Federally designated Class I area

- Indirect contribution to violation of any local, state, or Federal air quality standard from increased fugitive dust emissions

Significance Criteria

A significant impact on air quality would result if any of the following were to occur as a direct result of the Proposed Action:

- Predicted concentrations of criteria air pollutants would exceed state and/or Federal ambient air quality standards
- Predicted concentrations would exceed the maximum allowable PSD increments for PM_{10}, NO_2 or SO_2
- Predicted air pollutant emissions resulting in a change in visibility that would exceed Federal Class I standards

4.3.1 Regulatory Status

While emissions from the Proposed Action would not exceed any Federal significance thresholds, ADEQ has deemed that the Proposed Action is a modification to an existing major stationary source; therefore, EPA would be reviewing the permit application and ADEQ's proposed permit to ensure that all Federal program requirements are met.

ADEQ has determined that, while the Proposed Action would be a minor source by itself, for significance purposes, the emissions generated by the existing Griffith Energy facility needs to be included in determining significance. Griffith Energy is a Class I PSD facility. As such, for permitting purposes, the proposed power plant would also be classified as a Class I facility. Because the Proposed Action emissions would not exceed the significance thresholds for major modification (18 AAC §R18-2-101.106), no additional PSD analysis would be required for this proposed power plant.

40 CFR part 60 establishes NSPS for specific emission sources. 40 CFR 60 subpart KKKK: Standards of Performance for Stationary Combustion Turbines lists affected emission sources as stationary combustion turbines with a heat input at peak load equal to or greater than 10 MMBtu/hr which commenced construction, modification, or reconstruction after February 18, 2005. Each CTG has a heat input greater than 10 MMBtu/hr, and construction of the facility has not yet commenced; therefore, this regulation would be applicable.

The facility would not emit any of the individual HAPs included in the NESHAPs rules (40 CFR61) and would not be a major source of HAPs. Therefore, the Federal MACT provisions in 40 CFR63 do not apply to the Proposed Action.

The Proposed Action would be subject to the CAA Title IV Acid Rain Program, 40 CFR 72. NAEP filed an Acid Rain Permit Application with ADEQ in conjunction with its Class I Permit Application.

4.3.2 Air Quality Impacts

The Proposed Action would be composed of four GE LM6000 PC SPRINT NxGen CTGs with inlet air chillers. The proposed power plant would be designed to produce 175 MW of net electrical output with a heat rate of 9,975 Btu/kWh HHV based on the design condition ambient temperature of 90 °F. The CTGs are capable of rapid startup, allowing the Proposed Action to respond to fluctuations in electric demand within 10 minutes. Site conditions, combustion turbine equipment, and emissions control equipment are described in chapter 2.

NAEP submitted a Class I Permit Application to ADEQ in March 2007. The application included an ambient air quality impact assessment which verified that the Proposed Action would not cause or contribute to any violations of state or Federal ambient air quality standards.

4.3.3 Proposed Action

This section describes the impacts to air resources posed by the Proposed Action. There would be temporary impacts to air resources during the construction of transmission lines, power plant, and associated facilities. State-of-the-art emission control technology would be used to reduce emissions of NO_2 and CO.

4.3.3.1 Impacts from Construction

Impacts from construction would include fugitive dust and exhaust emissions from vehicles and diesel-powered generators. At the proposed power plant and along service corridors within the vicinity, air pollutant emissions that result from the operation of vehicles during construction activities are expected to be minor and temporary. Impacts from fugitive dust would be mitigated. Re-entrained dust from vehicle travel would be minimized by applying dust suppression. Reducing speed limits would also minimize dust emissions. Fugitive dust emissions would also occur during earth-moving activities. Soil handling activities would be minimized, and dust suppression, such as watering, would be implemented. Soil stockpiles would be covered or watered. After construction, temporary construction areas would be brought back to pre-project conditions, and all unpaved ground surfaces would be covered with gravel. Impacts from fugitive dust would be short in duration and would not be expected to exceed NAAQS.

Impacts from vehicle emissions and diesel-powered generators during construction are expected to be minor and temporary. Vehicular and crankcase emissions from gasoline and diesel engines would comply with applicable mobile source emission regulations.

4.3.3.2 Impacts from Operations

The Proposed Action includes the following sources of air pollutants:

- Four GE LM6000 PC SPRINT NxGen CTGs
- One six-cell, 7,600 gpm chiller module

The combustion turbines would be powered by natural gas. Anticipated hourly emission levels for the aforementioned equipment are shown in **table 4-1**. ADEQ issued Proposed Air Quality

Permit No. 43801 for the Proposed Action on June 19, 2007. Allowable annual emission limits included in ADEQ's proposed permit are listed in **table 4-2**. The emissions data are based on manufacturer-supplied emission factors and are supplemented, where necessary, with EPA default emission factors obtained from AP-42 (EPA, 2004). The CTGs can operate year-round, generally with one unit offline at any given time. **Figure 2-2** shows the plot plan layout for the above mentioned equipment.

Table 4-1 Estimated Project Hourly Emissions

Source	Hourly Emissions (lb/hr)[1]					
	NO_x	CO	SO_x[2]	$PM_{10}/PM_{2.5}$	VOC[3]	HAPs[4]
Four Combustion Turbines	31.6	23.09	24.56	10.8	11.02	1.23
Chiller				0.16		

Notes:
1 Total emissions are based on all four LM6000 combustion gas turbines operating.
2 SO_x emissions are based on the presence of sulfur in the fuel. A nominal amount of sulfur (5 grains per 100 standard cubic feet) was assumed to be present.
3 VOC = Volatile Organic Compound
4 HAP = Hazardous Air Pollutants

Table 4-2 Allowable Project Emission Limits[1]

Source	Annual Emissions (ton/yr)[2]					
	NO_x	CO	SO_x[3]	$PM_{10}/PM_{2.5}$	VOC	HAPs
Four Combustion Turbines	39.0	90.0	36.0	14.0	36.0	1.63
Chiller[4]				0.47		
Facility Total	39.0	90.0	36.0	14.47	36.0	1.63
PSD Significance Thresholds	40	100	40	15	40	NA[3]
Title V Threshold	100	100	100	100	100	10/25

Notes:

1 Based on ADEQ Proposed Permit No. 43801, issued June 19, 2007.
2 Total emissions are based on all four LM6000 combustion gas turbines operating ~10,500 hours/year.
3 SOx emissions are based on the presence of sulfur in the fuel. Pipeline quality natural gas with a maximum total sulfur content of 20 grains per 100 standard cubic feet or less would be used.
4 Chiller would operate when ambient temperature is higher than 60 °F. Annual emissions based on 6,000 hour/yr operation.

Table 4-3 presents the estimated HAP emissions and associated Arizona de minimis emission thresholds.

Emissions from the CTGs would be controlled by a combination of water injection and SCR to reduce NO_x emissions and an oxidation catalyst to reduce CO and VOC emissions. After passing through the SCR system, the exhaust gases would exit through the attached stack. Each of the four exhaust stacks would be approximately 85 feet tall and 10 feet in diameter. The stacks would be equipped with CEMS and test connections for performance monitoring.

Table 4-3 Estimated HAP Emissions and Associated Arizona De Minimis Emission Thresholds

HAP	Emissions			Emission De Minimis Thresholds	
	lb/hr	lb/yr	ton/yr	(lb/hr)	(lb/yr)
1,3-Butadiene	0.001	1.97	0.001	N/A	0.39
Acetaldehyde	0.069	183.25	0.092	N/A	5.3
Acrolein	0.011	29.32	0.015	0.013	0.129
Benzene	0.021	54.98	0.027	N/A	1.5
Ethyl Benzene	0.055	146.6	0.073	14	6,442
Formaldehyde	0.380	1,007.90	0.504	N/A	0.9
Hexane	0.298	788.45	0.394	659	13,689
Naphthalene	0.002	5.96	0.003	N/A	0.35
POM[1]	0.004	10.08	0.005	N/A	0.013
Propylene Oxide	0.050	132.86	0.066	N/A	N/A
Toluene	0.111	595.58	0.298	109	146,766
Xylene[2]	0.001	293.21	0.147	98	644
HAPs (total)			1.625		

[1] Polycyclic Organic Matter (selected compound: Benzo(a)pyrene)
[2] Mixed isomers

4.3.3.3 Air Modeling

Ambient air impacts from the Proposed Action emissions were evaluated using approved air pollutant dispersion models.

Potential impacts on ambient air quality from the Proposed Action alone, as well as in combination with the existing Griffith Energy, were assessed using SCREEN3 and Version 3 (Release 02035) of the Industrial Source Complex – Short Term model (ISCST3), both EPA-approved air quality dispersion models.

These models are mathematical descriptions of atmospheric diffusion and dispersion, allowing a pollutant source impact to be calculated at specified locations out to distances up to 50 kilometers. While AERMOD has been adopted as the EPA guideline model (replacing ISCST3 after November 9, 2006), a full meteorological data set has not yet been established for the project area. Due to this factor, and because the proposed power plant is a minor source, ADEQ has agreed that the use of ISCST3 is acceptable for analyzing the emission effects of the Proposed Action.

The impact analysis was used to determine the maximum ground level impacts of the Proposed Action alone and combined with Griffith Energy. The results were compared with the NAAQS and AAAQG values. The goal of the modeling was to demonstrate that the NAAQS and AAAQG values would not be exceeded by the modeled potential maximum impacts from the Proposed Action and Griffith Energy.

In accordance with the air quality impact analysis guidelines developed by EPA (40 CFR part 51, Appendix W: Guideline on Air Quality Models), the ground level impact analysis includes the following assessments:

- Impacts in simple, intermediate, and complex terrain;
- Aerodynamic effects (downwash) due to nearby building(s) and structures; and
- Impacts from inversion breakup (fumigation).

Simple, intermediate, and complex terrain impacts were assessed for all meteorological conditions that would limit the amount of final plume rise because plume impaction on elevated terrain might cause high ground level concentrations, especially under stable atmospheric conditions.

4.3.3.3.1 Evaluation of Compliance with NAAQS

The maximum facility impacts calculated from each of the modeling analyses described above are summarized in **table 4-4**.

To determine the overall air quality impacts, the modeled concentrations were added to the maximum background ambient air concentrations and then compared to the applicable NAAQS.

Background ambient air quality data for the Proposed Action were provided by the ADEQ air assessment section. Ambient NO_2, SO_2, PM_{10}, $PM_{2.5}$, and CO data were collected at various monitoring stations around Mohave County and have been deemed adequate for use in evaluating impacts from the Proposed Action.

Table 4-4 Maximum Potential Impact from Refined Modeling

Pollutant	Averaging Time	Modeled Concentration (µg/m³)	
		Proposed Action	Proposed Action and Griffith Energy Combined
NO_2	Annual	0.091	8.38
SO_2	3-hour	6.4	8.28
	24-hour	0.92	2.37
	Annual	0.070	0.31
CO	1-hour	12.5	590.4
	8-hour	2.47	93.94
$PM_{10}/PM_{2.5}$	24-hour	0.74	13.9
	Annual	0.039	1.42

$\mu g/m^3$ = micrograms per cubic meter

Maximum ground level impacts due to operation of the Proposed Action are shown together with the background concentrations and relevant NAAQS in **table 4-5**. Using the conservative assumptions described earlier, the results indicate that the Proposed Action would not cause or contribute to violations of any state or Federal air quality standards.

Table 4-5 Modeled Maximum Project Impacts with Griffith Energy

Pollutant	Averaging Time	Maximum Combined Facility Impact (µg/m³)	Background (µg/m³)	Total Impact (µg/m³)	NAAQS (µg/m³)	Percent of NAAQS	
						Modeled Combined Facility Impact	Total Impact
NO_2	Annual	8	4	12	100	8%	12%
SO_2	3-hour	8	246	254	1300	1%	20%
	24-hour	2	52	54	365	1%	15%
	Annual	0.3	6	6	80	<1%	8%
CO	1-hour	590	582	1,172	40,000	2%	3%
	8-hour	94	582	676	10,000	1%	7%
PM_{10}	24-hour	14	46	60	150	9%	40%
	Annual	1	14	15	50	3%	31%

µg/m³ = micrograms per cubic meter

4.3.3.3.2 Evaluation of Compliance with AAAQG Values

The procedure described above for determining criteria pollutant impacts was also followed in determining the ambient impacts of noncriteria pollutants for demonstrating compliance with the AAAQG. These guidelines define allowable 1-hour, 24-hour, and annual average concentrations for noncriteria pollutants to protect public health. **Table 4-6** summarizes the results of the analysis for the Proposed Action. The values are presented in scientific notation (e.g., 1.00E+02 = 1.00 X 10^2 = 100).

Table 4-6 Summary of AAQG Modeling Results for Project

AAAQG Pollutant	1-Hour Impact (µg/m³)	1-Hour AAAQG (µg/m³)	24-Hour Impact (µg/m³)	24-Hour AAAQG (µg/m³)	Annual Impact (µg/m³)	Annual AAAQG (µg/m³)
1,3-Butadiene	3.88E-04	7.20E+00	2.63E-05	1.90E+00	2.09E-06	6.70E-02
Acetaldehyde	3.71E-02	2.30E+03	2.51E-03	1.40E+03	2.00E-04	5.00E-01
Acrolein	5.94E-03	6.70E+00	4.00E-04	2.00E+00	--	--
Ammonia			8.42E-01	1.40E+02		
Benzene	1.11E-02	6.30E+02	7.50E-04	5.10E+01	6.00E-05	1.40E-01
Ethylbenzene	2.97E-02	4.50E+03	2.01E-03	3.50E+03	--	--
Formaldehyde	2.04E-01	2.00E+01	1.38E-02	1.20E+01	1.09E-03	8.00E-02
Hexane	1.60E-01	5.30E+03	1.08E-02	1.40E+03		
Napthalene	1.21E-03	6.30E+02	8.00E-05	4.00E+02	--	--
Propylene Oxide	2.69E-02	1.50E+03	1.82E-03	4.00E+02	1.40E-04	2.00E+00
Toluene	1.21E-01	4.70E+03	8.15E-03	3.00E+03	--	--
Xylenes	5.94E-02	5.50E+03	4.01E-03	3.50E+03	--	--

µg/m³ = micrograms per cubic meter

The combined emissions from the Proposed Action and Griffith Energy were also evaluated for compliance with the AAAOG. The analysis shows that the modeled ambient concentrations of each of the noncriteria pollutants emitted from the combined facilities would be below all AAAQG standards.

Table 4-7 shows that the modeled ambient concentrations of each of the noncriteria pollutants emitted from the combined facilities would be below all AAAQG standards.

Table 4-7 Summary AAAOG Combined Modeling Results for NAEP and Griffith

AAAQG Pollutant	1-Hour Impact (µg/m³)	1-Hour AAAQG (µg/m³)	24-Hour Impact (µg/m³)	24-Hour AAAQG (µg/m³)	Annual Impact (µg/m³)	Annual AAAQG (µg/m³)
1,3-Butadiene	1.78E-03	7.20E+00	2.90E-04	1.90E+00	2.00E-05	6.70E-02
Acetaldehyde	1.67E-01	2.30E+03	2.76E-02	1.40E+03	1.99E-03	5.00E-01
Acrolein	2.76E-02	6.70E+00	4.63E-03	2.00E+00	--	--
Ammonia			1.69E+00	1.40E+02		
Benzene	6.57E-02	6.30E+02	1.16E-02	5.10E+01	1.04E-03	1.40E-01
Ethylbenzene	1.51E-01	4.50E+03	2.58E-02	3.50E+03	--	--
Formaldehyde	9.46E-01	2.00E+01	1.57E-01	1.20E+01	1.12E-02	8.00E-02
Hexane	7.26E-01	5.30E+03	1.20E-01	1.40E+03		
Napthalene	8.15E-03	6.30E+02	1.46E-03	4.00E+02	--	--
Propylene Oxide	4.45E+00	1.50E+03	2.37E-01	4.00E+02	3.77E-02	2.00E+00
Toluene	6.12E-01	4.70E+03	1.04E-01	3.00E+03	--	--
Xylenes	3.20E-01	5.50E+03	5.52E-02	3.50E+03	--	--

µg/m³ = micrograms per cubic meter

The Proposed Action would comply with annual emission limits prescribed for a minor air emission source and would be subject to the annual emission limits that would be at or below the following levels:

- NO_x 40 tons per year
- CO 100 tons per year
- VOC 40 tons per year
- SO_x 40 tons per year
- PM_{10} 15 tons per year

Therefore, impacts to air quality would be less than the applicable air quality standards for the Proposed Action.

4.3.4 No Action Alternative

Under the No Action Alternative, the proposed power plant would not be built, and impacts to air resources in the area would remain the same as those under existing conditions. This would not increase the concentrations of criteria air pollutants and encroach upon state and/or Federal ambient air quality standards or Federal Class I visibility standards.

4.4 BIOLOGICAL RESOURCES

The biological resources within the ROI of the Proposed Action include vegetation species; wildlife species; and threatened, endangered, and sensitive wildlife and vegetation species. Impacts to the biological resources within the ROI of the Proposed Action were assessed taking into consideration the adjacent infrastructure and human activity, the type of construction that is to occur at the NAEP property, and the habitat types present.

Issues

- Potential effects on wildlife species
- Potential effects on vegetation
- Potential effects on threatened, endangered, and sensitive species

4.4.1 Vegetation

Significance Criteria

A significant impact on vegetation and wetlands/riparian areas would result if any of the following were to occur from construction or operation of the Proposed Action:

- Loss to any population of sensitive plants that would jeopardize the continued existence of that population
- Loss to any population of plants that would result in a species being listed or proposed for listing as endangered or threatened
- Introduction or increase in spread of noxious weeds
- Loss of a Federal or state protected wetland(s), as defined by section 404 of the CWA or other applicable regulations
- Indirect loss of wetlands or riparian areas caused by degradation of water quality, diversion of water sources, or erosion and sedimentation resulting from altered drainage patterns

4.4.1.1 Proposed Action

Most impacts to vegetation would be minimal due to the existing infrastructure and human activity already in place adjacent to the Proposed Action at the Griffith Power Plant. In addition, there are only 8 acres of disturbance, making the impacts to vegetation in the area minimal. Potential impacts to vegetation would be associated with ground disturbance related to construction of the Proposed Action. Permanent vegetation loss would occur due to placement of new structures and associated with construction of facilities. An accidental take of sensitive vegetation would be minimal, and it is unlikely to jeopardize the continued existence of the population. It is also unlikely that a take of any vegetation species within the ROI would result in a species being listed or proposed for listing as threatened or endangered. It is possible that the Proposed Action would facilitate the spread of a noxious weed species in the ROI if noxious weeds occur in the site, especially in the disturbed area in the northwest corner because the area

is already disturbed by the existing adjacent infrastructure, and noxious weeds thrive in disturbed areas. However, no populations of noxious weed species have been identified on the site.

4.4.1.2 No Action Alternative

The no action alternative would not change existing conditions at the NAEP property and, therefore, would have no impact on vegetation species in the area.

4.4.1.3 Wetlands and Riparian

No wetlands or riparian vegetation are present in the ROI (Avant, 2007). Therefore, there would be no loss of a Federal or state protected wetland under the Proposed Action and the No Action Alternative.

4.4.2 Wildlife

Significance Criteria

Impacts to wildlife would occur when habitats or individuals are disturbed or lost during the Proposed Action construction or operation. The significance of the impact depends in part on the sensitivity of the population. A significant impact on wildlife would result if any of the following were to occur from construction or operation of the Proposed Action:

- Loss to any population of sensitive wildlife that would jeopardize the continued existence of that population
- Loss to any population of animals that would result in the species being listed or proposed for listing as endangered or threatened
- Introduction of constituents into a water body (such as brine disposal ponds) in concentrations that could cause adverse effects on wildlife
- Interference with the movement of any native, resident, or migratory wildlife species for more than two reproductive seasons
- Local loss of wildlife habitat (compared to total available resources within the area) or habitat productivity
- Interference with nesting or breeding periods of any species
- Reduction in the range of occurrence of any wildlife species

4.4.2.1 Proposed Action

Potential impacts to wildlife associated with construction of the Proposed Action are expected to be minimal because power generation facilities and human activity are already in place adjacent to the NAEP property. Construction activities associated within the Proposed Action would temporarily disturb birds, reptiles, and big game mammals utilizing these habitats. The short-term displacement of wildlife would be related to the increased activity and noise associated with construction. This would especially impact any bird species that may be migrating through the area. In addition, direct mortality could occur for any small mammals and reptiles that may use the area for habitat.

Impact to wildlife would be less than significant because the NAEP project would only disturb approximately 8 acres, resulting in minimal long-term habitat loss for wildlife. The habitat encountered within the NAEP property is widely distributed in the region; therefore, loss of this habitat would neither affect the viability of any species, nor interfere with the movement of any species for more than two reproductive seasons. Loss to sensitive wildlife will be unlikely, would not jeopardize a population, and would not result in the listing or the proposed listing of a species as endangered or threatened. It is not anticipated that there will be an introduction of constituents into any water body. It is also unlikely that the proposed action will interfere with nesting or breeding periods or reduce the range of any species.

4.4.2.2 No Action Alternative

The No Action Alternative would not change existing conditions at NAEP property and, therefore, would have no impact on wildlife species.

4.4.3 Special Status Plant and Wildlife Species

Significance Criteria

A significant impact on endangered or threatened species or their critical habitats would result if any of the following were to occur from construction or operation of the Proposed Action:

- Jeopardizing the continued existence of a Federally listed species
- Loss of individuals of a population of species that would result in lowering a species status (e.g., from threatened to endangered)
- Adversely modifying Critical Habitat to the degree that it would no longer support the species for which it was designated
- Modification of habitat used by special status species for resting, nesting, feeding, or escape cover

4.4.3.1 Proposed Action

The construction and operation of the Proposed Action is not expected to have any adverse impacts on Federal and/or state listed wildlife and plant species of special concern. Based on site-specific surveys that were conducted for Griffith Energy (Griffith, 1998b), several species may occur in the ROI. No surveys were conducted for these species in the ROI for the Proposed Action. However, the surveys did not identify the presence of any Federal- and/or state-listed wildlife or plant species of special concern. Therefore, it is unlikely that any of the potential species would occur in this area. Impacts would be short-term and minimal.

Impact to endangered species and Critical Habitat areas would be less than significant because there are no known occurrences on the NAEP property or nearby areas and there are only 8 acres of disturbance associated with development of the proposed power plant.

4.4.3.2 No Action Alternative

The No Action Alternative would not change existing conditions at the NAEP property and, therefore, would have no impact on special status species in the area.

4.5 CULTURAL RESOURCES

The Proposed Action is not expected to impact cultural resources. As previously noted, reconnaissance surveys for Griffith Energy that included the Proposed Action (Ezzo and Späth, 1998) encountered no cultural resources. A recent Class III survey of the NAEP property (Jolly and Späth, 2007) also found no eligible cultural resources.

Issues

- Potential effects on any properties or sites listed in or eligible for the National Register of Historic Places
- Potential effects on any Native American Traditional Cultural Properties (TCPs) or traditional values

Evaluating cultural resources or TCPs involves two distinct subsets of concern. These subsets can overlap to a greater or lesser extent, depending on interests and perspectives of the evaluator, but for present purposes, it is simplest to retain the categories of prehistoric and historic cultural resources and TCPs.

4.5.1 Prehistoric and Historic Cultural Resources

Significance Criteria

A significant impact on cultural resources would result if any of the following were to occur from construction or operation of the Proposed Action:

- Damage to or loss of a site of archaeological, tribal, or historical value that is listed, or eligible for listing, on the National Register of Historic Places (NRHP)
- Adverse impacts to NRHP eligible properties that cannot be satisfactorily mitigated as determined through consultation with the State Historic Preservation Office, Tribes, and other interested parties

The Proposed Action is located within the Basin and Range physiographic province. Although this region has, in general, been sparsely inhabited, it has been utilized by human societies for at least 12,000 years. Evidence of human occupation is preserved in prehistoric and historic sites and in isolated cultural artifacts and features. Many classes of known prehistoric and historic resources tend to be clustered in the general vicinity of traditional trails and historic transportation corridors, and the trails and transportation corridors themselves are cultural resources.

Classes of prehistoric resources found in the region include but are not limited to rock shelters, artifact scatters (particularly lithic scatters), rock rings and cleared circles, trails, rock art, and

hearths or roasting pits. Common historic site classes include but are not limited to artifact scatters, historic roads, railroad corridors and associated facilities, mining prospects, and claim or survey cairns.

Available inventory information and more general studies of the region indicate that prehistoric and historic sites are not generally abundant in the open basin areas like the Sacramento Valley, particularly in the open flats where water and natural shelter are often limited. Dames and Moore (1996) for the nearby Kingman-Havasu Transmission Project suggested that prehistoric and historic site density could be expected to be less than four to five sites per square mile or one site every 2 to 3 miles along a linear corridor. Higher site densities can reasonably be expected in the Hualapai Mountains, where water; natural shelter; and plant, animal, and mineral resources are more abundant approximately 4 miles to the east. Dames and Moore also assumed, on the basis of available studies, that prehistoric and historic sites would be most abundant in foothill areas, on certain ancient pediments covered with desert pavement, at tool stone source areas, and along historic transportation corridors.

Within this context, cultural resources that may potentially be affected by the Proposed Action must be evaluated for eligibility for listing on the NRHP, and those which are eligible or currently listed are deemed "historic properties." Section 106 processing, or parallel processing under a separate programmatic agreement as permitted under 36 CFR part 800, then proceeds to the identification of effects on historic properties and the further determination of whether potential effects to historic properties are categorized as no effect, no adverse effect, or adverse effect. If adverse effects are identified, avoidance or treatment plans may be developed.

No historic properties have been identified that would be affected by the Proposed Action. There would be no damage to or loss of any known site of archaeological, tribal, or historical value that is listed or eligible for listing on the NRHP.

4.5.2 Traditional Cultural Properties

Significance Criteria

A significant impact on Native American religious concerns would result if any of the following were to occur from construction or operation of the Proposed Action:

- Loss or degradation of a TCP or sacred site, or if the property or site is made inaccessible for future use
- Disturbance of any human remains including those interred outside of formal cemeteries
- Unmitigated adverse effect to a TCP determined to be NRHP eligible or identified as important to tribes.

The Proposed Action is located within the traditional territories of several tribes. These tribes may include individuals who utilize the vicinity of the Proposed Action to maintain aspects of their traditional cultures. The Hualapai Tribe (1999) conducted an ethnographic study for Griffith Energy and identified some of the concerns they have in the general study area. Proper

tribal consultation and communication processes would be and are presently being undertaken to identify sensitive localities in or surrounding the Proposed Action.

One possible issue of concern is potential disturbance of undocumented human remains. Procedures for consultation with tribal groups regarding unavoidable or unanticipated disturbance of human remains and funerary objects are specified in the 1992 Native American Graves Protection and Repatriation Act and amendments to the Arizona Antiquities Act. Another issue of potential concern is disturbance to localities or natural features named in traditional stories. One of these localities in the area is Hualapai Peak, which is a distinctive named locality in the traditional stories of the Hualapai Tribe.

The Hualapai Tribe conducted a survey of the NAEP property during 2007. No TCPs or sacred sites have been identified by tribes within the NAEP property, and the Proposed Action would not impair access to any known sacred site for future use. There is no formal cemetery or any known human remains within the NAEP property. Therefore, there is no known potential to disturb any human remains. However, if human remains are encountered during the Proposed Action, all work would be halted and the tribes, State Historic Preservation Office (SHPO), and Western would be notified. The Proposed Action is located within the viewshed of the Hualapai Peak, which is of traditional importance to the Hualapai Tribe. However, the Proposed Action would not appreciably alter the character of that viewshed.

4.5.3 Proposed Action

A previous archaeological survey of the NAEP property (Ezzo and Späth, 1998) observed no surface or subsurface prehistoric or historic resources. The recent Class III survey of the NAEP property (Jolly and Späth, 2007) also found no significant prehistoric or historic resources. Accordingly, no impacts to cultural properties, including TCPs, are expected to occur from installation, operation, or maintenance of the Proposed Action.

4.5.4 No Action Alternative

The No Action Alternative would not involve development of additional facilities, and there would be no additional effect to cultural or historic properties in the area.

4.6 LAND USE AND RECREATION

This section analyzes the potential effects to existing and planned land uses, including residential uses, for each alternative. For the purposes of this discussion, "short-term" has been defined as the period during construction and shortly thereafter, and "long-term" has been defined as the life of the Proposed Action and beyond.

Issues

- Potential effects on current and planned land uses
- Potential effects on residential and recreational uses

Significance Criteria

A significant impact on land use and agricultural practices would result if any of the following were to occur from construction or operation of the Proposed Action:

- Conflict with applicable land use plans, policies, goals, or regulations
- Results in nuisance impacts attributable to incompatible land uses
- Conflict with existing or planned public utilities and services, water conveyance facilities, and/or utility rights-of-way
- Foreclosure of future land uses

4.6.1 Proposed Action

The Proposed Action would utilize an undeveloped portion of the parcel originally developed for Griffith Energy. The Proposed Action would be located on a 40-acre privately owned parcel of land within the I-40 Industrial Corridor. Within the 40-acre NAEP property, approximately 8 acres would be developed for the proposed power plant.

The planned land uses for the lands surrounding the I-40 Industrial Corridor include Rural Development, Suburban Development, and Urban Development Areas as shown o **figure 3-3**. Several areas near the Proposed Action have been platted for subdivision; however, there are currently no housing developments in the vicinity of the Proposed Action as shown on **figure 3-3**. The nearest residence is approximately 2.5 miles northwest of the NAEP property. Therefore, the Proposed Action would not be expected to impact residential areas.

The Proposed Action would be in conformance with the Mohave County Zoning Ordinance and planned land uses in the vicinity. No local land use permits, such as conditional use or special use permits, would be required by Mohave County, given the MX zoning of the NAEP property. Industrial land uses on the Proposed Action and within the I-40 Industrial Corridor would be compatible with Mohave County's previously planned land uses for development as outlined in the amended General Plan. The Proposed Action is located in the vicinity of existing industrial development, which includes the Praxair facility that manufactures specialty gases, as well as a prison. Proposed facilities for this industrial park include a Wal-Mart distribution center, Envirotech, and a Nutribiotechnologies, Inc. facility.

Within the MX zoning district, facilities between 0.25 and 1 mile of any Federal highway have a height limit of 150 feet. The Proposed Action would be within 1 mile of I-40, and the maximum height for the proposed power plant exhaust stacks would be 85 feet. Therefore, the Proposed Action would comply with the industrial performance standards for the MX zone.

The Proposed Action would be developed on approximately 8 acres of undeveloped land within the I-40 Industrial Corridor. Short-term indirect impacts to nearby residential areas may occur during construction as a result of the generation of dust and noise, the physical intrusion of the construction employees and equipment, and increased traffic volumes or delays. A temporary construction area would be utilized during the construction phase of the Proposed Action. Dust and vehicle emissions from construction activities would be limited and short-term as a result of implementation of dust control measures and duration of the project-related construction.

During the construction phase, public access on Griffith and South Apache Roads could be temporarily disrupted at some locations. These short-term impacts are not expected to be significant because they would be temporary during the 9- to 12-month construction period, and the closest residence is approximately 2.5 miles northwest of the Proposed Action.

The Proposed Action would not have any appreciable long-term adverse impacts on the surrounding land uses because of the localized nature of disturbance and because no existing residences or other sensitive land uses were identified in the immediate vicinity. The Proposed Action would be compatible with the county's zoning regulations and planned land uses for the I-40 Industrial Corridor and would comply with the industrial performance standards for the MX zone. Because the Proposed Action would be compatible with the current zoning regulations and the General Plan's planned land uses for the Proposed Action, no long-term impacts to planned land uses from the construction and operation of the Proposed Action are expected.

The Proposed Action would not have any appreciable short-term or long-term adverse impacts on the surrounding land uses because of the localized nature of disturbance and because no existing residences or other sensitive land uses were identified in the immediate vicinity. Therefore, the Proposed Action would not be expected to result in nuisance impacts to residential areas attributable to incompatible land uses.

The Proposed Action would be compatible with the county's zoning regulations, planned land uses for the I-40 Industrial Corridor, and the General Plan's planned future land uses for the land area affected by the Proposed Action; therefore, no conflicts with other existing or planned services, facilities, or rights-of-way are anticipated.

The future land uses for the properties affected by the Proposed Action are outlined in Mohave County's amended General Plan as industrial. The NAEP property is located in the vicinity of existing industrial development, which includes the existing Griffith Energy property, the Praxair facility, and a prison. Proposed facilities for this industrial park include a Wal-Mart distribution center, Envirotech, and a Nutribiotechnologies, Inc. facility. The Proposed Action would result in long-term foreclosure of the property for uses other than industrial; however, industrial land uses on the NAEP property and within the I-40 Industrial Corridor would be compatible with Mohave County's previously planned land uses for development as outlined in the amended General Plan.

The planned land uses for the lands surrounding the I-40 Industrial Corridor include Rural Development, Suburban Development, and Urban Development Areas as shown on **figure 3-4.** The Proposed Action would not preclude the planned future land uses for nearby properties.

4.6.2 No Action Alternative

The No Action Alternative would result in no new impacts to existing or planned land uses in the area. Operation of the existing industrial facilities located within the I-40 Industrial Corridor would continue and the Proposed Action would not be constructed. There would be no conflicts with existing land use policies or uses and no effect on potential future uses associated with the Proposed Action.

4.7 TRANSPORTATION

I-40 provides the primary access to the Proposed Action. Haul Road is located along the north boundary of the NAEP property and connects with I-40. The proposed power plant is also accessible from South Apache Road, which connects with I-40 via the Griffith interchange to the south. In addition, the BNSF railway line provides rail service to the existing Griffith Energy, which is adjacent to the Proposed Action.

Issues

- Employees commuting to the proposed power plant during construction
- Proposed power plant employees commuting on I-40 and arterial streets
- Suitability of existing access roads and constructed roads for access into proposed power plant

Significance Criteria

Significant impact on transportation would result if the following were to occur from construction or operation of the Proposed Action:

- Increase in number of vehicles transporting hazardous materials that would create additional danger to motorists
- Increases in traffic that exceed a level of service established by the local or state transportation management agency
- Creation of road dust and/or severe road damage at levels that create hazardous situations for motorists and pedestrians
- Cause major traffic delays on a primary transportation corridor
- Conflicts with transportation rights-of-way

4.7.1 Proposed Action

Impacts on transportation for construction of the Proposed Action would be short-term. Traffic on Apache Road would be interrupted to permit construction of a temporary equipment delivery crossing and for delivery of project facility components. Other traffic effects related to the Proposed Action would include daily commuting by construction employees and other construction-related delivery traffic.

Access to the proposed power plant would be via the Griffith interchange of I-40, which travels north-south near the Proposed Action. From the Griffith interchange, access to the proposed power plant would be west on Griffith Road, then approximately 1.7 miles north on South Apache Road, then east on Haul Road to the proposed power plant entrance. Heavy equipment delivery trucks would use a separate entrance from Haul Road into the proposed power plant. Currently, the Griffith interchange is used by Griffith Energy facilities employees, Praxair employees, and minor local traffic. The increase in usage of the Griffith interchange is not expected to exceed the design capacity for traffic levels on these roads.

All equipment and material deliveries would utilize the proposed power plant access via South Apache Road and Haul Road. Truck deliveries of equipment and materials would occur from the initial construction notice to proceed through the entire duration of the Proposed Action.

Construction of the Proposed Action would be expected to occur over a 9- to 12-month period. Activities typically take place 5 to 6 days a week. While employment levels would fluctuate each month, peak employment would occur at month 4 with as many as 162 workers. It is expected that most of these construction workers would commute to the Proposed Action via I-40, resulting in an increase in traffic during peak periods. During operations traffic increases would be minimal as a result of maintenance activities and the community of two to four permanent employees. Employee-generated traffic is not expected to cause traffic delays or diminished levels of service. Parking would be available in designated areas within the NAEP property.

Licensed vendors would be contracted for the transport of hazardous materials and wastes, including both fuels and non-fuel substances, and are evaluated in section 4.12 – Health and Safety. Over-the-road hazards associated with the transport of hazardous materials and wastes would be minimized by adherence with the applicable U.S. Department of Transportation and ADOT regulations.

Construction traffic would increase traffic levels on I-40 for the duration of construction activities; however, increases in traffic levels occurring at any one time would be expected to fall within the current capacity of the highway. Traffic congestion on highways is measured using a Level of Service (LOS) grading system. I-40 is rated with LOS A, which describes a free flow condition that corresponds to 0 to 0.20 volume/capacity ratio (Arizona Department of Transportation, 1999). Roadway segments with LOS A have substantial excess capacity. Project-related increases in traffic levels would be temporary.

Safety practices, such as use of construction cones or barriers, flag persons, lights, warning signs, and walkways, would be implemented to reduce impacts to public travel and safety as needed.

Impacts to public health and safety associated with project-related traffic are evaluated in section 4.12 – Health and Safety. Impacts to motorists and pedestrians from fugitive dust associated with vehicular traffic during construction and operation of the Proposed Action are expected to be unlikely, and therefore not significant with the implementation of mitigation included as part of the Proposed Action as described in chapter 2. Under implementation of these mitigation measures, health and safety impacts would be less than significant because there would be no anticipated hazards beyond limits set by health and safety regulatory agencies.

Existing design and safety deficiencies on I-40 are likely to be compounded by the construction vehicles, which in turn would likely elevate the potential for trucking accidents and spills along the transportation route. Maintenance of the roadway surface would reduce potential impacts.

There would be no major traffic delays or conflicts with existing transportation rights-of-way from project-related construction traffic on Haul Road, which does not access any other existing land uses in the vicinity of the Proposed Action. Construction traffic turning on to Haul Road from I-40 is not expected to cause traffic delays. If necessary, safety practices, such as use of

construction cones or barriers, flag persons, lights, warning signs, and walkways, would be implemented to reduce impacts to public travel and safety.

4.7.2 No Action Alternative

Under the No Action Alternative, there would be no increase in traffic levels on I-40 or Apache Road over existing levels. There would be no increased traffic hazards, no exceedance of established level of service, and no changes to existing traffic patterns or use associated with the Proposed Action.

4.8 VISUAL RESOURCES

Issues

- Potential effects of structures and facilities on scenic quality

Significance Criteria

The assessment of visual impacts was based on methodology described in the BLM Visual Contrast Rating Handbook (BLM Manual Handbook 8431-1) in its visual contrast rating system. Visual impacts may result from the construction, operation, and/or maintenance of the Proposed Action. The measure of potential adverse impacts on visual resources is typically the degree of perceived change that would occur in the landscape as a result of project implementation (as seen from sensitive viewpoints) and from the effects to the aesthetic values of the landscape. Visual contrast usually results from:

- Landform modifications associated with facility construction,
- Removal of vegetation required by project construction and operation, and/or
- Introduction of new structures to the landscape.

A significant impact on visual resources would result if any of the following were to occur from construction or operation of the Proposed Action:

- Degradation of the scenic quality of the landscape as viewed in the foreground and middleground distance zones from sensitive viewpoints
- Predicted air pollutant emissions causing a change in visibility that would exceed Class I standards
- Conflict with visual standards identified by a Federal land management agency
- Lighting not consistent with Mohave County lighting ordinance
- Intrusion on a viewshed from a cultural resource that is registered (or eligible for registration) with the NRHP or from a TCP identified as important to tribes
- Visual interruption that would dominate a unique viewshed or scenic view

4.8.1 Proposed Action

Impacts to the visual resources in the vicinity of the Proposed Action from the development of the proposed power plant and the ancillary facilities would occur as short-term disturbance of the landscape by construction activities and long-term addition resulting from the addition of facilities to the landscape. These effects would result from changes to the physical setting and visual quality of the landscape and how the landscape is experienced from sensitive viewpoints including travel routes, residences, and wilderness areas. Over the long-term life of the Proposed Action, the facilities would introduce new elements into the landscape that would alter the existing form, line, color, and texture of the existing landscape.

Short-term impacts to the visual character of the Proposed Action's landscape would likely occur over the construction period. Activities typically would take place five to seven days a week. There would also be traffic associated with moving equipment over public highways and local roads. These visual intrusions would be most noticeable to travelers on I-40.

Long-term impacts would result from the addition of the Proposed Action to the landscape. The Proposed Action, particularly its taller features, would constitute a moderate additive visual impact because they would be a noticeable change to a previously undeveloped landscape. The Proposed Action is on private land approximately 0.25 mile west of I-40 and would be within the viewshed of travelers on the highway, from residential areas in the valley, and in portions of wilderness. The proposed power plant would be lit during periods of darkness, creating a moderate additive visual impact, characteristic for an industrial area. Lighting would be designed to cause the least visual intrusion.

Effects to visual resources from the development of the Proposed Action facilities would result from changes to the physical setting and visual quality of the landscape and from effects on the landscape as experienced from sensitive viewpoints including travel routes, residences, and popular use areas. The Proposed Action would not significantly change the character of the existing landscape, as the associated facilities would repeat the form, line, color, scale, and texture elements of the existing Griffith Energy facilities, which characterize the existing landscape and is adjacent to the Proposed Action.

The Proposed Action facilities would provide additive forms, lines, colors, and textures to the existing industrial character of the landscape, as they would be within the viewshed of travelers on the highway. The geometric, rectangular block forms of the Proposed Action facilities would be visible from the highway but would be painted to harmonize with landscape colors and the existing plant facilities, and would result in a low to moderate contrast with the surrounding landscape.

The most visible component of the Proposed Action facilities from all viewpoints would be the exhaust stacks. Each of the four turbines would have an attached exhaust stack that would be approximately 85 feet tall and 10 feet in diameter. The four exhaust stacks would create additional columns and vertical forms that would be obvious to viewers on I-40. However, the stacks would be smaller in scale than the existing Griffith Energy exhaust stacks and cooling towers, which range in height from 90 to 150 feet. Because the stacks would repeat the existing vertical line and columnar form, but would be smaller in scale than the existing Griffith Energy stacks, they would be difficult to discern when viewed from most viewing areas, depending on

the angle of view. The Proposed Action would not be visible from existing or proposed residential developments. The Proposed Action facilities would be difficult to discern from the existing Griffith Energy facilities and the surrounding facilities as viewed from the three wilderness areas.

The proposed power plant would not contribute a steam plume from the chiller module. The time of operation for a peaking unit such as NAEP in the desert southwest would be during hot summer days. The Proposed Action would not likely be in operation when the ambient temperature is less than 75 °F, and operation at these temperatures is not likely to produce a plume. Normally, the temperature and humidity conditions suitable for plume creation would not occur any time during the year in this climate.

The Proposed Action facilities would be artificially lit as necessary to enhance the safety of personnel. Night lighting would increase the visibility of the facility to all viewpoints. The additive light, glare, or backscatter illumination visible to sensitive viewpoints would be minimized by the use of directional shielding of lights. The off-site visibility and potential glare of the lighting would be restricted by the screening structures to be placed around the facility's major equipment, specification of non-glare fixtures, and placement of lights to direct illumination into only those areas where it is needed.

The Federal Aviation Administration (FAA) requires that any permanent object that exceeds an overall height of 200 feet above ground level or exceeds any obstruction standard contained in Federal Aviation Regulation (FAR) part 77 be lighted with a flashing lighting system. Because the exhaust stacks are 85 feet tall and more than 3 nautical miles from the nearest airport (as per FAR part 77), blinking safety lights would not be required.

There would be minimal short-term adverse effects to visual resources from the construction and operation of infrastructure including gas, water, and electric interconnections. These required infrastructures would be available to the Proposed Action within the NAEP property boundary and from the adjacent Griffith Energy property.

KOPs were selected to represent viewpoints from transportation routes and nearby residential subdivisions (**figure 3-6**). **Figures 3-7** through **3-11** each depict a simulation of the Proposed Action facilities that would be visible from each KOP.

KOP 1 provides a simulated view shown on **figure 3-7** of the Proposed Action from southbound I-40 towards Haul Road, which is at the north boundary of the NAEP property. The facilities are slightly smaller in scale than the existing Griffith Energy facilities, so that the existing plant is the dominant feature. In addition, the exhaust stacks of the existing plant are skylined against the Black Mountains (in the wilderness), drawing the attention of most viewers from the proposed facilities, which are shorter and are not skylined. The proposed facilities would provide a weak contrast with existing industrial landscape elements. The existing landscape character would not change.

KOP 2 provides a simulated view shown on of the Proposed Action from Haul Road and South Apache Road about 0.2 mile from the northwest corner of the NAEP property. The facilities are in close proximity to the viewpoint (**figure 3-8**), and would be a dominant feature in the landscape, obscuring the backdrop of the Hualapai Mountains to the southeast. The proposed

facilities would provide a weak contrast with existing industrial landscape elements, and the overall industrial landscape character would not change. The existing landscape character would not change.

KOP 3 provides a simulated view shown on **figure 3-9** of the Proposed Action from South Apache Road about 0.85 mile from the southwest corner of the NAEP property. The view faces northeast, providing a view of the facilities to the north of the existing Griffith Energy facilities. The facilities are slightly smaller in scale than the existing Griffith Energy facilities, which would be the dominant industrial feature in the landscape. In addition, the exhaust stacks of the existing Griffith Energy facilities are skylined against the Hualapai Mountains, which would also draw the attention of most viewers from the facilities, as the Proposed Action would not include any facilities that are skylined against the mountains. The proposed facilities would provide a weak contrast with existing industrial landscape elements The existing landscape character would not change.

KOP 4 provides a simulated view shown on **figure 3-10** of the Proposed Action from South Apache Road near Dawson Drive about 0.64 mile north of the northwest corner of the NAEP property. The view faces southeast, providing a view of the facilities at a closer distance to the viewer than the existing Griffith Energy facilities. As seen from the distance and viewing angle, the overall mass and strong vertical elements of the exhaust stacks are a noticeable addition to the existing impact from the existing Griffith Energy facilities. Although the exhaust stacks would be easily noticeable, there would be a weak contrast of the proposed facilities with the existing landscape, resulting in a small increase in the industrial elements of the rural/industrial landscape character.

Figure 3-11 provides a simulation of the Proposed Action from KOP 5, which is on I-40 1.6 miles southeast of the NAEP property. As shown in the simulation, the proposed NAEP facilities would be northwest of the existing Griffith Energy facilities. The four CTGs would be visible as regularly spaced, geometric forms with strong vertical lines that constitute an incremental impact of industrial features in addition to the existing Griffith facilities. The Black Mountains form a backdrop in the background distance zone that provides some screening for the proposed NAEP facilities. The proposed facilities would provide a weak contrast with existing industrial landscape elements. The existing landscape character would not change.

Other sensitive viewing areas include trails in the nearby Wilderness Areas that provide expansive views of the Sacramento Valley, including the NAEP property. The Thimble Butte trailhead is located on Oatman Road at the north boundary of the Warm Springs Wilderness. A visual simulation was prepared for the Griffith Energy (Griffith, 1998b) from this location. At the distance of more than 8 miles, the simulated Griffith Energy facility was very difficult to discern because of the small scale of the facilities relative to the surrounding landscape. At this distance, the facility would have been visible only if there were a strong color contrast, as is evident in the appearance of the existing Praxair facility, which is located at about the same distance from the KOP. The trail that extends south into the wilderness is located in a drainage and does not provide views of the Sacramento Valley and the NAEP property.

Two trailheads are located at the west boundary of the Mount Nutt Wilderness. The trails extend west into the wilderness. Both trailheads are located more than 10 miles northwest of the proposed NAEP facilities. The proposed facilities would be very small in scale, and would not

be visible to users of the trails once the facilities are painted to harmonize with the surrounding landscape colors.

The ongoing economic and population growth of Mohave County is expected to continue into the future. The visual character of the Proposed Action, particularly in and adjacent to the I-40 Industrial Corridor, would continue to change as a result of additional industrial development.

Long-term visual impacts resulting from the installation and operation of the Proposed Action would be minimized by implementing mitigation focused on facility design measures. Mitigation measures would include painting plant facilities with colors similar to the surrounding desert landscape, principally tan, sand, and buff colors. Mitigation measure would also include selecting plant lighting to reduce lighting impacts. Mitigation of surface disturbance would include revegetation of disturbed areas.

The Proposed Action would result in an incremental increase of the industrial component of the existing landscape, which contains the existing Griffith Energy facilities in a rural setting. The character of the landscape would continue to be more industrially modified; however, visual degradation of the landscape would be minimal. The Proposed Action would not conflict with visual standards of any agency or the lighting standards of Mohave County. There would be no intrusion on a viewshed from a cultural resource that is registered (or eligible for registration) with the NRHP or from a TCP identified as important to tribes, and the facilities would not dominate a unique viewshed or scenic view. Class I visibility standards would not be exceeded.

4.8.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and operated. There would be no additional impacts to visual resources from the Proposed Action, but future development in the I-40 Industrial Corridor would be expected, with attendant visual impacts.

4.9 NOISE

This section describes the impacts to noise resources for both the Proposed Action and No Action Alternative.

Issues

- Exposure of persons to, or generation of, noise or vibration levels in excess of any standards established in the local general plan or noise ordinance, or any other applicable standards of other agencies
- Substantial permanent increase in ambient noise or vibration levels in the above existing levels without the Proposed Action
- Substantial temporary or periodic increase in ambient noise or vibration levels in the vicinity above levels existing without the Proposed Action

Significance Criteria

A significant impact on noise would result if any of the following were to occur from construction or operation of the Proposed Action:

- Exceedance of local, state, or Federal noise regulations or guidelines
- Imposition of restrictions by increased noise levels on land currently planned for residential development
- Direct or indirect effect by increased noise levels on any traditional use or TCP locations that are NRHP registered or eligible, or identified as important to tribes

4.9.1 Proposed Action

4.9.1.1 Construction

Noise generated during the construction phase would result from the operation of construction equipment and vehicles. **Table 4-8** presents typical noise levels for construction equipment at a distance of 45 feet (Crocker and Kessler, 1982). These values assume that the equipment is operating at full power.

Table 4-8 Typical Construction Noise Levels

Equipment Category	Noise Level at 45 ft (dBA)
Dump Truck	88
Portable Rock Drill	88
Concrete Mixer Truck	85
Pneumatic Tool	85
Grader	85
Front-End Loader	84
Mobile Crane	83
Excavator	82
Backhoe	81
Dozer	78
Generator	78

Source: Crocker and Kessler, 1982

The typical noise at 45 feet from a construction site would be 85 dBA because the construction equipment would typically spread throughout a construction site and may not be operating concurrently. This value and the data presented above indicate that there would be a temporary increase in ambient noise that would be limited to the construction phase of the Proposed Action. The propagation of noise depends on many factors including atmospheric conditions, ground cover, and the presence of any natural or man-made barriers. As a general rule, noise decreases by approximately 6 dBA with every doubling of the distance from the source (Bell, 1982). Therefore, noise levels at various distances from the construction site can be predicted and are shown in **table 4-9**.

Construction noise generated by the Proposed Action would be intermittent in nature and would be temporary, as the construction period is estimated to be 9 to 12 months. Up to 6 months of the construction period would involve performance testing of the proposed power plant equipment. During this startup and testing period, noise levels would be consistent with noise levels during operation.

Table 4-9 Predicted Noise Near Construction Activities	
Distance from construction site (feet)	**Predicted Noise Level (dBA)[1]**
45	85
90	79
180	73
360	67
720	61
1440	55

[1] Approximated typical noise level at 45 feet from a construction site.
Source: Bell, 1982

The nearest noise receptor (residence) to the NAEP property would be approximately 2.5 miles to the northwest. At this distance, the noise from construction of the Proposed Action would be significantly lower and near the background level. Rural areas typically have background levels between 35 and 50 dBA. The actual noise level at distance would vary with wind direction and velocity.

It is expected that most construction would occur during daylight hours. Some deliveries and continuous construction activities, such as foundation pours would be required during non-daylight hours. During startup and testing, performance testing would also require some continuous work, but the noise profile associated with these activities would be consistent with operational levels. Impacts to noise are expected to be minor and short in duration.

4.9.1.2 Operations

The CTGs are housed in a metal enclosure to protect the units from the elements and for noise reduction. The primary noise sources anticipated with operation of the proposed power plant include the CTG inlet, the CTG compartments, the exhaust ductwork, the stack, gas compressors, and the chiller module. Secondary noise sources are anticipated to include the GSU transformers and miscellaneous pumps, fans, and compressors. All equipment sound levels were estimated based on available data from the equipment manufacturers. Equipment purchased for the proposed power plant would be specified for equivalent A-weighted sound pressure levels not to exceed 85 dBA at 3 feet. Should the purchased equipment emit sound levels that exceed the OSHA permissible noise limits (CFR 29, 1910.95), administrative or engineering controls would be utilized, such as personal protective equipment.

4.9.1.3 Noise Profile

The sound power level (PWL) for each equipment noise source is listed in **table 4-10**. These equipment sound level specifications are provided from the vendors based on standard packaged equipment.

Table 4-10 Equipment Sound Power Levels	
Noise Source	**dBA**
Air Compressor Skid	103
Air Inlet Filter House	94
Ammonia Forwarding Pumps	98
Ammonia Injection Skid	98
Ammonia Vaporizer	98
Auxiliary Skid	103
Auxiliary Transformer	89
Chiller skid	103
Cooling / Purge Air Fans	95
Demineralized Water Pumps	98
Fuel Gas Compressors	109
Fuel Gas Regulator Skid	99
Generator Enclosure Walls	95
Generator Exhaust Silencer, Damper & Exit	94
Generator Vent Fan Motor & Shell Surfaces	88
Rooftop Ventilation Fans	88
Selective Catalytic Reduction Unit	100
Step-Up Transformer	99
Turbine Enclosure Walls	98
Turbine Exhaust Duct Casing	97
Turbine Exhaust Stack	133
Turbine Lube Oil Cooler (fin-fan)	104
Turbine Vent Fan Discharge	93
Turbine Vent Surfaces	96
Wastewater Forwarding Pumps	98

Table 4-11 shows the noise levels expected to be generated from operation of the Proposed Action. The proposed power plant would be expected to have a characteristic noise level (L_{dn}) of 47.8 dBA at the NAEP property boundary at South Apache Road. Noise propagating to the east, south, and north toward and parallel to I-40 would generally be masked by I-40 traffic and the occasional train passing east of the Interstate. Noise propagating toward the west would be at levels slightly above the background noise of the Interstate and train noise. The noise at the closest residence, 2.5 miles to the northwest of the proposed power plant, would be dominated by the noise produced by the existing Griffith Energy equipment and facilities.

At the northern boundary (Haul Road) the NAEP property would have an estimated L_{eq} of 55 dBA and an L_{dn} of 62 dBA. South Apache Road is approximately 1,000 feet from the proposed power plant and 2,000 feet from the existing Griffith Energy facilities. Although the proposed power plant is closer to South Apache Road, it is estimated to have a lower impact than the existing Griffith Energy facilities at this location.

Table 4-11 Noise Levels Expected From Operation of the Project vs. Noise Levels from I-40

Location	Sound Levels (dBA)			
	NAEP Project		Griffith Energy	I-40 Traffic[2]
	L_{eq}	L_{dn}[1]	L_{eq}	L_{eq}
400 Feet from Source	49.3	55.7	75	62
1,000 Feet from Source	41.3	47.8	67	57
2,000 Feet from Source	34.1	40.5	61	52
1 Mile from Source	25.6	32.0	53	41
2 Miles from Source	19.6	26.0	47	30
2.5 Miles from Source (nearest residence)	17.7	24.1	45	20

1. $L_{dn} = 10 * \log \{1/24 [15 * (10^{Ld/10}) + 9 * (10^{(Ln+10)/10})]\}$
   Ld is the average daytime noise level L_{eq} dBA.
   Ln is the average nightime noise level L_{eq} dBA.
   Values above were calculated assuming Ld = Ln
   L_{eq} is defined as the average sound level, on an energy basis, for a stated period of time (e.g. hourly) at a given location
   L_{dn} is defined as the average A-weighted sound level for a 24-hour period.
2. I-40 radiates noise as a line source while the proposed power plant would radiate noise as a point source. Therefore, road noise diminishes with distance.

Source: Griffith, 1998b

Impacts to noise resources from the Proposed Action are expected to be minor. The proposed power plant is expected to emit operational sound levels that are below existing background sound levels. Sound levels during construction may be temporarily elevated above existing background levels (**table 4-11**).

The proposed power plant is not expected to exceed local, state, or Federal noise regulations or guidelines. There is currently no planned residential development in the vicinity of the NAEP property, and there would be no noise level restrictions. No TCPs or sacred sites have been identified within the Proposed Action, and the Proposed Action would not impair access to any known sacred site for future use.

4.9.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not go forward, and there would be no associated noise impacts.

4.10 SOCIOECONOMICS

Issues

- Social and economic impacts in the vicinity of the Proposed Action which include, but are not limited to, construction and operational period impacts related to local and regional population, housing, labor market, or demand on public services
- Fiscal impacts within local jurisdictions which include, but are not limited to, taxation and property values
- Induced growth impacts attributed from the Proposed Action

Significance Criteria

A significant impact on social and economic values would result if any of the following were to occur from construction or operation of the Proposed Action:

- An increase in population that would create shortages of housing and place an excessive burden on local government and community facilities and services
- Creation of a need for new infrastructure systems including power or gas utilities, communications systems, water and sewer services, or solid waste disposal systems
- Long-term economic benefit (A positive impact that could be considered significant)
- Reduction or depletion of groundwater that results in a substantial loss of beneficial uses, such as residential or commercial uses which require low amounts of water

4.10.1 Proposed Action

The analyses indicated that implementation of the Proposed Action would not result in significant direct or indirect adverse effects on regional population, labor market, housing, demand for public services, fiscal or induced growth factors. The potential effects to these socioeconomic resources are discussed in the following subsections.

4.10.1.1 Population

An estimate of construction staffing by month is provided in **table 2-5.** The peak construction workforce would be 162 employees. It is expected that most construction workers are available within the Kingman, Yucca, and Lake Havasu areas. The Proposed Action would not require a large influx of new employees into the region. Peak employment for the Proposed Action would represent less than 0.1 percent of the total population of the Kingman Area. Therefore, local or regional population impacts are anticipated to be minimal. While some employees with specialized skills may not be available within the region and may come from outside the area, it is expected that these workers would be required for a short time only and would not relocate permanently.

4.10.1.2 Housing

The potential demand for new permanent housing is expected to be minimal. New or commuting construction workers could affect temporary housing stock such as motels or weekly rentals. Because the Proposed Action is located approximately 15 miles from the community of Kingman, some workers may also be accommodated in personal trailers or motor homes.

4.10.1.3 Labor and Employment

The Proposed Action may affect the local labor market and economy in a variety of ways. Project-related employment includes both direct and indirect employment. Direct employment effects are classified as the actual number of employees required to build and operate the Proposed Action. Indirect effects involve support industries which provide services to the power generation industry. The local economy would be affected positively by direct project spending

and induced economic effects, which occur as a result of employees and businesses spending income within the area.

Project-related employment would occur in two phases. The first phase includes the employment of a labor force for construction, followed by a smaller level of employment required for operation and management of the Proposed Action. Construction is anticipated to occur over a 9- to 12-month period and would require a variety of tradesmen and contractors with a peak construction workforce of 162 employees. The employment force would include both skilled and non-skilled workers.

Two to four permanent workers would be needed for operation of the Proposed Action. This would include full-time operational and maintenance staff.

It is anticipated that most of the required labor pool would be available in the Kingman, Yucca, and Lake Havasu areas. To the extent that some specialized skill classes are not available in the area, it is assumed that these workers would migrate to the area on a temporary basis during the construction phase. The peak construction employment for the Proposed Action would represent approximately 0.2 percent of the total civilian labor force in Mohave County. For operations, employment would be less than 0.1 percent of the total civilian labor force. Therefore, potential impacts to local employment are anticipated to be minimal and beneficial.

The Kingman, Yucca, and Lake Havasu areas would gain some economic benefit from the expenditures for construction of the Proposed Action. The Proposed Action would increase the assessed value of the NAEP property, resulting in a substantial increase in property tax revenues to Mohave County. In addition, a variety of other state and local tax payments would be incurred during construction, producing additional revenues to various agencies. The projected taxes to be paid by the Proposed Action over the life of the project are discussed in section 4.10.1.4.

The Proposed Action would be located in the I-40 Industrial Corridor. The Proposed Action would not have any direct growth-inducing effects because it is designed to sell power on the open market and not necessarily to local users. Indirect growth-inducing effects are not likely to occur from any increased reliability of electrical service in Mohave County. A change in the ability of the county to attract new businesses is not anticipated.

4.10.1.4 Fiscal Impacts

There would likely be some fiscal benefits derived from the Proposed Action. In the short term, the construction work force would increase revenues in the retail and service sectors of the economy. The total cost of the Proposed Action is estimated to be in the range of $140 to $160 million. The cost includes the CTGs, gas compressors, transformers, chiller, and all ancillary balance of plant equipment as well as all civil works, construction labor, construction materials, and engineering.

In the long term, the available power would provide greater reliability of service in area communities. The newly available power would also contribute to the stability of the regional power grid. The Proposed Action would provide up to two to four relatively high-paying jobs for the long term.

Property taxes paid by electric generating facilities can be an important component of the county tax revenues. Based on various assumptions including a personal property tax base of approximately $100 million and a tax-in-service Years of Service (YOS) date of July 1, 2009, the estimated annual property taxes payable by the Applicant are shown in **table 4-12**. **Table 4-12** also provides the allocation of such payments among the various taxing authorities based on the allocation factors in effect for 2006.

Annual property tax revenues paid over the life of the project would total $25.3 million, ranging from $0.2 to $1.7 million annually, as shown in **table 4-12**. In the fiscal year 2004-2005, Mohave County realized $34.2 million in property tax revenues, which accounted for 24 percent of the total operating revenue (Mohave County, 2005c). The property tax revenues paid by the Applicant would represent an annual increase of approximately 0.6 to 5.0 percent compared to current property tax revenues. In addition to property tax revenue, Mohave County will benefit from a portion of the sales tax paid by the Applicant during construction.

There would be beneficial fiscal impacts during both construction and operation of the Proposed Action. Fiscal benefits would primarily result from construction materials purchased locally and from annual property taxes paid over the life of the project.

4.10.1.5 Public Utilities and Services

Potential impacts to public services could result during construction or operation of the Proposed Action if additional project-related demands impacted existing public utilities and services such as police, fire, medical, and other emergency services. It is not expected that these effects would be significant with implementation of the standard construction health and safety measures included as part of the Proposed Action including site fencing, an on-site fire protection system, a worker safety program, and communication equipment to alert local emergency services when necessary.

Existing infrastructure for the gas, water, and electric interconnections are available to the Proposed Action within its property boundary or from the adjacent Griffith Energy property. The Proposed Action would interconnect with the Western 230 kV system at the existing Griffith Switchyard. No new transmission line laterals or other off-site infrastructure development would be required for the Proposed Action.

High-pressure natural gas would be supplied to the Proposed Action from the UES gas distribution system located adjacent to the NAEP property. Natural gas would be delivered via two existing UES-owned and operated gas pipelines that interconnect with the El Paso and Transwestern interstate pipelines and transport natural gas to the I-40 Industrial Corridor. Both pipelines terminate at an existing gas regulating/metering station located at the northeast corner of the Original Griffith Energy property. As previously described in chapter 2, section 2.1.5, an adequate supply of natural gas is available to meet the gas requirements of the Proposed Action.

Solid wastes would be generated primarily by construction. Operational wastes would be generated mostly from operations employees and would be minimal. The wastes generated from construction and operation are described in section 4.12.1.3. The amounts of wastes generated would be too small to affect the life expectancy of the two municipal solid waste facilities

Table 4-12Tax Revenue Forecast: Mohave County

Year	Kingman Unified School District #20	Mohave County General Fund	Mohave Community College	School District #20 Class A Bonds	Mohave County Library District	Fire District Assistance Fund	Mohave County TV District	Mohave County Flood Control	Total (1) All Authorities
Allocation (2)	49.5%	23.9%	12.8%	6.3%	4.6%	1.4%	1.2%	0.3%	100.0%
YOS + 1	396,000	191,200	102,400	50,640	36,800	11,360	9,840	2,000	**800,000**
YOS + 2	544,500	262,900	140,800	69,630	50,600	15,620	13,530	2,750	**1,100,000**
YOS + 3	693,000	334,600	179,200	88,620	64,400	19,880	17,220	3,500	**1,400,000**
YOS + 4	792,000	382,400	204,800	101,280	73,600	22,720	19,680	4,000	**1,600,000**
YOS + 5	841,000	406,300	217,600	107,610	78,200	24,140	20,910	4,250	**1,700,000**
YOS + 6	792,000	382,400	204,800	101,280	73,600	22,720	19,680	4,000	**1,600,000**
YOS + 7	792,000	382,400	204,800	101,280	73,600	22,720	19,680	4,000	**1,600,000**
YOS + 8	742,500	358,500	192,000	94,950	69,000	21,300	18,450	3,750	**1,500,000**
YOS + 9	693,000	334,600	179,200	88,620	64,400	19,880	17,220	3,500	**1,400,000**
YOS + 10	693,000	334,600	179,200	88,620	64,400	19,880	17,220	3,500	**1,400,000**
YOS + 11	643,500	310,700	166,400	82,290	59,800	18,460	15,990	3,250	**1,300,000**
YOS + 12	643,500	310,700	166,400	82,290	59,800	18,460	15,990	3,250	**1,300,000**
YOS + 13	594,000	286,800	153,600	75,960	55,200	17,040	14,760	3,000	**1,200,000**
YOS + 14	544,500	262,900	140,800	69,630	50,600	15,620	13,530	2,750	**1,100,000**
YOS + 15	495,000	239,000	128,000	63,300	46,000	14,200	12,300	2,500	**1,000,000**
YOS + 16	445,000	215,100	115,200	56,970	41,400	12,780	11,070	2,250	**900,000**
YOS + 17	445,000	215,100	115,200	56,970	41,400	12,780	11,070	2,250	**900,000**
YOS + 18	396,000	191,200	102,400	50,640	36,800	11,360	9,840	2,000	**800,000**
YOS + 19	346,500	167,300	89,600	44,310	32,200	9,940	8,610	1,750	**700,000**
YOS + 20	297,000	143,400	76,800	37,980	27,600	8,520	7,380	1,500	**600,000**
YOS + 21	247,500	119,500	64,000	31,650	23,000	7,100	6,150	1,250	**500,000**
YOS + 22	198,000	95,600	51,200	25,320	18,400	5,680	4,920	1,000	**400,000**
YOS + 23	148,500	71,700	38,400	18,990	13,800	4,260	3,690	750	**300,000**
YOS + 24	99,000	47,800	25,600	12,660	9,200	2,840	2,460	500	**200,000**
TOTAL									**25,300,000**

Notes:

(1) Based on estimated personal property tax base of $100 million.

(2) YOS = Years of Service.

Source: NAEP, 2007

currently operated by Mohave County. The Proposed Action would dispose of hazardous wastes at a permitted hazardous waste facility either in Phoenix or another location.

Water supply for the Proposed Action would be obtained from the Sacramento Valley aquifer previously described in chapter 2, section 2.1.7.

A fire protection system would be developed for the Proposed Action as part of its safety program as described in chapter 2, section 2.1.9.1. The Proposed Action would include an underground firewater loop interfaced with the existing Griffith Energy firewater system. The ground disturbance associated with installation of the underground firewater loop would occur within the NAEP property. Analysis of this disturbance is included in the analysis of construction-related impacts for other resource sections. There would be two connections to two different portions of the Griffith Energy firewater loop. The Proposed Action would not require on-site storage of firewater because it would be served from the existing Griffith Energy.

Because a large influx of new employees is not anticipated in the region, there are minimal expected effects to public utilities and services in Kingman or other local communities resulting from increased population effects. Local schools are not expected to experience significant increases in enrollment from construction workers' children.

4.10.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed, and there would be no project-related effects to socioeconomics such as the associated economic benefits and potential demands on infrastructure, housing, and local government and community facilities and services.

4.11 ENVIRONMENTAL JUSTICE

Issues

- Disproportionate adverse health or environmental impacts to minority populations
- Disproportionate adverse health or environmental impacts to populations living below the poverty level

Significance Criteria

A significant impact on social and economic values would result if any of the following were to occur from construction or operation of the Proposed Action:

- Impacts associated with environmental justice are considered to be significant if the impacts of construction and operation of the Proposed Action would have disproportionately high and adverse impacts on minority or low-income populations.
- They are also considered significant if affected minority or low-income populations were not informed of and offered an opportunity for meaningful involvement to ensure that their interests and concerns about the Proposed Action would be considered.

4.11.1 Proposed Action

Impacts on minority or low-income populations that could result from the Proposed Action were analyzed for the geographic area in which the Proposed Action would be located to determine if there would be a disproportionately high and adverse impact on minority populations. To meet current and future power demands in this area of Arizona, the Proposed Action would need to be located somewhere within this region. Therefore, the environmental justice analysis focuses on the local region, specifically Mohave County, and the location for the Proposed Action (census tract). For this analysis, the racial and ethnic characteristics of the census tract containing the Proposed Action were compared to those of Mohave County.

This section summarizes the analysis of potential project-related impacts on minority or low-income populations in the geographic area in which the Proposed Action would be located to determine if there would be disproportionately high and adverse impact on minority populations. In addition, Western has coordinated with tribes and tribally affiliated interests to identify potential impacts and measures that would be taken to mitigate impacts to cultural resources. Studies pertaining to cultural resources, including cultural landscapes, are described in another section of this document.

Section 3.11 identified minority and low-income populations in the vicinity of the Proposed Action pursuant to EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 FR 7629). This section discusses the potential for environmental justice impacts to those populations. The ROI for the environmental justice analysis includes the census tract containing the Proposed Action. The impact analysis was performed in three steps:

- Identify minority and/or low-income populations in the vicinity of the Proposed Action.
- Identify the anticipated impacts from implementation of the Proposed Action.
- Determine if the anticipated project-related impacts would disproportionately impact the minority and/or low-income populations.

The analysis protocol for identifying minority or low-income populations follows the guidelines described in the Environmental Justice Guidance under the NEPA (CEQ, 1997). Information on locations and numbers of minority and low-income populations for the census tract containing the Proposed Action was obtained from when census data was gathered. As stated in chapter 3, section 3.11.1, "minority" refers to people who classified themselves in the 2000 census as Black or African American, Asian or Pacific Islander, American Indian or Alaskan Native, Hispanic of any race or origin, or other non-White races (CEQ, 1997). As stated in chapter 3, section 3.12.1, environmental justice guidance defines low-income populations using U.S. Census Bureau statistical poverty thresholds. Information on low-income populations was developed from 1999 incomes reported in the 2000 census. In 1999, the poverty-weighted average threshold for an individual was $8,501 (U.S. Census Bureau, 2000b).

Second, the anticipated impacts from implementing the Proposed Action were analyzed. Analyses of potential impacts from the Proposed Action are provided in chapter 4 for each resource including: geology and soils, water resources, air resources, biological resources,

cultural resources, land use and recreation, transportation, visual resources, noise, socioeconomics, and health and safety during the construction, operation, and maintenance phases of the Proposed Action.

Third, an analysis was performed to determine if the anticipated impacts of the Proposed Action would disproportionately affect minority and low-income populations. The basis for making this determination was a comparison of locations predicted to experience human health or environmental impacts with any areas in the ROI known to contain high percentages of minority or low-income populations, as reported by the U.S. Census Bureau and defined by the CEQ. Impacts on minority or low-income populations that could result from the Proposed Action were analyzed for the geographic area in which the Proposed Action would be located to determine if they would have disproportionately high and adverse impacts. Impacts related to the Proposed Action were analyzed within the census tract containing the NAEP property.

Analysis of environmental justice impacts is also applied to issues that are unique to and involve Native Americans, particularly to cultural resource issues. Input from tribal representatives would determine if significant impacts are likely to occur to cultural resources of importance to the tribes. Potential impacts of the Proposed Action related to Native American cultural resources could occur not only to individual resources, but also to the traditional, sacred, and historic landscape of the area within which the NAEP property is located. Impacts to the cultural landscape and individual resources could have a significant impact on the role of the landscape in tribal traditions and the use of the landscape by tribal members.

4.11.1.1 Minority Populations

Disproportionately high and significant effects to minority populations are unlikely based on a lower percentage of minority populations in the census tract containing the NAEP property compared with Mohave County as a whole, and because the Proposed Action is not anticipated to have any significant adverse impacts. In particular, no minority populations reside nearby because the NAEP property is located within a designated commercial-industrial area.

The census tract containing the NAEP property has a lower minority population than Mohave County as a whole. The total minority population in the census tract containing the NAEP property is estimated at 9.3 percent of the total population compared to a 9.9 percent county-wide minority population (U.S. Census Bureau, 2000a).

Compared to the composition of the entire Mohave County population, there is no substantial increase in the percentage of minority populations in the vicinity of the Proposed Action. In addition, the Proposed Action would have low potential effects to human health and/or the environment. Therefore, there would be no disproportionately high and adverse effects to minority populations from the Proposed Action.

4.11.1.2 Low-Income Populations

The low-income population (individuals below poverty level) within the census tract containing the NAEP property represents approximately 17.7 percent of the total population. The low-income population within Mohave County as a whole is 13.9 percent. The low-income population within the census tract containing the NAEP property represents a slightly higher

percent of poverty level individuals compared to the population in Mohave County (3.9 percent higher). However, compared to the low-income composition of the entire Mohave County population, this is not considered to be a substantial increase in the proportion of low-income individuals in the vicinity of the Proposed Action. Based on these criteria and the low potential of the Proposed Action to significantly affect human health and/or the environment, there would be no disproportionately high and adverse effects to low-income populations expected to be caused by the Proposed Action.

4.11.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be built and operated, and there would be no impact to any populations including minority or low-income populations.

4.12 HEALTH AND SAFETY

Issues

- Worker safety and health
- Public health and safety
- Hazardous materials and waste disposal

Significance Criteria

A significant impact on public health would result if any of the following were to occur from construction or operation of the Proposed Action:

- Creation of worker health hazard(s) beyond limits set by health and safety regulatory agencies or that endangers human life and/or property
- Serious injuries to workers, visitors to the area, or area residents
- Changes in traffic in the area that result in hazardous situations for motorists
- An increase in the size and volume of a water body (e.g. wastewater and brine disposal ponds) that fosters breeding insects that may transmit hazardous diseases (e.g., West Nile virus)

A significant impact would result from the transport, storage, and use of hazardous materials or creation of hazardous wastes if any of the following were to occur during construction or operation of the Proposed Action:

- Improper disposal of solid or sanitary waste generated by the Proposed Action that would pose a threat to the public health and environment in the vicinity
- Spills or releases of hazardous materials, hazardous substances, or oil at or above reportable quantities within the area that would pose a threat to public health and the environment in the vicinity

4.12.1 Proposed Action

Construction and operation of the Proposed Action may expose proposed power plant workers and/or the public to hazards affecting health and safety. Potential health and safety hazards associated with the Proposed Action include construction and occupational hazards, potential accidental spills of hazardous materials and wastes including both fuels and non-fuel substances, and fire hazards. The risk of a spill would be proportionate to the amount of chemicals and materials transported, stored, and used. The operator's adherence to regulations and required environmental health and safety plans would minimize the potential for spills.

Standard safety procedures for construction and operation of the Proposed Action would be implemented to minimize the probability of an accidental spill or fire. An SPCC Plan and Contingency Plan would be implemented to minimize the potential for accidental spills of hazardous materials and wastes. Adherence to these procedures and development of emergency plans with defined fire prevention and firefighting procedures would minimize the risk to the public. The construction, operation, and maintenance of the Proposed Action would be consistent with safety considerations, and the Proposed Action would not offer public access.

4.12.1.1 Worker Health and Safety

During construction and operation of the Proposed Action, the Applicant and its contractors would comply with the requirements of the applicable OSHA and ADOSH regulations. Implementation and compliance with these codes and standards would be a contractual and legal responsibility of the party performing construction. In addition, utility safety standards and the Applicant's construction standards would be implemented for all construction activities.

The risks associated with construction accidents increase based on the duration of the construction period and the number of workers at any given time (see chapter 2, section 2.1.10.4 for construction workforce details). The primary hazards for employees would include typical construction site injuries related to trips and falls, working at heights, operating or working near heavy equipment, and exposures to fuels or chemicals. A Construction Safety Program would be developed and implemented by the contractor performing construction to ensure compliance with OSHA and ADOSH codes and other safe work practices to minimize potential adverse impacts to worker health and safety during construction. The Construction Safety Program would include plans with response procedures for emergencies including fires, employee injuries, and releases of fuels or chemicals; and telephone numbers for medical and emergency services and emergency contacts. The plans would be readily available to the employees and posted at both the company offices and the field facilities. Employees and subcontractors would be trained in the proper transfer procedures, storage and use of fuels and hazardous materials, as well as emergency response procedures.

The types of hazardous materials used at the facility are discussed in section 4.12.1.3. Quantities of each material used will be provided in the site-specific SPCC Plan to be developed prior to the start of construction. Hazardous materials anticipated to be on site during construction include equipment fuels (gasoline and diesel), lubricants, solvents, and various chemicals. These materials would be handled according to standard safety precautions described in the Construction Safety Program and manufacturers' specifications for use, where appropriate. No exposure to hazardous wastes or soil contamination is anticipated during construction.

Potential health impacts to construction workers from the Proposed Action would also include fugitive dust and noise typical of construction sites as discussed in chapter 4. Construction workers could be exposed to airborne emissions from routine activities such as welding, soldering, grinding, painting, and cleaning operations. The potential noise impact to workers would include heavy equipment operation and other activities. Noise exposures would be intermittent, but may be intense and would be evaluated at the time of construction.

A comprehensive occupational safety and health program would be developed and implemented to optimize minimize safe and healthy working conditions during all phases of construction and operation of the Proposed Action. The contractor would be required to prepare and conduct an Applicant-approved safety program in compliance with all applicable Federal, state, local, and Applicant safety standards and requirements. The safety program would include, but not be limited to, procedures for accident prevention, use of protective equipment, medical care of injured employees, safety education, fire protection, and general health and safety of employees and the public. Employees would be trained to minimize hazards during both construction and operations. Training would also be required for spill response and use of spill containment equipment. The Applicant would also establish provisions for taking appropriate actions in the event that the contractor fails to comply with the approved safety program.

Potential health and safety hazards during construction and operation of the Proposed Action would be minimized by implementation of the mitigation measures included as part of the Proposed Action Description in chapter 2. Under implementation of these mitigation measures, health and safety impacts to the proposed power plant workers would be less than significant because there would be no anticipated worker hazards beyond limits set by health and safety regulatory agencies, no elevated threat to human life and/or property, and little or no exposure to hazardous wastes.

4.12.1.2 Public Health and Safety

The public would not have access to the facility; therefore, public health and safety risks would be limited to off-site effects. Construction and operation of the Proposed Action would result in minimal increases in traffic volumes on public roads in the vicinity of the Proposed Action, along with proportionate increases in noise and air emissions from project-related vehicles and equipment, fugitive dust from roads, and a very slight increased risk of traffic accidents. Under implementation of the Proposed Action, impacts to public health and safety associated with noise, vehicle emissions, and fugitive dust associated with vehicular traffic during construction and operation of the Proposed Action are expected to be unlikely. A very slight increased risk of traffic accidents would occur temporarily during construction. During operations, the two to four permanent employees would not increase the risk of traffic accidents.

During construction and operation of the Proposed Action, public health and safety could potentially be affected by potential spills or leaks in storage containers for fuel, lubricants, fluids, and chemical if spills were to migrate off site. On-site spills would not impact the public because the public would not have access to the facility, and spills would be cleaned up immediately to prevent off-site migration. The risk of accidental spills would be reduced by compliance with existing regulations applicable to the transport, storage, use, and disposal of hazardous materials and wastes. The Applicant and their contractors understand the financial

and environmental risks of accidental spills. Adequate control measures would be taken to prevent off-site releases of hazardous materials or wastes during both construction and operation of the Proposed Action. Specific control measures for fuels, non-fuel hazardous materials, and wastes are discussed in the following paragraphs.

As previously discussed in chapter 3, section 3.12, a project-specific SPCC Plan would be prepared establishing procedures for the storage, handling, and response to spills of fuels and other hazardous materials. The SPCC Plan would specifically address each hazardous material that could be used or stored on-site and measures to contain, stop, or control spills to prevent hazardous materials from leaving the site. All hazardous materials would be stored in structures that meet the requirements of the fire code with adequate secondary containment. The SPCC Plan would include the location of spill control equipment, procedures for control of releases, and protocols for shutting down ignition sources in the event of a release of gas. A Hazardous Materials Inventory Statement and Management Plan would be developed and submitted to responding fire departments. All applicable spill reporting requirements would be met. The SPCC Plan would include telephone numbers for medical and emergency response personnel and agencies and procedures for handling and disposing of spilled chemicals, oils, hazardous materials, contaminated soils, or other contaminated materials. The procedures are also intended to reduce hazardous materials exposure to workers and the public.

During operation of the Proposed Action, public health and safety could potentially be affected if spills or leaks of wastewater or very saline brine water occurred. The Proposed Action is designed to be a zero-discharge facility as discussed in section 4.2.

Public health and safety would likely be protected by the Applicant's compliance with all applicable Federal and state laws including spill prevention and control measures for hazardous materials and wastes. Potential public health and safety impacts during construction and operation of the Proposed Action would also be minimized by implementation of the mitigation measures described in this section and included in the Proposed Action description in chapter 2, section 2.4. Under implementation of the proposed mitigation measures, no health and safety impacts are anticipated.

West Nile Virus

Operation of the proposed NAEP facilities would not require an increase in the size or volume of a water body for process wastewater because the process wastewater disposal would be integrated with the existing Griffith Energy wastewater system. The existing Griffith Energy 25-acre brine disposal pond would be adequate for the disposal of all plant wastewater and stormwater discharges from the NAEP property.

Stormwater runoff would be managed to avoid standing water on the NAEP property to minimize the potential for the breeding of insects that may transmit diseases such as the West Nile Virus. On-site stormwater runoff would be routed to the west of the proposed power plant by means of swales, ditches, and sheet flow. However, where space restriction precludes the use of open ditches and channels, a series of pipes and inlets would be used. Culverts would be used to convey stormwater under on-site traffic areas. Stormwater runoff would discharge by gravity from the proposed power plant area to a 1-acre stormwater retention basin located west of the

proposed power plant to prevent stormwater from leaving the NAEP property. Water which typically flows across the site during storm events would be routed to the stormwater retention basin instead of being discharged below the site. Off-site runoff would be routed around the NAEP property using berms and ditches. The stormwater retention basin is unlikely to foster breeding insects that may transmit hazardous diseases because the retained water is anticipated to evaporate and/or infiltrate rapidly. The Griffith pond is unlikely to allow insect breeding because it is anticipated to be too salty. In the event that insects appear to be breeding in the stormwater retention basin or Griffith pond, appropriate control measures will be taken.

4.12.1.3 Hazardous Materials and Waste Management

Hazardous materials that may be used during construction and operation of the Proposed Action include both fuels and limited quantities of hazardous non-fuel substances which pose a potential for leaks and spills as shown in **table 4-12**. In addition, construction and operation of the Proposed Action would generate wastes including solid and liquid wastes. Vendors would be contracted for the transport of hazardous materials and wastes including both fuels and non-fuel substances. Over-the-road hazards associated with the transport of hazardous materials and wastes would be minimized by adherence with the applicable U.S. Department of Transportation and ADOT regulations.

NAEP would implement the standard operating procedures (SOP)s as described in the SPCC Plan for the transfer, storage, and use of hazardous materials including both fuels and non-fuel substances. Transfers of hazardous materials and refueling operations would be limited to specific locations and would follow specific procedures to prevent leaks and spills from contaminating the environment. Storage locations for hazardous materials and fuels would have adequate secondary containment, and the spill prevention measures would be implemented as described in the SPCC Plan. NAEP would also implement the project-specific Contingency Plan to minimize the potential risks associated with hazardous materials and wastes. Management procedures for fuels, hazardous materials, and wastes would be implemented to minimize the risk of releases as discussed in the following subsections.

Fuels and Lubricants

During construction, the storage and use of fuels, lubricants, and other petroleum-based fluids would be confined to the NAEP property, and there would be no public access to the facility. Therefore, it is unlikely that the public would be exposed to project-related hazardous materials. If hazardous materials were to spill on site and migrate off site, the public could potentially be exposed. This impact would be minimized or avoided by restricting the location of refueling activities and by requiring immediate cleanup of spills and leaks of hazardous materials.

Oil and diesel fuel would be stored in clearly marked tanks on site which would be provided with adequate secondary containment structures. Construction equipment would be maintained regularly, and the source of any leaks would be identified and repaired. Any soil or water contaminated by fuel or oil spills would be removed and disposed by a contractor to an approved disposal site. Lubricating oils, acids for equipment cleaning, and concrete curing compounds are potentially hazardous wastes which may be associated with construction activities. These would be placed in containers within secondary containment structures on site and disposed of at a

licensed treatment and/or disposal facility in accordance with local or state regulations and in compliance with manufacturers' recommendations. Paint containers would be tightly sealed to prevent leaks or spills. Excess paint would not be discharged to the stormwater system, but disposed of consistent with manufacturers' recommendations and according to applicable governmental regulations.

The potential for spills or leaks of fuels or hazardous materials during construction and operation of the Proposed Action would be minimized or avoided by providing adequate secondary containment, restricting the location of refueling activities, and immediately cleaning up spills and leaks. Preparation and implementation of the project-specific SPCC Plan, as previously discussed in chapter 3, section 3.12, would minimize the potential for fuel or lubricant spills or adverse health and safety to on-site personnel, the public, or the environment. Therefore, risks to health and safety associated with fuels or lubricants are anticipated to be less than significant.

Hazardous Non-fuel Substances

During construction and operation of the Proposed Action, a variety of chemicals and hazardous materials would potentially be used as shown in **table 4-13**. Potentially hazardous materials used at the proposed power plant would be stored in limited quantities. The quantities of hazardous non-fuel substances will be provided in the site-specific SPCC Plan to be developed prior to the start of construction. The Proposed Action would comply with the handling and disposal procedures identified in the Material Safety Data Sheets (MSDSs) for each substance.

The storage, handling, and use of all chemicals would be performed using applicable laws, ordinances, regulations, and standards. All chemicals would be stored in appropriate storage containers, with secondary containment, as appropriate. As needed, the R-123 refrigerant from the chillers would be periodically reclaimed with certified equipment operated by certified technicians, and would be recycled or disposed of.

Table 4-13 Chemicals and Hazardous Materials

Chemical Use	Use
Sodium hypochlorite or sodium bromide	Biocide for water treatment
Sodium hydroxide	pH control for cooling tower
Sulfuric acid	pH control for cooling tower
Sulfur hexafluoride	Insulating gas for electric equipment
Ammonia	Control of nitrous oxide emissions in CTG exhaust gas stream
R-123	Refrigerant for chiller units
Water treatment chemicals/alkaline inhibitor	Scale control, pH control, corrosion control, and as a biocide
Carbon dioxide	Fire protection system
Mineral oil	Insulating fluid for transformers
Lubricating oil	Rotating equipment
No. 2 Diesel fuel	Backup fuel for combustion turbines
Battery acid	Emergency battery banks
Various cleaning chemicals	Plant maintenance

Source: Griffith, 1998b

Preparation and implementation of the project-specific SPCC Plan, as previously discussed in chapter 3, section 3.12, would minimize the potential for spills of hazardous materials or adverse

impacts to on-site personnel and the surrounding public and environment. All hazardous materials would be stored according to state and Federal regulations, and any spills would be cleaned up, which would include proper disposal of contaminated soils. Therefore, risks to health and safety associated with spills or releases of hazardous materials are anticipated to be less than significant.

Waste Management

During construction, a number of non-regulated wastes would be generated, including wood and metal construction scrap, waste oil from equipment, and cleaning wastes. The quantities of waste being disposed at the landfill would be small and would not substantially affect the life of the existing landfill. Domestic waste generated by the construction work force would be kept in appropriate containers and properly disposed. The construction contractor would be required to develop measures to properly handle and dispose of waste including:

- Storing construction scrap and debris in disposal bins and dumpsters on the site, which would be picked up regularly by a disposal contractor and disposed of at an approved local landfill
- Collecting and storing waste oil and cleaning waste in approved containers to be picked up for recycling or disposal at a licensed disposal facility
- Using portable toilets during construction. A licensed contractor would handle and dispose of waste.

Small amounts of waste would be generated during operation of the Proposed Action such as minor packing materials or paper associated with operations. Such waste would be handled and disposed at a licensed landfill.

The Proposed Action would be constructed and operated to minimize the volume of hazardous waste that would require off-site disposal. To the extent practicable, materials would be consumed, recycled, or neutralized. Off-site disposal would be limited to mostly small quantities of solid waste and hazardous waste, primarily hydrocarbons. For the small volumes of hazardous waste generated, the facility would obtain a hazardous waste identification number under hazardous waste rules and dispose of the hazardous waste according to state and Federal regulations. Mineral oil in transformers must be replaced periodically and would be recycled or disposed of in accordance with state and Federal used oil regulations. Used oils and other wastes would be stored in properly contained barrels or tanks and removed for off-site recycling and disposal at approved facilities.

During both construction and operation of the Proposed Action, personnel would use the existing Griffith Energy sanitary facilities with no increase in design capacity required for the additional personnel. During periodic major maintenance events, portable facilities would be provided to accommodate the additional maintenance workers.

The Applicant is committed to preventing and reducing pollution at the source, and would implement strategies employing waste minimization, waste management, recycling, and spill prevention during plant operation. All wastes generated at the proposed power plant would be

recycled or disposed of in accordance with applicable laws and regulations. Therefore, there would be little risk to health and safety associated with hazardous or non-hazardous wastes.

4.12.1.4 Fires and Explosions

Natural gas would fuel the Proposed Action via high-pressure gas pipelines and large-diameter natural gas transmission lines located at the adjacent Griffith Energy. There is a potential for fires or explosions if gas were released as a result of leaks or ruptures of the natural gas pipelines. Pipes, valves, or connections could fail, resulting in the release of gas ranging from minor leaks to catastrophic rupture. Most pipeline ruptures are caused when heavy equipment accidentally strikes a pipeline that is operating in close proximity. Ruptures can result in an explosion and fire if a spark or open flame were to ignite the escaping gas. However, the potential for such failures in gas containment would be low because construction in the vicinity of the natural gas pipelines would be in accordance with applicable U.S. Department of Transportation standards to minimize the potential for a leak or rupture. Frequent signage is also installed along the existing pipelines to reduce the risk of accidental ruptures caused by excavating equipment. Monitoring the flow in the pipeline either by remote sensors or by daily inspections of the flow meters reduces the probability of ruptures by promoting prompt detection of leaks. The Applicant would implement a monitoring program for detecting leaks or pre-leak conditions for the natural gas supply facilities in adherence to an approved schedule for the life of the Proposed Action. Industry standards of valving and emergency shutoff controls and procedures would also be used and maintained.

A fire protection system would be developed for the Proposed Action as part of its safety program described in chapter 2, section 2.1.9.1. The Proposed Action would include an underground firewater loop interfaced with the existing firewater system at Griffith Energy. There would be two connections to two different portions of the Griffith Energy firewater loop. Water supply for the Proposed Action would be obtained from the Griffith Energy as previously described in chapter 2, section 2.7. Therefore, the Proposed Action would not require on-site storage of firewater and no incremental water supply obligation from the I-40 Industrial Corridor Water System is required to serve the Proposed Action.

The proposed power plant would not be located within a designated Fire District. A private company, Inland Valley Fire, serves Griffith Energy and the Arizona State Prison in Kingman 24 hours a day. The Inland Valley Fire equipment, which includes a fire truck, ambulance, and staff, is located in the vicinity. It is anticipated that NAEP would contract with Inland Valley Fire Company to provide fire protection.

4.12.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed or operated, and there would be no associated health and safety impacts.

4.13 CUMULATIVE IMPACTS

Cumulative impacts can be the consequence of individually minor but collective actions of existing facilities and reasonably foreseeable future actions occurring over time. Based on the land use plans developed by Mohave County and the plans of developers in the area, it is

expected that the I-40 Industrial Corridor would continue to be developed for industrial uses and that additional housing and population growth would occur in Mohave County. The impacts of the proposed NAEP Project would contribute cumulatively to the impacts associated with this planned development.

Although future development of the I-40 Industrial Corridor is planned and expected, no projects are proposed currently. Consequently, no projections about future developments and their impacts to resources, such as air, water, biological, and cultural resources are available and any projections developed here would be speculative. Of most concern in this arid environment would be the potential impact to the Sacramento Valley aquifer. The Proposed Action was found to have only a minimal impact to the ground water resource and no impact or minimal impact to all other environmental components. Therefore, the Proposed Action would not contribute substantially to cumulative impacts.

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5.0 PERSONS AND AGENCIES CONSULTED

5.1 PUBLIC PARTICIPATION

The public participation program for the NAEP included contacts with individuals and Federal, state, and local agencies, public notices, the mailing of a scoping letter, and agency and public meetings.

5.1.1 Agency and Public Meetings

The following meetings were held for agency personnel and for the public to discuss and collect comments on the NAEP:

- An informational open house meeting for the public, hosted by the Applicant, was held on February 5, 2007 in Golden Valley from 4:00 p.m. to 7:00 p.m. This open house meeting was advertised in local papers and 400 announcements were mailed directly to all property owners within 5 miles of the NAEP property.
- A forum was held by the Applicant in Lake Havasu, Arizona on February 5, 2007 from 12:00 p.m. to 2:00 p.m. with key community leaders and elected officials.
- Public scoping for the EA developed by Western included the mailing a scoping letter to all interested parties (including all property owners within 2 miles of the NAEP.

A copy of the scoping letter is provided in **appendix B**.

5.1.2 Agencies and Organizations Consulted

Western, as the lead Federal agency, has consulted with Federal, state, and local agencies, Native American groups, organizations, and individuals regarding the proposed NAEP. The following is a list of contacts that were made during the scoping process and the preparation of Draft EA.

Federal Agencies

Environmental Protection Agency
- Air Division, Region 9
- Communities and Ecosystem Division, Region 9

U.S. Department of Agriculture
- Natural Resources Conservation Service

U.S. Department of Homeland Security
- Federal Emergency Management Agency, Region IX

U.S. Department of Housing and Urban Development
- San Francisco Regional Office

U.S. Department of Interior
- Bureau of Indian Affairs
  - Colorado River Agency
  - Ft. Yuma Agency
  - Truxton Canon Agency
  - West Regional Office
  - Environmental Quality Services

Bureau of Land Management
Kingman Field Office
State Director
Fish and Wildlife Service
Bill Williams Wildlife Refuge
Ecological Services Field Office, Phoenix
Havasu National Wildlife Refuge
Oakland Regional Office
National Park Service
Air Resources Division
Glen Canyon National Recreation Area
Grand Canyon National Park
Grand Canyon Science Center
Intermountain Field Area
U.S. Geological Survey
Grand Canyon Monitoring and Research Center
U.S. Department of the Army
Corps of Engineers, Los Angeles District
U.S. Department of Transportation
Arizona Division Office

State Agencies
Arizona Corporation Commission Utilities Division
Arizona Department of Environmental Quality
Air Quality Division, Permits Section
Air Quality Division, Planning Section
Counsel
Northern Regional Office
Water Quality Division
Arizona Department of Transportation
Kingman District
Office of Risk Management
Roadside Development Section
Arizona Department of Water Resources
Arizona Game and Fish Department
Kingman Office
Arizona Office of the Governor
Governor
Natural Resources, Agriculture and Environment
Arizona State Land Department
Right of Way
Arizona State Parks
Arizona State Historic Preservation Office
Cooperative Extensions Services

Local Agencies
City of Kingman

Special Projects Administration
Kingman Airport Authority
LaPaz County
Board of Supervisors
Mohave County
Board of Supervisors
Bullhead City Municipal Court
Bullhead City Public Library
Community College
Information Technology Department
Kingman Public Library
Mohave Valley Campus Library
Parks Department
Public Works
Planning and Zoning Department
Transportation Commission

Native American Tribes and Communities

Agua Caliente Band of Cahuilla Indians
Historic Preservation
Ak-Chin Indian Community
Chemehuevi
Tribal Council
Cocopah Indian Tribe
Cocopah Museum
Colorado River Indian Tribe
Fort McDowell Yavapai Nation
Cultural Preservation Office
Fort Mojave
Aha Makav Cultural Society
Tribal Council
Fort Yuma-Quechan Indian Tribe
Cultural Preservation Committee
Hopi Tribe
Historic Preservation Office
Hualapai
Department of Cultural Resources
Tribal Council
Kumeyaay
Campo Band
Viejas Band
Navajo Nation
Historic Preservation Office
Salt River Pima-Maricopa Indian Community
Tonto Apache Tribe

Yavapai-Apache Nation
Yavapai Prescott Indian Tribe
Department of Cultural Resources

Organizations
A/M Gas N Go Inc 50
Audubon Arizona
Arizona Cattleman's Association
Arizona Desert Bighorn Sheep Society
Arizona Electric Power Cooperative, Inc.
Arizona Nature Conservancy
Arizona Wildlife Federation
Blake Cattle Company
Calpine
Calvin James LLC
CEJ LLC
Center for Biological Diversity
Century 21
Coldwell Banker
Council of Energy Resource Tribes
Desert Tortoise Council
El Paso Natural Gas Company
Environmental Defense Fund, Inc.
Ford Motor Company
Arizona Proving Grounds
Gerdau Ameristeel
Globe Corporation
Historic 66 Association of Arizona
Information Society for Protection of Mustangs and Burros
Kiewit Western Company
Kingman Area Chamber of Commerce
Kingman Daily Miner
Land and Water Fund of the Rockies
McKee Foods Corporation
M. De Torro LLC
M&M 2000 LLC
McKee Foods Transportation, LLC
National Parks and Conservation Association
National Tribal Environmental Council
National Wildlife Federation
North Coast Village LLC
Northern Arizona Audubon Society
Northwestern University
Institute for Policy Research
Outback Off-Road Adventures
PDQ Rock & Sand
Prescott Audubon Society

Roadway Express
Sante Fe Railroad
Sierra Club
    Southwest Office
Southwest Network for Environmental and Economic Justice
Sun Up II LLC
TEPPCO
The Nature Conservancy
    Western Resource Office
    Northern Arizona Program and Hart Prairie Preserve
Unisource Energy Services
W F Cattle Company
Walnut Creek Development Company
Wild Horse Organized Assistance
Valley Pioneer Water Company

Individuals
Allen & Lillian C. Smith Trustees
Bonnie & Brien Giglio
Brad L. McCoy
Charles John Romer Trustee
Christopher B. Martin Jr
Daniel E. Calwell
David R. Carey
Donna L. Baker
Edward A. Sr & Donna M. Austin Jr
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George & Monica C. Banuelos CPWRS
James Blake
James & Karen Dove Jr
James E. & Beverly N. Brand CPWRS
Jack Erhart
Jack E. & Navis L. Runyan
Jeannie Hirschfeld Etal Jr
Max D. Linn
Michael W. Reilly
Scot A. Durst Jt
Thomas L. Cloos Etal Jr
Travis Holyoak
Timothy Huddleston
Wendy Carlson
William & Christine Summitt Trustees
Verna A. Schwab
Victoria Torres-Huerta

5.1.3 List of Preparers

Name	Responsibility
Western Area Power Administration	
Lynn Almer	Water Resources
Erica Walters	Climate and Air Quality
Misti Schriner	Biological Resources
Mary Barger and Steve Tromly	Cultural Resources
Nancy Werdel	Land Use, Recreation, and Socioeconomics
Robert Scott	Visual
Ken Mathias	Health and Safety
Doug Harness	Legal
Glenn Wallace and Mark Wieringa	Western's Project Management; Document Coordination
ARCADIS	
Jackie Headrick	Water Resources, Geology, and Soils
Gordon Frisbie and Susan Riggs	Air Quality and Noise
Janell Harvey and Pat Golden	Biological Resources
Carl Spath and Don Jolly	Cultural Resources
Kathryn Cloutier	Land Use, Socioeconomics, Health and Safety, Environmental Justice
Lisa Welch	Visual, Transportation, and Recreation
Jason Gregory	GIS, Simulations
Randy Schroeder and Eric Cowan	Project Management; Document Coordination
Sierra Research	
Mark Peak	Air Quality

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APPENDIX A — ADWR HYDROLOGIC REVIEW

ARIZONA DEPARTMENT OF WATER RESOURCES

HYDROLOGY DIVISION

MEMORANDUM

TO: Arizona Power Plant and Transmission Line Siting Committee

THRU: Frank Putman, Chief Hydrologist

FROM: Dale Mason, Hydrologist, Water Resources Section

DATE: July 18, 2007

RE: Hydrologic Review of the Northern Arizona Energy Project's Power Plant Application, Docket Number L-00000FF-07-0134-00133.

Summary

On April 26, 2007, the Arizona Corporation Commission Utilities Division Staff requested that the Arizona Department of Water Resources (ADWR) address the following subjects regarding the Northern Arizona Energy Project (NAEP) application. Those subjects are: 1) will the project have a detrimental impact upon water supplies in Mohave County, and 2) will the project have any impact on water supplies for existing or known planned developments in Mohave County.

The answer to the first question, will the NAEP have a detrimental impact upon water supplies in Mohave County, is no. A comparison of the expected annual volume of water used by the NAEP to the estimated annual recharge for the Sacramento Valley Groundwater basin indicates that the NAEP may potentially have a small impact on the annual water budget for the basin. A second comparison of the estimated total water use over the life expectancy of the NAEP to estimates of groundwater in storage in the basin indicates that any impacts to overall water supplies in the basin will be insignificant.

The answer to the second question, will the NAEP have an impact on water supplies for existing or known developments, is that the NAEP will probably have an insignificant impact on any such developments. A well impact analysis of NAEP pumpage predicts a maximum drawdown of 15 feet at the pumping well after 40 years of pumping at the maximum projected annual withdrawal rate of 270 acre-feet per year (Figure 1). A drawdown of 4 feet is expected to occur at approximately three-quarters of a mile from the pumping well, and a drawdown of 1 foot is expected at approximately 6.7 miles from the pumping well after 40 years (Figure 1). Wells for the Golden Valley – Phase 1 development can expect additional drawdowns of between 1 to 2 feet after 40 years due to the NAEP. Proposed wells for the planned Golden Valley - Phase 2 development may experience additional drawdowns of 1 to 4 feet (Figure 1).

In all cases, the impacts from the NAEP would by considered insignificant. A detailed discussion of the potential impacts from NAEP is included below.

Impact to Water Resources

Estimates of the annual ground-water outflow from the Sacramento Valley basin have ranged from less than 500 ac-ft per year to as much as 10,000 ac-ft per year (Gillespie, J.B. and Bentley, C.B., 1971; Freethey, G.W. and Anderson, T.W., 1986; Owens-Joyce, 1987; Rascona, S.J., 1991; ADWR, 1997). Groundwater in Sacramento Valley generally flows to the south, paralleling Sacramento Wash, before turning east and flowing out of the basin near Topock, Arizona. In 1997, the ADWR estimated ground-water outflow from the Sacramento Valley basin to be 1,200 ac-ft per year (ADWR, 1997). This estimate was based on water level data, aquifer test results, and a geologic cross-section across Sacramento Valley's ground-water outflow point near Topock, Arizona. Water levels in wells in the southern part of the Sacramento Valley basin have generally been steady over the past 20 to 30 years indicating that the basin's ground-water outflow probably has not been greatly affected by pumpage in the central part of the valley. Therefore, the basin's outflow is probably equal to the annual aquifer recharge.

The NAEP is a peaking plant that will be used to supply electrical power during times of peak demand and is expected to run an average 2,500 hours per year and use 160 acre-feet of water per year. A worst case scenario of the NAEP running for 5,000 hours per year would result in a water use of 270 acre-feet per year. The range of water use by the NAEP represents from 13 to 22 percent of the estimated annual recharge for the Sacramento Valley basin. However, the expected NAEP annual water use probably falls within the range of uncertainty of the ADWR recharge estimate.

Current water use in Sacramento Valley is estimated at about 2,900 ac-ft per year (Tadayon, 2004, Southwest Groundwater, 2007). Water uses consist of about 1,500 ac-ft for municipal/domestic use and about 1,400 ac-ft of industrial pumpage. The majority of the industrial pumpage, about 1,200 ac-ft per year, is for the Griffith Power Plant. Annual historic water use estimates have ranged from less than 500 ac-ft per year to as much as 6,000 ac-ft per year during the late 1960s and the 1970s (Rascona, 1991; Tadayon, 2004). The high water use during the 1960s and 1970s was due to withdrawals for mineral extraction and processing by the Cyprus Metals Company (Rascona, 1991). In 1989 the mine was placed on stand-by and withdrawals for mining have decreased to about 300 ac-ft per year. Future pumpage in Sacramento Valley may exceed 30,000 ac-ft per year if the planned developments reach full build out, the mine becomes active again, and the Mohave County water system reaches its maximum capacity of 4,800 gallons per minute (7,260 ac-ft per year).

Estimates of the volume of groundwater in storage above 1,200 feet below land surface and available for withdrawal in Sacramento Valley basin ranges from 2.3 to 13 million acre-feet (Gillespie, J.B. and Bentley, C.B., 1971; Freethey, G.W. and Anderson, T.W., 1986; ADWR, 1994). Total water use by the NAEP over its 40 year life expectancy would be between 6,400 and 10,800 acre-feet, which represents much less than one percent of the total groundwater available in storage.

Impact to Future Developments

A well impact analysis of NAEP pumpage assigned to a single well in the existing Mohave County Well field produced a maximum drawdown of 15 feet at the well after 40 years of pumping the maximum projected annual withdrawals of 270 acre-feet per year (Figure 1). A drawdown of 4 feet is expected to occur at approximately three-quarters (0.75) of a mile from the well, and a drawdown

of 1 foot is expected at approximately 6.7 miles from the well after 40 years (Figure 1).

The well impact analysis indicates that the existing Mohave County well field, which supplies water to the county industrial park, will be most affected by withdrawals for the NAEP (Figure 1). After 40 years the existing county wells can expect additional drawdowns of between 3 and 15 feet. Wells supplying two major proposed developments may also be slightly affected by withdrawals for the NAEP. Water supply wells for the permitted Golden Valley development can expect additional drawdowns of between 1 and 2 feet after 40 years due to NAEP pumpage (Figure 1). Wells for the proposed Golden Valley Phase 2 development, which is under review by the ADWR, may experience additional drawdowns of 1 to 4 feet after 40 years at its proposed well sites (Figure 1). Drawdowns of such small amounts will probably have an insignificant impact on the water supplies for these developments.

Attachments:

Figure 1). Maps showing NAEP well impact analysis and locations of existing and future developments, Sacramento Valley

References:

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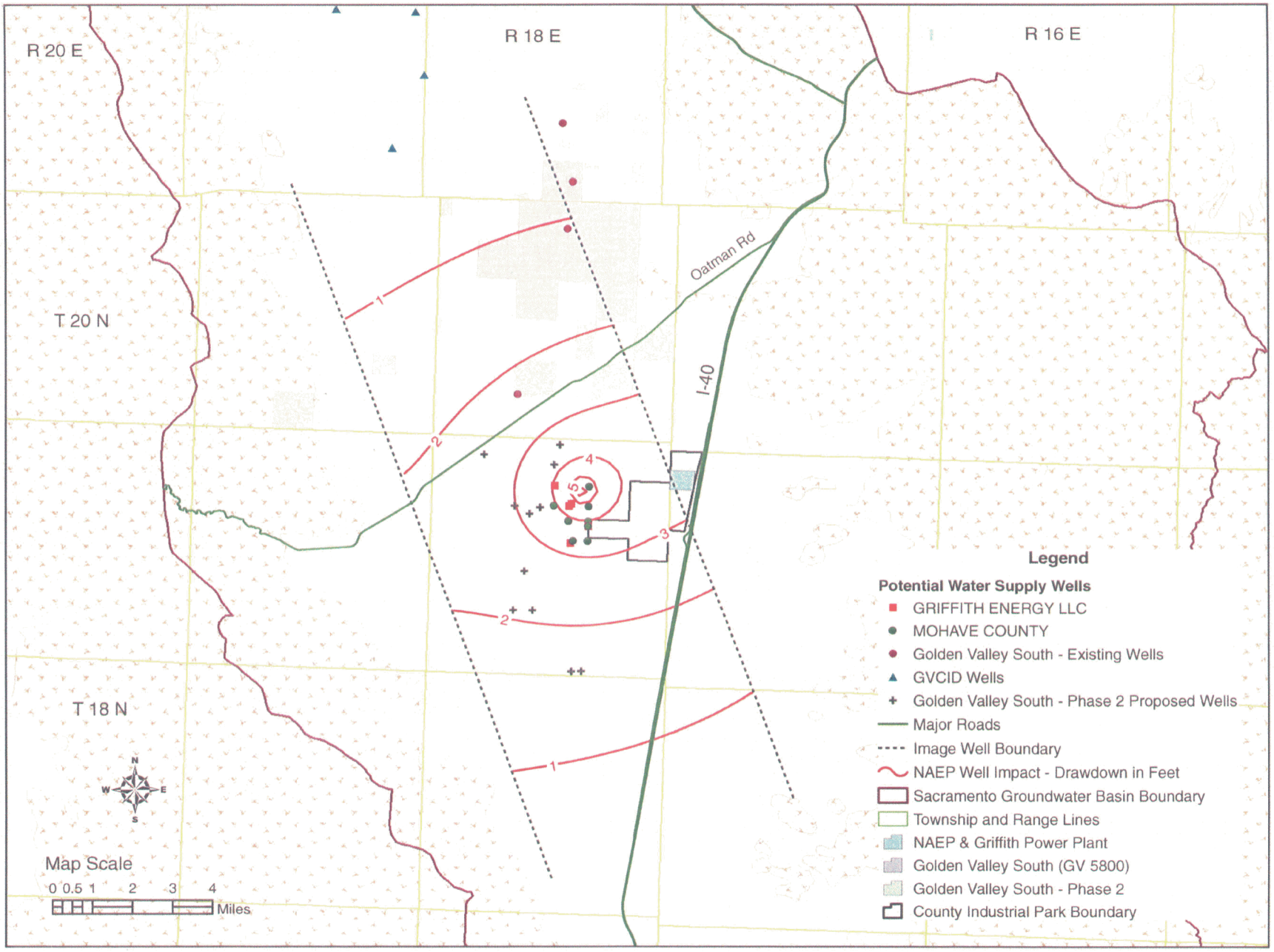


Figure 1. Map showing NAEP impact analysis and existing and planned developments, Sacramento Valley.

APPENDIX B — WESTERN SCOPING NEWSLETTER

Western
AREA POWER
ADMINISTRATION

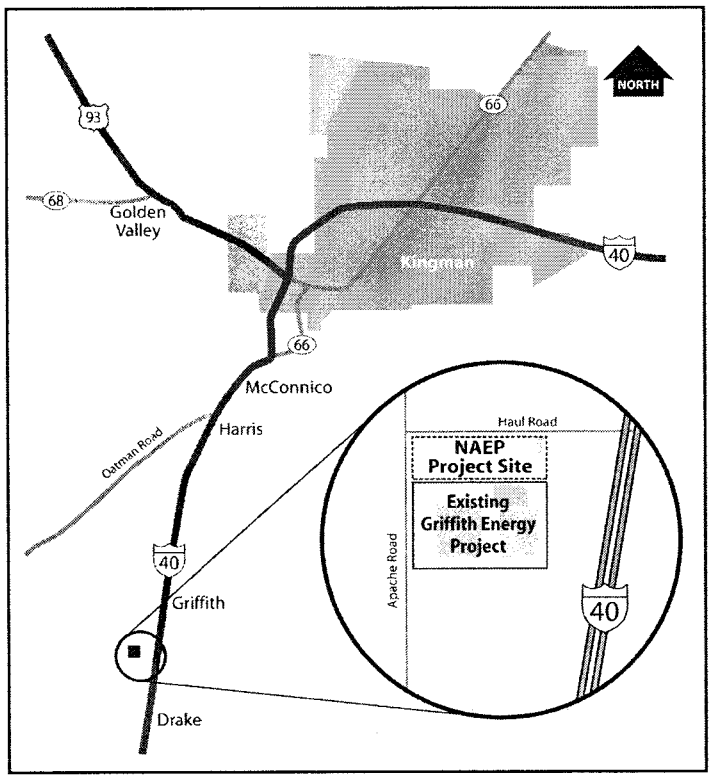
Northern Arizona
ENERGY PROJECT

MARCH 2007

New 175-MW powerplant planned for Mohave County, Ariz., site

Western Area Power Administration, a power marketing agency of the U.S. Department of Energy, wants to hear your comments about a proposed power generation facility that would interconnect with Western's transmission system.

Northern Arizona Energy, LLC proposes to construct the Northern Arizona Energy Project, a natural gas fired, simple-cycle power plant located on private lands located about 9 miles south of Kingman, Ariz. The proposed project would supply power to utilities in Arizona and surrounding regions to serve their customers during periods of peak electricity demand. Construction of the proposed project would start in late 2007 and be complete by May 2008.



The proposed project would be located on an approximately 40-acre parcel of land just north of the existing Griffith Energy Project. Gas and water would be provided by the adjacent Griffith Energy Project. Within the parcel, approximately 8 acres would be used for equipment, a stormwater retention basin and interconnection facilities. The proposed project would be interconnected to the regional transmission grid via transmission interconnections at the existing Griffith Switchyard, owned and operated by Western. The Griffith Switchyard would be expanded about 1 acre to accommodate the interconnection with the proposed project. A temporary construction area for contractor facilities, construction parking, and equipment and material lay down would be located east of the power plant site and would require about 3 acres.

Why the Northern Arizona Energy Project?

The Northern Arizona Energy Project is being developed in response to several factors, including:

- Extreme historical and forecasted peak load growth in Mohave County and across Arizona
- Arizona utilities seeking peaking resources
- No existing simple-cycle units in Mohave County to serve peak load profile
- Use of existing I-40 Industrial Corridor infrastructure at property boundaries
  - Existing gas transportation capacity and meter station
  - Western's existing Griffith 230-kV Switchyard
  - Mohave County water system

What facilities and equipment are planned?

Equipment associated with the proposed project would include four General Electric LM6000 PC SPRINT NxGen 45 megawatt combustion turbine generators with inlet air chiller modules. The proposed project would be designed to produce 175 MW of net electrical output. However, annual average output of the proposed project would not exceed 50 average MW. The generators are capable of rapid startup within 10 minutes, allowing the proposed project to respond to fluctuations in electric demand.

The equipment and facilities would be arranged for optimum use of the power plant site as well as to ensure operability and maintainability. Conceptual engineering studies have been conducted to define the specific equipment requirements and to confirm the suitability of the proposed site.

Why is Western involved in the Northern Arizona Energy Project?

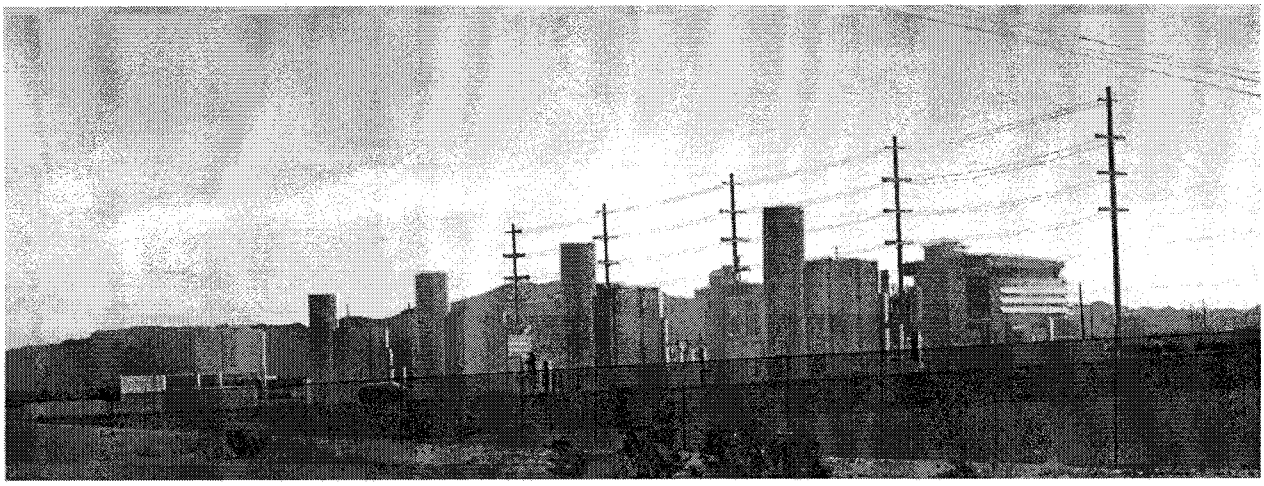
Western operates and maintains about 17,000 miles of high-voltage transmission lines and associated facilities within a 15-state region of the central and western United States. Federal law requires us to provide eligible organizations open access to transmission services so that they can move power to load areas. We provide these services through an interconnection if there is available capacity on the Federal transmission system.

Any entity requesting transmission services must abide by our Open Access Transmission Service Tariff, including our Large Generator Interconnection Procedures. More information about these requirements is available on our Web site at **http://www.wapa.gov/transmission/interconn.htm.**

The owners of the proposed project requested an interconnection with Western's transmission system at Griffith Swithyard. This interconnection request triggers a Federal National Environmental Policy Act review process in addition to the state's permitting processes. Before Western can agree to the construction and interconnection of the proposed project, we must consider the project's potential environmental impacts.

Western needs your help to address environmental impacts

Public involvement is an important and integral part of Western's NEPA process. Scoping involves actively acquiring input from interested Federal, state, tribal and local agencies and the public. Information gained during scoping assists Western in identifying potential environmental issues, alternatives and mitigation measures associated with constructing and operating the proposed project. Scoping also helps narrow the



This visual simulation shows the proposed Northern Arizona Energy Project viewed from the intersection of Haul Road and Apache Road looking southeast.

scope of issues so the analysis of environmental impacts can focus on areas of high interest and concern.

Western wants you to comment on the proposal, offer suggestions to improve the proposal and even suggest alternative actions. Western is also asking you to identify any issues of concern about potential environmental impacts. You can provide input into this process by e-mailing, delivering, or sending by mail or fax your comments by March 31, 2007 to John Holt or by mailing the enclosed addressed response sheet.

This newsletter also serves as Western's notification of plans to prepare an environmental assessment. The EA will provide Western with a framework to analyze and judge the magnitude of environmental impacts. If Western finds that there are no significant environmental impacts, we can issue a "finding of no significant impact" and move forward with the proposed project. If the EA process identifies likely unmitigated significant impacts, an environmental impact statement process will be initiated to take a more detailed look at the impacts and alternative approaches to the proposed project.

If you would like to receive a copy of the Draft EA for review, please note so on the response sheet. Western will also be the lead agency for compliance with the National Historic Preservation and Endangered Species acts.

Preliminary issues

The following issues and concerns have been identified as among those that should be examined for impacts. The list will be finalized during Western's EA process and used to prepare the Draft EA.

- Air emissions from the combustion turbines
- Noise generated by the combustion turbines
- Loss of desert habitat
- Construction worker travel effects on local transportation facilities
- Changes in land use
- Influx of construction workers and effects on local infrastructure
- Water required by the proposed power plant

Where can I get more information?

Mr. John Holt
Western Area Power Administration
P.O. Box 6457
Phoenix, AZ 85005-6457
Phone: 602/605-2525
Fax: 602/605-2630
E-mail: holt@wapa.gov

Ms. Dana Diller
Northern Arizona Energy Project
6410 E. Everett Dr.
Scottsdale, AZ 85254
Phone: 480/664-8154

You can also find out more about the proposed project by visiting us online at **www.wapa.gov/transmission/internaep.htm**

What Is the EA schedule?

- **Early March 2007** – Scoping notice sent to stakeholders; comments solicited to help define EA scope
- **March 31, 2007** – EA scoping period closes
- **April 2007** – Western incorporates scoping comments and distributes Draft EA for review
- **August 2007** – Western determines whether to prepare a FONSI or an EIS and issues a FONSI or EIS determination

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