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Duke Energy North America
A Duke Energy Company

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P.O. Box 1642
Houston, TX 77251-1642
(713) 627-6500

July 13, 2001

HAND DELIVERED

Deborah Scott, Director
Utilities Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, AZ 85007

RE: Application for a Certificate of Environmental Compatibility for the Arlington Valley Energy Facility II (AVEF II) Project

Dear Ms. Scott:

Duke Energy Maricopa LLC ("Duke") is pleased to provide 25 copies of the attached Application for a Certificate of Environmental Compatibility ("CEC"). This CEC Application is for the AVEF II Project proposed to be located adjacent to the AVEF I that is currently under construction near Arlington in Maricopa County, Arizona.

We also have enclosed a check for $10,000 as per A.R.S. § 40-360.09.

Duke requests that the public hearing before the Power Plant and Transmission Line Siting Committee for this Application be set at the first available date. We have enclosed a form of notice to the Power Plant and Transmission Line Siting Committee for its convenience.

If we can be of assistance to the Power Plant and Transmission Line Siting Committee on this Application, please contact me at (713) 627-6572.

Sincerely,

Max Shilstone
Manager

Enc. 25 copies of the CEC Application
Check for $10,000
Form of Notice

Duke Energy North America
A Duke Energy Company

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2001 JUL 13 P 4: 14

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North America, LLC
5400 Westheimer Court
Houston, TX 77056-5310
P.O. Box 1642
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BEFORE THE ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF DUKE ENERGY MARICOPA, L.L.C. IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES §40-360.03 AND §40-360.06 FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING THE CONSTRUCTION OF A NATURAL GAS-FIRED, COMBINED CYCLE GENERATING FACILITY (ARLINGTON VALLEY ENERGY FACILITY II) NEAR ARLINGTON IN MARICOPA COUNTY, ARIZONA	Docket No. L-________ L-00000P-01-0117 CASE No: _____

NOTICE OF HEARING

A public hearing will be held before the Power Plant and Transmission Line Siting Committee ("Committee") at ______________________________________ Arizona, on ___________, 2001 at _____ _.m. and continuing on __________, 2001 at ________ _.m. or as soon as the matter can be heard, regarding the Application of Duke Energy Maricopa, L.L.C. or their assignee(s) ("Duke") for a Certificate of Environmental Compatibility authorizing the Arlington Valley Energy Facility II in Maricopa County, Arizona. The Arlington Valley Energy Facility II includes a 600-megawatt (MW) (nominal) gas turbine/steam turbine combined-cycle merchant power plant. This is an expansion of Duke's approved Arlington Valley Energy Facility I. The proposed site of the project is a 65 acre site approximately 50 miles west-southwest of Phoenix, in Maricopa County, Arizona. The project site is situated approximately 1.5 miles southwest of the Palo Verde Nuclear Generating Station property and 5 miles west of the town of Arlington. The site is located on the south side of Elliot Road between 387th Avenue and 391st Avenue, 112° 53' 34" longitude and 33° 20'54" latitude, Section 17, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian.

The application, including detailed maps of the proposed Arlington Valley Energy Facility II, is on file with the Docket Control Center of the Arizona Corporation Commission's Phoenix Office at 1200 West Washington Street, Suite 108, Phoenix, Arizona 85007 and the Commission's Tucson Office at 400 West Congress, Suite #218, Tucson, Arizona 85701.

Depending upon the issues raised and the number of intervenors appearing during the hearing, the Committee may deem it appropriate at some point to recess the hearing to a time and place to be announced during the hearing. At the discretion of the Committee, such resumed hearing may be held at a date, time and place to be agreed upon by the Committee and or its Chairman.

NOTE: Notice of such resumed hearing will be given. Published notice of such resumed hearing is not required.

Each county and municipal government and state agency interested in the proposed facilities and desiring to become a party to the certificate 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 facilities are 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 hearing officer, 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 oral testimony or cross-examine witnesses.

This proceeding is governed by Arizona Revised Statutes §§40-360 and 40-360.13 and Arizona Administrative Code rules R14-3-201 to R14-3-219. The written decision of the Committee shall be submitted to the Arizona Corporation Commission pursuant to Arizona Revised Statutes §40-360.07. Any person intending to be a party before the Arizona Corporation Commission must be a party to the certification proceedings.

ORDERED this ____ day of ___________, 2001.

____
Laurie A. Woodall
Chairman
Arizona Power Plant and Transmission
Line Siting Committee

ORIGINAL

NEW APPLICATION

APPLICATION FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

ARLINGTON VALLEY ENERGY FACILITY II PROJECT

DOCKET NO. L00000P-01-0117

Prepared for

STATE OF ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

Prepared by

DUKE ENERGY MARICOPA, LLC

Date: July 2001
Case No. ________

BEFORE THE
POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

DOCKET NO. L00000P-01-0117

In the Matter of the Application of Duke Energy Maricopa, LLC in conformance with the requirements of Arizona Revised Statutes 40-360.01 et seq., for a Certificate of Environmental Compatibility authorizing construction of a natural gas-fired, combined-cycle generating facility (Arlington Valley Energy Facility II) near Arlington in Maricopa County, Arizona	)))))))))	Case No. __________

APPLICATION FOR
CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

TABLE OF CONTENTS

INTRODUCTION

Duke Energy Maricopa, LLC (Duke) is requesting a Certificate of Environmental Compatibility (CEC) from the Arizona Power Plant and Transmission Line Siting Committee (Siting Committee) for construction of the Arlington Valley Energy Facility II (AVEF II), which is an expansion of Duke's approved Arlington Valley Energy Facility I (AVEF I). The proposed project will include the construction and operation of a 600-megawatt (MW) (nominal) gas turbine/steam turbine combined-cycle merchant power plant in Maricopa County, Arizona. The key elements of the proposed project include:

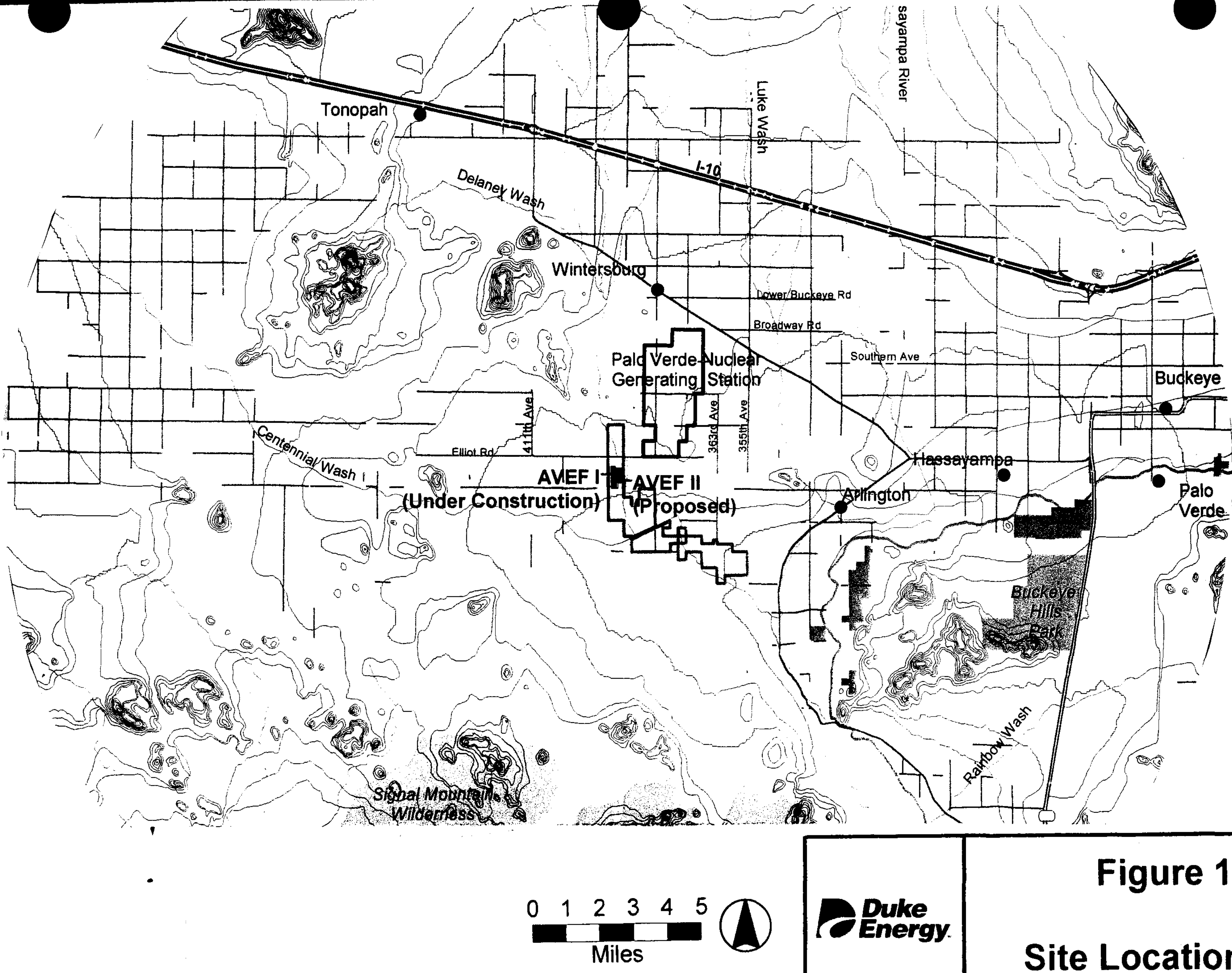
- Two combustion turbine generators (CTGs) with inlet chilling fueled by pipeline-quality natural gas;
- Two natural gas supplementary-fired Heat Recovery Steam Generators (HRSG);
- One steam turbine generator (STG) set;
- One gas-fired (intermittent) auxiliary boiler;
- One surface condenser; and
- Two mechanical draft cooling systems.

Construction will begin in February 2002, with commercial operation scheduled to begin in June 2003. The plant will generate 600 MW, enough electricity to serve approximately 480,000 homes during peak summer demand. The project is designed to use the latest combined cycle generating technology to produce reliable and low-cost electrical power and minimize environmental impacts.

The project will be located approximately 50 miles west of Phoenix, in unincorporated Maricopa County near Arlington, Arizona, which is about 8 miles south of Interstate 10 (Figure 1). This facility will be located immediately south and adjacent to AVEF I that is currently under construction. The project site was selected for the following reasons:

- A natural gas pipeline, water sources, roads, and railroad access needed for construction and operation of the project are already in place at or near the proposed plant site. Electrical transmission lines are available near the project site to provide interconnections with the existing power grid through the Hassayampa switchyard, currently under construction east of the proposed AVEF II plant site.

- The area presently supports energy production and transmission facilities. The PVNGS, which has been in operation for 15 years, is located 2 miles from the project site. The Redhawk Generating Station, the Mesquite Generating Station, and AVEF I plants which were recently approved by the ACC are within a 5 mile radius of the project site. The Hassayampa switchyard that will connect the plant to the existing distribution system is located approximately 1.5 miles east of the project site. The new generation units will be compatible with existing land uses in the vicinity of the project site and will not conflict with any future development plans.



Duke Energy

Figure 1:

Site Location

- Local community services are available to support the additional workforce required for this project. The project location is within commuting distance of the Phoenix metropolitan area, which would be expected to supply the majority of the facility's work force and thereby cause no changes in the area population.

This application includes the environmental evaluation and documentation relevant to the proposed project as specified by Arizona Administrative Code Rule R14-3-219. Environmental controls will be provided to ensure that the project complies with all applicable environmental regulations. In summary, impacts will be avoided and minimized as follows:

- All groundwater pumped at the facility will be withdrawn and used in accordance with the Groundwater code and the associated Phoenix Active Management Area Management Plan.

- Prior to building AVEF I, Duke acquired 6,800 acre-feet of water rights through the purchase of former agricultural land. In preparation for AVEF II, Duke purchased an additional 1,000 acre-feet of water on adjacent lands. Therefore, the total water available to Duke is approximately 7,800 acre-feet/year. Duke will operate both AVEF I and AVEF II, along with its land management plan water obligations, on 7,800 acre-feet/year. This result is achieved through the use of a High Efficiency Reverse Osmosis ("HERO") water treatment system.

- In anticipation of the CEC application, Duke performed an impact study on the withdrawal of an additional 1,000 acre-feet/ year from the aquifer. The results of that study, which is set forth in full at Exhibit B-2, establishes that the withdrawal of 7,800 acre-feet/year (the sum of the original 6,800 acre-feet/year and the additional 1,000 acre-feet/year) will have minimal impact on the aquifer. The study at Exhibit B-2 also addresses the cumulative impact the additional pumping will have on groundwater in the Arlington Valley area, and found those impacts to be relatively unchanged from the original study by Dr. Peter Mock.

- In an effort to offset the additional groundwater pumping that will occur as a result of AVEF II, Duke intends to participate in the Central Arizona Water Conservation District's Agua Fria Recharge Project, in cooperation with the Arizona Water Banking Authority. Duke anticipates recharging 1,000 acre-feet/year of water through the recharge project for the life of the AVEF II facility, subject to reasonable limitations on costs and availability of water supplies. Although the Agua Fria project will not directly replenish groundwater withdrawn from beneath the facility, it will add recharge water to the Phoenix Active Management Area in a Critical Area of concern for the Department of Water Resources under the Third Management Plan.

- The plant site is located on land previously used for agriculture.

- Based on discussions with agencies, database review, and field evaluations, impacts to sensitive plants or wildlife populations/habitat are not anticipated.

- No documented archaeological or historic resources are located at the proposed plant site.

- Noise from the new generating facilities is expected to have minimal impacts on residents in the vicinity of the plant (see Exhibit I for results of noise surveys conducted in May 2001).

- The proposed natural gas-fired combustion turbines operating in combined cycle mode use the lowest emitting fossil fuel fired technology available, on a per-unit generating capacity basis, and produce the least amount of waste per unit of electricity.

The total project cost is estimated to be about $250 million. The new generating units will provide social and economic benefits to the community in the following ways:

- Annual property tax revenues from AVEF II will increase funds available to any one of a number of public services (see Exhibit J-4, Economic and Fiscal Impact Report and Update).

- Approximately 300 jobs, including many technical and skilled craft positions, will be created during the 12- to 14-month construction period. Up to 10 moderate- to high-wage permanent jobs also will be generated for commercial operations. In addition, a comparable number of secondary employment opportunities (services, vendors, and suppliers) will likely be generated during the construction and operational phases of the proposed project (see Exhibit J-4, Economic and Fiscal Impact Report and Update).

- The project will increase electrical energy supply capacity and help moderate large swings in wholesale electricity prices during periods of high consumer demand, such as during the hottest summer months.

- As evidenced in Exhibit J, AVEF II is supported by the community. Duke has been an active contributor and participant in the Arlington community and the expansion of the AVEF I will strengthen the relationship between Duke and the community.

After evaluating the factors to be considered by the Siting Committee (as defined in ARS §40-360.06), Duke has concluded that the project is environmentally compatible with the surrounding area.

APPLICATION

APPLICATION

1. *Name and address of the applicant:*

   Duke Energy Maricopa, LLC
   5400 Westheimer Court
   Houston, Texas 77056-5310

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

   Mr. Max Shilstone, Manager
   Duke Energy North America
   5400 Westheimer Court
   Houston, Texas 77056-5310
   (713) 627-6572

3. *State each date on which applicant has filed a 10-year plan in compliance with ARS §40-360.02,and designate each such filing in which the facilities for which this application is made were described. If they have not been previously described in a 10-year plan, state the reasons therefore.*

   Not applicable because new transmission lines are not the subject of this application. Duke has filed a 10-year plan for its transmission line that was approved in ACC Decision No. 62995.

4. *Description of the proposed facilities, including:*

4.a. *With respect to an electric generating plant:*

   4.a.i *Type of Generating Facilities.*

   The proposed AVEF II will utilize two, 170-MW GE 7FA natural gas-fired combustion turbines operating in combined-cycle mode with two supplementary fired, three-pressure HRSGs and a common, reheat condensing steam turbine. Steam generation in the HRSGs will be augmented with supplementary natural gas-fired duct burners. Each HRSG will produce high-pressure steam at approximately 1,800 pounds per square inch gauge (psig) for introduction into the steam turbine. The steam turbine will drive an additional generator to increase the total plant output to about 500 MW without duct firing or 600 MW with duct firing and inlet air chilling.

The production of electricity using a combustion turbine engine coupled with a shaft driven generator is referred to as the Brayton Cycle. This also is referred to as a "simple-cycle" and has been traditionally utilized for electricity peaking generation since the unit and its output can be brought on line very quickly. The Rankine Cycle represents the traditional method of generating power from utility steam electric power plants. In this cycle, boilers are used to produce high-pressure steam, which expands in a steam turbine to drive an electric generator. Each AVEF II generator connects through the 500 kV switches and connects to a strain bus connected as a continuation of the existing strain bus of AVEF I, which is connected to a single tie line to the Hassayampa switchyard.

The proposed project will combine the Brayton and Rankine cycles to maximize thermal efficiency. Natural gas will be combusted in two Brayton Cycle turbines that will generate most of the electrical output. Instead of being discarded to the environment, the exhaust heat will be recovered in a Rankine Cycle HRSG/steam turbine, and the heat will be extracted until the exhaust temperature is about 200°F before being discharged through the stacks. This will result in an overall thermal efficiency for the proposed project of over 55 percent. The project, therefore, will consume only about two thirds of the fuel that would be consumed in a conventional utility power plant to produce the same amount of electricity. This state-of-the-art, high-efficiency technology combined with the exclusive use of the cleanest fossil fuel (natural gas) and the application of Best Available Control Technology, will yield a small fraction of the air emissions of a similarly sized conventional power plant.

4.a.ii Number and size of proposed units.

The proposed 600-MW merchant power plant will include the following components:

- Two CTGs with inlet chilling fueled by pipeline-quality natural gas;
- Two natural gas supplementary-fired HRSGs;
- One STG set;
- One gas-fired (intermittent) auxiliary boiler;

- One surface condenser;
- Two mechanical draft cooling systems (one for the condenser and one for the chiller);
- Cooling tower water treatment system;
- Plant sumps, sump pumps, and oily water separator;
- Feed water treatment systems including demineralizer regeneration and neutralization tanks;
- Plant and instrument air compressors and auxiliary equipment;
- Sanitary lift station;
- Steam and water sampling systems;
- Deaerator vent; and
- Several buildings for warehouse/maintenance administration and operational activities.

4.a.iii The source and type of fuel to be utilized, including a proximate analysis of fossil fuels.

The combustion turbines will be fueled entirely by natural gas supplied by El Paso Natural Gas Company. A proximate analysis of the natural gas is provided in Table 1. Pipeline quality natural gas will be delivered to the facility at a pressure sufficient for use in the CTGs without additional fuel compression. The gas will be heated to approximately 365°F using steam from the HRSGs. AVEF II service connection within the plant will require the installation of a tee on the 20-inch-diameter natural gas fuel lines to be constructed for AVEF I. Natural gas usage and pressure for AVEF II will be measured at the same regulator stations developed for AVEF I.

Natural gas will first be sent through a knockout drum for removal of any liquid which may have been carried through from the pipeline. The gas will then pass through a filter/separator to remove particulate matter and entrained liquid. The gas will flow through the filter/separator's first chamber, the filtration section, where entrained liquid will coalesce on the filter cartridges, drop to the bottom of the chamber and either vaporize and return to the main gas stream or drain to the sump below. The gas will then flow through the coalescing filters that will remove particulate matter. The gas will then pass to the second chamber, the separation section, where any entrained liquid remaining in the stream will be returned to the gas stream. The gas will be preheated and split into two streams, one for each CTG. Finally, the gas will be delivered to the CTGs and combusted as part of the power generation operation.

Table 1
Natural Gas Analysis

Component	Normalized Percent
Carbon Dioxide	0.78
Nitrogen	1.33
Methane	96.08
Ethane	1.49
Propane	0.21
Iso. Butane	0.03
Normal Butane	0.03
Iso. Pentane	0.01
Normal Pentane	0.01
Hexane and Heavier	0.03
Gallons Per Minute	0.776
BTU (standard cubic feet)	1,020
Specific Gravity	0.587

Source: Casa Grande Gravitometer 01 April, 2001; El Paso Natural Gas, June 1999 to June 2000 (annual average).

One emergency diesel engine, nominally 400 horsepower (hp), will be located on-site and operated as an emergency fire-water pump driver. The facility operations plan calls for this unit to be operated less than 500 hours per year. The engine will be equipped with a 150-gallon fuel storage tank.

4.a.iv *Amount of fuel to be utilized daily, monthly, and yearly.*

Maximum natural gas usage for the proposed project will be approximately 100 million standard cubic feet (100 MMscf) per day; 3,000 MMscf per month; and

37,000 MMscf per year. This projected gas usage is based on lower heating value (LHV). The fuel use will vary based on the actual number of hours of operation of the combustion turbines, duct burner, and auxiliary boiler, and start-up/shut-down conditions. In the unlikely event of a fire, diesel will be used to fuel fire-water pump operations.

4.a.v Type of cooling to be utilized and the source of any water to be utilized.

4.a.v.1 Type of cooling:

A ten-cell cooling tower will be integral to operation of the facility. The majority of the cooling water will be used in the surface condenser to absorb the heat rejected from the steam turbine. Water from the cooling tower is commonly referred to as "main" cooling water. A dedicated set of cooling water pumps will be provided for this service. Additional cooling water will be required for auxiliary plant cooling. Cooling tower water will not be used for direct cooling of plant auxiliaries; a closed loop auxiliary cooling system consisting of pumps, expansion tank, and heat exchangers will be provided for this purpose. Cooling tower water circulated through a set of plate and frame heat exchangers will cool a closed loop coolant, usually a glycol/water mixture; this is commonly referred to as "auxiliary" cooling water. The cooling tower itself is a device designed to evaporate clean water, which provides cooling. Some small water droplets (referred to as drift) will escape from the top of the tower, and may liberate dissolved solids as they evaporate in the atmosphere.

The turbines will employ inlet chillers during hot ambient conditions to recover power output that would normally be lost due to lower air density at higher ambient temperatures. The process of cooling takes place at the cooling coils where inlet air is cooled before entering the CTG compressor. At lower temperature, the air becomes more dense and therefore more mass flows through the CTGs. The net increase in mass flow will result in higher output for each of the CTGs by up to 22 MW. In addition to the output enhancement from the CTGs, the additional mass flow also will increase output of the STG by approximately 12 MW.

The inlet chilling system is a mechanical system using refrigerant for cooling. A second, smaller (7 celled) cooling tower will reject heat for the chillers. This tower will be similar to the process cooling tower, except that it will only operate when the chillers are on (high ambient temperatures).

4.a.v.2 Water Source:

Sufficient water exists for Duke to operate both facilities (AVEF I and II) efficiently and to complete its obligations set forth in the Land Management Plan.

AVEF I and AVEF II will use approximately 7,800 acre-feet/year of water. This water will be used mainly for the purpose of steam generation and system cooling. Small quantities of water will be required for on-site drinking water, landscaping and other less demanding uses. Water will be pumped from existing or new wells located on Duke's property. All groundwater pumped at the facility will be withdrawn and used in accordance will the Groundwater Code and the associated Phoenix Active Management Area Management Plan.

Groundwater for both projects will be supplied by Grandfathered Right 58-101121. This right is the result of consolidation of six distinct rights located on the lands Duke acquired in preparation for building AVEF I. In anticipation of AVEF II, Duke has acquired additional Irrigation Grandfathered Rights Nos. 58-105005 and 58-100105. Duke anticipates consolidating these rights into Right No. 58-101121. Combined, it is estimated that Duke will have approximately 7,800 acre-feet/year of Type I groundwater available for use at its sites. Duke will convert the Irrigation Grandfathered Rights into Type I rights as they become necessary to meet the needs of the two facilities.

An evaluation of the physical availability of water over the lifetime of the two projects has been conducted and is attached as Exhibit B-2. This study took into account the impact to the aquifer of the additional pumping associated with AVEF II. This study also renders an opinion regarding cumulative impacts of this additional pumping on the aquifer. Duke's water impact analysis concludes that the withdrawal of 7,800 acre-feet per year will have minimal impact to the aquifer.

The evaluation of the potential impact of groundwater pumping on groundwater levels was conducted using two approaches. The first approach compared projected pumpage (7,800 acre-feet per year) for this proposed project to historic pumpage to provide insight into potential future impacts. The proposed water use is less than half of the historic withdrawals for irrigation on the parcels being acquired by Duke, and about a quarter of the historic pumpage in the project area. The potential impacts of the proposed are therefore expected to be considerably less than what was experienced historically when the area was under irrigation.

The second approach simulated the potential effects of the proposed groundwater pumping (7,800 acre-feet per year) on the aquifer. Groundwater modeling over the expected life of the expanded power plant was conducted to simulate water level changes from the proposed pumping alone. After 30 years of pumping, minimal water level changes (up to 10 feet) are projected within 3 miles of the plant production wells, and smaller level changes at greater distances. These projections are considered conservative as they do not consider the retirement of current irrigation pumpage or the natural recovery of water levels that has occurred in recent years.

The same model also was used to simulate water level changes from the addition of the proposed pumping for AVEF II. After 30 years of pumping, minimal water level changes (up to 3 feet) are projected within about 0.5 mile of the plant production wells, and smaller level changes at greater distances. Again, these projections are considered conservative as they do not consider the retirement of current irrigation pumpage or the natural recovery of water levels that has occurred in recent years.

An assessment of the cumulative impact to groundwater levels in the Arlington area, from the withdrawals from three separate power generating facilities (AVEF I, Sempra Mesquite, and Pinnacle West Redhawk) was conducted in 2000 by Dr. Peter Mock. Duke has asked Dr. Mock to update his study to take into consideration the additional groundwater use (1,000 acre-feet per year) proposed by AVEF II. Duke has asked that Dr. Mock undertake the update under the same elements of impartiality that he used to conduct his original study. We anticipate that Dr. Mock's update will be completed in time for the hearing on this CEC.

Duke anticipates utilizing lined evaporative ponds with leak detection monitors, to be permitted by ADEQ, for disposal of its wastewater.

4.a.vi Proposed height of stacks and number of stacks, if any:

A total of 5 stacks will be constructed at the plant site. Both CTG and HRSG units will include stacks 185 feet above ground surface. The auxiliary boiler will require a 37-foot-high stack. The diesel engine fire pump and the diesel engine backup systems will require approximately 14-foot-high stacks.

4.a.vii Dates for scheduled start-up and firm operation of each unit and date construction must commence in order to meet schedules:

A primary contractor (Duke-Fluor Daniel) will design and construct the facility. Duke has firm contracts for the delivery of essential turbine equipment to meet the construction schedule. Construction activities will be initiated by February 2002 and are expected to extend over a period of 12 to 14 months into 2003. During this period, the construction work force will include up to 300 people. An area at the site will be used temporarily for construction parking, work trailers, storage, and laydown areas. Water and electrical power facilities will be made available at the site for use during construction. The primary access during construction to the project site will be from the existing access road that enters the site from the north off of Elliot Road. Commercial operations are scheduled to begin in June 2003.

4.a.viii To the extent available, the estimated costs of the proposed facilities and site, stated separately.

Estimated construction costs for the power plant associated natural gas and water pipelines, and related facilities are $250 million.

4.a.ix Legal description of the proposed site.

The AVEF II site, which will include approximately 65 acres associated with the plant facility and evaporation ponds, is located approximately 50 miles west-southwest of Phoenix, in Maricopa County, Arizona. It's anticipated that additional acreage of previously disturbed agricultural land will be disturbed temporarily during construction activities. The project site is situated approximately 1.5 miles southwest of the PVNGS property and 5 miles west of the town of Arlington. The site is located on the south side of Elliot Road between 387th Avenue and 391st Avenue. The site is located at 112° 53' 34" longitude and 33° 20' 54" latitude. The plant site will be located in Section 17, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian.

4.b With respect to a proposed transmission line:

4.b.i Nominal voltage for which the line is designed; description of the proposed structures and switchyards or substations associated therewith; and purpose for constructing said transmission line.

No new transmission lines, switchyards, or substations will be required. AVEF II will use the already approved intertie line from the AVEF I to the Hassayampa switchyard.

4.b.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.

No transmission line will be required (see 4.b.i)

4.b.iii *Nominal width of right-of-way required, nominal length of spans, maximum height of supporting structures, and minimum height of conductor above ground.*

No transmission line will be required (see 4.b.i)

4.b.iv *To the extent available, the estimated costs of proposed transmission line and route, stated separately.*

No transmission line will be required (see 4.b.i)

4.b.v *Description of proposed route and switchyard locations.*

No transmission line will be required (see 4.b.i)

4.b.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.).*

No transmission line will be required (see 4.b.i)

5. *List the areas of jurisdiction (as defined in ARS §40-360) affected by each alternative site or route and designate those proposed sites or routes, if any, which are contrary to the zoning ordinances or master plans of any of such areas of jurisdiction.*

All components of the project will be located entirely within an unincorporated area of Maricopa County. The plant site, access road, and natural gas and water pipelines will be located on private lands currently owned or controlled by Duke.

The proposed project is located within the Rural-190 Zoning District as designated by Maricopa County and shown on the Maricopa County Zoning Maps. For the AVEF I, Duke obtained from Maricopa County (a) a Special Use Permit for an electrical generating facility and (b) a Comprehensive Plan Amendment to an Industrial land use designation. AVEF II will require an Amendment of AVEF I's Special Use Permit, which will be in conformance with the site's Industrial designation on Maricopa County's Tonopah/Arlington Area Plan.

6. *Describe any environmental studies applicant has performed or caused to be performed in connection with this application or intends to perform or cause to be performed in such connection, including the contemplated date of completion.*

Duke has engaged several experienced consultants who have conducted studies and impact evaluations of the project. The results of these studies are included in Exhibits B through I. For the proposed plant site, evaluations of the existing environment were completed for land use, air quality, water resources, visual resources, biological resources, cultural resources, and noise effects.

Environmental studies of the project area began with the collection of existing environmental data, including literature, maps, and other agency data. Background information and data collected and utilized for AVEF I were reviewed, updated, and incorporated into this application, where applicable to AVEF II. Interviews were conducted with appropriate agencies and organizations. Resource specialists conducted field studies of the project area.

Potential environmental effects of the proposed project were assessed for the disciplines addressed above. Where appropriate, mitigation measures were identified to minimize or eliminate impacts. Duke will implement identified mitigation measures as integral elements of the project. These include state-of-the-art combustion technology and continuous air emissions monitoring.

Duke therefore affirms, upon thorough, expert scientific environmental investigation and analyses, that the proposed project is environmentally compatible, and respectfully requests the Committee to issue its Certificate of Environmental Compatibility for the proposed AVEF II project.

DUKE ENERGY MARICOPA, LLC

By: Bradley K Porter
Authorized Officer

ORIGINAL and 25 copies of the foregoing hand delivered and filed
With the Director of Utilities, Arizona Corporation Commission,
this 5th day of July, 2001.

A

Table 4. Complete Inventory of Wells for Township 1 South, Range 6 West
Arlington Valley Energy Facility, Arlington Valley, Arizona

Category	Duke Parcel	Duke Well ID	Cadastral Location	Registration Number	Water Use	Site Use	Owner	Depth (feet)	Diameter (inches)	Perforated Interval (feet)	Year Constructed	Source
Palo Verde Wells			C-01-06 03BBD	613287	Monitoring	Observation	AZ PUBLIC SERVICE	41	3		1978	Registry
			C-01-06 03BBD	613288	Monitoring	Observation	AZ PUBLIC SERVICE	44	3		1978	Registry
			C-01-06 03BBD	613289	Monitoring	Observation	AZ PUBLIC SERVICE	41	3		1978	Registry
			C-01-06 03BCB	502177	Monitoring	Observation	ANPP	0	0			Registry
			C-01-06 03BCD	502169	Monitoring	Observation	ANPP	0	0			Registry
			C-01-06 03BDA	613278	Monitoring	Observation	AZ PUBLIC SERVICE	61	2		1977	Registry
			C-01-06 03BDA	613279	Monitoring	Observation	AZ PUBLIC SERVICE	44	2		1977	Registry
			C-01-06 03BDA	613290	Monitoring	Observation	AZ PUBLIC SERVICE	44	3		1978	Registry
			C-01-06 03BDB	519348	Monitoring	Observation	AZ PUBLIC SERVICE	70	6		1987	Registry
			C-01-06 03BDB	519355	Test	Piezometer	AZ PUBLIC SERVICE	25	6		1987	Registry
			C-01-06 03BDB	519364	Monitoring	Observation	AZ PUBLIC SERVICE	70	6		1987	Registry
			C-01-06 03BDB	519370	Test	Piezometer	AZ PUBLIC SERVICE	15	6		1987	Registry
			C-01-06 03BDD		Unused	Observation	PVNGS	50		20 - 50	1973	GWSI
			C-01-06 03CAC	519351	Monitoring	Observation	AZ PUBLIC SERVICE	130	6		1987	Registry
			C-01-06 03CAC	519367	Monitoring	Observation	AZ PUBLIC SERVICE	130	6		1987	Registry
			C-01-06 03CBD	502170	Monitoring	Observation	ANPP	0	0			Registry
			C-01-06 03CCA	502167	Monitoring	Observation	ANPP	0	0			Registry
			C-01-06 03CCC	502307	Monitoring	Observation	AZ NUCLEAR POWER	62	4		1982	Registry
			C-01-06 03CCD	502171	Monitoring	Observation	ANPP	0	0			Registry

Table 4. Complete Inventory of Wells for Township 1 South, Range 6 West
Arlington Valley Energy Facility, Arlington Valley, Arizona

Category	Duke Parcel	Duke Well ID	Cadastral Location	Registration Number	Water Use	Site Use	Owner	Depth (feet)	Diameter (inches)	Perforated Interval (feet)	Year Constructed	Source
Palo Verde Wells			C-01-06 03CDC	519362	Test	Piezometer	AZ PUBLIC SERVICE	40	6		1987	Registry
			C-01-06 03CDC	519375	Test	Piezometer	AZ PUBLIC SERVICE	15	6		1987	Registry
			C-01-06 03DAA	519358	Test	Piezometer	AZ PUBLIC SERVICE	31	6		1987	Registry
			C-01-06 03DAA	519373	Test	Piezometer	AZ PUBLIC SERVICE	15	6		1987	Registry
			C-01-06 03DAC	519359	Test	Piezometer	AZ PUBLIC SERVICE	45	6		1987	Registry
			C-01-06 03DAC	519374	Test	Piezometer	AZ PUBLIC SERVICE	15	6		1987	Registry
			C-01-06 03DCC	519350	Monitoring	Observation	AZ PUBLIC SERVICE	100	6		1987	Registry
			C-01-06 03DCC	519361	Test	Piezometer	AZ PUBLIC SERVICE	50	6		1987	Registry
			C-01-06 03DCC	519366	Monitoring	Observation	AZ PUBLIC SERVICE	85	6		1987	Registry
			C-01-06 03DCC	519376	Test	Piezometer	AZ PUBLIC SERVICE	15	6		1987	Registry
			C-01-06 03DDB	86024	Monitoring	Abandoned	ANPP	24	4		1980	Registry
			C-01-06 03DDB	86037	Monitoring	Abandoned	ANPP	45	4		1980	Registry
			C-01-06 03DDB	519349	Monitoring	Observation	AZ PUBLIC SERVICE	110	6		1987	Registry
			C-01-06 03DDB	519365	Monitoring	Observation	AZ PUBLIC SERVICE	80	6		1987	Registry
			C-01-06 03DDC	519360	Test	Piezometer	AZ PUBLIC SERVICE	49	6		1987	Registry
			C-01-06 03DDC	519377	Test	Piezometer	AZ PUBLIC SERVICE	15	6		1987	Registry
			C-01-06 03DDD	86030	Monitoring	Observation	ANPP	65	4		1980	Registry
			C-01-06 03DDD	86031	Monitoring	Observation	ANPP	27	4		1980	Registry

Table 4. Complete Inventory of Wells for Township 1 South, Range 6 West
Arlington Valley Energy Facility, Arlington Valley, Arizona

Category	Duke Parcel	Duke Well ID	Cadastral Location	Registration Number	Water Use	Site Use	Owner	Depth (feet)	Diameter (inches)	Perforated Interval (feet)	Year Constructed	Source
Palo Verde Wells			C-01-06 03DDD	502172	Monitoring	Observation	ANPP	0	0			Registry
			C-01-06 03DDD	502301	Monitoring	Observation	AZ NUCLEAR POWER	82	4		1982	Registry
			C-01-06 03DDD		Unused	Observation	PVNGS	50		20 - 50	1973	GWSI
			C-01-06 04AAD	613263	Unused	Observation	APS	41	3	23 - 41	1978	GWSI; Registry
			C-01-06 04AAD	613272	Monitoring	Observation	AZ PUBLIC SERVICE	36	2		1977	Registry
			C-01-06 04AAD	613275	Monitoring	Observation	AZ PUBLIC SERVICE	41	2		1977	Registry
			C-01-06 04ACC	502175	Monitoring	Observation	ANPP	0	0			Registry
			C-01-06 04ACC	502310	Monitoring	Observation	AZ NUCLEAR POWER	63	4		1982	Registry
			C-01-06 04ACC	502311	Monitoring	Observation	AZ NUCLEAR POWER	65	4		1982	Registry
			C-01-06 04ADA	613264	Monitoring	Observation	AZ PUBLIC SERVICE	42	3		1978	Registry
			C-01-06 04ADB	502176	Monitoring	Observation	ANPP	0	0			Registry
			C-01-06 04ADB	502316	Monitoring	Abandoned	AZ NUCLEAR POWER	130	4		1982	Registry
			C-01-06 04ADB	502317	Monitoring	Abandoned	AZ NUCLEAR POWER	130	4		1982	Registry
			C-01-06 04ADB	502325	Monitoring	Observation	AZ NUCLEAR POWER	80	4		1982	Registry
			C-01-06 04BDB	502324	Monitoring	Observation	AZ NUCLEAR POWER	80	4		1982	Registry
			C-01-06 04BDC	502314	Monitoring	Observation	AZ NUCLEAR POWER	100	4		1982	Registry
			C-01-06 04BDC	502315	Monitoring	Observation	AZ NUCLEAR POWER	100	4		1982	Registry
			C-01-06 04CBB	502312	Monitoring	Observation	AZ NUCLEAR POWER	100	4		1982	Registry

Table 4. Complete Inventory of Wells for Township 1 South, Range 6 West
Arlington Valley Energy Facility, Arlington Valley, Arizona

Category	Duke Parcel	Duke Well ID	Cadastral Location	Registration Number	Water Use	Site Use	Owner	Depth (feet)	Diameter (inches)	Perforated Interval (feet)	Year Constructed	Source
Palo Verde Wells			C-01-06 04CBB	502313	Monitoring	Observation	AZ NUCLEAR POWER	100	4		1982	Registry
			C-01-06 04DBC	502174	Monitoring	Observation	ANPP	0	0			Registry
			C-01-06 04DCC	502173	Monitoring	Observation	ANPP	0	0			Registry
			C-01-06 04DCC	613252	Monitoring	Observation	AZ PUBLIC SERVICE	94	4		1976	Registry
			C-01-06 09DDD	523299	Monitoring	Monitor	AZ PUBLIC SERVICE	270	8		1989	Registry
			C-01-06 10ACC	502322	Monitoring	Observation	AZ NUCLEAR POWER	102	4		1982	Registry
			C-01-06 10ACC	502323	Monitoring	Observation	AZ NUCLEAR POWER	102	4		1982	Registry
			C-01-06 10ADB	519352	Monitoring	Observation	AZ PUBLIC SERVICE	110	6		1987	Registry
			C-01-06 10ADB	519368	Monitoring	Observation	AZ PUBLIC SERVICE	110	6		1987	Registry
			C-01-06 10BAA	86022	Monitoring	Observation	ANPP	27	4		1980	Registry
			C-01-06 10BAA	86039	Monitoring	Observation	ANPP	47	4		1980	Registry
			C-01-06 10BAA	502308	Monitoring	Observation	AZ NUCLEAR POWER	67	4		1982	Registry
			C-01-06 10BAA		Unused	Observation	APS	50		20 - 50	1973	GWSI
			C-01-06 10BBB	86023	Monitoring	Observation	ANPP	58	4		1980	Registry
			C-01-06 10BBB	86038	Monitoring	Observation	ANPP	20	4		1980	Registry
			C-01-06 10BBB		Unused	Observation	APS	50		20 - 50	1973	GWSI
			C-01-06 10BCB	502320	Monitoring	Observation	AZ NUCLEAR POWER	102	4		1982	Registry
			C-01-06 10BCB	502321	Monitoring	Observation	AZ NUCLEAR POWER	102	4		1982	Registry

Table 5. Available Water Quality Information for Existing On-Site Production Wells
Arlington Valley Energy Facility, Arlington Valley, Arizona

Class	Analyte	Method	Units	Well Depth Sample ID	4-1 480 4-1-480	4-1 620 4-1-620	4-1 Discharge 4-1-Discharge	4-2 Discharge 4-2-Discharge	7-1 370 7-1-370	7-1 450 7-1-450	7-1 Discharge 7-1-Discharge	8-1 760 8-1-760	8-1 900 8-1-900	8-1 Discharge 8-1-Discharge
Organics	VOCs	EPA 524.2	ug/L		ND	ND	Toluene = 0.52	ND	ND	ND	ND	-	ND	Toluene = 1.2 1,2,4-Trimethylbenzene = 2.2 1,3,5-Trimethylbenzene = 0.66 Total Xylenes = 0.93
	SVOCs	-	-		-	-	ND	ND	-	-	ND	-	-	ND
Metals	Antimony	EPA 200.9	mg/L		<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	-	<0.0080	<0.0040
	Arsenic	EPA 200.7	mg/L		0.062	0.09	-	-	-	-	-	-	-	-
	Arsenic	EPA 200.9	mg/L		-	-	0.046	0.042	0.017	0.019	0.015	-	0.078	0.079
	Barium	EPA 200.7	mg/L		0.016	0.012	0.016	0.016	0.014	<0.010	<0.010	-	<0.010	<0.010
	Beryllium	EPA 200.7	mg/L		<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	-	<0.0040	<0.0040
	Cadmium	EPA 200.7	mg/L		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050
	Calcium	EPA 200.7	mg/L		60	74	94	56	16	15	14	-	37	37
	Chromium	EPA 200.7	mg/L		0.04	0.091	-	-	-	-	-	-	-	-
	Chromium	EPA 200.9	mg/L		-	-	0.024	0.027	0.015	0.016	0.018	-	0.047	0.043
	Copper	EPA 200.7	mg/L		<0.020	<0.020	0.021	<0.020	<0.020	<0.020	<0.020	-	<0.020	<0.020
	Iron	EPA 200.7	mg/L		0.74	1.6	<0.10	0.88	<0.10	<0.10	0.13	-	0.68	0.24
	Lead	EPA 200.9	mg/L		<0.0020	0.0034	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	-	<0.0040	<0.0020
	Magnesium	EPA 200.7	mg/L		11	6.5	16	10	5.9	4.9	4.9	-	5.1	5.3
	Manganese	EPA 200.7	mg/L		<0.020	0.029	<0.020	<0.020	<0.020	<0.020	<0.020	-	<0.020	<0.020
	Mercury	EPA 245.1	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	-	<0.00020	<0.00020
	Nickel	EPA 200.7	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050
	Potassium	EPA 258.1	mg/L		4.5	4.1	4.4	4.7	4.7	4.7	4.2	-	4.3	4.2
	Selenium	EPA 200.9	mg/L		<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	-	<0.0040	<0.0040
	Sodium	EPA 273.1	mg/L		420	400	460	530	310	320	270	-	190	410
	Thallium	EPA 200.9	mg/L		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	-	<0.0020	<0.0020
	Zinc	EPA 200.7	mg/L		0.36	0.51	<0.050	<0.050	0.12	0.084	<0.050	-	0.12	<0.050
Inorganics	Alkalinity (as CaCO3)	SM2320B	mg/L		96	45	91	110	110	110	120	81	80	80
	Bicarbonate Alkalinity (as CaCO3)	SM2320B	mg/L		96	45	91	110	110	110	120	81	80	80
	Carbonate Alkalinity (as CaCO3)	SM2320B	mg/L		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Chloride	EPA 300.0	mg/L		480	470	550	580	320	340	280	430	460	450
	Fluoride	EPA 300.0	mg/L		5.9	6	5.5	7.1	5.7	6.8	6.2	6.6	6.6	6.6
	Hydroxide Alkalinity	SM2320B	mg/L		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Nitrate (as N)	EPA 300.0	mg/L		1.3	1.2	5.2	14	1.33	1.36	1.8	1.6	1.6	1.6
	Nitrate/Nitrite (as N)	EPA 300.0	mg/L		-	-	-	-	-	-	-	1.6	1.6	1.6
	Nitrite (as N)	EPA 300.0	mg/L		<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Phosphorus	EPA 365.3	mg/L		<0.50	<0.50	<5.0	<5.0	<0.25	<0.25	<0.50	<0.050	<0.050	<0.050
	Sulfate	EPA 300.0	mg/L		320	310	360	320	170	170	150	250	260	260
	TDS	SM2540C	mg/L		1500	1400	1700	1700	970	1000	900	1300	1300	1300
	TKN	SM4500-N-O,C	mg/L		<0.50	<0.50	-	-	<0.50	2.8	<0.50	-	0.56	<0.50
Biological	Total Coliform	SM9223B	P/A		Present	Present	Present	Present	Present	Present	Present	-	Present	Present
	E.Coli	SM9223B	P/A		Absent	Absent	Absent	Absent	Absent	Absent	Absent	-	Absent	Absent

Table 5. Available Water Quality Information for Existing On-Site Production Wells
Arlington Valley Energy Facility, Arlington Valley, Arizona

				Well	4-1	4-1	4-1	4-2	7-1	7-1	7-1	8-1	8-1	8-1
				Depth	480	620	Discharge	Discharge	370	450	Discharge	760	900	Discharge
Class	Analyte	Method	Units	Sample ID	4-1-480	4-1-620	4-1-Discharge	4-2-Discharge	7-1-370	7-1-450	7-1-Discharge	8-1-760	8-1-900	8-1-Discharge
Radiochemical	Gross Alpha	600/00-02	pCi/L		-	-	4.1 ± 1.0	5.0 ± 1.1	-	-	2.5 ± 0.5	-	-	<1.0
	Gross Beta	900	pCi/L		-	-	<3.6	<3.6	-	-	<4.2	-	-	25.8 ± 1.6
	Radium 226	903.1	pCi/L		-	-	<0.5	<0.4	-	-	<0.9	-	-	<0.5
	Radium 228	904	pCi/L		-	-	<0.4	<0.4	-	-	<0.3	-	-	<0.3
	Total Radium	-	pCi/L		-	-	<0.5	<0.4	-	-	<1.0	-	-	<0.9
	Total Uranium	00-07	pCi/L		-	-	3.1 ± 0.4	4.5 ± 0.5	-	-	3.3 ± 0.5	-	-	1.4 ± 0.5

Table 6. Historical Analytical Model of Regional Response to Groundwater Extraction
Arlington Valley Energy Facility, Arlington Valley, Arizona

Right No.	Year Earliest Well Drilled	Approximate Irrigated Acreage*	Approximate Annual Water Use (acre-feet)**
100037.0001	1974	20	62
100105.0002	Unknown	60	186
100229.0002	Unknown	25	78
100291.0001	Unknown	20	62
100608.0000	Unknown	40	124
100902.0003	1980	260	806
101121.0001	1960	320	992
102369.0000	1958	380	1,178
103054.0001	Unknown	160	496
104995.0000	1947	650	2,015
105005.0000	1977	280	868
105414.0000	Unknown	650	2,015
106422.0001	Unknown	40	124
106422.0002	Unknown	40	124
106422.0003	Unknown	40	124
106422.0004	Unknown	40	124
106422.0005	Unknown	40	124
106422.0006	Unknown	40	124
106422.0007	Unknown	40	124
106422.0008	Unknown	40	124
106981.0001	1954	60	186
107182.0000	1947	110	341
107183.0000	Unknown	200	620
107804.0001	Unknown	1,750	5,425
107805.0001	1978	400	1,240
108354.0003	1974	360	1,116
109909.0001	1953	320	992
111348.0002	1954	880	2,728
112193.0000	1975	640	1,984
115649.0001	Unknown	20	62
116602.0001	1942	80	248
117240.0002	1973	80	248
130196.0000	Unknown	30	93
130197.0000	Unknown	50	155
130493.0000	Unknown	80	248
130754.0000	Unknown	40	124
130755.0000	Unknown	10	31

Approximate Annual Pumpage Prior to 1980 =	**25,715**	**Acre-Feet**
Amount of Regional Drawdown to 1980 =	**80**	**Feet**
Long-Term Regional Response to Groundwater Pumpage =	**3.1**	**Feet**
(Feet of Drawdown per 1,000 Acre-feet/year of Groundwater Extracted)		
Expected Long-Term Regional Response to Plant Pumpage (7,800 Acre-feet/year) =	**24**	**Feet**

Table 6. Historical Analytical Model of Regional Response to Groundwater Extraction
Arlington Valley Energy Facility, Arlington Valley, Arizona

*Taken from 1986 and 1992 aerial photographs and ADWR maps of extent of groundwater rights

** Average water use per acre calculated as follows

Parcel No.	Irrigation Right	1986 Reported Groundwater Usage (acre-feet)	1986 Irrigated Acreage (from aerial photograph)	1992 Reported Groundwater Usage (acre-feet)	1992 Irrigated Acreage (from aerial photograph)	Calculated Water Use (acre-feet/acre)
1	8-105414.000	1137	504	-	-	2.3
2	8-104995.000	-	-	1702	471	3.6
4	8-102369.000	973	288	-	-	3.4

Average Water Use Per Acre = 3.1

Table 7. Results of Groundwater Flow Modeling
Arlington Valley Energy Facility
Arlington Valley, Arizona

Modeling Run	Pumpage Used (Acre-feet/year)[1]	Hydraulic Conductivity Used (feet/day)[2]	Duration of Transient Run (Years)	Maximum Drawdown (feet)	Approximate Radius of 10-Foot Drawdown (Miles from Parcel Boundary)
1	7,800	21	30	31.67	3.4
2	1,000	21	30	4.02	-

[1] Total allotment obtained from Type I IGRs

[2] Calculated by ADWR for facility well spacing analysis (April 2001)

Table 1. Details of Water Rights Obtained by Duke Energy Maricopa
Arlington Valley Energy Facility,
Arlington Valley, Arizona

Parcel Identification		Current Allotment (1999)	Irrigation Acres	Water Duty (Acre-feet/acre)			Calculated Water Duty Acres	Type I Conversion @ 3 a-f/a
Parcel No.	Irrigation Grandfathered Right	(acre-feet/year)	(acres)	1992-1994	1995-1999	2000-	(acres)	(acre-feet/year)
1	58-105414.0000	3,352	740	5.98	4.70	3.87	713	2,139
2	58-104995.0000	3,467	618	7.09	5.74	5.29	604	1,812
3	58-130196.0000	144	34	5.31	4.37	3.75	33	99
4	58-102369.0000	1,617	395	5.35	4.20	3.46	385	1,155
7	58-101121.0001	1,297	320	5.78	4.54	3.74	286	857
8	58-100902.0003	1,343	284	6.80	5.34	4.40	252	755
Popoff	58-105005.0000	1,372	279	5.38	5.38	5.38	255	765
Marven	58-100105.0002	378	81	5.05	4.67	4.34	81	243
Totals		**12,969**	**2,750**				**2,608**	

Estimated Total Type 1 Non-Irrigation Grandfathered Right = 7,824

Table 2. Annual Groundwater Withdrawals Reported to ADWR for Duke Parcels
Arlington Valley Energy Facility
Arlington Valley, Arizona

Parcel No.	Right No.	Pumped From Well	Annual Withdrawals Reported to ADWR (Acre-feet)												
			1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
1	58-105414.0000	624677	1069.29	656.7	0	0	0	0	-	-	-	-	-	0	-
		624678	67.67	826.4	0	0	55.7	0	-	-	-	-	-	0	-
2	58-104995.0000	611935	-	1426.6	1345.76	997.74	953.46	1019.29	870.82	1164.09	1105.44	1257.92	1453.14	1149.78	863.38
		611936	-	0	0	0	0	0	0	0	0	1107.1	1196.75	1443.4	0
		611937	-	1278.4	1094.3	1092.92	908.59	969.23	831.1	1083.7	1130.96	0	0	0	1499.58
3	58-130196.0000	None specified	0	0	0	0	0	0	0	-	-	-	-	0	-
4	58-102369.0000	602601	379	698.3	450.94	293.57	301.79	0.81	2.49	1.9	27.62	16.24	455	303.75	159
		602602	594	583.23	416.79	563.98	445.32	0	0.67	0	160.38	173.45	367	257.67	335
7	58-101121.0001	610922	-	-	-	-	-	-	-	-	-	-	369.91	0	-
8	58-100902.0003	627971	-	-	-	-	-	-	-	-	-	-	0	0	0
Popoff	58-105005.0000	628079	763.9	1385.6	930.81	996.36	1024.61	621.37	442.2	628.65	717.14	540.99	404.34	294.11	85
Marven	58-100105.0002	None specified	-	-	-	-	-	-	-	-	-	-	0	0	-
	Annual Total Groundwater Usage for Duke Parcels		**2,874**	**6,855**	**4,239**	**3,945**	**3,689**	**2,611**	**2,147**	**2,878**	**3,142**	**3,096**	**4,246**	**3,449**	**2,942**

- No annual withdrawal report on file with ADWR

Table 3. Estimates of Aquifer Hydraulic Parameters
Arlington Valley Energy Facility, Arlington Valley, Arizona

Source of Data	Well	Method of Estimation	Date	Discharge During Pumping Test (gpm)	Duration of Pumping Test	Transmissivity of Well (gpd/ft)[1]	Hydraulic Conductivity of Aquifer (feet/day)[2]	Transmissivity of Aquifer (gpd/ft)[3]
Site-specific aquifer tests	4-1	Recovery	October 2000	2,000	23.5 Hours	83,810	14.3	106,716
	7-1	Pumping	October 2000	2,300	19 Hours	129,191	19.7	147,015
	7-1	Recovery	October 2000	2,300	19 Hours	189,750	29.0	216,418
	8-1	Pumping	September 2000	2,200	21.5 Hours	58,080	13.5	100,746
	8-1	Recovery	September 2000	2,200	21.5 Hours	252,522	58.6	437,313
Site-specific aquifer tests	4-1	Specific Capacity	October 2000	2,000	23.5 Hours	60,606	10.4	77,612
	7-1	Specific Capacity	October 2000	2,300	19 Hours	30,263	4.6	34,328
	8-1	Specific Capacity	September 2000	2,200	21.5 Hours	15,789	3.7	27,612
Regional data compilation[4]	Sempra #1			2,100	168 Hours			239,392
	Sempra #8			2,500	24 Hours			187,025
	Sempra #10			933	24 Hours			59,848
	Sempra #14			490	25 Hours			216,949
	C-01-06 14DBB			2,500	120 Hours			130,918
	C-01-06 23ABD			1,875	6 Hours			44,886
	B-01-06 34ABB			2,360	24 Hours			97,253

Minimum Transmissivity	**27,612**
Maximum Transmissivity	**437,313**
Arithmetic Average Transmissivity	**141,602**
Median Transmissivity	**106,716**
Transmissivity Estimated by Inverse Distance Method[5]	**156,346**

[1] $T_w = 264 * Q / \Delta s$

T_w = Transmissivity of well, in gpd/ft
Q = Pumping rate, in gpm
Δs = Drawdown, in ft (one log-cycle on semi-log plot)

[2] $K_a = 0.134 * T / b'$

K_a = Hydraulic conductivity of aquifer, in ft/day
b' = Saturated thickness of well (saturated screened interval), in ft

[3] $T_a = 7.481 * K_a * b$

T_a = Transmissivity of aquifer, in gpd/ft
b = Saturated thickness of aquifer, in ft (1,000 feet)

[4] All transmissivity values shown as provided by Peter Mock Groundwater Consulting, Inc.

[5] Calculated by ADWR.

Table 4. Complete Inventory of Wells for Township 1 South, Range 6 West
Arlington Valley Energy Facility, Arlington Valley, Arizona

Category	Duke Parcel	Duke Well ID	Cadastral Location	Registration Number	Water Use	Site Use	Owner	Depth (feet)	Diameter (inches)	Perforated Interval (feet)	Year Constructed	Source
Duke Wells	Parcel 1	Well 1-1	C-01-06 26DAD	624677	Irrigation	Withdrawal	W PERRY; B YOUNGKER	1135	20	126-1135	1948	Registry; GWSI
	Parcel 1	Well 1-2	C-01-06 35ADA	624678	Irrigation	Withdrawal	W PERRY	1000	20		1974	Registry; GWSI
	Parcel 2	Well 2-1	C-01-06 28ACC2	611937	Irrigation	Withdrawal	LEON HARDISON	337	15	124-337	1961	Registry; GWSI
	Parcel 2	Well 2-2	C-01-06 27BBC	611935	Irrigation	Withdrawal	HARDISON	1090	20		1947	Registry; GWSI
	Parcel 2	Well 2-3	C-01-06 28ACC1	611936	Stock	Withdrawal	LEON HARDISON	0				Registry; GWSI
	Parcel 4	Well 4-1	C-01-06 21CBB2	602602	Irrigation	Withdrawal	SHEPPARD	1012	20		1958	Registry; GWSI
	Parcel 4	Well 4-2	C-01-06 21BCB	602601	Irrigation	Withdrawal	ROBERT SHEPPARD	1001	20	350-980	1980	Registry; GWSI
	Parcel 7	Well 7-1	C-01-06 17ABB	610922	Irrigation	Withdrawal	E SHEPARD; BETTY MARTIN	1219	20	260-1219	1960	Registry; GWSI
	Parcel 8	Well 8-1	C-01-06 20AAB2	627971	Irrigation	Withdrawal	SHIRLEY DESHETLER	1110	20	508-1110	1968	GWSI
	Popoff	Popoff	C-01-06 08ACC1	628079	Irrigation	Withdrawal	L MARTIN; PETE POPOFF	936	18		1977	Registry; GWSI
Non-Palo Verde Wells			C-01-06 03BBB1		Unused	Unused		1085	20		1948	GWSI
			C-01-06 04CBA	556600	Domestic	Withdrawal	BERRYMAN, MICHAEL	320	8		1996	Registry
			C-01-06 07AAD	610921	Irrigation	Withdrawal	JOHN HALL ASSOCIATES; J HODGES; JAMES BIRMINGHAM	819	16	120-819	1979	Registry; GWSI
			C-01-06 07BBB	610923	Irrigation	Withdrawal	J HODGES; JAMES BIRMINGHAM	605	20	20-605	1979	Registry; GWSI
			C-01-06 07BCC	610924	Irrigation	Withdrawal	JOHN HALL ASSOCIATES; J HODGES; JAMES BIRMINGHAM	936	16	264-936	1979	Registry; GWSI
			C-01-06 08ACC2		Domestic	Withdrawal	L MARTIN	300	8		1979	GWSI
			C-01-06 09ABC		Unused	Unused		176	4			GWSI
			C-01-06 10DDD	609047	Irrigation	Withdrawal	PAUL GARBER	322	8	240-320	1974	Registry; GWSI
			C-01-06 12BBC		Unused	Unused		1000	20		1951	GWSI

Table 4. Complete Inventory of Wells for Township 1 South, Range 6 West
Arlington Valley Energy Facility, Arlington Valley, Arizona

Category	Duke Parcel	Duke Well ID	Cadastral Location	Registration Number	Water Use	Site Use	Owner	Depth (feet)	Diameter (inches)	Perforated Interval (feet)	Year Constructed	Source
Non-Palo Verde Wells			C-01-06 13	802026	Irrigation	Withdrawal	BECK WAYNE E	1100	8			Registry
			C-01-06 13CAB		Irrigation	Withdrawal		1200	20			GWSI
			C-01-06 14AAA	608004			JACKSON	700	18		1967	Registry; GWSI
			C-01-06 14ADB	608003	Unused	Unused	J JACKSON	1000	18	325-1000	1967	Registry; GWSI
			C-01-06 14CBB	623232	Irrigation	Withdrawal	GLADDEN BROTHERS; GLADDEN BROTHERS; WILLIAM MCMURTRY	1140	20	375-1126	1978	Registry; GWSI
			C-01-06 14DBB	623227	Irrigation	Withdrawal	BEN YOUNGKER; WILLIAM MCMURTRY	1114	20	190-1114	1948	Registry; GWSI
			C-01-06 15BAB	514110	Domestic	Withdrawal	SICHI, MIKE	595	8		1986	Registry
			C-01-06 18ABC	627864	Irrigation	Withdrawal	GARY CACCIOGUIDE; OLIVIA DALTON	500	10	235-495	1973	Registry; GWSI
			C-01-06 18BBB	629645	Irrigation	Withdrawal	VANOSDELL	1333	20		1953	Registry; GWSI
			C-01-06 19ABB	629644	Irrigation	Withdrawal	CAMPILLO	1045			1959	Registry; GWSI
			C-01-06 19BAA	535718	Domestic	Withdrawal	CAMPILLO, CELEDONIO	360	6		1992	Registry
			C-01-06 19BBB		Irrigation	Withdrawal	RONALD HARPER	940	20	225-940	1976	GWSI
			C-01-06 19BBB	628647	Irrigation	Withdrawal	CAMPILLO	980	18		1975	Registry
			C-01-06 19BBB	629650	Irrigation	Withdrawal	VANOSDELL, CHARLES	0	0		1975	Registry
			C-01-06 19BBC	628645	Irrigation	Withdrawal	CAMPILLO	822	18		1954	Registry
			C-01-06 19CBB	629651	Irrigation	Withdrawal	VANOSDELL, CHARLES	0	0			Registry
			C-01-06 20AAB1		Unused	Unused	DE SHETLER FARMS	340	20	150-340	1930	GWSI
			C-01-06 20ABA					280	8		1968	GWSI
			C-01-06 20BCA	614948	Stock	Withdrawal	AZ STATE LAND DEPT	200	9		1973	Registry

Table 4. Complete Inventory of Wells for Township 1 South, Range 6 West
Arlington Valley Energy Facility, Arlington Valley, Arizona

Category	Duke Parcel	Duke Well ID	Cadastral Location	Registration Number	Water Use	Site Use	Owner	Depth (feet)	Diameter (inches)	Perforated Interval (feet)	Year Constructed	Source
Non-Palo Verde Wells			C-01-06 21AAB	86398	Irrigation	Withdrawal	YOUNGKER	0	0			Registry
			C-01-06 21AAB	501579	Irrigation	Withdrawal	YOUNGKER	0	0			Registry
			C-01-06 21AAB	504407	Irrigation	Withdrawal	YOUNGKER	0	0			Registry
			C-01-06 21ABB	633945	Domestic	Withdrawal	TERRELL	350	8		1977	Registry
			C-01-06 21CBB1	602600	Irrigation	Withdrawal	SHEPPARD	408	20			Registry; GWSI
			C-01-06 22DDD	555667	Domestic	Withdrawal	MCCOLLUM, PATRICK	230	7		1997	Registry
			C-01-06 23ADB	623230	Irrigation	Withdrawal	JG LAND AND CATTLE; WILLIAM MCMURTRY	1158	20	140-930	1948	Registry; GWSI
			C-01-06 23BA	803973	Domestic	Withdrawal	WOODMANSEE, PERRY	302	10		1986	Registry
			C-01-06 23BAB	623228	Irrigation	Withdrawal	JG LAND AND CATTLE; B YOUNGKER FARMS; WILLIAM MCMURTRY	1010	20	355-1010	1950	Registry; GWSI
			C-01-06 23CAA	623229	Irrigation	Withdrawal	JG LAND AND CATTLE; BEN YOUNGKER JR; WILLIAM MCMURTRY	1157	20	380-1157	1959	Registry; GWSI
			C-01-06 26ABA	623231	Irrigation	Withdrawal	B YOUNGKER; WILLIAM MCMURTRY	1130	20	200-1130	1948	Registry; GWSI
			C-01-06 27ACC	611938	Domestic	Withdrawal	HARDISON & HARDISON	0	0			Registry
			C-01-06 29ABB	620365	Irrigation	Withdrawal	GARY ACCOMAZZO; OLIVER HARPER	960	18	300-490	1970	Registry; GWSI

Table 4. Complete Inventory of Wells for Township 1 South, Range 6 West
Arlington Valley Energy Facility, Arlington Valley, Arizona

Category	Duke Parcel	Duke Well ID	Cadastral Location	Registration Number	Water Use	Site Use	Owner	Depth (feet)	Diameter (inches)	Perforated Interval (feet)	Year Constructed	Source
Non-Palo Verde Wells			C-01-06 30AAA	629647	Irrigation	Withdrawal	PAUL HARPER; CAMPILLO	800	18	150-800	1976	Registry; GWSI
			C-01-06 30ABB	629646	Irrigation	Withdrawal	PAUL HARPER; CAMPILLO	980	18	225-480	1975	Registry; GWSI
			C-01-06 30CDD	541428	None	Cathodic	ALL AMERICAN PIPELN	400	10		1993	Registry
			C-01-06 31ADB	626716	Stock	Withdrawal	SOUTHERN PACIFIC TRN	315	5		1926	Registry; GWSI
			C-01-06 31DAC	559905	Domestic	Withdrawal	DERESH, ROBERT	0	0			Registry
			C-01-06 34CAB	614949			AZ STATE LAND DEPT	0	0			Registry
			C-01-06 34CAB	614950	Stock	Withdrawal	AZ STATE LAND DEPT	0	0			Registry
Palo Verde Wells			C-01-06 02BBB	86025	Monitoring	Observation	AZ NUCLEAR POWER	58	0		1980	Registry
			C-01-06 02BBB	86036	Monitoring	Observation	AZ NUCLEAR POWER	28	4		1980	Registry
			C-01-06 02BBB	502303	Monitoring	Observation	AZ NUCLEAR POWER	64	4		1982	Registry
			C-01-06 02BBB	502304	Monitoring	Observation	AZ NUCLEAR POWER	62	4		1982	Registry
			C-01-06 02BBB	502305	Monitoring	Observation	AZ NUCLEAR POWER	0	0			Registry
			C-01-06 02BCC	502318	Monitoring	Observation	AZ NUCLEAR POWER	100	4		1982	Registry
			C-01-06 02BCC	502319	Monitoring	Observation	AZ NUCLEAR POWER	100	4		1982	Registry
			C-01-06 03ACA	519356	Test	Piezometer	AZ PUBLIC SERVICE	35	6		1987	Registry
			C-01-06 03ACA	519371	Test	Piezometer	AZ PUBLIC SERVICE	15	6		1987	Registry

Table 4. Complete Inventory of Wells for Township 1 South, Range 6 West
Arlington Valley Energy Facility, Arlington Valley, Arizona

Category	Duke Parcel	Duke Well ID	Cadastral Location	Registration Number	Water Use	Site Use	Owner	Depth (feet)	Diameter (inches)	Perforated Interval (feet)	Year Constructed	Source
Palo Verde Wells			C-01-06 03ACC	502306	Monitoring	Abandoned	AZ NUCLEAR POWER	47	4		1982	Registry
			C-01-06 03ADA	519357	Test	Piezometer	AZ PUBLIC SERVICE	36	6		1987	Registry
			C-01-06 03ADA	519372	Test	Piezometer	AZ PUBLIC SERVICE	15	6		1987	Registry
			C-01-06 03BAD	613281	Monitoring	Observation	AZ PUBLIC SERVICE	45	2		1977	Registry
			C-01-06 03BBA	502327	Monitoring	Observation	AZ NUCLEAR POWER	75	7		1982	Registry
			C-01-06 03BBA	613277	Monitoring	Observation	AZ PUBLIC SERVICE	41	2		1977	Registry
			C-01-06 03BBB	613276	Monitoring	Observation	AZ PUBLIC SERVICE	48	2		1977	Registry
			C-01-06 03BBB2	613251	Unused	Observation	APS	75	4	30 - 75	1976	GWSI; Registry
			C-01-06 03BBB3	613273	Unused	Observation	APS	49	2	37 - 49	1977	GWSI
			C-01-06 03BBC	613280	Monitoring	Observation	AZ PUBLIC SERVICE	30	2		1977	Registry
			C-01-06 03BBC		Unused	Observation	APS	44		22 - 42	1978	GWSI
			C-01-06 03BBD	502329	Monitoring	Observation	AZ NUCLEAR POWER	60	4		1982	Registry
			C-01-06 03BBD	613274	Monitoring	Observation	AZ PUBLIC SERVICE	41	2		1977	Registry
			C-01-06 03BBD	613282	Monitoring	Observation	AZ PUBLIC SERVICE	45	2		1977	Registry
			C-01-06 03BBD	613283	Monitoring	Observation	AZ PUBLIC SERVICE	44	8		1978	Registry
			C-01-06 03BBD	613284	Monitoring	Observation	AZ PUBLIC SERVICE	41	3		1978	Registry
			C-01-06 03BBD	613285	Monitoring	Observation	AZ PUBLIC SERVICE	47	3		1978	Registry
			C-01-06 03BBD	613286	Monitoring	Observation	AZ PUBLIC SERVICE	44	3		1978	Registry

EXHIBIT A
LOCATION AND LAND USE MAPS

EXHIBIT A
LOCATION AND LAND USE MAPS

As stated in Arizona Corporation Commission Rules of Practice R-14-3-219:

"Where commercially available, a topographic map, 1:250,000 scale, showing the proposed plant site and the adjacent area within twenty (20) miles thereof. If application is made for alternative plant sites, all sites may be shown on the same map, if practicable, designated by applicant's order of preference."

"Where commercially available, a topographic map, 1:62,500 scale, of each proposed plant site, showing the area within two (2) miles thereof. The general land use plan within this area shall be shown on the map, which shall also show the areas 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."

The following maps are included as exhibits:

- Exhibit A-1 – Proposed Project and Adjacent Area within 20-mile Radius
- Exhibit A-2 – Proposed Project and Adjacent Area within 2-mile Radius

More detailed discussion regarding land ownership and existing and future land use conditions and potential impacts on such resources within the vicinity of the proposed project are provided in Exhibit B-3.

EXHIBIT A-1

PROPOSED AVEF II PROJECT – 20-MILE RADIUS

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FIGURES

TABLES

APPENDICES

1 INTRODUCTION

Duke Energy Maricopa, LLC (Duke) retained Water Resources Consulting Southwest to conduct a hydrologic analysis for a proposed expansion of a combined-cycle natural gas power plant in Arlington Valley, in western Maricopa County, Arizona. This report summarizes the results of the hydrologic analysis conducted by Water Resources Consulting Southwest, and provides conclusions as to the physical availability of a water supply over the lifetime of the proposed project and the expected impact of groundwater pumping on groundwater levels in the area. The proposed project (known as the Arlington Valley Energy Facility) will occupy a portion of the east half of Section 17, Township 1 South (T1S), Range 6 West (R6W), approximately 1.5 miles south of the Palo Verde Nuclear Generating Station (PVNGS). The location of the proposed project is shown on Figures 1 and 2. This property is located within the Lower Hassayampa sub-basin of the Phoenix Active Management Area (Phoenix AMA).

2 PURPOSE AND SCOPE OF ANALYSIS

This hydrologic assessment has been conducted to support an Application for a Certificate of Environmental Compatibility to be submitted to the Power Plant and Transmission Line Siting Committee of the Arizona Corporation Commission (ACC). The specific purpose of this report is to demonstrate the physical availability of a water supply over the expected lifetime of the proposed project, and to assess the impact of groundwater extraction on groundwater levels in the Arlington Valley area.
Specific statutory or regulatory guidelines for this hydrologic analysis do not exist. However, the scope of this analysis was modeled after guidelines developed by the Arizona Department of Water Resources (ADWR) for hydrologic studies for assured and adequate water supplies (ADWR, 1995).

3 METHOD OF ANALYSIS

3.1 Elements of Demand Methodology

Preliminary estimates of expected water demand were obtained from Duke, and vary based on the expected operational parameters of the proposed project, including methods of pre-treatment, use of duct-firing for greater efficiency, expected cycles of concentration of cooling water, and disposal options for blowdown water. For the purposes of this hydrologic analysis, the water demand is assumed to be the maximum amount of water available to Duke through the conversion of Irrigation Grandfathered Rights (IGRs) that have been obtained by Duke, as discussed in the next section.

3.2 Elements of Supply Methodology

Water demand for the proposed project will be supplied fully through groundwater pumpage. Duke has obtained eight IGRs from approximately 2,750 acres of contiguous, irrigated land located in the vicinity of the proposed project. The 1999 irrigation allotment of these rights is approximately 13,000 acre-feet per year, which is based on the

application of varying water duties to approximately 2,600 water duty acres. Duke will convert the existing IGRs to Type 1 Non-Irrigation Grandfathered Rights (Type 1 Rights). For the purposes of this study, it is estimated that the conversion will occur using a water duty of approximately 3 acre-feet per acre, resulting in a total estimated Type 1 Right of approximately 7,800 acre-feet per year. Details of the water rights obtained by Duke and the Type 1 Right conversion are summarized in Table 1.
For the purposes of this study, all water is expected to be withdrawn from five production wells located at the site (four of these are new wells, one is a replacement well for existing production well 8-1).

3.3 Elements of Adequacy Methodology

Several methods were used to determine the adequacy of water supply for the proposed project and to determine the impacts to groundwater levels expected from groundwater extraction to meet the project water supply. These methods include the development of an analytical model based on historical response of groundwater levels to agricultural pumpage, and the use of a two-dimensional analytical groundwater flow modeling software package. In addition, a regional three-dimensional groundwater flow model was prepared by Dr. Peter Mock to describe the cumulative impacts from pumping from all power plants in the Arlington Valley (Mock, 2000).

Historically, water use in the study area has been largely related to agricultural irrigation, beginning approximately in the early 1940's and continuing to present. As a result, water levels in the area have decreased significantly since the 1940's, although they began to rebound beginning in the early 1980's as agricultural pumpage decreased. Based on annual groundwater pumpage as reported to ADWR since 1986 and available aerial photographs for the area, an estimated amount of groundwater extracted over the last 40 years has been developed. By comparing this estimate to known declines in water levels over this time period, a simple analytical model of regional groundwater level response to pumpage has been developed. This model has been used to estimate the expected impact regionally due to pumpage by Duke over the lifetime of the proposed project.

In addition to the analytical model based on historic data, the expected impact from the five production wells was modeled using THWELLS, an analytical two-dimensional groundwater flow modeling software. The transient modeling analysis used by THWELLS solves for the Theis equation. The model assumes a uniform, isotropic, homogeneous aquifer with an infinite lateral extent. No recharge or leakage was applied to the model for this analysis. The groundwater flow model was used to calculate the amount of drawdown over the 30-year expected lifetime of the proposed project that can be attributed to withdrawals from the Duke supply wells.

The regional three-dimensional flow model developed by Dr. Mock included several projected future demand scenarios for the area. One of these assumed the operation of the three approved power plants in the area, supplied by groundwater withdrawals equal to the sum of the individual facilities Type I Rights. The total use was approximately 22,000 acre-feet per year. For the purposes of Dr. Mock's study, 6,800 acre-feet per year was used as the demand for the Arlington Valley Energy Facility. Our assessment will add only 1,000 acre-feet to this model. An additional two-dimensional modeling run was conducted using THWELLS to estimate the amount of drawdown expected above and beyond Dr. Mock's results due to the increase of water use at the Arlington Valley Energy Facility.

4 ELEMENTS OF DEMAND

A review of aerial photos and the pumpage data reported to ADWR indicate that the withdrawals from the wells associated with the IGRs for the subject parcels has decreased since the 1980's as noted for the area in general. Based on quantity of groundwater available under the IGRs, irrigation pumpage for the Duke parcels could be as high as approximately 13,000 acre-feet/year. Conversion of the IGRs to Type I Rights will reduce the allowable pumpage from the subject parcels to approximately 7,800 acre-feet/year, as shown in Table 1. Since approximately 1988, irrigation has continued on three of the Duke parcels (Shepard, Hardison, and Popoff properties) under the associated IGRs, averaging approximately 3,500 acre-feet/year over the past three years, as shown in Table 2.

The proposed pumpage for the project is expected to increase over the current irrigation withdrawal, but to no more than the amount allowed under the converted Type I Rights. For the purpose of this modeling it is presumed that the pumping will be equivalent to the full groundwater rights, or approximately 7,800 acre-feet/year. The combined pumpage for both facilities represents a 4,300 acre-feet/year increase over the current irrigation pumpage of 3,500 acre-feet/year, but a 5,200 acre-feet/year decrease over the potential agricultural groundwater pumpage.

5 ELEMENTS OF SUPPLY

5.1 Hydrogeologic Setting

5.1.1 Geology

The Lower Hassayampa sub-basin of the Phoenix AMA is an alluvial plain bounded by the White Tank Mountains on the east, on the south by the Buckeye Hills and the Gila Bend Mountains, and on the west by the Palo Verde Hills.

Bedrock in the Lower Hassayampa area consists of granitic and metamorphic rocks (basement complex), and locally of interbedded volcanic and sedimentary deposits that overlie the basement complex. The main water-bearing unit in the area consists of the basin-fill sediments, comprised of gravel, sand, silt and clay (Sanger and Appel, 1980); however, the interbedded volcanic and sedimentary deposits are also comprise the regional aquifer (Mock, 2000a). These sediments range from a few tens of feet thick near the mountains to more than 1,000 feet thick near the center of the plain.

Basin-fill sediments in the area are divided into three major units and include the upper, middle and lower alluvium (U.S. Bureau of Reclamation, 1976). The upper alluvium ranges from 30 to 60 feet thick and consists of silty-sands and gravelly-sands with discontinuous lenses of clay and silty clay (Long, 1983). Caliche may be present in the upper 50 feet of the upper alluvium. The middle alluvium ranges from 230 to 300 feet thick and is comprised of clay and silty clay interbedded with discontinuous lenses of clayey silt, clayey sand, and silty sand. It includes the Palo Verde clay that varies north of the project site from 80 to 130 feet thick. The middle alluvium is intermittent within the bounds of the project site, disappearing entirely in the northwest corner. However, further southeast, the middle alluvium appears in driller's logs to be over 200 feet thick. The lower alluvium consists of less than 100 to greater than 1,000 feet of unconsolidated silty sand, sand, and gravelly sand (Long, 1983).

5.1.2 Hydrology

5.1.2.1 Groundwater Resources

Groundwater occurs predominantly in the basin-fill sediments of the three alluvial layers and the interbedded volcanic and sedimentary deposits. The upper alluvium is unsaturated in most of the Lower Hassayampa area. The middle alluvium consists of two fine-grained layers. Agricultural irrigation water has percolated through the permeable upper alluvium over time and now forms a local perched water table on top of the relatively impermeable upper layer of the middle alluvium (Long, 1983). Studies of the perched aquifer indicate that it probably formed between 1950 and 1975, and contained very little water prior to that time-interval (APS, 1997). Groundwater in this perched zone flows radially outward from the center of the groundwater mound. The areal size of the mound has stabilized at a size which allows downward percolation to equal or exceed recharge rates. The approximate location of the perched groundwater is shown on Figure 3 (APS, 1997).

The lower alluvium is typically saturated throughout the region. Most productive wells in the area are completed in the lower alluvium.

5.1.2.2 Water Levels

Regionally, groundwater flows from northeast to southwest. In the general vicinity of the proposed project, groundwater converges around a cone of depression that formed due to the long-term pumping for agricultural activity in the basin (APS, 1997). The cone of depression appears centered near the western-most edge of the Duke property, with a radius of about 5 miles in 1992 (APS, 1997). Since approximately 1980 agricultural pumping has decreased substantially and water levels are rebounding. Regional water level contours are shown in Figure 3, and primarily represent water levels in the lower alluvium. Representative hydrographs of the area are included as Figures 4 and 5 (the locations of these hydrographs are shown on Figure 3). Available data indicate that water levels decreased as much as 100 feet in response to agricultural pumpage in the area, and have recovered approximately 50 feet as pumpage began to decease in the early 1980's.

5.1.2.3 Hydraulic Parameters

Hydraulic parameters for the area were derived from aquifer test conducted on production wells in the area, including tests conducted on Duke production wells. Estimates of transmissivity range from approximately 27,000 to 437,000 gallons per day per foot (gpd/ft), which corresponds to a hydraulic conductivity range of approximately 4 to 59 feet/day. A complete summary of estimates of aquifer parameters obtained from various sources is included in Table 3. A complete description of the aquifer tests conducted on Duke production wells is included as Appendix A.

A Well Spacing Analysis was submitted to ADWR in April 2001 for the permitting of two new production wells at the site. The Well Spacing Analysis utilized an identical modeling technique (THWELLS) as that used for this impact assessment. After review by ADWR, a transmissivity value of 156,346 gpd/ft was agreed on as appropriate for the site (SWCA, 2001). The ADWR approved the Well Spacing Analysis using the agreed value.

5.2 Well Inventory and Water Supply Wells

A well inventory for the immediate vicinity of the proposed project (Township 1 South, Range 6 West) is included as Table 4. The well inventory was derived from several databases maintained by ADWR, including the Well Registry database (also known as the "55-files") and the Groundwater Site Inventory (GWSI) database. Based on these sources there are approximately 158 wells located within the above township. Due to overlap and uncertainty between the two databases, there are likely to be less than 158 wells in actuality. Duplicates have been removed from Table 4 where possible.
With the acquisition of the property needed for the IGRs, Duke acquired nine wells that have been used in the past to supply irrigation demands for the subject properties. These wells are indicated on Table 4. Of the remaining wells, approximately 100 are monitoring wells associated with PVNGS. All wells in the immediate vicinity of the proposed project are shown on Figure 6.

5.3 Water Quality

Detailed site-specific groundwater samples were obtained from four of the Duke production wells in September and October 2000. Laboratory analytical results for these samples are summarized in Table 5. Groundwater quality is adequate to meet the needs of the project water supply.

6 ELEMENTS OF ADEQUACY

6.1 Historical Analytical Model of Regional Groundwater Usage

All known water rights in Arlington Valley and the approximate irrigated acreage for each are summarized in Table 6. Adequate information exists from aerial photographs and records of groundwater use as reported to ADWR to determine the approximate water use per acre for the area. Details of these calculations are shown in Table 6.

Based on this information, an estimate of the approximate annual groundwater use prior to 1980 was calculated as approximately 25,700 acre-feet/year for the period from the early 1940's to 1980, as shown in Table 6. From existing hydrographs, this magnitude of pumpage caused a long-term groundwater decline in the area of approximately 80 feet, or approximately 3.1 feet per 1,000 acre-feet/year of groundwater pumpage. This value was used to extrapolate the expected regional groundwater response to Duke pumpage over the 30-year lifetime of the proposed project.

To the extent that the past can be used to predict the future, the estimated pumpage for the proposed project would have contributed approximately a 24-foot decline in the area of the facility over a similar period. This is about a quarter of the observed water level declines over a historic period about the same length as the projected lifetime of the plant. This estimated impact is a worst-case estimate, as water levels have increased since the 1980's and are continuing to rise in the Arlington Valley area under the current reduced rate of agricultural pumpage. Impacts of the rebound from the current reduced pumpage and the future projected pumpage can be expected to be offset to an extent.

Application of the historical analytical model is meant only as an informal examination of proposed project impacts relative to previous impacts to Arlington Valley and expected future recovery of water levels. More reliable specific impacts due to project production wells were developed using a numerical groundwater flow model, as discussed in the next section.

6.2 Theis Hydrologic Impact Analysis

The transient numerical model employed by Water Resources Consulting Southwest utilizes values of hydraulic conductivity, pumpage, and storativity to produce expected groundwater levels at a specific time in the future resulting from the projected pumpage. The model illustrates the impacts of the projected pumpage only, and no attempt was made to model groundwater recharge or inflows that are the cause of the ongoing increases in groundwater levels. The model results therefore predict the changes in water levels due to the projected pumpage, and should be combined with ongoing water level trends to project future depths to groundwater and water levels. A complete description of the modeling effort employed is included as Appendix B.

Conservative estimates of all parameters were used in the model. The pumpage amount used was also conservative, as the maximum possible water demand of 7,800 acre-feet/year was used, rather than the increase over current pumpage on the parcels. Pumpage by well was determined by dividing this demand between five modeled production wells.

The transmissivity/hydraulic conductivity value used in the model was that already agreed upon by ADWR, and represents a spatially-weighted average of aquifer tests conducted for on-site production wells and other local wells.

In order to assess the likely expected groundwater conditions at the end of the project's expected lifetime, impacts to water levels were modeled for a 30-year period. Results of the modeling are summarized in Table 7.

At the end of 30 years, the maximum drawdown projected in the immediate vicinity of the site is approximately 32 feet within the well field, and over 25 feet for a distance of 0.4 miles. Drawdowns from projected annual withdrawals of 7,800 acre-feet of up to 10 feet extend a distance of approximately 3.4 miles radially from the site. Water level declines are shown on Figure 7.

To estimate the drawdown expected for the additional 1,000 acre-feet/year now projected to be used by the facility (7,800 acre-feet minus 6,800 acre-feet), an additional two-dimensional model run was conducted. The results of this model are shown in Figure 8. This represents an approximate 3 foot increase in drawdown over that originally modeled for the area.

6.3 Cumulative Impacts Using Three-Dimensional Model

Dr. Mock's modeling for the power plant scenario projected the estimated regional cumulative impact from pumping from all major water users in the Arlington Valley, including remaining agriculture uses and proposed power plants (Mock, 2000b). Dr. Mock estimated that approximately 70 feet of drawdown would occur over 30 years, taking into account the observed increase in water levels observed over the last few decades.

The results of Dr. Mock's model are shown on Figure 9. The combination of the results from Dr. Mock's model and the impact of an additional 1,000 acre-feet/year used at the Arlington Valley Energy Facility is shown on Figure 10. The expected maximum increase over Dr. Mock's result is approximately 3 feet of drawdown over 30 years (Figure 8).

7 CONCLUSIONS

Based on the information presented in this report, the following conclusions are warranted:

1. Water supply for the proposed project will be met completely through the use of groundwater. Approximately 13,000 acre-feet/year of Irrigation Grandfathered Rights will be converted to Type 1 Non-Irrigation Grandfathered Rights to provide a

water supply of approximately 7,800 acre-feet/year. Current pumpage under the irrigation rights is about 3,500 acre-feet/year.

2. Historically, the Arlington Valley area experienced approximately 80 feet of groundwater decline due to agricultural pumpage prior to 1980. Water levels have recovered approximately 50 feet in the area since approximately 1980 and are continuing to recover. Impacts of future pumpage can be expected to be offset by this recovery.

3. Adequate information is available for the vicinity of the proposed project to obtain a reliable estimate of changes in groundwater levels due to the groundwater pumpage for the proposed project and to support the conclusions set forth in this report. This includes the analysis of site-specific pumping and recovery tests.

4. Groundwater quality is adequate to provide a water supply for the proposed project.

5. Modeling of impacts to the groundwater system over the 30 year expected lifetime of the proposed project indicate that sufficient water is physically available to supply the project water demands. Projected impacts of groundwater pumpage were estimated. Based on groundwater flow modeling, projected maximum water level changes due to withdrawals of the full 7,800 acre-foot Type I Right are approximately 32 feet in the immediate vicinity of the site, and minimal water level changes (up to 10 feet of decline) are projected within about 3 miles of the project production wells. Based on an analytical model of historical response to groundwater pumpage, water levels are estimated to change no more than 24 feet over the lifetime of the proposed project. Actual future water level changes will be less than projected as these projections do not include retirement of current agricultural pumpage and the ongoing recovery of water levels in the area.

6. The same model was also used to simulate water level changes from the addition of the proposed pumping for AVEF II. After 30 years of pumping 1,000 acre-feet/year, minimal water level changes (up to 3 feet) are projected within about a half mile of the plant production wells, and smaller level changes at greater distances. Again, these projections are considered conservative as they do not consider the retirement of current irrigation pumpage or the natural recovery of water levels that has occurred in recent years.

7. Estimates of the cumulative impact of the three power plants approved and proposed were made using previous modeling (Mock, 2000b) and modeling of a proposed increase in pumping from the previous modeling of 1,000 acre-feet per year. The projected increase in drawdown is less than 3 feet for the area beyond 0.5 miles from the Arlington Valley Energy Facility.

8. Sufficient water is available to supply the proposed project needs. The proposed withdrawal of this water will have minimal impact on the aquifer.

8 REFERENCES

Arizona Public Service, 1987. Aquifer Protection Permit Application for Palo Verde Nuclear Generating Station.

Arizona Department of Water Resources, 1995. Hydrology Studies for Assured and Adequate Water Supplies – ARS § 45-108 and ARS § 45-576 – Guidelines, March 3, 1995.

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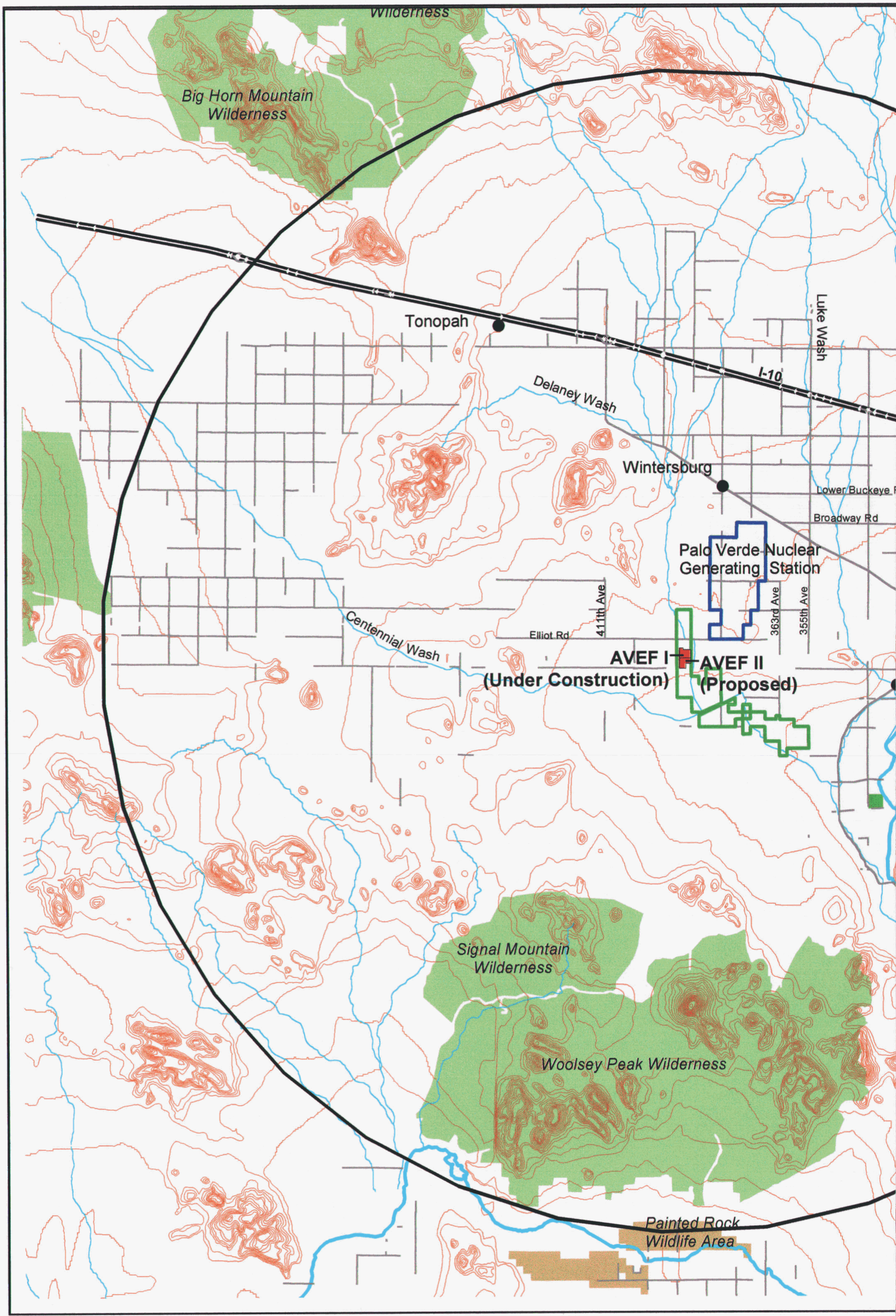


Wilderness
Big Horn Mountain Wilderness
Tonopah
Luke Wash
I-10
Delaney Wash
Wintersburg
Lower Buckeye R
Broadway Rd
Palo Verde Nuclear Generating Station
411th Ave
363rd Ave
355th Ave
Elliot Rd
Centennial Wash
AVEF I
AVEF II
(Under Construction)
(Proposed)
Signal Mountain Wilderness
Woolsey Peak Wilderness
Painted Rock Wildlife Area

Exhibit A-1:

Proposed AVEF II Project and Adjacent Area within 20-mile Radius

- Arlington Valley Energy Facility
- Duke Properties
- Palo Verde Nuclear Generating Station
- Elevation Contours
- Rivers and Washes
- Cities and Towns
- 20-mile Radius
- Streets
- BLM Wilderness Areas
- Parks and Recreation
- Game and Fish
- Painted Rock Wildlife Area

0 1 2 3 4 5
Miles

Duke Energy

EXHIBIT A-2

PROPOSED AVEF II PROJECT – 2-MILE RADIUS

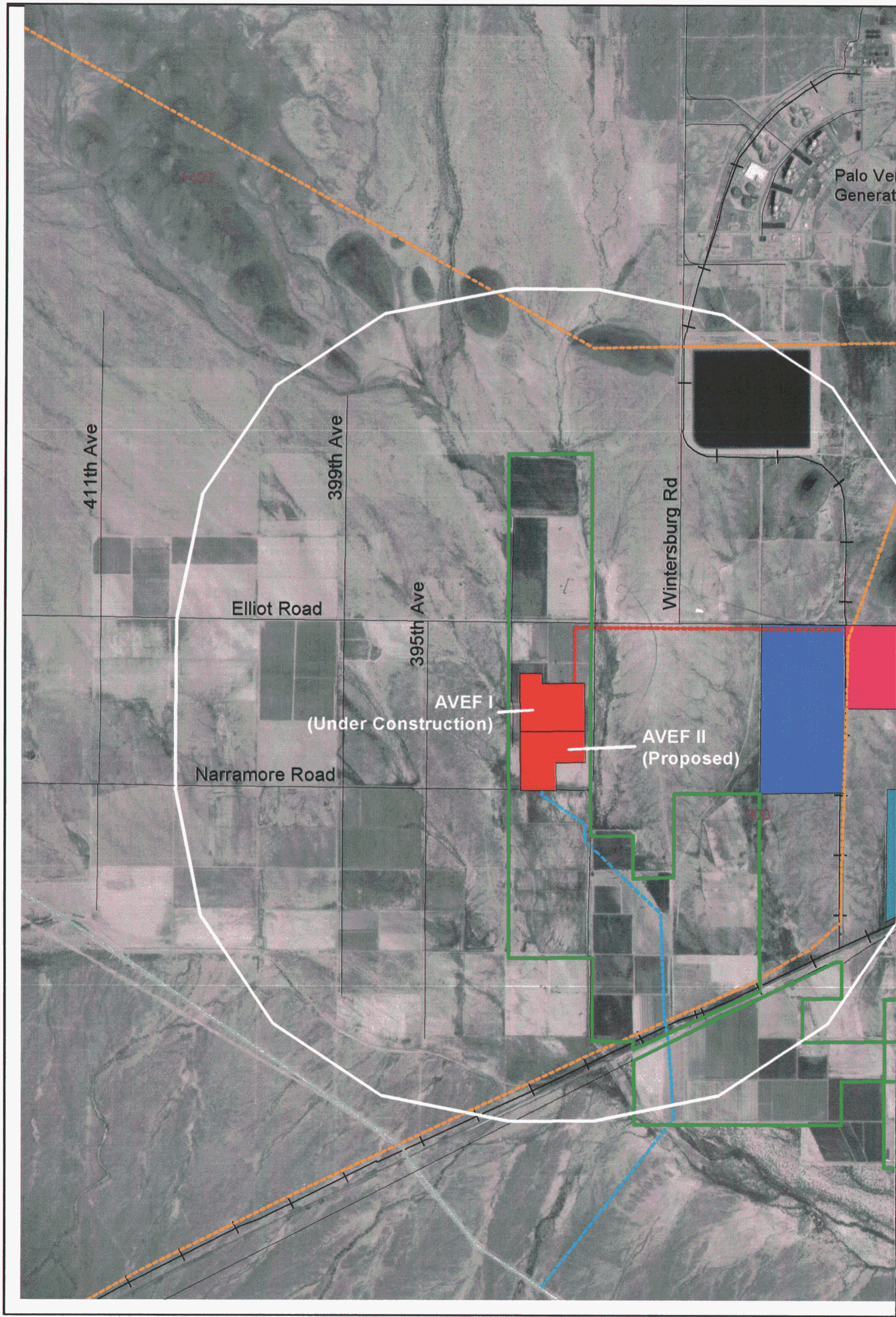

Palo Ve
Generat
411th Ave
399th Ave
395th Ave
Wintersburg Rd
Elliot Road
Narramore Road
AVEF I
(Under Construction)
AVEF II
(Proposed)

Exhibit A-2:

Proposed AVEF II Project and Adjacent Area within 2 Miles of Project

- Arlington Valley Energy Facility
- Hassayampa Switchyard (Under Construction)
- Redhawk Generating Station (Under Construction)
- Mesquite Generating Station (Approved)
- Duke Properties
- AVEF Transmission Line (Under Construction)
- Existing Transmission Lines
- AVEF Natural Gas Line (Approved)
- Existing Natural Gas Line
- Streets
- Area within 2 Miles of Project
- Large Lot Residential Land Use

Land use for the remainder of the area is Rural.

0 0.5 1
Miles

Duke Energy

Aerial photograph base from Landiscor, 1986

EXHIBIT B
ENVIRONMENTAL REPORTS

EXHIBIT B
ENVIRONMENTAL REPORTS

As stated in Arizona Corporation Commission Rules of Practice R-14-3-219:

"Attached 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."

Duke retained the services of consultants to complete the environmental studies for the proposed project. The environmental studies completed for this project are described in this exhibit and include the following:

- Exhibit B-1 – Air Quality Permit Application (Summary)
- Exhibit B-2 – Groundwater Assessment
- Exhibit B-3 – Land Use Study

Descriptions of other resource studies including biology, cultural, visual, and noise are discussed in Exhibits C, D, E, G, and I.

EXHIBIT B-1

AIR QUALITY PERMIT APPLICATION (SUMMARY)

Air Quality Permit Application (Summary)

Introduction

Duke Energy Maricopa, LLC (Duke) is in the process of constructing the Arlington Valley Energy Facility I (AVEF I), a 580-megawatt (MW) (nominal) gas turbine/steam turbine combined-cycle merchant power plant in Maricopa County, Arizona. Duke received a Title V and Prevention of Significant Deterioration (PSD) air quality permit from Maricopa County in 2000 allowing AVEF I's construction and operation. Duke now proposes to add an additional 600 MW of generating capacity at the AVEF site through a significant revision to its existing Title V/PSD air quality permit. The new project will be known as AVEF II.

AVEF II will employ best available control technology (BACT) for oxides of nitrogen (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), volatile organic compounds (VOC), and particulate matter with a nominal aerodynamic diameter of 10 microns or less (PM_{10}) to minimize air emissions. Consistent with Duke's objectives and the stated desires of the Corporation Commission, the project will be operated so as to meet a 2.5 parts per million NO_x emissions level, within the parameters established in its Title V/PSD air quality permit to be issued by Maricopa County.

Duke has already started the process to apply to the Maricopa County Environmental Services Department (MCESD) for an air quality pre-construction permit as required by Maricopa County Air Pollution Control Regulation (MCAPCR) II, "Permits and Fees." Duke has submitted a request for expedited permit processing to MCESD. In the expedited review process, MCESD selects an outside consultant, at the applicant's expense, to assist the MCESD staff in reviewing and processing the permit application. MCESD has not yet selected its outside consultant for the AVEF II application. Duke has been informed by MCESD in a pre-application meeting that the results of an air quality modeling analysis must be part of the air quality permit application for AVEF II. Before the modeling can be conducted, MCESD and its outside consultant must approve the protocol for the modeling.

As soon as MCESD assigns an outside consultant to the AVEF II project, Duke intends to submit its protocol for the required air quality modeling analyses. Once the modeling analysis is completed, Duke will incorporate the modeling results and submit its application for a significant revision to the existing AVEF I air quality permit. Duke anticipates that it will have the necessary approvals from MCESD to file its air quality permit application by mid-August 2001.

Project Description

The key elements of the new AVEF II project include:

- Two combustion turbine generators with inlet chilling fueled by pipeline-quality natural gas;
- Two natural gas supplementary-fired Heat Recovery Steam Generators (HRSG);
- One steam turbine generator set;
- One gas-fired (intermittent) auxiliary boiler;
- One surface condenser; and
- Two mechanical draft cooling systems.

These are the same elements that were permitted for AVEF I, except that the steam turbine is slightly larger in AVEF II, so that the proposed equipment will have the capacity to produce more electricity than the AVEF I equipment.

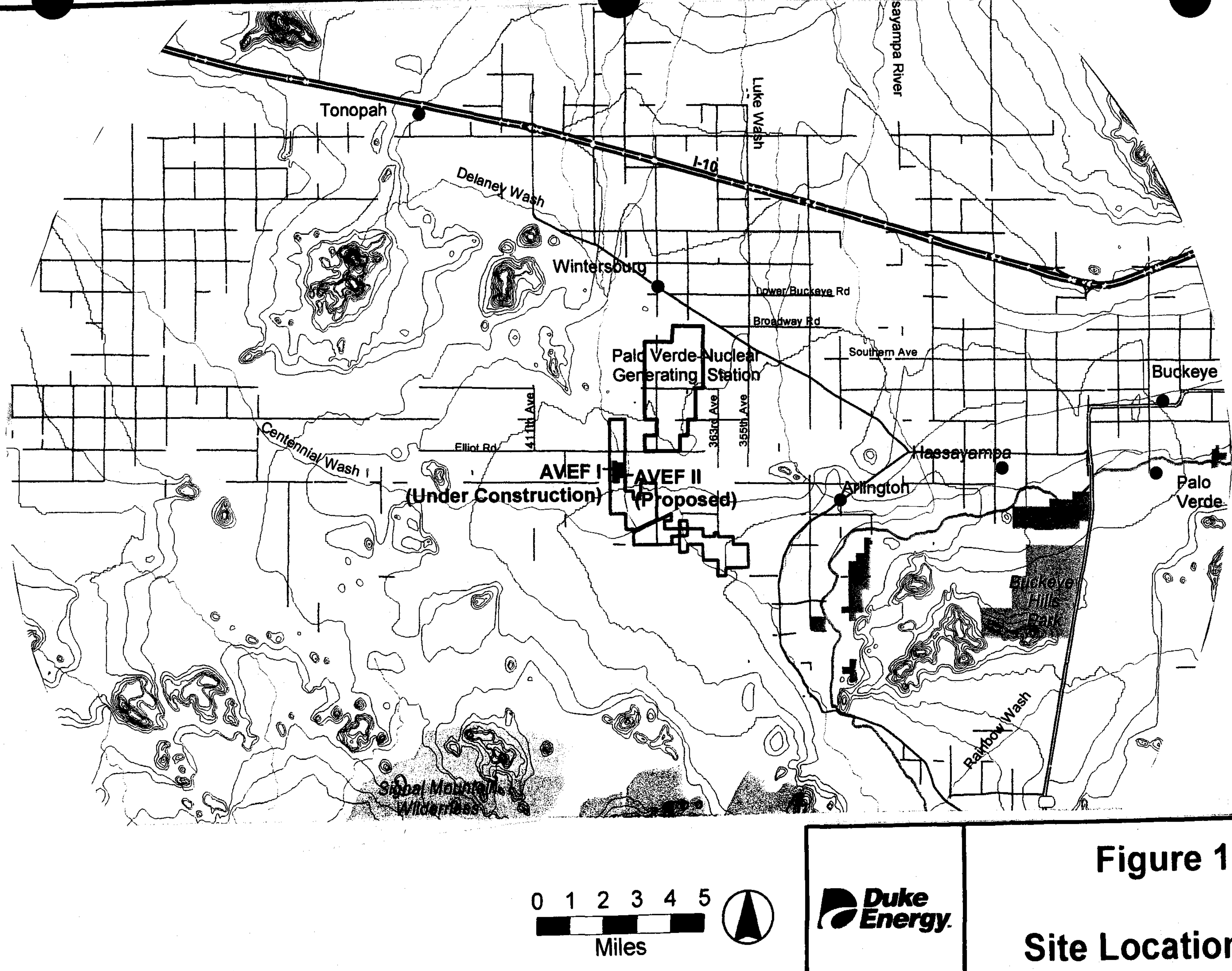
AVEF II will be constructed on approximately 65 acres of undeveloped property immediately adjacent to and south of AVEF I. The approximate project property boundary and local road network is shown on Figure 1. Figure 1 also shows the land use within the region surrounding the proposed site. Within this area are:

- The Palo Verde Nuclear Generating Station;
- The residential communities of Arlington and Palo Verde to the east and Wintersburg to the north; and
- Roadways including Interstate 10 and U.S. Route 85.

Beside AVEF I and II, two other power plants are planned in this area. They are the Pinnacle West (Redhawk) and Sempra (Mesquite) power generating stations.

The proposed AVEF II project will be a natural gas-fired combined-cycle power plant. The plant will operate commercially as a merchant power plant. A merchant power plant is a power generation facility designed to produce electricity for the emerging deregulated electricity market without pre-arranged long-term utility power purchase agreements. As a merchant plant in a deregulated electricity market, AVEF II is being designed to convert clean natural gas to useful power at high efficiency and low cost. Commercial operation is scheduled to commence in the year 2003.

AVEF II will include two 170-MW General Electric 7FA natural gas-fired combustion turbines operating in combined-cycle mode with two supplementary fired, three-pressure HRSGs and a common, reheat condensing steam turbine. Steam generation in the HRSGs is augmented with supplementary natural gas-firing using duct burners. Each HRSG will produce high pressure steam at approximately 1,800 pounds per square inch gauge for introduction into the steam turbine. The steam turbine will drive an additional generator to increase the total plant output to about 500 MW without duct firing or 600 MW with duct firing and inlet air chilling.



Duke Energy

Figure 1:

Site Location

Other potential sources of criteria pollutants associated with this facility include a gas-fired auxiliary boiler, a cooling tower, an emergency generator, and a small diesel fire-water pump. There will be a minor amount of emissions associated with ancillary facilities, including a small diesel storage tank for the fire-water pump, small acid storage tank(s) used in the treatment of process water, and an ammonia tank used to store the aqueous ammonia solution that will be used with the Selective Catalytic Reduction system used to control NO_x emissions.

Air Emissions

Criteria pollutants are those for which the U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) and consist of PM_{10}, CO, NO_x, SO_2, lead, and ozone, which is formed through the photochemical reaction of VOC and NO_x in the atmosphere. These pollutants also are known as "conventional air pollutants" under State law.

As indicated earlier, AVEF II will employ BACT to minimize its criteria pollutant emissions of NO_x, CO, VOC, PM_{10}, and SO_2. Consistent with Duke's objectives and the stated desires of the Corporation Commission the project will be designed and operated to meet a 2.5 NO_x emissions level, within the parameters that will be established in its Title V/PSD air quality permit from MCESD. The project will not produce significant emissions of lead.

AVEF II also will emit federally listed hazardous air pollutants as a result of the combustion turbines, duct burner and auxiliary boiler. AVEF II also will emit other substances that are not regulated, but which MCESD has a practice of comparing to informal guidelines that have not been adopted as rules. These informal comparative guidelines are known as the Ambient Air Quality Guidelines.

Regulatory Requirements

1. Air Quality Permitting Requirements

New and existing stationary sources are classified as either major or minor based on their potential-to-emit regulated air contaminants. This classification also is affected in part by whether the area in which the source is located has attained the NAAQS. An area is classified as attainment if the ambient air quality concentration for a specific pollutant as measured by a monitor is below the standard concentration level for a set averaging period. The area in which AVEF II will be located is designated as attainment for all the NAAQS.

This project will be subject to the requirements of two permit programs applicable to major sources under the federal Clean Air Act (CAA): PSD and Title V. MCESD is authorized by the USEPA to issue PSD permits and permit revisions in Maricopa County under MCAPCR 240. MCESD's Title V program, set forth in MCAPCR 220, has been approved by USEPA. As an electrical energy producer, AVEF II will also subject to the Title IV Acid Rain provisions of the CAA Amendments of 1990, set forth in MCAPCR 371. New Source Performance Standards also will apply to the gas turbines and duct burners.

The PSD program applies to the construction or major modification of a major source in an attainment area. If a source is 1 of 28 "categorical sources," the major source threshold is 100 tons per year (tpy) of a regulated air pollutant; otherwise the threshold is 250 tpy. AVEF I is 1 of the 28 categorical sources (fossil-fuel-fired steam electric plants of more than 250 million British thermal unit per hour heat input) with a PTE of more than 100 tpy for three regulated pollutants: NO_x, PM_{10}, and CO. AVEF I, therefore, is a major source. Major modifications to major sources also are required to go through PSD review. Major modifications are those changes at a major stationary source that increase potential emissions of criteria pollutants by more than a specified threshold. AVEF II will have potential emissions above the major modification thresholds and therefore will have to undergo PSD review.

Major modifications must also be included in the major source's operating permit under Title V of the CAA. Duke's existing Title V permit will be revised to include AVEF II.

2. Air Quality Modeling Requirements

Duke Maricopa will be required to perform certain air quality modeling analyses in connection with its application for a revision to its air quality permit for the proposed AVEF II project.

PSD regulations require an ambient air quality impact analysis for sources located within 50 kilometers (km) of non-attainment areas. As described earlier, AVEF II will be located in an area designated as attainment for all criteria air pollutants. The nearest ozone, CO, and PM_{10} non-attainment areas in Maricopa County are the metropolitan Phoenix area located east of the facility. The non-attainment areas are within 50 km of the proposed facility.

A cumulative air quality impact analysis is required for pollutants that are modeled to be greater than the Significant Impact Levels (SILs) established by USEPA. Based on preliminary modeling of both AVEF I and II, only PM_{10} is expected to be greater than the SILs. Therefore, an ambient impact analysis with other sources in the area is only required for PM_{10}. The area of influence for PM_{10} is expected to be 5 km. This is the maximum distance to which the maximum modeled concentration for any averaging time drops to below the SIL. For the NAAQS analysis, all sources within the area of influence, or that are within 50 km of the area of influence and have the potential to contribute a significant impact within the area, must be modeled. If the background air quality data are available, however, only nearby sources, i.e., within the area of influence, need to be modeled. An inventory of other PM_{10} emissions sources within 55 km of AVEF I has been obtained from MCESD.

PSD regulations require also that facilities within 100 km of a Federal Class I areas perform a modeling evaluation of ambient air quality in terms of Class I PSD Increments and Air Quality Related Values (AQRVs). PSD increments are numerical values of ambient concentration of criteria pollutants that cannot be exceeded. For this project, the AQRVs relate to changes in visibility as it could affect the experience of visitors to the Class I area and deposition of acidic species.

In addition, large projects between 100 and 200 km or more from a Class I area may be requested by the Federal Land Managers to conduct an evaluation of air quality impacts. The designated FLM in this case is the U.S. Forest Service. Due to technical limitations in the applicable dispersion model (CALPUFF), modeling of sources much more than 200 km from a PSD Class I area is not recommended.

The project is located in a PSD Class II area. There are no Class I areas within 100 km. The nearest Class I area to the facility is the Superstition Wilderness Area located 120 km west of the project site. Other Class I areas within 200 km are Mazatzal, Pine Mountain, Sierra Ancha, and Sycamore Canyon Wilderness Areas. As a courtesy, the analysis of impacts from this project also will be determined on the following Class II areas:

- Signal Hill Wilderness Area;
- Woolsey Peak Wilderness Area;
- Gila Bend Indian Reservation;
- North Maricopa Mountain Wilderness Area;
- Sierra Estrella Wilderness Area;
- Hummingbird Springs Wilderness Area;
- Big Horn Wilderness Area; and
- Eagletail Mountain Wilderness Area.

EXHIBIT B-2

GROUNDWATER ASSESSMENT

REVISED WATER RESOURCE IMPACT ASSESSMENT
ARLINGTON VALLEY ENERGY FACILITY
ARLINGTON VALLEY, ARIZONA

Submitted to

Duke Energy Maricopa, LLC

Submitted by

Philip C. Briggs
Water Resources Consulting Southwest, LLC
6631 S. 38th Street
Phoenix, Arizona 85040

JULY 9, 2001

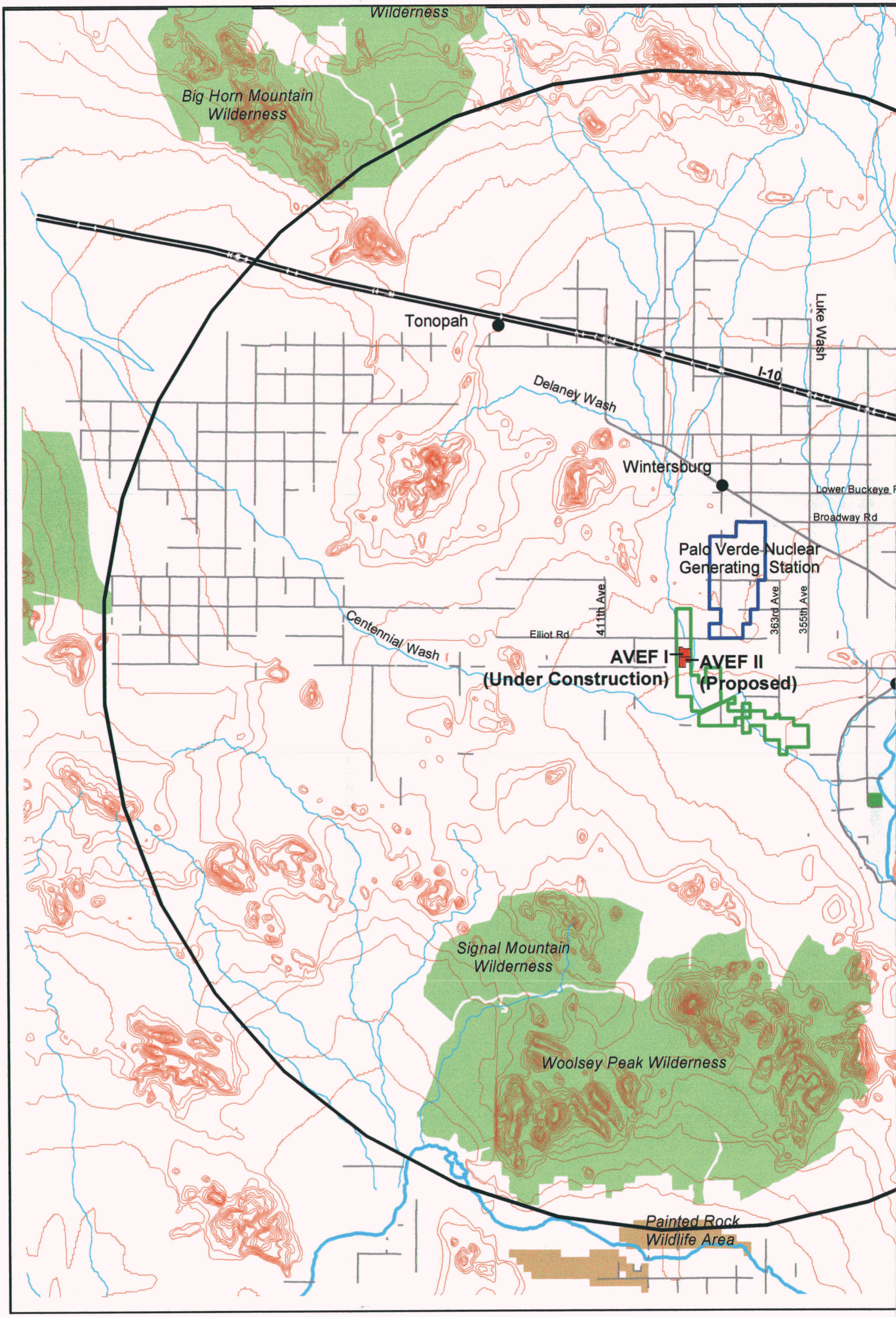
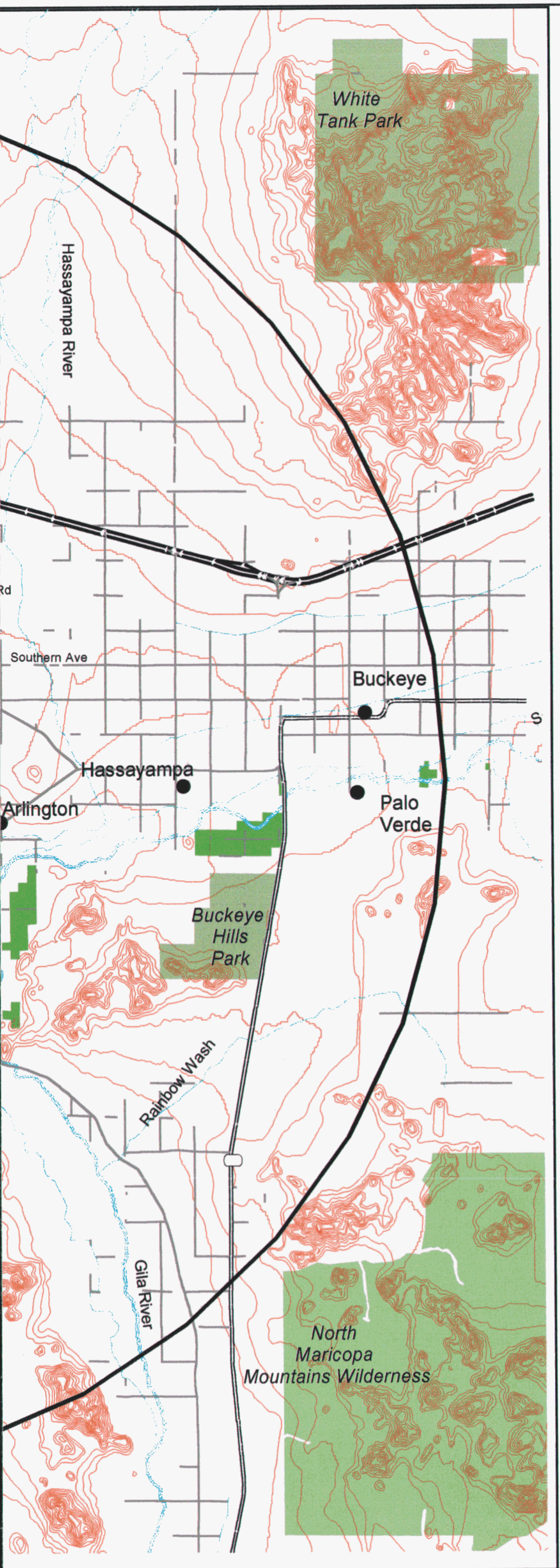

Wilderness
Big Horn Mountain Wilderness
Tonopah
I-10
Luke Wash
Delaney Wash
Wintersburg
Lower Buckeye R
Broadway Rd
Palo Verde Nuclear Generating Station
411th Ave
363rd Ave
355th Ave
Elliot Rd
Centennial Wash
AVEF I (Under Construction)
AVEF II (Proposed)
Signal Mountain Wilderness
Woolsey Peak Wilderness
Painted Rock Wildlife Area

Figure 1:

Site Location



Arlington Valley Energy Facility

Duke Properties

Palo Verde Nuclear Generating Station

Elevation Contours

Rivers and Washes

Cities and Towns

20-mile Radius

Streets

BLM Wilderness Areas

Parks and Recreation

Game and Fish

Painted Rock Wildlife Area

0 1 2 3 4 5

Miles

Duke Energy

Palo Ver
Generat
411th Ave
399th Ave
395th Ave
Wintersburg Rd
Elliot Road
Narramore Road
AVEF I
(Under Construction)
AVEF II
(Proposed)

MAP 12/17/99

Figure 2:

Site Plan

- Arlington Valley Energy Facility
- Hassayampa Switchyard (Under Construction)
- Redhawk Generating Station (Under Construction)
- Mesquite Generating Station (Approved)
- Duke Properties
- AVEF Transmission Line (Under Construction)
- Existing Transmission Lines
- AVEF Natural Gas Line (Approved)
- Existing Natural Gas Line
- Streets
- Area within 2 Miles of Project
- Large Lot Residential Land Use

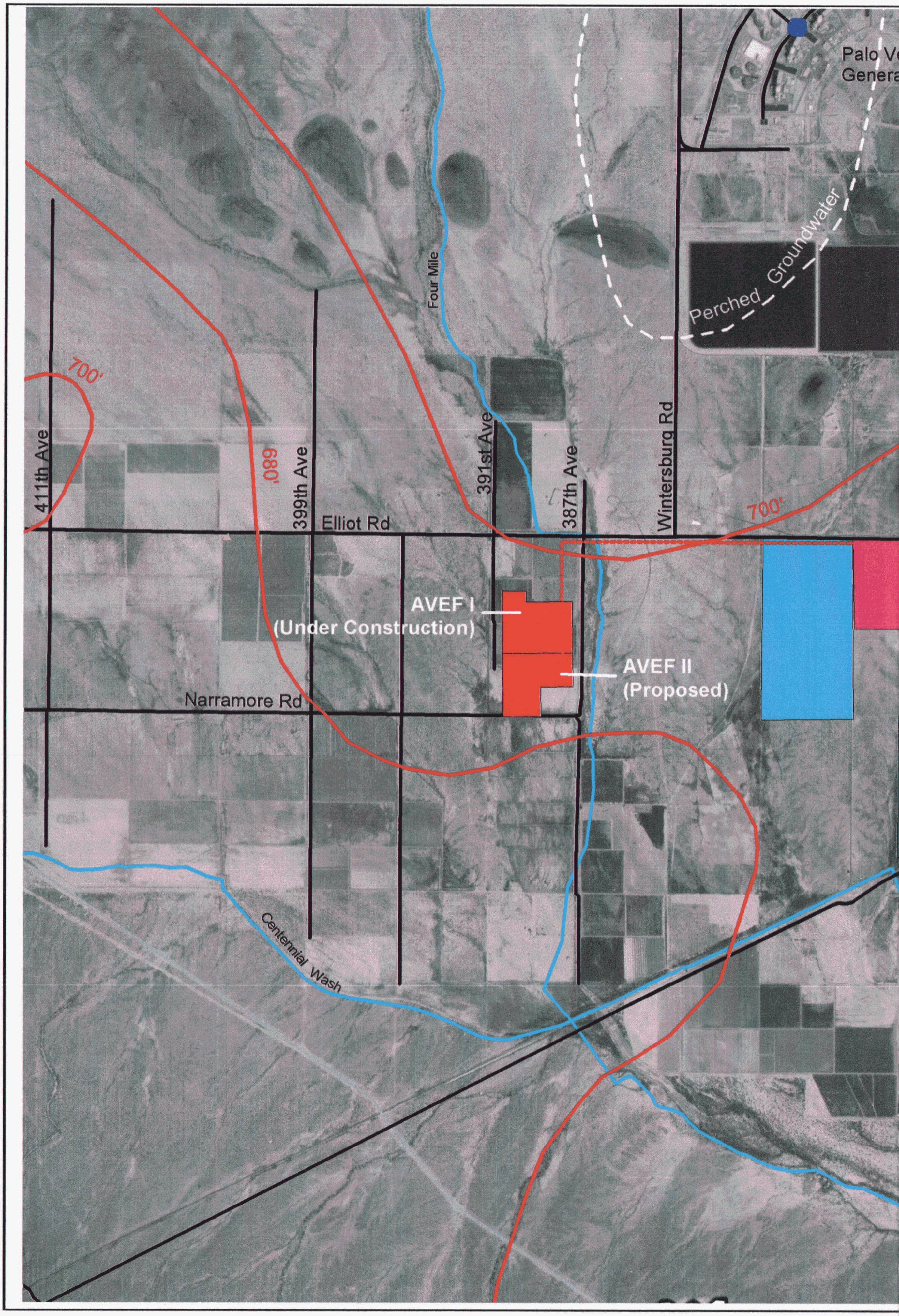
Land use for the remainder of the area is Rural.

0 0.5 1

Miles

Duke Energy

Aerial photograph base from Landiscor, 1986



Palo Ve
Genera
Perched Groundwater
Four Mile
700'
680'
411th Ave
399th Ave
391st Ave
387th Ave
Wintersburg Rd
Elliot Rd
700'
AVEF I
(Under Construction)
AVEF II
(Proposed)
Narramore Rd
Centennial Wash

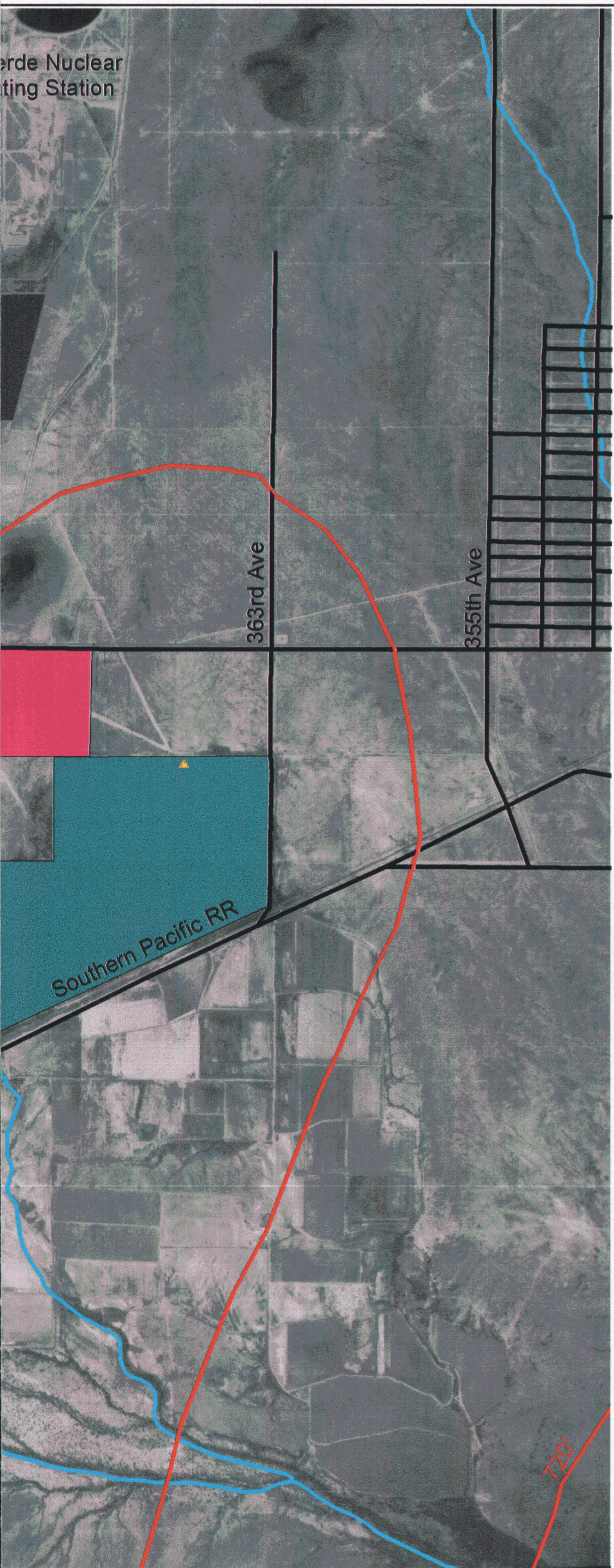


Figure 3:

Regional Water Level Contours and Extent of Perched Aquifer

- Arlington Valley Energy Facility
- Hassayampa Switchyard (Under Construction)
- Redhawk Generating Station (Under Construction)
- Mesquite Generating Station (Approved)
- AVEF Transmission Line (Under Construction)
- Groundwater Elevation Contours (From APS, 1997)
- Approximate Area of Perched Groundwater
- Rivers and washes
- Streets
- Existing Natural Gas Line
- Palo Verde Nuclear Generating Station
- Location of Hydrographs Shown in Figures 4 and 5

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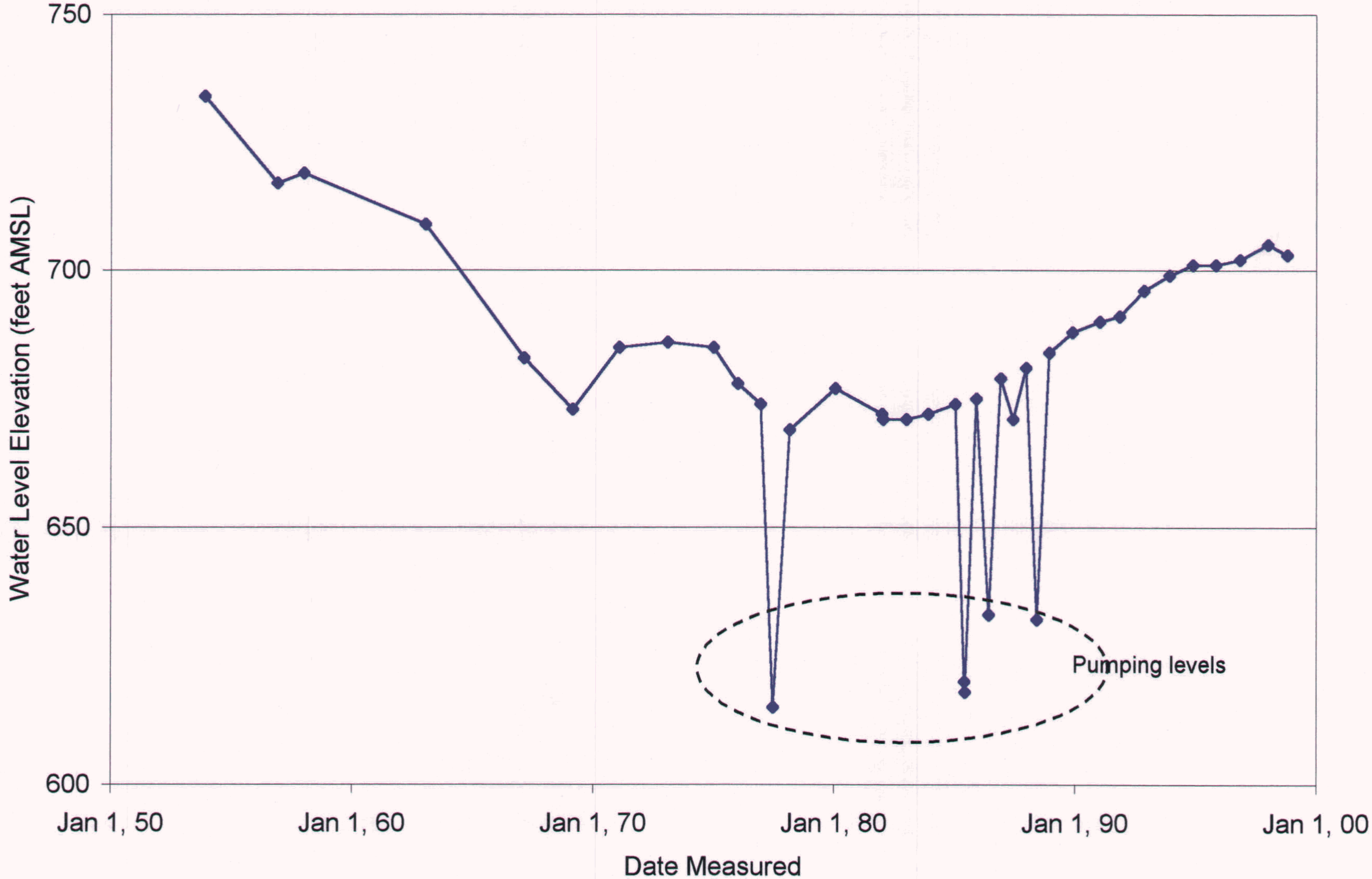
Miles

Duke Energy

Aerial photograph base from Landiscor, 1986



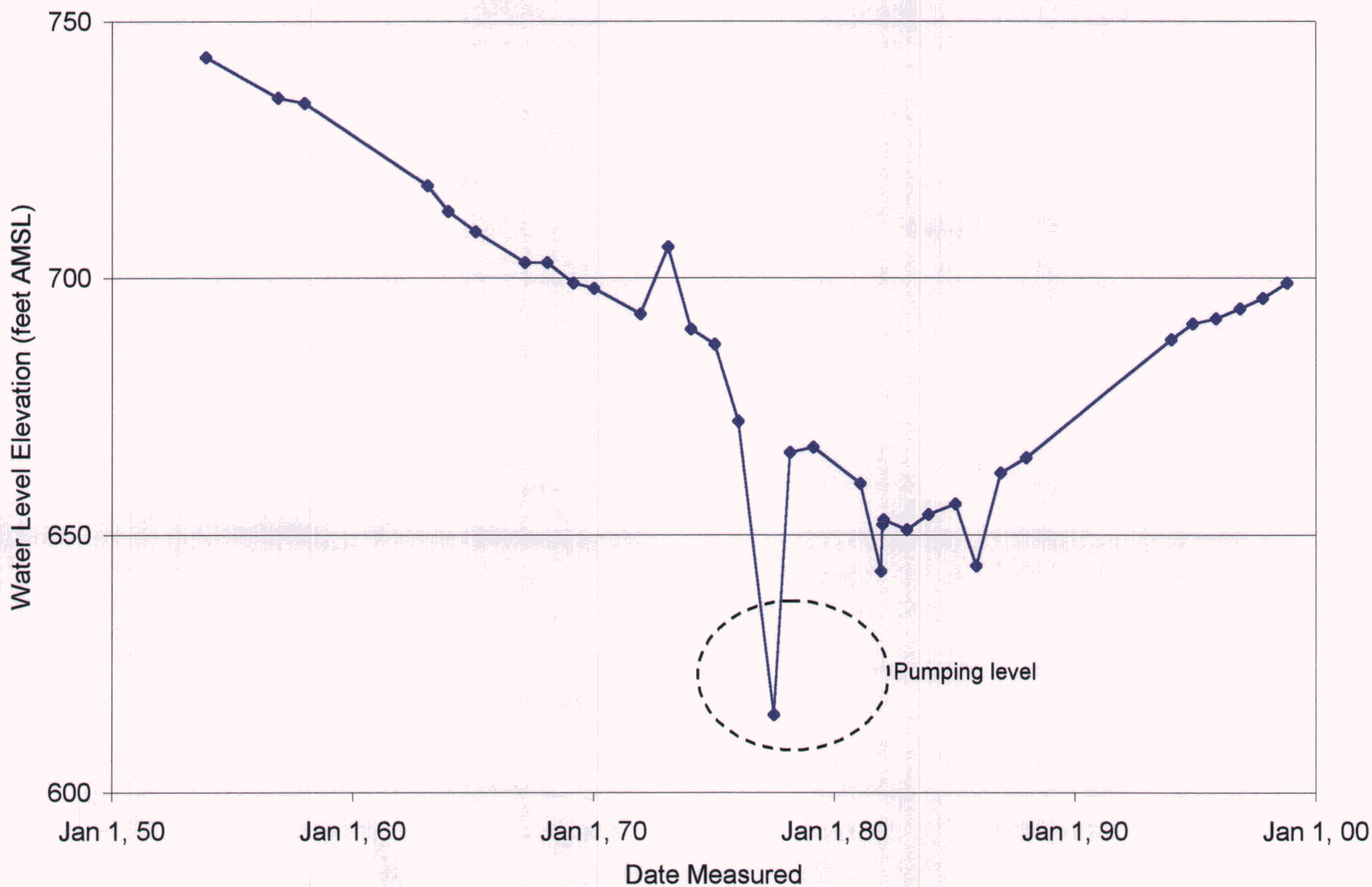
Duke Energy

GROUNDWATER ELEVATIONS FOR WELL C-01-06 14DBB

Arlington Valley Energy Facility
Arlington Valley, Arizona

Figure

4



GROUNDWATER ELEVATIONS FOR WELL C-01-06 18BBB

Arlington Valley Energy Facility
Arlington Valley, Arizona

Figure

5

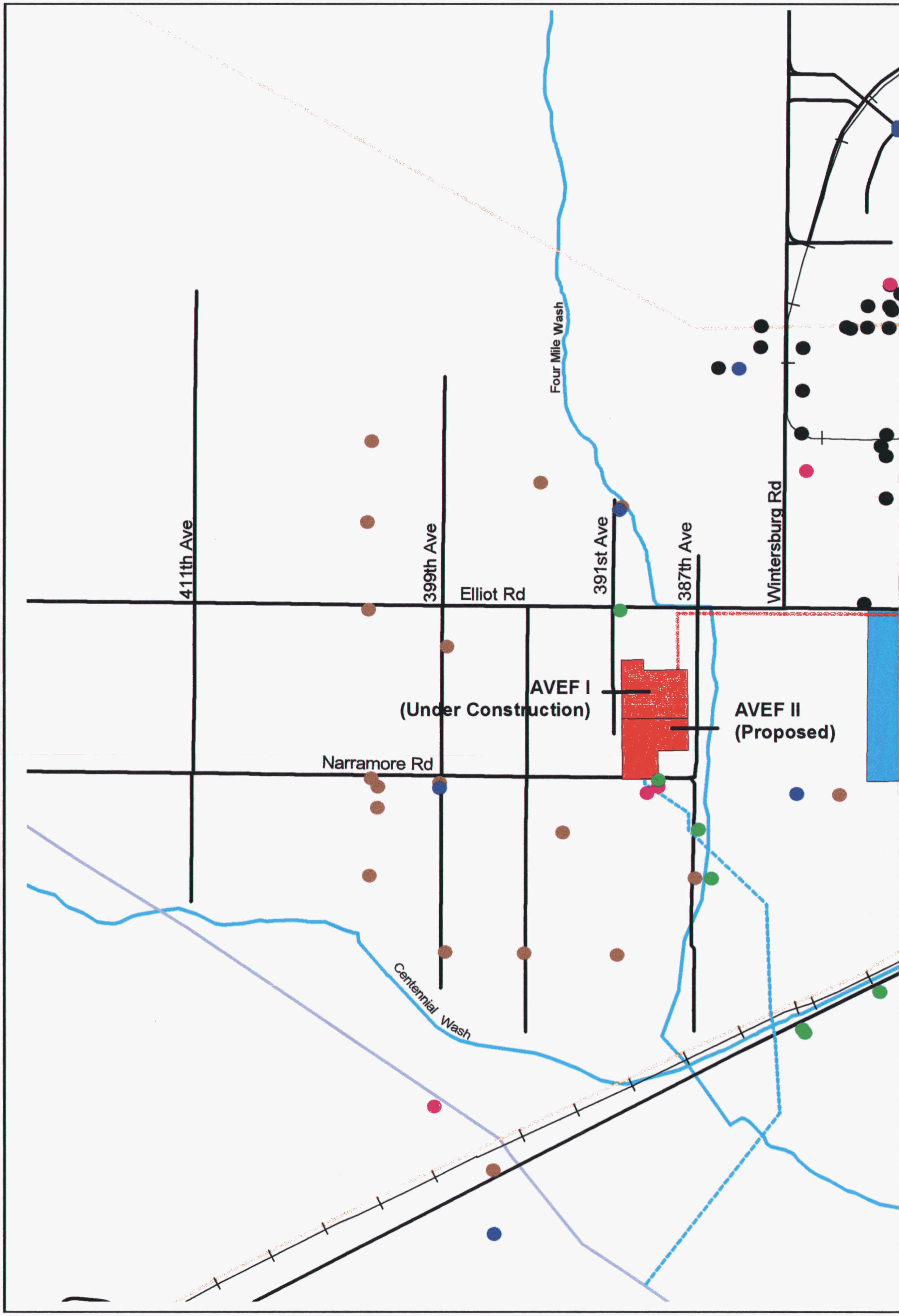
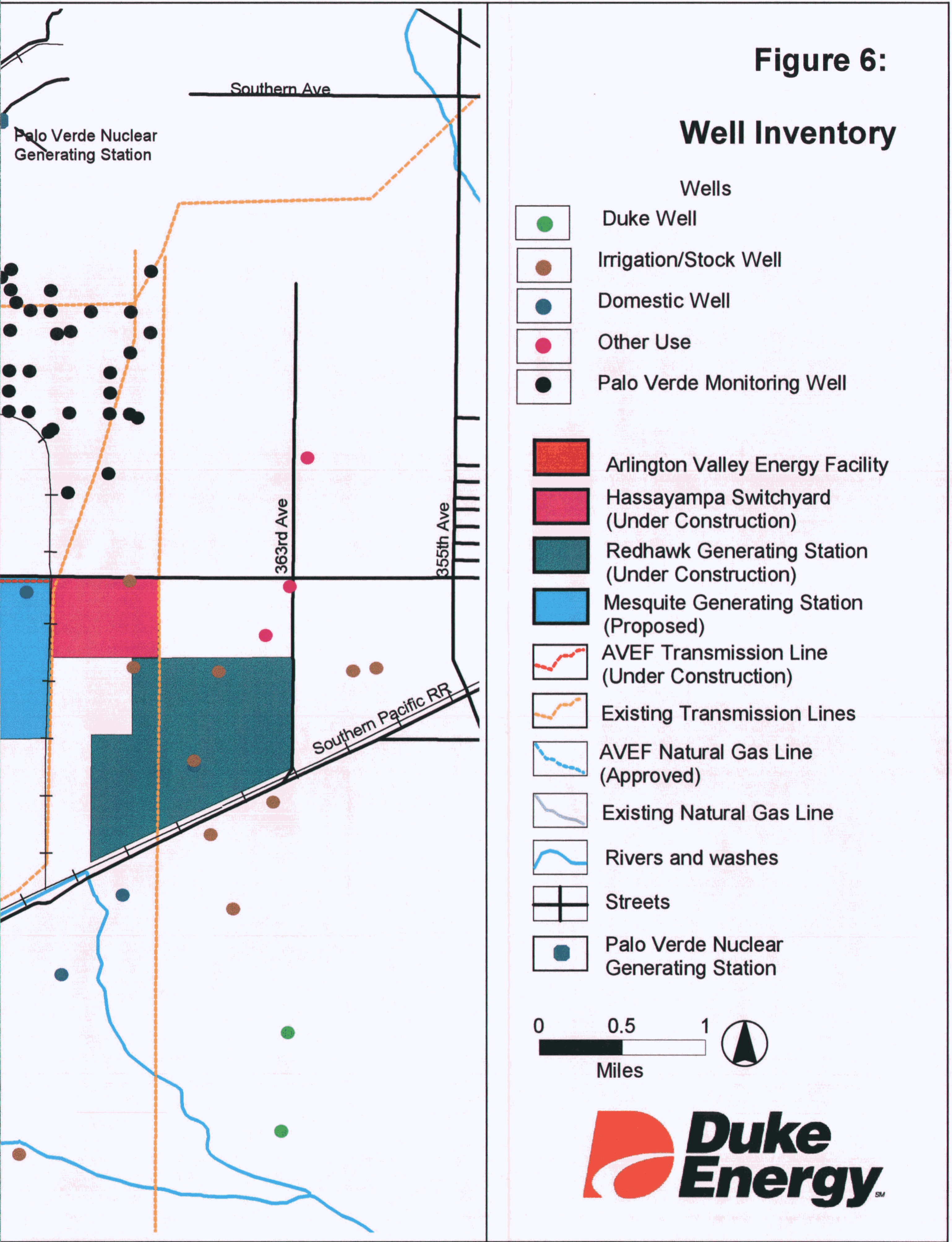
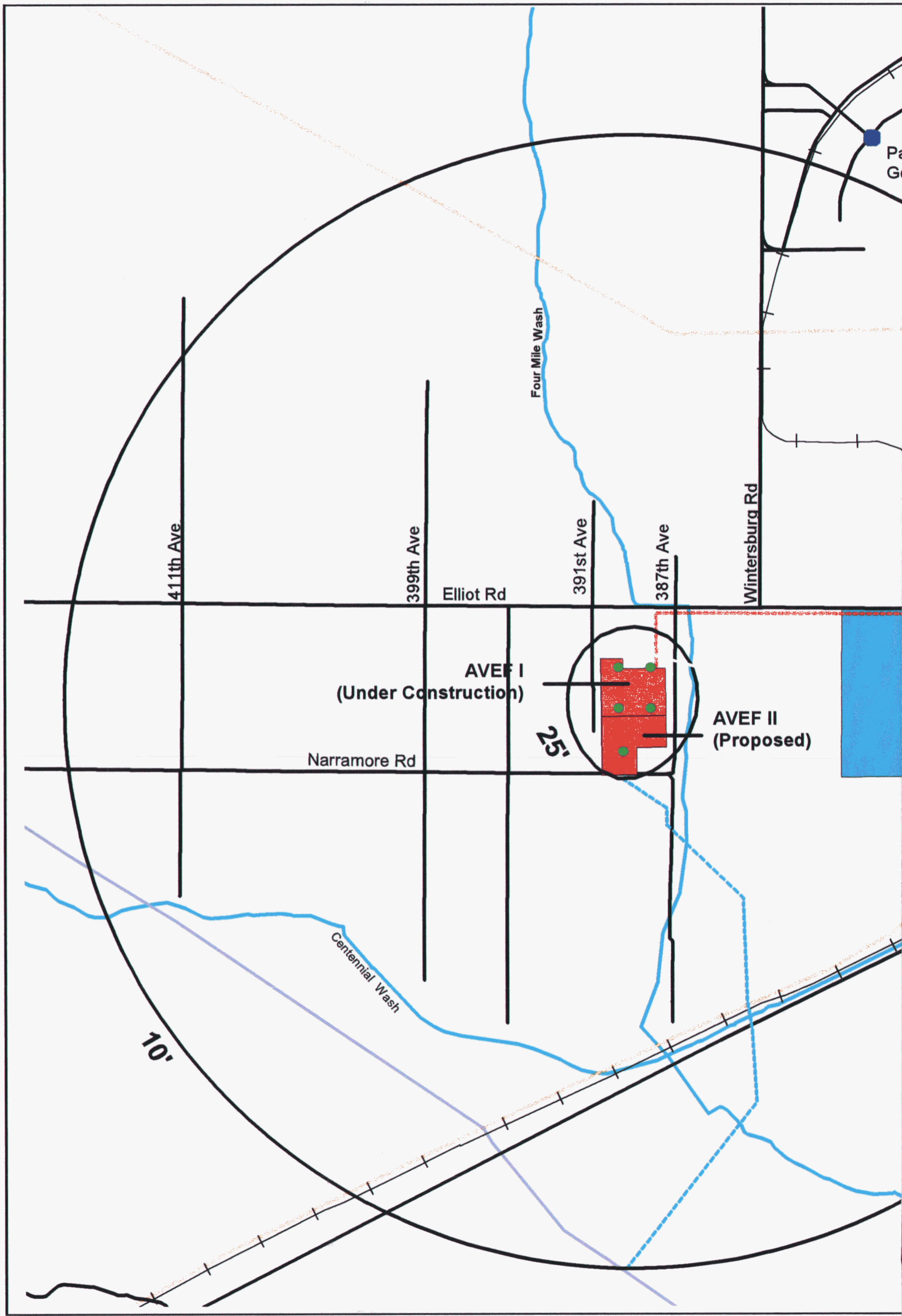

Four Mile Wash
411th Ave
399th Ave
391st Ave
387th Ave
Wintersburg Rd
Elliot Rd
AVEF I
(Under Construction)
AVEF II
(Proposed)
Narramore Rd
Centennial Wash

Figure 6:

Well Inventory





Four Mile Wash
411th Ave
399th Ave
391st Ave
387th Ave
Wintersburg Rd
Elliot Rd
Narramore Rd
AVEF I
(Under Construction)
AVEF II
(Proposed)
25'
10'
Centennial Wash

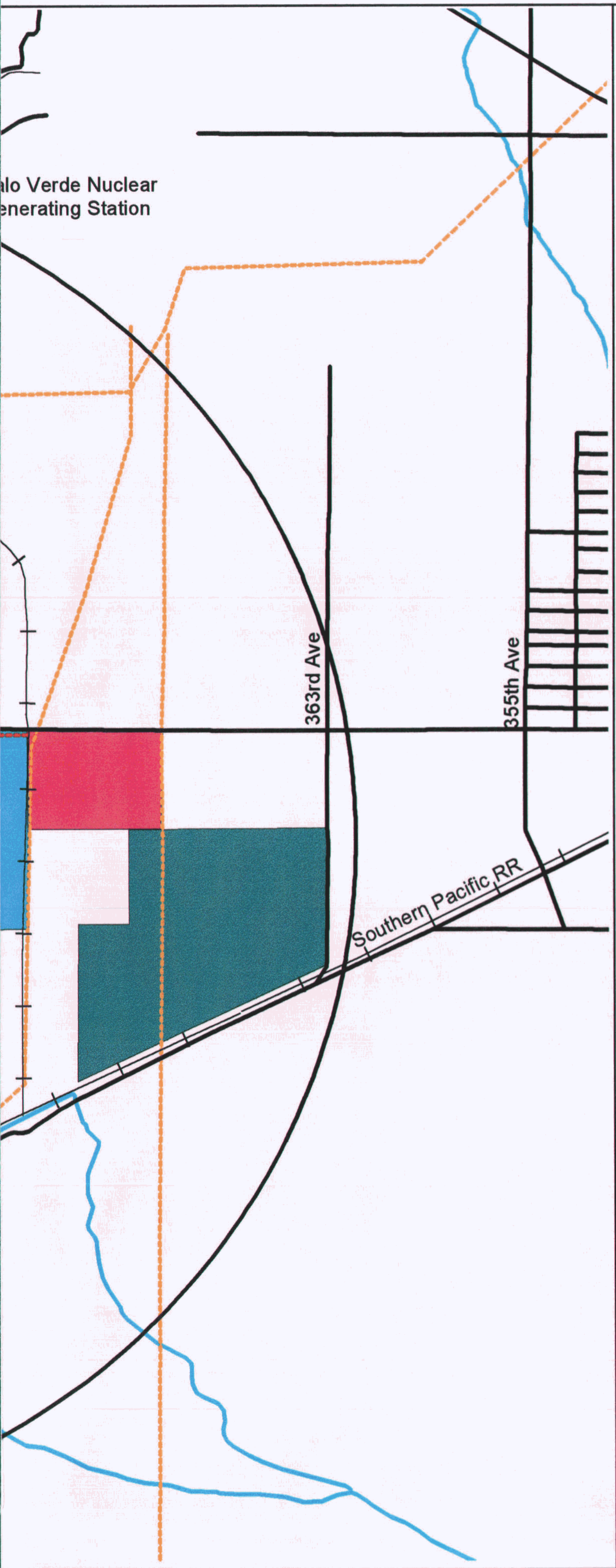


Figure 7:

Impact to Regional Groundwater Elevations (After 30 Years)

Drawdown Contours

Modeled with THWELLS℠ Version 4.01
Transient-state conditions at 30 years
Hydraulic Conductivity = 21 feet/day
Storage Coefficient = 0.1
Five wells pumping at 970 gpm each,
for a total of approximately 7,800 acre-feet/year

Future Duke Production Wells

Arlington Valley Energy Facility

Hassayampa Switchyard (Under Construction)

Redhawk Generating Station (Under Construction)

Mesquite Generating Station (Approved)

AVEF Transmission Line (Under Construction)

Existing Transmission Lines

AVEF Natural Gas Line (Approved)

Existing Natural Gas Line

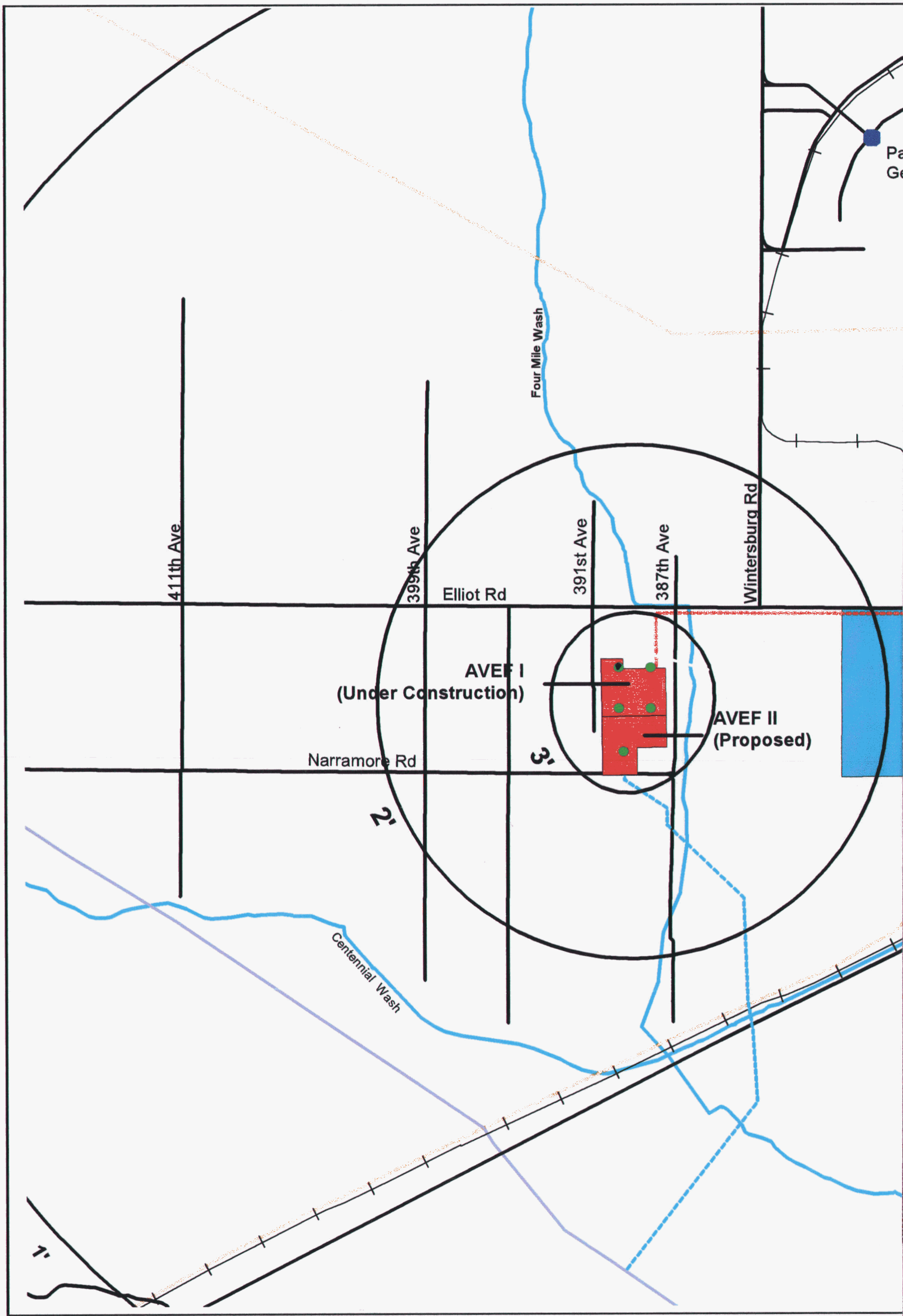
Rivers and washes

Streets

Palo Verde Nuclear Generating Station

0 0.5 1
Miles

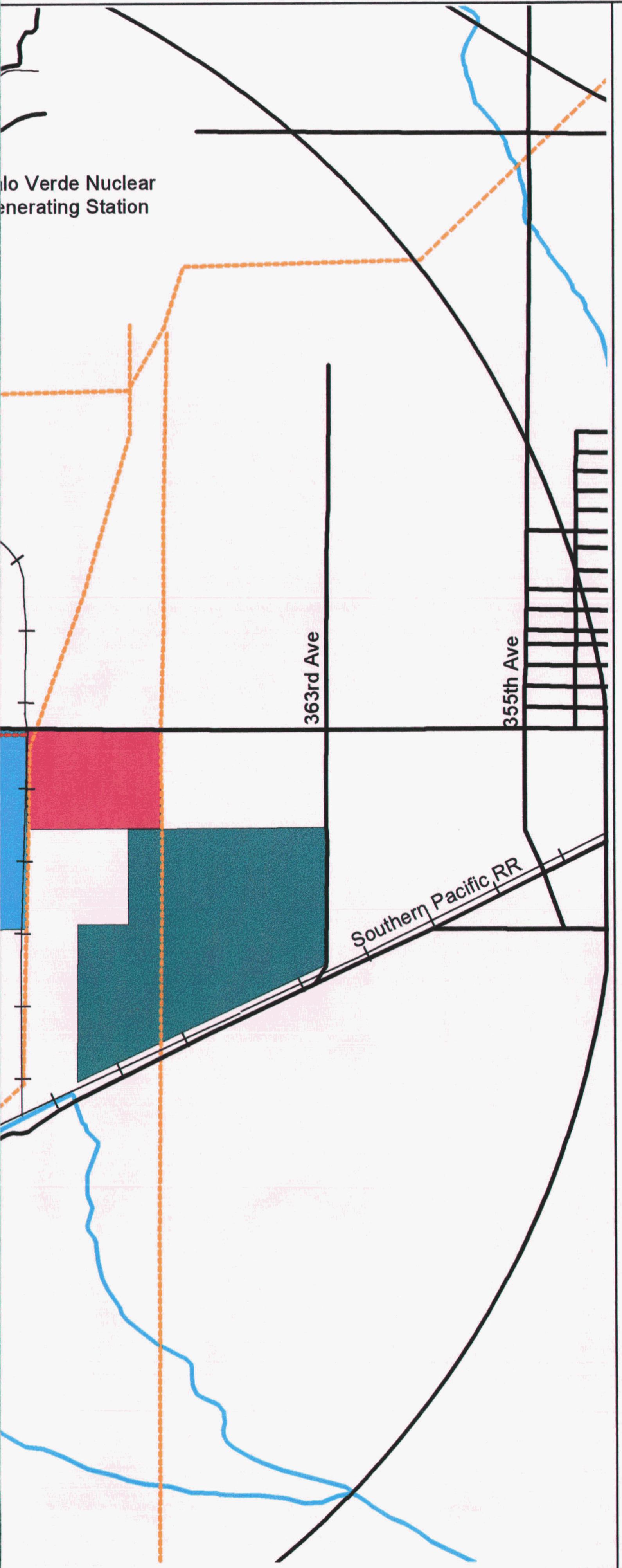
Duke Energy℠



Pa
Ge
Four Mile Wash
411th Ave
399th Ave
391st Ave
387th Ave
Wintersburg Rd
Elliot Rd
AVEF I
(Under Construction)
AVEF II
(Proposed)
Narramore Rd
3'
2'
Centennial Wash
1'

Figure 8:

Additional Impact Above Cumulative Model (After 30 Years)



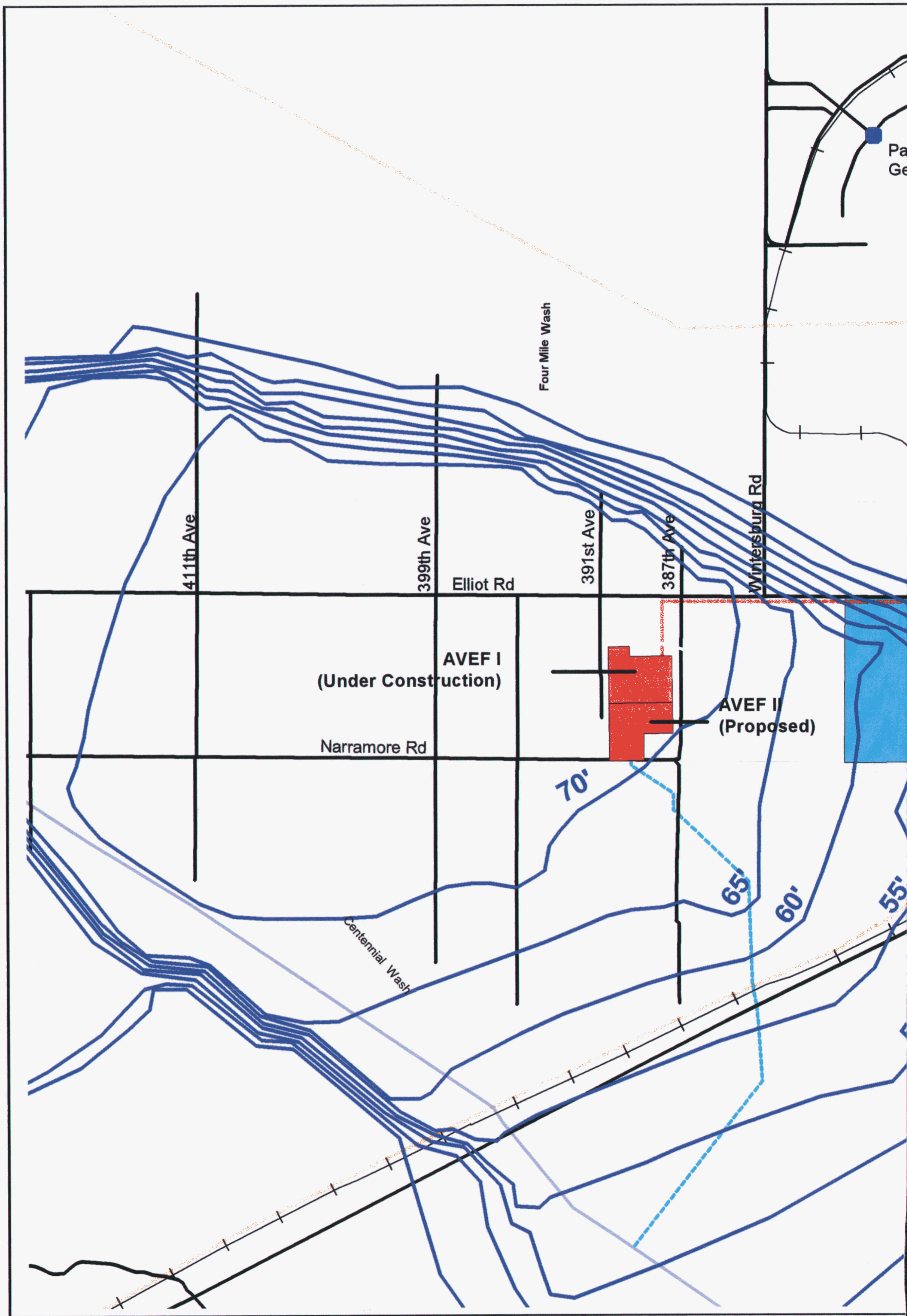
Drawdown Contours

Modeled with THWELLS℠ Version 4.01
Transient-state conditions at 30 years
Hydraulic Conductivity = 21 feet/day
Storage Coefficient = 0.1
Five wells pumping at 120 gpm each,
for a total of approximately 1,000 acre-feet/year

- Future Duke Production Wells
- Arlington Valley Energy Facility
- Hassayampa Switchyard (Under Construction)
- Redhawk Generating Station (Under Construction)
- Mesquite Generating Station (Approved)
- AVEF Transmission Line (Under Construction)
- Existing Transmission Lines
- AVEF Natural Gas Line (Approved)
- Existing Natural Gas Line
- Rivers and washes
- Streets
- Palo Verde Nuclear Generating Station

0 0.5 1
Miles

Duke Energy℠



Pa
Ge
Four Mile Wash
411th Ave
399th Ave
391st Ave
387th Ave
Wintersburg Rd
Elliot Rd
AVEF I
(Under Construction)
AVEF II
(Proposed)
Narramore Rd
70'
65'
60'
55'
Centennial Wash

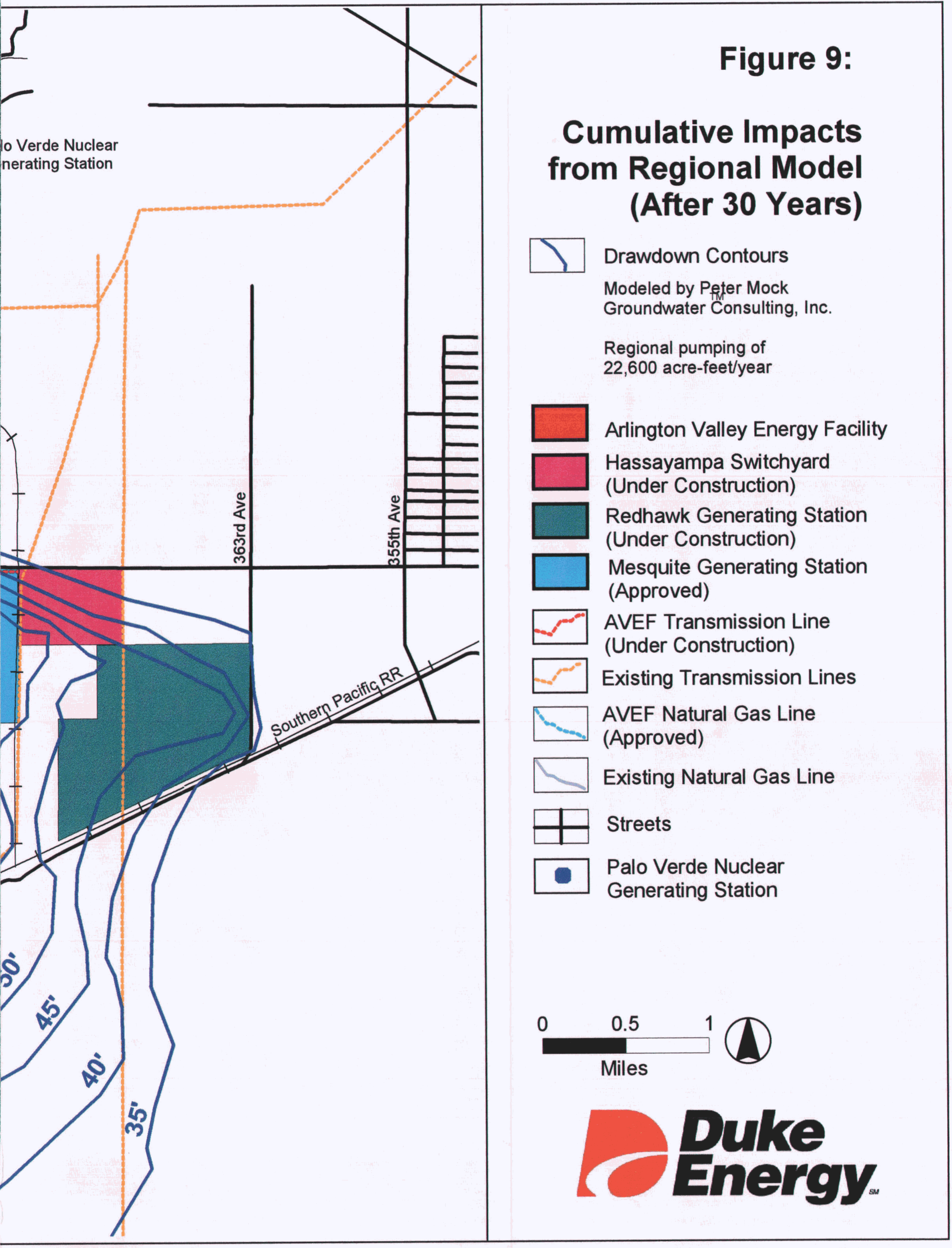
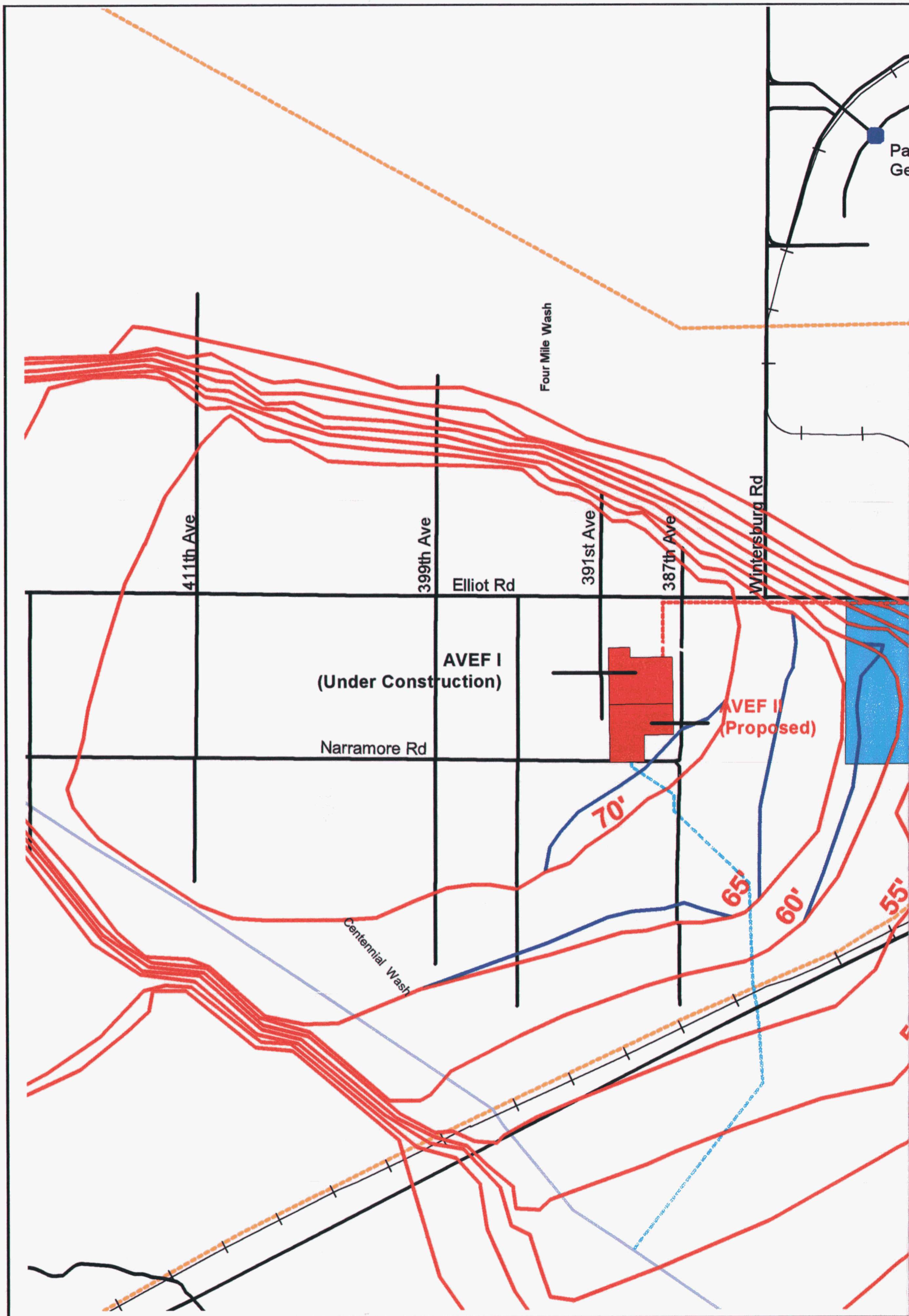


Figure 9:

Cumulative Impacts from Regional Model (After 30 Years)



Four Mile Wash
411th Ave
399th Ave
391st Ave
387th Ave
Wintersburg Rd
Elliot Rd
AVEF I
(Under Construction)
AVEF II
(Proposed)
Narramore Rd
70'
65'
60'
55'
Centennial Wash

Figure 10:

Combined Impacts from Cumulative Regional Model and Additional AVEF Pumpage (After 30 Years)

Original Drawdown Contours

Combined Drawdown Contours

Cumulative model took into account 6,800 acre-feet/year for AVEF

Combined impacts include impacts from additional 1,000 acre-feet/year from AVEF

Arlington Valley Energy Facility

Hassayampa Switchyard (Under Construction)

Redhawk Generating Station (Under Construction)

Mesquite Generating Station (Approved)

AVEF Transmission Line (Under Construction)

Existing Transmission Lines

AVEF Natural Gas Line (Approved)

Existing Natural Gas Line

Streets

Palo Verde Nuclear Generating Station

0 0.5 1

Miles

Duke Energy SM

APPENDIX A

METHODOLOGY AND CALCULATIONS FOR AQUIFER TESTS

Method of Analysis – Pumping Tests

Data collected during the pumping tests were analyzed using the Cooper-Jacob method for drawdown data (Driscoll, 1986). For this method, pumping test data are plotted in a semi-logarithmic manner, with drawdown (in feet) plotted along the scalar y-axis, and elapsed time (in minutes) plotted along the logarithmic x-axis. Transmissivity is calculated using the following formula:

$$T=264 * Q / \Delta s$$

Where:

- T : coefficient of transmissivity of the well, in gallons per day per foot (gpd/ft)
- Q: pumping rate, in gpm
- Δs: slope of the time-drawdown graph expressed as the change in drawdown between any two times on the log scale whose ratio is 10 (one log cycle).

The Cooper-Jacob method is derived from the Theis nonequilibrium well equation, and relies on the same assumptions:

1. The water-bearing formation is uniform in character and the hydraulic conductivity is the same in all directions.
2. The formation is uniform in thickness and infinite in areal extent.
3. The formation receives no recharge from any source.
4. The pumped well penetrates, and receives water from, the full thickness of the water-bearing formation.
5. The water removed from storage is discharged instantaneously when the head is lowered.
6. The pumping well is 100-percent efficient.
7. All water removed from the well comes from aquifer storage.
8. Laminar flow exists throughout the well and the aquifer.
9. The water table or potentiometric surface has no slope.

The effect of partial penetration of the aquifer is accounted for when calculating hydraulic conductivity from transmissivity:

$$K = 0.134 * T / b'$$

Where:

K = hydraulic conductivity of the aquifer, in feet/day

T = coefficient of transmissivity of the well, in gpd/ft

b' = saturated thickness of perforated interval of well, in feet

Method of Analysis – Recovery Tests

Data collected during the recovery tests were analyzed using the Theis method for analyzing recovery data (Driscoll, 1986). For this method, recovery test data is plotted in a semi-logarithmic manner. Residual drawdown (in feet) is plotted along the scalar y-axis, and the ratio T/T' is plotted along the logarithmic x-axis, where T/T' is the ratio of time since the pump was started to time since the pump was stopped. Transmissivity is calculated using the following formula:

$$T = 264*Q/\Delta s'$$

Where:

T = coefficient of transmissivity of the well, in gpd/ft

Q = pumping rate, in gpm

$\Delta s'$ = slope of the time-residual drawdown graph expressed as the change in residual drawdown between any two times on the log scale whose ratio is 10 (one log cycle)

The Theis recovery method relies on similar assumptions as the Cooper-Jacob method for analysis of pumping tests.

Method of Analysis – Specific Capacity

Additional estimates of hydraulic conductivity can be obtained from an empirical relationship between specific capacity and transmissivity (Driscoll, 1986). For unconfined aquifers, this relationship is:

$$T = Q/s * 1{,}500$$

Where:

T = coefficient of transmissivity of the well, in gpd/ft

Q = pumping rate, in gpm

s = drawdown in well, in feet

Calculations for Duke Energy Well 8-1

Estimate of Saturated Thickness of Perforated Interval of Well (b')

Static water level = 164 ft.

Dynamic water level = 373 ft.

Perforated Interval = 508 to 1,085 ft.

Saturated Thickness (b') = 577 ft.

Critical Time for Casing Storage

$t_c = 0.6 * (d_c^2 - d_p^2)/(Q/s)$

d_c = 20 inches

d_p = 12 inches

Q = 2,200 gpm

s = 209 feet

$t_c = 0.6 * (20^2 - 12^2)/(2{,}200/209) = 14.6$ minutes

Estimate of Transmissivity and Hydraulic Conductivity from Pumping Test

$T = 264 * Q / \Delta s$

$K = 0.134 * T / b'$

Q = 2,200 gpm

Δs = 10 feet

b' = 577 feet

T = 264 * 2,200 / 10 = 58,080 gpd/ft

K= 0.134 * 58,080 / 577 = 13.5 ft/day

Calculations for Duke Energy Well 8-1 (continued)

Estimate of Transmissivity and Hydraulic Conductivity from Recovery Test

$T = 264 * Q / \Delta s'$

$K = 0.134 * T / b'$

$Q = 2,200$ gpm

$\Delta s' = 2.3$ feet

$b' = 577$ feet

$T = 264 * 2,200 / 2.3 = 252,522$ gpd/ft

$K = 0.134 * 252,522 / 577 = 58.6$ ft/day

Estimate of Hydraulic Conductivity from Specific Capacity

$T = Q/s * 1,500$

$K = 0.134 * T / b'$

$Q = 2,200$ gpm

$s = 209$ feet

$b' = 577$ feet

$T = 2,200 / 209 * 1,500 = 15,789$ gpd/ft

$K = 0.134 * 15,789 / 577 = 3.7$ ft/day

Calculations for Duke Energy Well 4-1

Estimate of Saturated Thickness of Perforated Interval of Well (b')

Static water level = 164 ft.

Dynamic water level = 213.5 ft.

Perforated Interval = 229 to 1,012 ft.

Saturated Thickness (b') = 783 ft.

Estimate of Transmissivity and Hydraulic Conductivity from Recovery Test

$T = 264 * Q / \Delta s'$

$K = 0.134 * T / b'$

$Q = 2,000$ gpm

$\Delta s' = 6.3$ feet

$b' = 783$ feet

$T = 264 * 2,000 / 6.3 = 83,810$ gpd/ft

$K = 0.134 * 83,810 / 783 = 14.3$ ft/day

Estimate of Hydraulic Conductivity from Specific Capacity

$T = Q/s * 1,500$

$K = 0.134 * T / b'$

$Q = 2,000$ gpm

$s = 49.5$ feet

$b' = 783$ feet

$T = 2,000 / 49.5 * 1,500 = 60,606$ gpd/ft

$K = 0.134 * 60,606 / 783 = 10.4$ ft/day

Calculations for Duke Energy Well 7-1

Estimate of Saturated Thickness of Perforated Interval of Well (b')

Static water level = 190 ft.

Dynamic water level = 304 ft.

Perforated Interval = 260 to 1,181 ft.

Saturated Thickness (b') = 877 ft.

Critical Time for Casing Storage

$t_c = 0.6 * (d_c^2 - d_p^2)/(Q/s)$

$d_c = 20$ inches

$d_p = 12$ inches

Q = 2,300 gpm

s = 114 feet

$t_c = 0.6 * (20^2 - 12^2)/(2{,}300/114) = 7.6$ minutes

Estimate of Transmissivity and Hydraulic Conductivity from Pumping Test

$T = 264 * Q / \Delta s$

$K = 0.134 * T / b'$

Q = 2,300 gpm

$\Delta s = 4.7$ feet

b' = 877 feet

T = 264 * 2,300 / 4.7 = 129,191 gpd/ft

K= 0.134 * 129,191 / 877 = 19.7 ft/day

Calculations for Duke Energy Well 7-1 (continued)

Estimate of Transmissivity and Hydraulic Conductivity from Recovery Test

T = 264 * Q / Δs'

K = 0.134 * T / b'

Q = 2,300 gpm

Δs' = 3.2 feet

b' = 877 feet

T = 264 * 2,300 / 3.2 = 189,750 gpd/ft

K= 0.134 * 189,750 / 877 = 29.0 ft/day

Estimate of Hydraulic Conductivity from Specific Capacity

T = Q/s * 1,500

K = 0.134 * T / b'

Q = 2,300 gpm

s = 114 feet

b' = 877 feet

T = 2,300 / 114 * 1,500 = 30,263 gpd/ft

K = 0.134 * 30,263 / 877 = 4.6 ft/day

APPENDIX B

APPLICATION OF A NUMERICAL GROUNDWATER MODEL (THWELLS) TO THE REGION SURROUNDING THE PROPOSED ARLINGTON VALLEY ENERGY FACILITY

CALCULATION OF DRAWDOWN IN A HOMOGENEOUS, ISOTROPIC, CONFINED, LEAKY CONFINED OR UNCONFINED AQUIFER WITH MULTIPLE PRODUCTION AND INJECTION WELLS AND UNIFORM REGIONAL FLOW

AVEF II Well Impacts

********************************** INPUT DATA **********************************

UNCONFINED AQUIFER - THEIS EQUATION WITH JACOB'S CORRECTION

WATER TABLE CORRECTION APPLIED

AQUIFER THICKNESS = 1000 [ft]
TRANSMISSIVITY = 156346 [gpd/ft]

STORAGE COEFFICIENT = .1

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 = 1000 [ft]

PUMPING/INJECTION WELL DATA

WELL NO. 1

X-COORDINATE = 813 [ft]
Y-COORDINATE = 1950 [ft]
PUMPING/INJECTION RATE = 1397055 [gpd]
TIME SINCE START PUMPING/INJECTION = 10950 [day]

WELL NO. 2

X-COORDINATE = 1827 [ft]
Y-COORDINATE = 1950 [ft]
PUMPING/INJECTION RATE = 1397055 [gpd]
TIME SINCE START PUMPING/INJECTION = 10950 [day]

WELL NO. 3

X-COORDINATE = 813 [ft]
Y-COORDINATE = 3250 [ft]
PUMPING/INJECTION RATE = 1397055 [gpd]
TIME SINCE START PUMPING/INJECTION = 10950 [day]

WELL NO. 4

X-COORDINATE = 1827 [ft]
Y-COORDINATE = 3250 [ft]
PUMPING/INJECTION RATE = 1397055 [gpd]
TIME SINCE START PUMPING/INJECTION = 10950 [day]

WELL NO. 5

X-COORDINATE = 965 [ft]
Y-COORDINATE = 4620 [ft]
PUMPING/INJECTION RATE = 1397055 [gpd]
TIME SINCE START PUMPING/INJECTION = 10950 [day]

-------------------- Drawdown in [ft] -- Time in [days] ----------------------

X-coordinate observation well = 0 [ft]
Y-coordinate observation well = 0 [ft]

time	drawdown	time	drawdown	time	drawdown	time	drawdown
0.000	0.000	365.000	10.216	730.000	12.641	1095.000	14.079
1460.000	15.105	1825.000	15.904	2190.000	16.558	2555.000	17.112
2920.000	17.593	3285.000	18.017	3650.000	18.397	4015.000	18.741
4380.000	19.056	4745.000	19.345	5110.000	19.613	5475.000	19.862
5840.000	20.096	6205.000	20.316	6570.000	20.523	6935.000	20.718
7300.000	20.904	7665.000	21.081	8030.000	21.250	8395.000	21.411
8760.000	21.565	9125.000	21.713	9490.000	21.856	9855.000	21.993
%10220.000	22.125	%10585.000	22.252	%10950.000	22.375	--------------	

EXHIBIT B-3

LAND USE STUDY

LAND USE

INTRODUCTION

The land use study identifies potential impacts of the proposed AVEF II Project on existing and future land uses. Where necessary, mitigation measures were developed to reduce potential impacts. The land use study addresses components inventory, impact assessment, and mitigation.

Study Components

The land use analysis was divided into components to facilitate the inventory and impact analysis for the proposed Project, as described below. Seven study maps detailing the land use components have been included as follows:

- Land Ownership - Figure 1
- Existing Land Use - Figure 2
- Known Residential Structures - Figure 3
- Large Lot Subdivisions - Figure 4
- Existing Facilities and Utilities - Figure 5
- Existing Zoning - Figure 6
- Land Use Map - Figure 7

Ownership

The Project site is located on privately owned land within an unincorporated area of Maricopa County. Private land, State Trust Lands administered by the Arizona State Land Department and Bureau of Land Management land are present within the study area. See Figure 1 for land ownership information within the study area.

Existing Land Use

The study area is rural in nature and consists primarily of agricultural, vacant, scattered residential areas, the PVNGS, and the Pinnacle West (Redhawk) and Sempra (Mesquite) power plants currently under construction (see Figure 2). Descriptions of the specific types of land uses and their respective locations within the study area is provided below.

Residential -- There are approximately nine (9) occupied single-family dwelling units and a few abandoned homes within the study area (see Figure 3). There are two recorded Records of Survey for Unsubdivided Lands (Horseshoe Trails Phase I and Horseshoe Trails Phase II) within the 2-mile study area (see Figure 4).

Agriculture--Agricultural uses in the study area predominantly include irrigated farmland with alfalfa the primary crop. The majority of agricultural land being cropped within the study area is located southeast of the Project site, along Centennial Wash and the Southern Pacific Railroad. Several properties in the area that were previously used for agriculture are now out of production and are returning to vacant desert.

Industrial--Industrial uses within the study area includes portions of the PVNGS property located in the northern portion of the study area. Phase I of Duke Energy's Arlington Valley Energy Project (AVEF I) is under construction within the study area. Phase I and II of Pinnacle West's Redhawk facility is under construction just east of the study area. Sempra's Mesquite facility, east of AVEF I and within the study area, is scheduled to begin construction in early fall 2001. Construction has also begun on the Hassayampa Switchyard that is located east and adjacent to Sempra's Mesquite facility. This facility will be located approximately 1.5 miles east of the project site and south of Elliot Road at approximately 375th Avenue (between the existing Kyrene and North Gila 500kV transmission lines). This switchyard will serve as a satellite facility for new and existing power lines and an alternative to connecting directly into the existing PVNGS switchyard.

Utilities– A network of electrical transmission lines are present in the study area (see Figure 5). Several agricultural irrigation wells and canals/ditches were identified throughout the study area. Several of these facilities were found at the Project site, but none appear to be in operation.

Transportation–The majority of the roads within the study area are unpaved, two-track roads used by local property owners. Major arterial roads within the study area that are paved include Elliot Road and Wintersburg Road (383rd Avenue).

The Southern Pacific Railroad operates one main railroad line that generally parallels the southern boundary of the Project site. One spur of this railroad serves the PVNGS site and is located approximately 1.5 miles east of the project site.

Vacant Land–A large portion of the study area is undeveloped or vacant land. These tracts of land currently have no visible structures or buildings.

<u>Zoning</u>

Zoning is a method of land use control that specifies the types of land uses allowed, the intensity or density of the use, and standards for development. The zoning classification for the project area was obtained from Maricopa County's Planning and Development Department. The zoning classification for the project area is shown in Figure 6.

According to the Maricopa County's *Zoning Ordinance* (1999), the project area includes the Rural-190 zoning district. The principal purpose of this zoning district is to conserve and protect farms and other open land uses, foster orderly growth in rural areas, and prevent urban and agricultural land use conflicts. Uses permitted in this zoning district typically include farm and non-farm residential uses, farms, and recreational and institutional uses. The Rural-190 zoning district requires a minimum lot size of 190,000 square feet per dwelling unit. However, more specifically, in Maricopa County a Special Use Permit ("S.U.P.") is required for a generating facility. The site (as a part of Duke's AVEF I approvals) has an approved S.U.P. To allow the construction of AVEF II, Duke Energy is in the process of applying for a Major Amendment to AVEF I's S.U.P., which will be issued by the Maricopa County Board of Supervisors upon recommendation of the County's Planning and Zoning Commission. The PVNGS is currently operated under a Special Use Permit granted by Maricopa County.

<u>Future Land Use</u>

The purpose of the future land use inventory was to document all planned or proposed land uses. Sources of future land use information include projected uses embodied in officially adopted general and area-wide plans. Planned land uses within the vicinity of the proposed project are described by Maricopa County's recently updated *Tonopah/Arlington Area Plan* (2000). The Existing Zoning and Land Use maps from the *Tonopah/Arlington Area Plan* follow as Figures 6 and 7.

Changes in existing, developed land uses within the study area are unlikely to occur. However, the development of vacant and agricultural lands is more likely to occur as rural-type development (e.g., residential) continues throughout the study area.

The majority of lands within the study area are currently planned for Rural Residential, High Density use. According to Maricopa County's *Tonopah/Arlington Area Plan*, the Rural Residential, High Density category denotes areas where single-family residential development is desirable but urban services (e.g., water, sewer, schools, parks, law enforcement, fire protection) are limited. Uses in this category include agricultural and single-family residential.

Several locations within the study area are designated by the County's Plan as open space. The majority of land designated as open space is located south of the project site and adjacent to the Pinnacle West and Sempra power plant sites. According to the *Tonopah/Arlington Area Plan*, this designation is prescribed for areas that would be best precluded from development except for recreational purposes.

The *Tonopah/Arlington Area Plan* designates the AVEF property as Industrial. Uses permitted in this category include general warehousing, storage, distribution activities, and general manufacturing. The PVNGS is identified as a major industrial employment center.

Inventory

The purpose of the land use inventory was to compile baseline data in an effort to assess potential land use impacts that may result from the construction, operation, and maintenance of the proposed Project. The inventory included current land jurisdiction, existing and future land uses, and zoning information within a 2-mile radius (study area) of the project site.

Base maps were generated using the Tonopah/Arlington Area Plan and aerial photography. Subsequently, land use information was inventoried within a 2-mile radius of the project site. Information compiled for the land use study was based on a review of existing maps, aerial photographs, planning agency contacts and publications, and field reconnaissance.

The Project site is located approximately 1.5 miles southwest of the Palo Verde Nuclear Generating Station ("PVNGS"), on the south side of Elliot Road between the 387th Avenue and 391st Avenue alignments. The Southern Pacific Railroad is approximately 1.5 miles to the south. The Project site is located on vacant land, and there is no indication that the property has been farmed or used for any discernable use in the past decade.

Impact Assessment

The proposed project site is located on land under private ownership. Lands adjacent to the project are primarily undeveloped. The project will not have any direct adverse impacts to existing residential or other uses.

Based on a records search at the County's Planning and Development Department, no residential developments have been proposed or approved for the area immediately surrounding the project site. Recent approvals (i.e., Duke's AVEF I, Pinnacle West, Sempra, and the Hassayampa Switchyard) indicate that other land use plans within the vicinity will be consistent with the proposed Project. Therefore, the Project would have no adverse impacts to future land use plans.

Mitigation

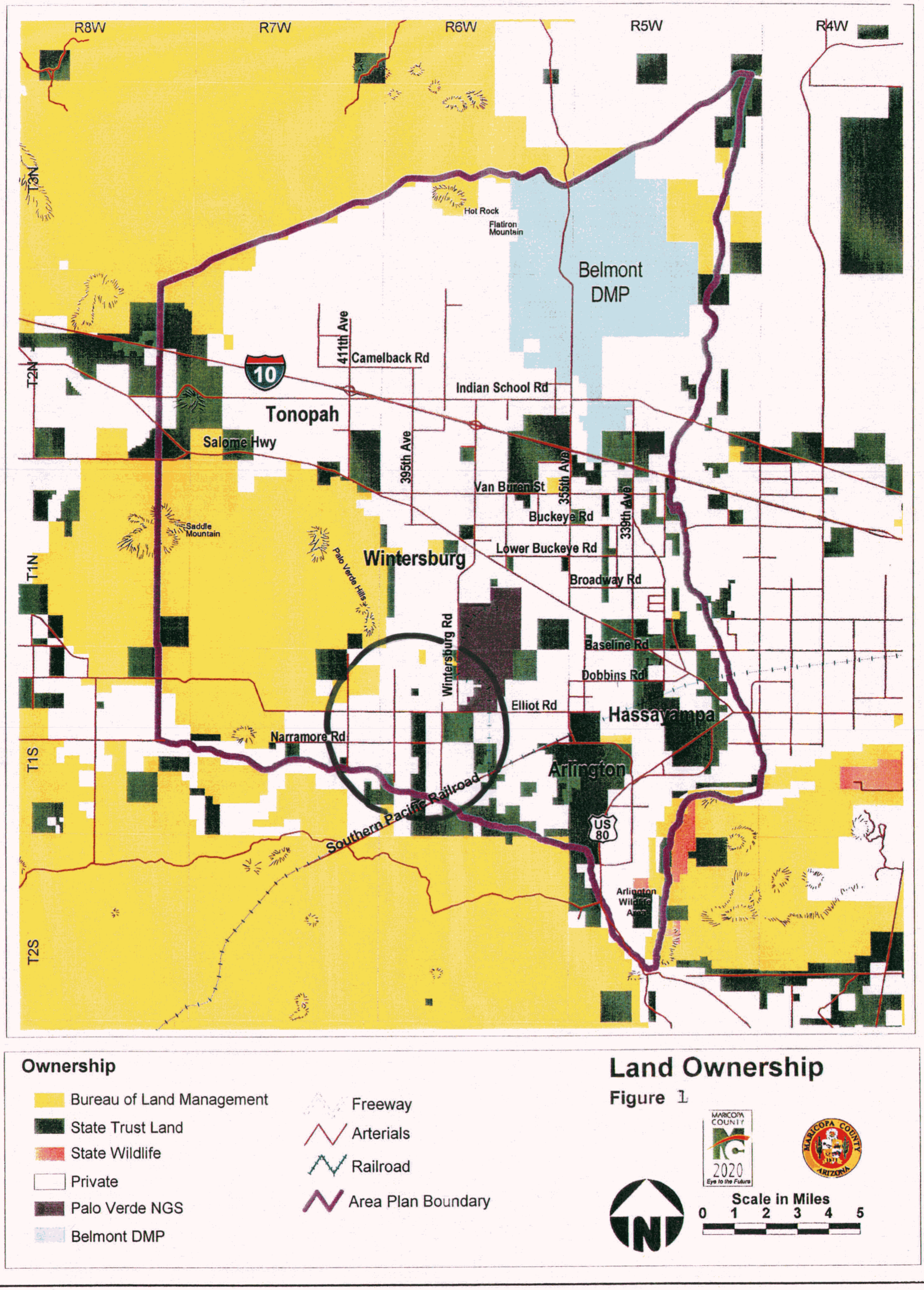
No site-specific mitigation measures have been identified at this time because no substantial impacts to existing or future land use are expected as a result of constructing and operating the proposed Project.

REFERENCES

Maricopa County. November 1999. *Zoning Ordinance*. Phoenix, Arizona.

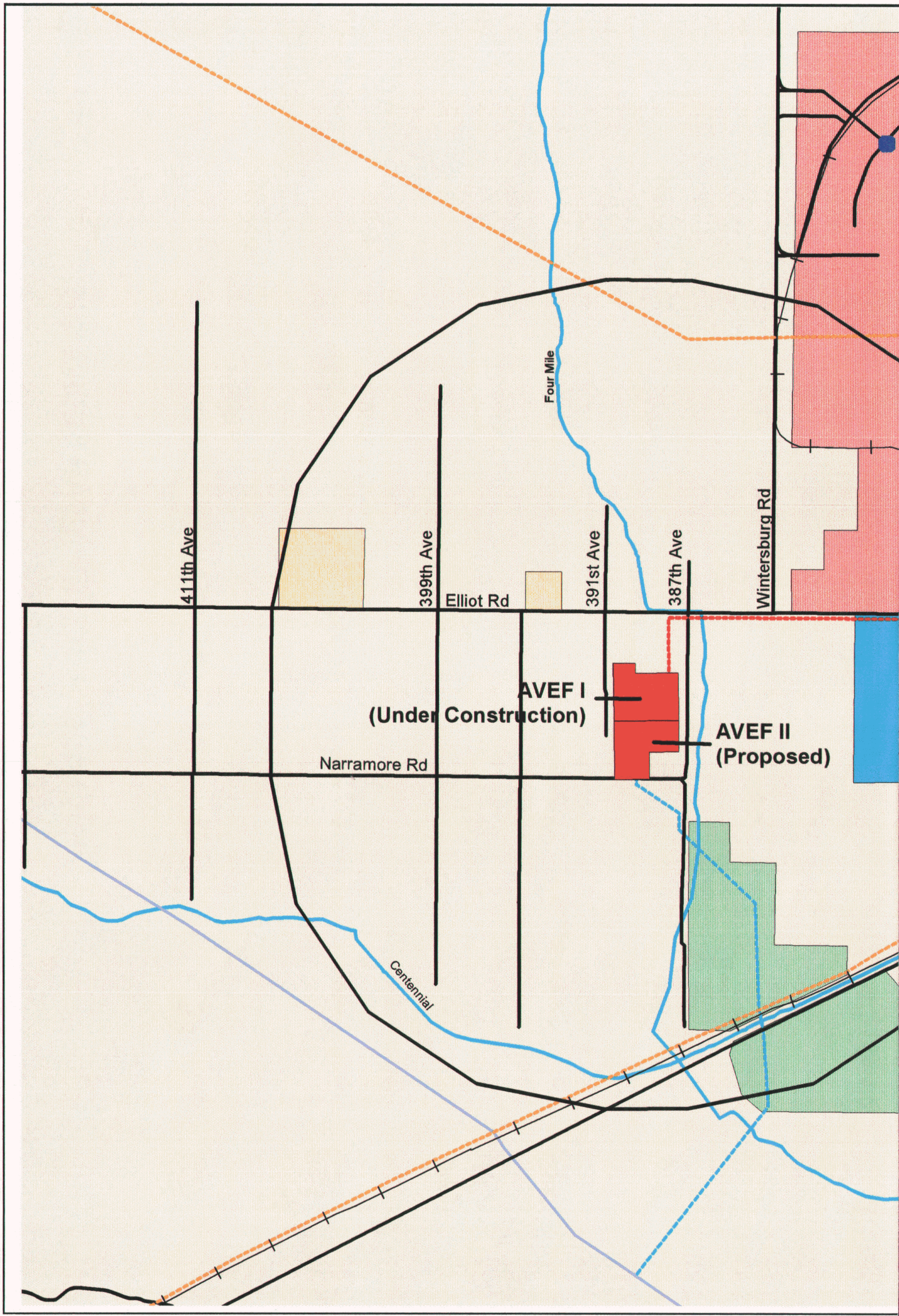
Maricopa County. 2000. *Tonopah/Arlington Area Plan*. Phoenix, Arizona.

U.S. Geological Survey. 1984. 1:24,000 scale map - Arlington, Arizona.



Land Ownership

Figure 1



411th Ave
399th Ave
391st Ave
387th Ave
Wintersburg Rd
Four Mile
Elliot Rd
Narramore Rd
AVEF I
(Under Construction)
AVEF II
(Proposed)
Centennial

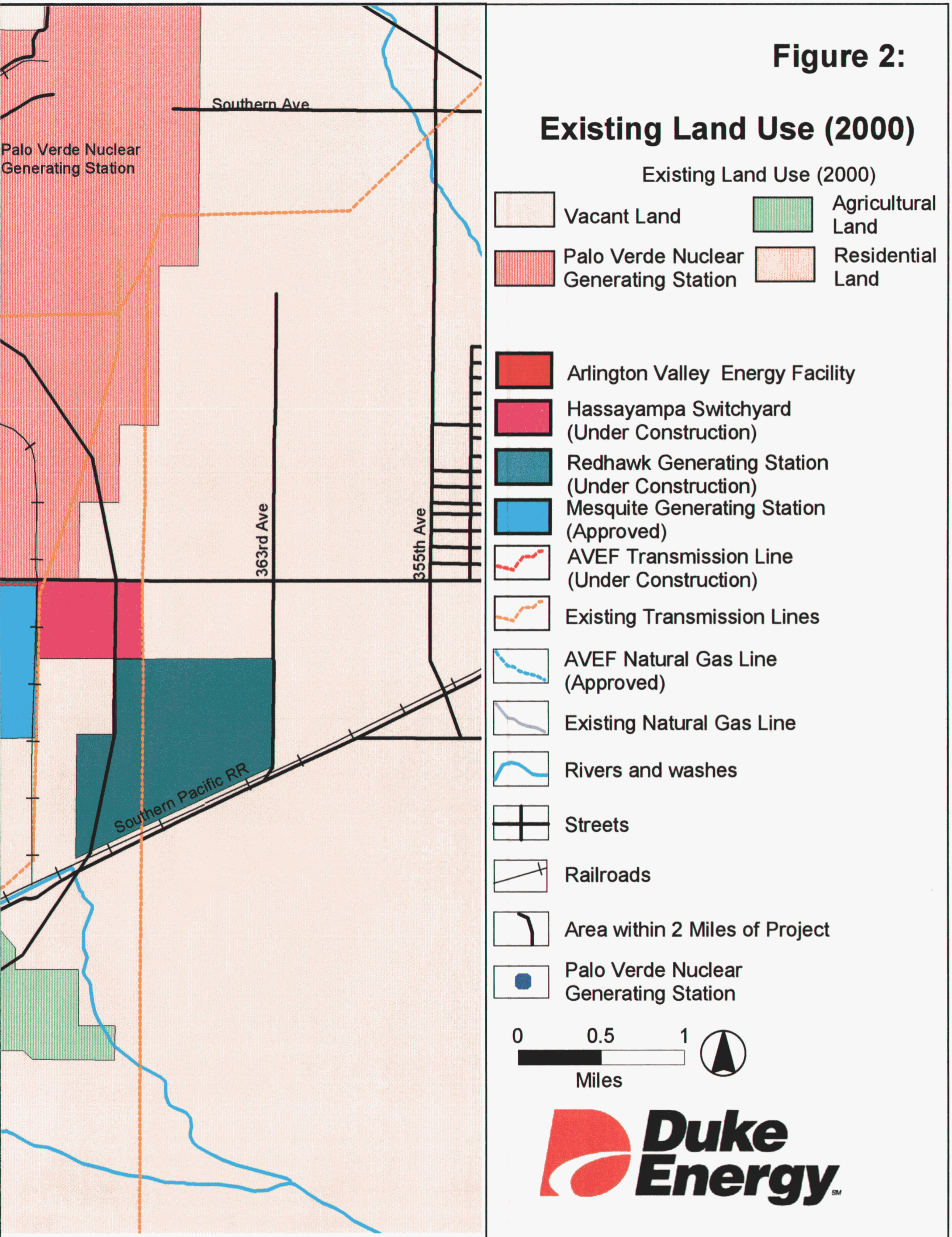
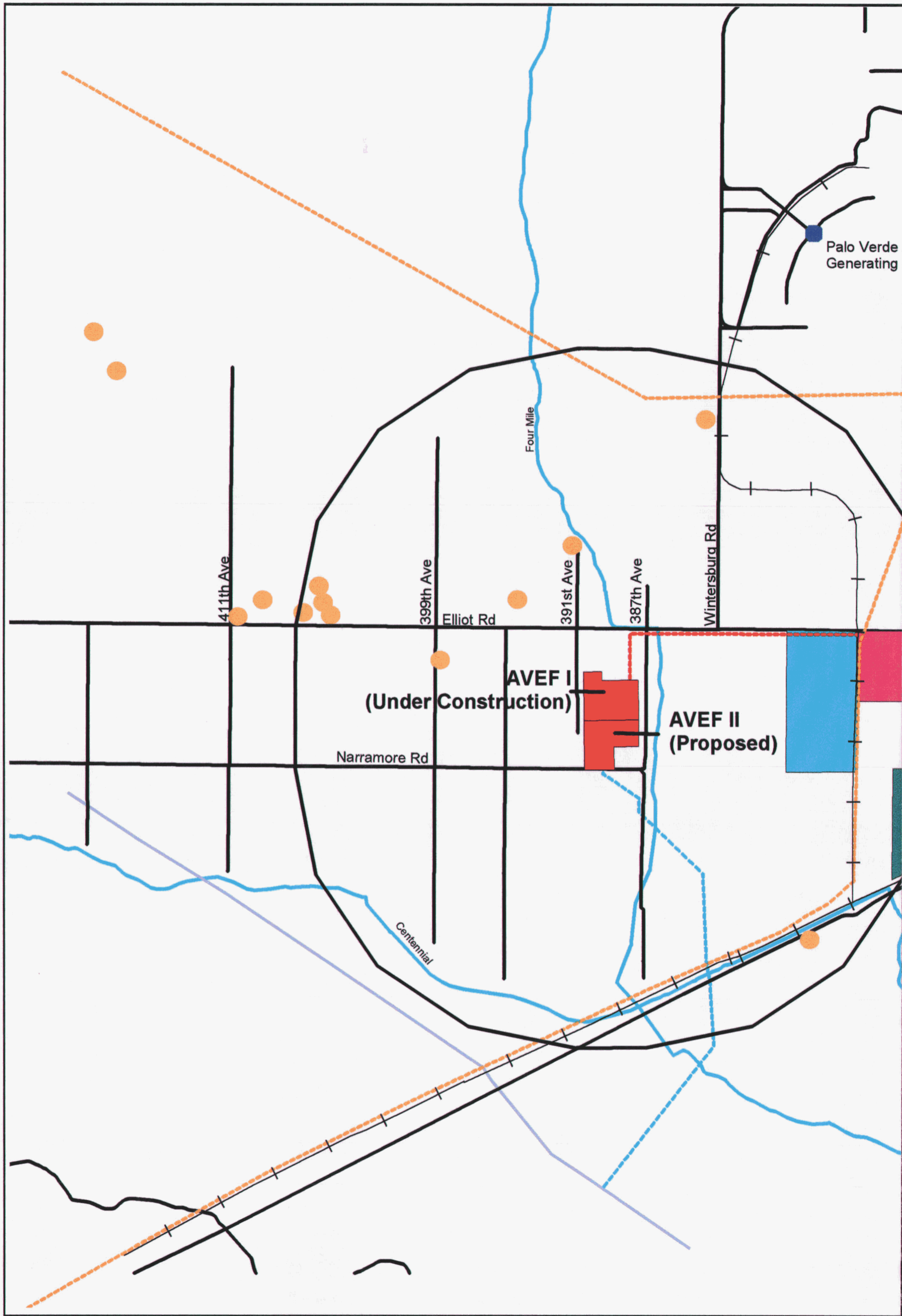


Figure 2:

Existing Land Use (2000)



Palo Verde
Generating
Four Mile
411th Ave
399th Ave
391st Ave
387th Ave
Wintersburg Rd
Elliot Rd
AVEF I
(Under Construction)
AVEF II
(Proposed)
Narramore Rd
Centennial

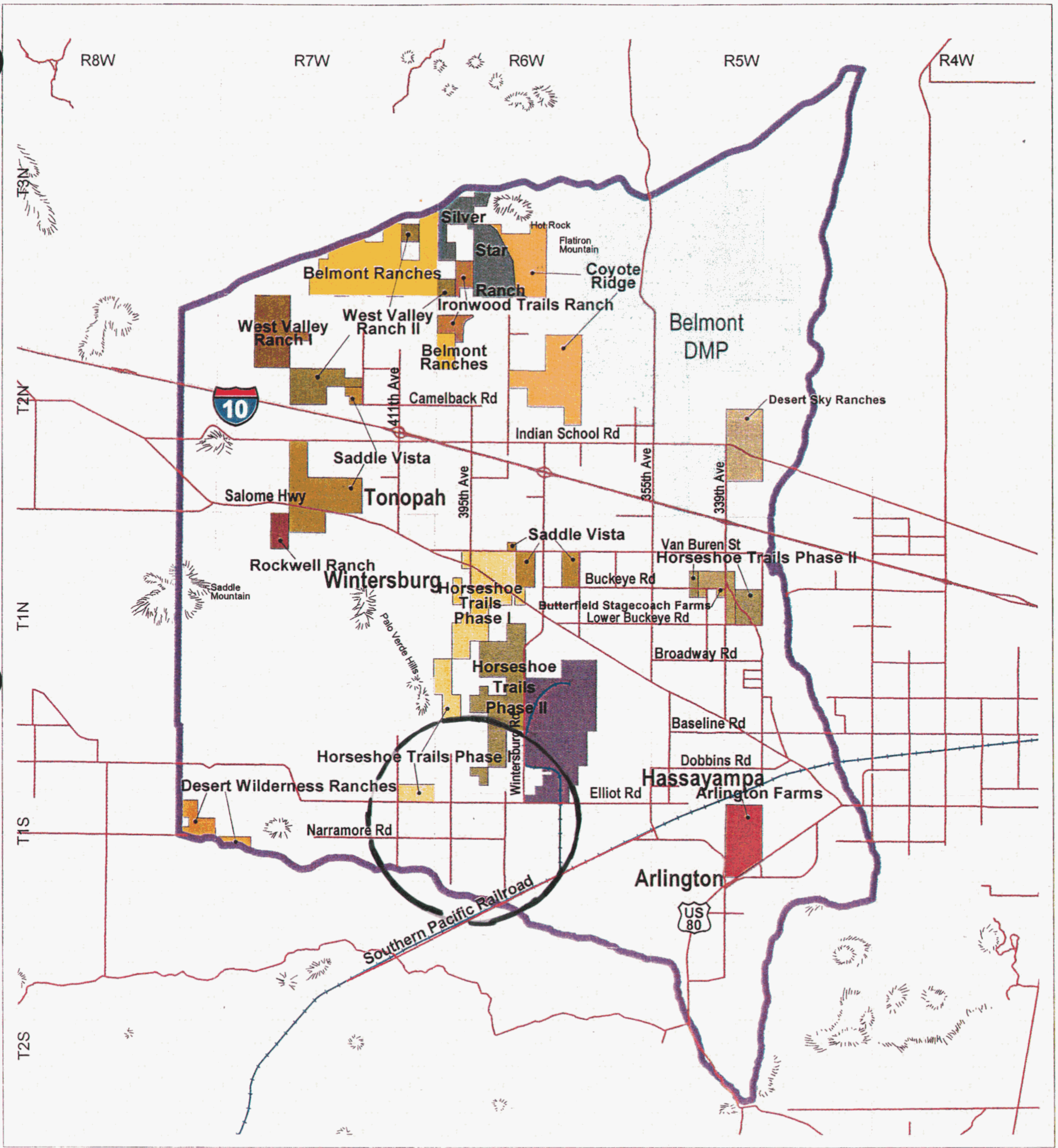
Figure 3:

Known Residential Structures

Known Residential Structures
Arlington Valley Energy Facility
Hassayampa Switchyard (Under Construction)
Redhawk Generating Station (Under Construction)
Mesquite Generating Station (Approved)
AVEF Transmission Line (Under Construction)
Existing Transmission Lines
AVEF Natural Gas Line (Approved)
Existing Natural Gas Line
Rivers and washes
Streets
Railroads
Area within 2 Miles of Project
Palo Verde Nuclear Generating Station

0 0.5 1
Miles

Duke Energy



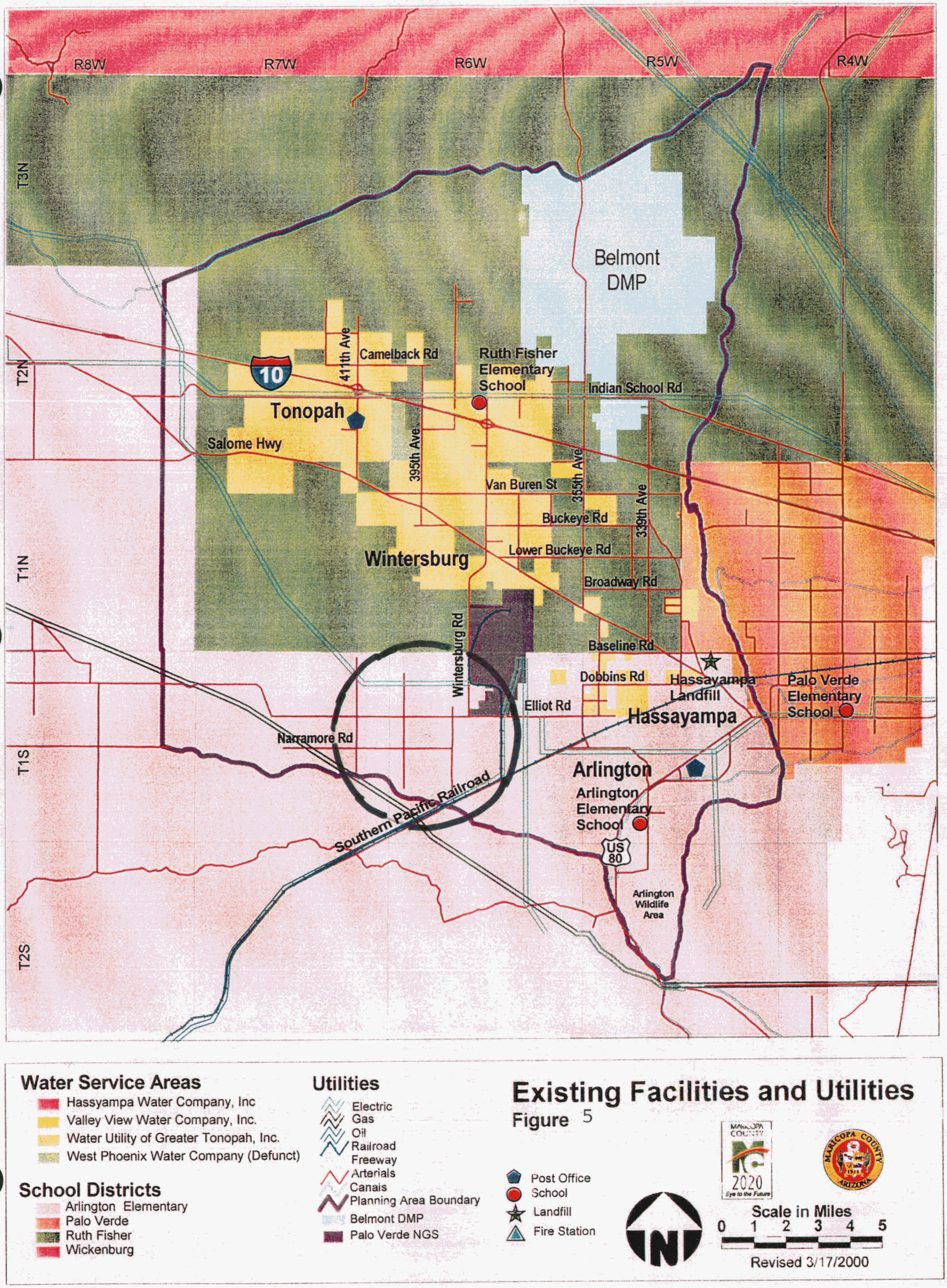
Legend

Palo Verde NGS
Belmont DMP
Freeway
Arterials
Railroad
Area Plan Boundary

Large Lot Subdivisions

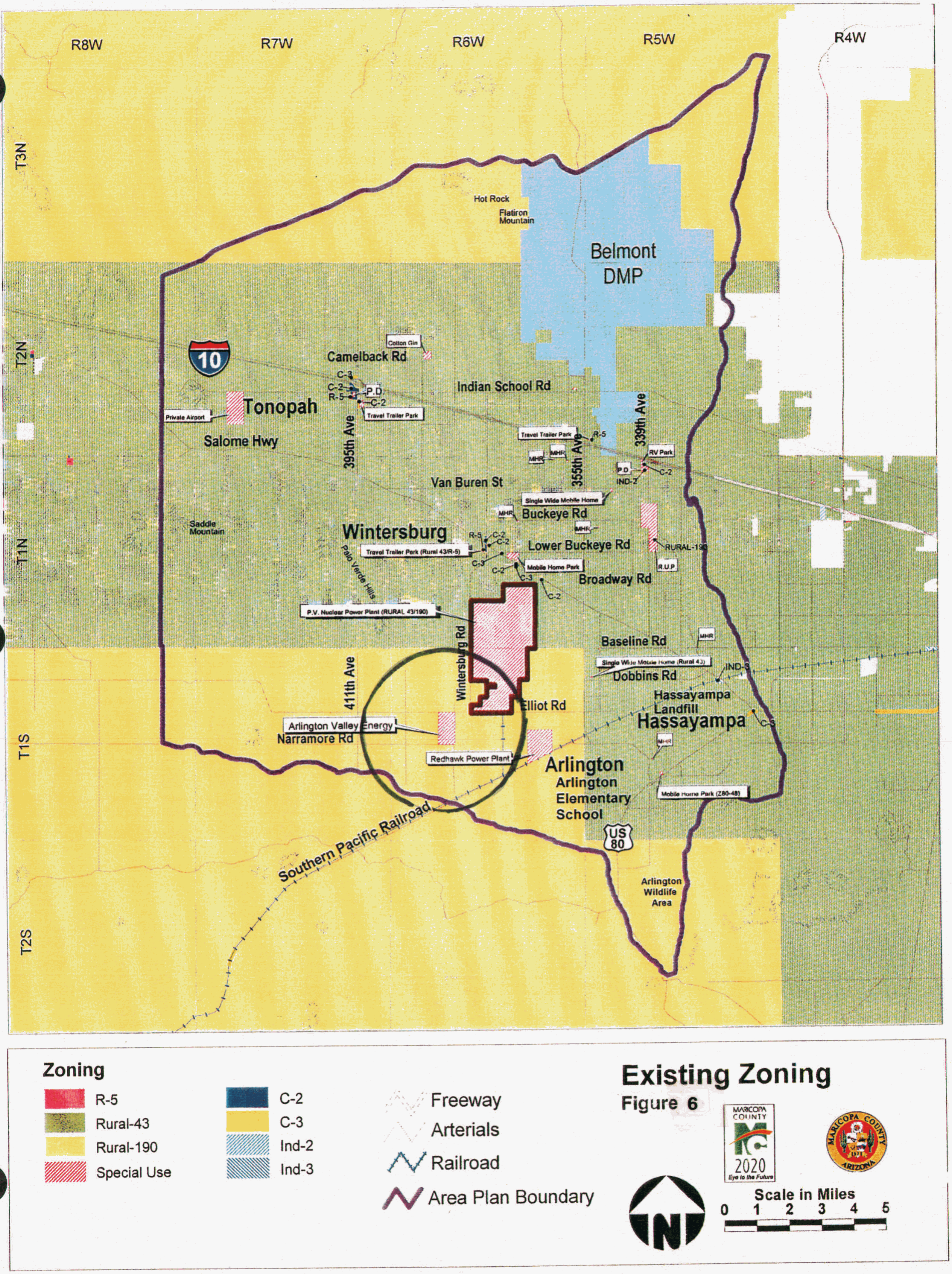
Figure 4

Scale in Miles
0 1 2 3 4 5

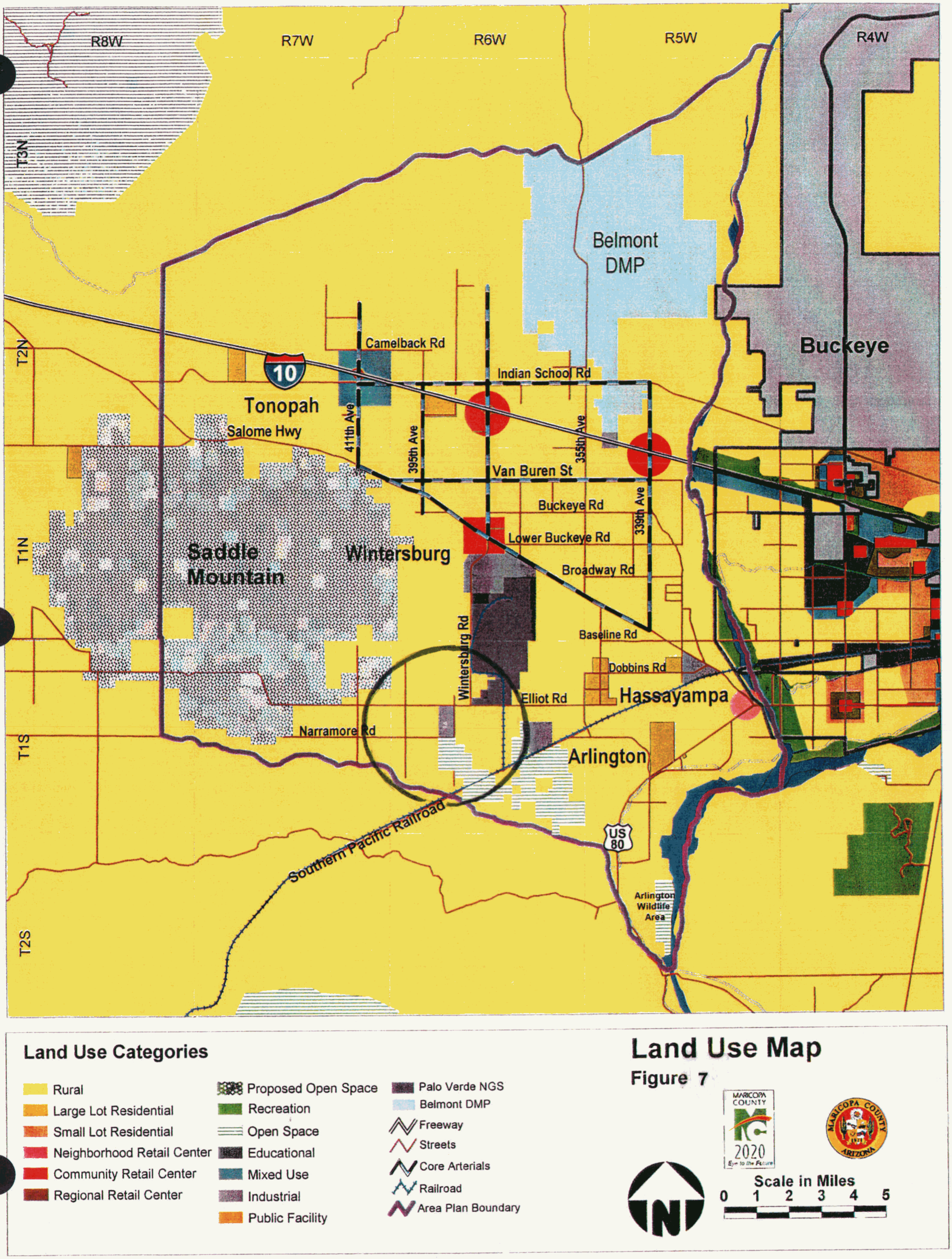


Existing Facilities and Utilities

Figure 5



Existing Zoning
Figure 6



Land Use Map

Figure 7

EXHIBIT C
AREAS OF BIOLOGICAL WEALTH

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 the effects, if any, the proposed facilities will have thereon."

The proposed power plant site is located on agricultural land that has been out of production for several years. The sparsely vegetated site is dominated by Russian thistle, Johnsongrass, canarygrass, bermuda grass, annual sunflower, globemallow, and nightshade, with scattered mesquite and tamarisk. Winters Wash and Centennial Wash are located east and south of the plant site, respectively. Dominant plant species in these riparian areas include mesquite, blue palo verde, ironwood, and catclaw acacia. Other species present include fourwing saltbush, panicum, pigweed, and ragweed.

Special status wildlife and plant species documented for Maricopa County are listed in Table C-1. These include species listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS), Wildlife of Special Concern identified by the Arizona Game and Fish Department (AGFD), and Highly Safeguarded Plants protected by the Arizona Native Plant Law per Arizona Department of Agriculture (ADA). Letters from the USFWS and AGFD that provide information on special status species that may occur in the site vicinity are presented in Attachment 1.

Only a few species (peregrine falcon, ferruginous hawk, southwestern willow flycatcher, California leaf-nosed bat, lesser long-nosed bat, and southern yellow bat) potentially could occur at or near the project site.

Neither peregrine falcons nor ferruginous hawks are expected to breed in the vicinity of the proposed project; however, they may forage in the area during spring or fall migration. Such occurrences would be very rare, as the project area does not support large numbers of prey species required by either raptor. Impacts to these species from construction and operation of the project are expected to be negligible.

Southwestern willow flycatchers breed in dense riparian areas of cottonwood, willow, and/or salt cedar in the lowlands of southern Arizona and willow thickets in montane areas, and are

Table C-1

Special Status Species of Maricopa County, Arizona

Common Name	Scientific Name	Federal Status[1]	State Status[2]	Habitat Present on Site[3]
MAMMALS				
California leaf-nosed bat	Macrotus californicus		WC	Yes, forage
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	E	WC	Yes, forage
Western red bat	*Lasiurus blossevillii*		WC	No
Southern yellow bat	*Lasiurus ega*		SC	Yes, forage
Sonoran pronghorn	*Antilocapra americana sonoriensis*	E	WC	No
BIRDS				
American bittern	*Botaurus lentiginosus*		WC	No
Least bittern	*Ixobrychus exilis hesperis*		WC	No
Great egret	*Ardea alba*		WC	No
Snowy egret	*Egretta thula*		WC	No
Black-bellied whistling duck	*Dendrocygna autumnalis*		WC	No
Mississippi kite	*Ictinia mississippiensis*		WC	No
Bald eagle	*Haliaeetus leucocephalus*	T	WC	No
Common black-hawk	*Buteogallus anthracinus*		WC	No
Ferruginous hawk	*Buteo regalis*		WC	Yes, migration
American peregrine falcon	*Falco peregrinus anatum*		WC	Yes, migration
Yuma clapper rail	*Rallus longirostris yuman ensis*	E	WC	No
Snowy plover	*Charadrius alexandrinus*		WC	No
Western yellow-billed cuckoo	*Coccyzus americanus*		WC	No
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	E	WC	No
Mexican spotted owl	*Strix occidentalis lucida*	T	WC	No
Southwestern willow flycatcher	*Empidonax trailli extimus*	E	WC	Yes, migration
REPTILES AND AMPHIBIANS				
Lowland leopard frog	*Rana yavapaiensis*		WC	No
Desert tortoise	*Gopherus agassizii*		WC	No
Arizona skink	*Eumeces gilberti arizonensis*		WC	No
FISHES				
Razorback sucker	*Xyrauchen texanus*	E	WC	No
Desert pupfish	*Cyprinodon macularius macularius*	E	WC	No
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	E	WC	No

Common Name	Scientific Name	Federal Status[1]	State Status[2]	Habitat Present on Site[3]
		PLANTS		
Arizona agave	Agave arizonica	E	HS	No
Hohokam agave	Agave murpheyi		HS	No
Arizona cliffrose	Purshia subintegra	E	HS	No
Crested or Fan-top saguaro	Carnegiea gigantea	E	HS	No
Arizona hedgehog cactus	Echinocereus triglochidiatus arizonicus	E	HS	No
Acuna cactus	Echinomastus erectocentrus acunensis		HS	No
Opuntia echinocarpa	Straw-top cholla		SR	No
Lemmon fleabane	Erigeron lemmoni		HS	No

Key:

Federal Status: E = Endangered T = Threatened
WC = Wildlife of Special Concern HS = Highly Safeguarded SR = Salvage Restricted

Sources:
[1]USFWS 2001
[2]AGFD 1996, AGFD 2001, and ADA 1999
[3]Habitat assessments based on discussions with USFWS and AGFD staff specialists and field evaluations conducted in November 1999 for the AVEF I project, field evaluations conducted in June 2001, and the following sources: Kearney and Peebles 1960, Stebbins 1985, and Hoffmeister 1986.
[4]Habitat requirements for the spotted bat are not well known, but appear to include cliffs and rocks (Hoffmeister 1986).

associated with water or saturated soil conditions (Sogge et al. 1997). These habitats are not present within or adjacent to the proposed site. As a result, impacts to southwestern willow flycatchers associated with construction and operation of the project are not expected to occur.

California leaf-nosed bat, lesser long-nosed bat, and southern yellow bat could potentially forage over or near the project (AGFD 1993). No known bat roosts have been documented in or near the project area. As a result, impact to these species is expected to be negligible.

Based on the results of field evaluations conducted in 2001, AGFD Heritage Data Management System and USFWS records, a field project review meeting with AGFD staff specialists conducted in November 1999 for the approved AVEF I project, and the proposed project design, construction and operation of the power plant is not expected to impact threatened, endangered, or otherwise sensitive species of plants and animals identified by USFWS, AGFD, or ADA. Loss of habitat associated with the project is expected to be negligible for any of these species.

REFERENCES

Arizona Department of Agriculture. 1999. Protected Native Plants by Categories web site: http://agriculture.state.az.us/PSD/protplantlst.htm. Arizona Department of Agriculture. Accessed June 2001.

Arizona Game and Fish Department. 1993. Arizona Wildlife View: Bats of Arizona, August 1993. Vol. 36, No. 8.

Arizona Game and Fish Department. 1996. *Wildlife of Special Concern in Arizona* (Public Review Draft). Arizona Game and Fish Department, Phoenix, Arizona.

Arizona Game and Fish Department. 2001. Correspondence with P. Hackney, ENSR. [July 2001, AGFD #6-4-01 (07) .

Hoffmeister, D. F. 1986. *Mammals of Arizona*. University of Arizona Press, Tucson, Arizona.

Kearney, T. H. and R. H. Peebles. 1960. *Arizona flora*. University of California Press.

Stebbins, R. C. 1985. *A Field Guide to Western Reptiles and Amphibians*. Petersen Field Guides. Houghton Mifflin Co., Boston.

Sogge, et al. 1997. A Southwestern Willow Flycatcher Natural History Summary and Survey Protocol. National Park Service and Colorado Plateau Research Station at Northern Arizona University. Technical Report NPS/NAUCPRS/NRTR-97/12.

U.S. Fish and Wildlife Service. 2001. Correspondence with P. Hackney, ENSR, June 7, 2001, AESO/SE 2-21-00-I-036.

ATTACHMENT 1

USFWS and AGFD LETTERS

United States Department of the Interior
U.S. Fish and Wildlife Service
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 FAX: (602) 242-2513

In Reply Refer To:

AESO/SE
2-21-00-I-036

June 7, 2001

Mr. Phil Hackney
Project Manager
ENSR International
1601 Prospect Parkway
Fort Collins, Colorado 80525-9769

RE: Arlington Valley Energy Facility II (AVEF II), Project, Maricopa County, Arizona

Dear Mr. Hackney:

This letter responds to your June 1, 2001, request for an inventory of threatened or endangered species, or those that are proposed to be listed as such under the Endangered Species Act of 1973, as amended (Act), which may potentially occur in your project area (Maricopa County). The enclosed list may include candidate species as well. We hope the enclosed county list of species will be helpful. In future communications regarding this project, please refer to consultation number 2-21-00-I-036.

The enclosed list of the endangered, threatened, proposed, and candidate species includes all those potentially occurring anywhere in the county, or counties, where your project occurs. Please note that your project area may not necessarily include all or any of these species. The information provided includes general descriptions, habitat requirements, and other information for each species on the list. Also on the enclosed list is the Code of Federal Regulations (CFR) citation for each list and is available at most public libraries. This information should assist you in determining which species may or may not occur within your project area. Site-specific surveys could also be helpful and may be needed to verify the presence or absence of a species or its habitat as required for the evaluation of proposed project-related impacts.

Endangered and threatened species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat may be adversely affected by a federally funded, permitted, or authorized activity, the action agency must request formal consultation with the Service. If the action agency determines that the planned action may jeopardize a proposed species or destroy or adversely modify proposed critical habitat, the action agency must enter into a section 7 conference with the Service. Candidate species are those which are being considered for addition to the list of threatened or endangered species. Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event that they become listed or proposed for listing prior to project completion.

If any proposed action occurs in or near areas with trees and shrubs growing along watercourses, known as riparian habitat, the Service recommends the protection of these areas. Riparian areas are critical to biological community diversity and provide linear corridors important to migratory species. In addition, if the project will result in the deposition of dredged or fill materials into waterways or excavation in waterways, we recommend you contact the Army Corps of Engineers which regulates these activities under Section 404 of the Clean Water Act.

The State of Arizona protects some plant and animal species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department and the Arizona Department of Agriculture for State-listed or sensitive species in your project area.

The Service appreciates your efforts to identify and avoid impacts to listed and sensitive species in your project area. If we may be of further assistance, please feel free to contact Tom Gatz (x240).

Sincerely,

Jacqueline Hanson

David L. Harlow
Field Supervisor

Enclosure

cc: John Kennedy, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

LISTED, PROPOSED, AND CANDIDATE SPECIES FOR THE FOLLOWING COUNTY: **MARICOPA**

02/26/2001

1) LISTED TOTAL= 13

NAME: **ARIZONA AGAVE** *AGAVE ARIZONICA*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: No CFR: 49 FR 21055, 05-18-1984

DESCRIPTION: HAS ATTRACTIVE ROSETTES OF BRIGHT GREEN LEAVES WITH DARK MAHOGANY MARGINS. FLOWER: BORNE ON SUB-UMBELLATE INFLORESCENCES.

ELEVATION RANGE: 3000-6000 FT.

COUNTIES: GILA, YAVAPAI, MARICOPA

HABITAT: TRANSITION ZONE BETWEEN OAK-JUNIPER WOODLAND & MOUNTAIN MAHOGANY-OAK SCRUB

SCATTERED CLONES IN NEW RIVER MOUNTAINS AND SIERRA ANCHA. USUALLY FOUND ON STEEP, ROCKY SLOPES. POSSIBLY MAZATAL MOUNTAINS. SHOULD BE LOOKED FOR WHEREVER THE RANGES OF Agave toumeyana var. bella AND Agave chrystantha OVERLAP.

NAME: **ARIZONA CLIFFROSE** *PURSHIA SUBINTEGRA*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 49 FR 22326 5-29-84

DESCRIPTION: EVERGREEN SHRUB OF THE ROSE FAMILY (ROSEACEAE). BARK PALE SHREDDY. YOUNG TWIGS WITH DENSE HAIRS. LEAVES 1-5 LOBES AND EDGES CURL DOWNWARD (REVOLUTE). FLOWERS: 5 WHITE OR YELLOW PETALS <0.5 INCH LONG.

ELEVATION RANGE: <4000 FT.

COUNTIES: GRAHAM YAVAPAI MARICOPA MOHAVE

HABITAT: CHARACTERISTIC WHITE SOILS OF TERTIARY LIMESTONE LAKEBED DEPOSITS.

WHITE SOILS OF TERITIARY LIMESTONE LAKEBED DEPOSITS CAN BE SEEN FROM A DISTANCE.

NAME: **ARIZONA HEDGEHOG CACTUS** *ECHINOCEREUS TRIGLOCHIDIATUS ARIZONICUS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: No CFR: 44 FR 61556,10-15-1979

DESCRIPTION: DARK GREEN CYLINDROID 2.5-12 INCHES TALL, 2-10 INCHES IN DIAMETER, SINGLE OR IN CLUSTERS. 1-3 GRAY OR PINKISH CENTRAL SPINES LARGEST DEFLEXED AND 5-11 SHORTER RADIAL SPINES. FLOWER: BRILLIANT RED, SIDE OF STEM IN APRIL- MAY

ELEVATION RANGE: 3700-5200 FT.

COUNTIES: MARICOPA, GILA, PINAL

HABITAT: ECOTONE BETWEEN INTERIOR CHAPPARAL AND MADREAN EVERGREEN WOODLAND

OPEN SLOPES, IN NARROW CRACKS BETWEEN BOULDERS, AND IN UNDERSTORY OF SHRUBS. THIS VARIETY IS BELIEVED TO INTERGRADE AT THE EDGES OF ITS DISTRIBUTION WITH VARIETIES MELANCANTHUS AND NEOMEXICANUS CAUSING SOME CONFUSION IN IDENTIFICATION.

NAME: **LESSER LONG-NOSED BAT** *LEPTONYCTERIS CURASOAE YERBABUENAE*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 53 FR 38456, 09-30-88

DESCRIPTION: ELONGATED MUZZLE, SMALL LEAF NOSE, AND LONG TONGUE. YELLOWISH BROWN OR GRAY ABOVE AND CINNAMON BROWN BELOW. TAIL MINUTE AND APPEARS TO BE LACKING. EASILY DISTURBED.

ELEVATION RANGE: <6000 FT.

COUNTIES: COCHISE, PIMA, SANTA CRUZ, GRAHAM, PINAL, MARICOPA

HABITAT: DESERT SCRUB HABITAT WITH AGAVE AND COLUNMNAR CACTI PRESENT AS FOOD PLANTS

DAY ROOSTS IN CAVES AND ABANDONED TUNNELS. FORAGES AT NIGHT ON NECTAR, POLLEN, AND FRUIT OF PANICULATE AGAVES AND COLUMNAR CACTI. THIS SPECIES IS MIGRATORY AND IS PRESENT IN ARIZONA , USUALLY FROM APRIL TO SEPTMBER AND SOUTH OF THE BORDER THE REMAINDER OF THE YEAR.

NAME: **SONORAN PRONGHORN** *ANTILOCAPRA AMERICANA SONORIENSIS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 32 FR 4001, 03-11-67

DESCRIPTION: BUFF ON BACK AND WHITE BELOW, HOOFED WITH SLIGHTLY CURVED BLACK HORNS HAVING A SINGLE PRONG. SMALLEST AND PALEST OF THE PRONGHORN SUBSPECIES.

ELEVATION RANGE: 2000-4000 FT.

COUNTIES: PIMA, YUMA, MARICOPA

HABITAT: BROAD, INTERMOUNTAIN ALLUVIAL VALLEYS WITH CREOSOTE-BURSAGE & PALO VERDE-MIXED CACTI ASSOCIATIONS

TYPICALLY, BAJADAS ARE USED AS FAWNING AREAS AND SANDY DUNE AREAS PROVIDE FOOD SEASONALLY. HISTORIC RANGE WAS PROBABLY LARGER THAN EXISTS TODAY. THIS SUBSPECIES ALSO OCCURS IN MEXICO.

NAME: **DESERT PUPFISH** *CYPRINODON MACULARIUS*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 51 FR 10842, 03-31-1986

DESCRIPTION: SMALL (2 INCHES) SMOOTHLY ROUNDED BODY SHAPE WITH NARROW VERTICAL BARS ON THE SIDES. BREEDING MALES BLUE ON HEAD AND SIDES WITH YELLOW ON TAIL. FEMALES & JUVENILES TAN TO OLIVE COLORED BACK AND SILVERY SIDES.

ELEVATION RANGE: <5000 FT.

COUNTIES: LA PAZ, PIMA, GRAHAM, MARICOPA, PINAL, YAVAPAI, SANTA CRUZ

HABITAT: SHALLOW SPRINGS, SMALL STREAMS, AND MARSHES. TOLERATES SALINE & WARM WATER

CRITICAL HABITAT INCLUDES QUITOBAQUITO SPRING, PIMA COUNTY, PORTIONS OF SAN FELIPE CREEK, CARRIZO WASH, AND FISH CREEK WASH, IMPERIAL COUNTY, CALIFORNIA. TWO SUBSPECIES ARE RECOGNIZED: DESERT PUPFISH (C. m. macularis) AND QUITOBAQUITO PUPFISH (C. m. eremus).

NAME: **GILA TOPMINNOW** *POECILIOPSIS OCCIDENTALIS OCCIDENTALIS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 32 FR 4001, 03-11-1967

DESCRIPTION: SMALL (2 INCHES), GUPPY-LIKE, LIVE BEARING, LACKS DARK SPOTS ON ITS FINS. BREEDING MALES ARE JET BLACK WITH YELLOW FINS.

ELEVATION RANGE: <4500 FT.

COUNTIES: GILA, PINAL, GRAHAM, YAVAPAI, SANTA CRUZ, PIMA, MARICOPA, LA PAZ

HABITAT: SMALL STREAMS, SPRINGS, AND CIENEGAS VEGETATED SHALLOWS

SPECIES HISTORICALLY OCCURRED IN BACKWATERS OF LARGE RIVERS BUT IS CURRENTLY ISOLATED TO SMALL STREAMS AND SPRINGS

NAME: **RAZORBACK SUCKER** *XYRAUCHEN TEXANUS*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 55 FR 21154, 05-22-1990; 59 FR 13374, 03-21-1994

DESCRIPTION: LARGE (UP TO 3 FEET AND UP TO 16 POUNDS) LONG, HIGH SHARP-EDGED KEEL-LIKE HUMP BEHIND THE HEAD. HEAD FLATTENED ON TOP. OLIVE-BROWN ABOVE TO YELLOWISH BELOW.

ELEVATION RANGE: <6000 FT.

COUNTIES: GREENLEE, MOHAVE, PINAL, YAVAPAI, YUMA, LA PAZ, MARICOPA (REFUGIA), GILA, COCONINO, GRAHAM

HABITAT: RIVERINE & LACUSTRINE AREAS, GENERALLY NOT IN FAST MOVING WATER AND MAY USE BACKWATERS

SPECIES IS ALSO FOUND IN HORSESHOE RESERVOIR (MARICOPA COUNTY).CRITICAL HABITAT INCLUDES THE 100-YEAR FLOODPLAIN OF THE RIVER THROUGH GRAND CANYON FROM CONFLUENCE WITH PARIA RIVER TO HOOVER DAM; HOOVER DAM TO DAVIS DAM; PARKER DAM TO IMPERIAL DAM. ALSO GILA RIVER FROM AZ/NM BORDER TO COOLIDGE DAM; AND SALT RIVER FROM HWY 60/SR 77 BRIDGE TO ROOSEVELT DAM; VERDE RIVER FROM FS BOUNDARY TO HORSESHOE LAKE.

NAME: **BALD EAGLE** *HALIAEETUS LEUCOCEPHALUS*

STATUS: THREATENED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 60 FR 35999, 07-12-95

DESCRIPTION: LARGE, ADULTS HAVE WHITE HEAD AND TAIL. HEIGHT 28 - 38"; WINGSPAN 66 - 96". 1-4 YRS DARK WITH VARYING DEGREES OF MOTTLED BROWN PLUMAGE. FEET BARE OF FEATHERS.

ELEVATION RANGE: VARIES FT.

COUNTIES: YUMA, LA PAZ, MOHAVE, YAVAPAI, MARICOPA, PINAL, COCONINO, NAVAJO, APACHE, SANTA CRUZ, PIMA, GILA, GRAHAM, COCHISE

HABITAT: LARGE TREES OR CLIFFS NEAR WATER (RESERVOIRS, RIVERS AND STREAMS) WITH ABUNDANT PREY

SOME BIRDS ARE NESTING RESIDENTS WHILE A LARGER NUMBER WINTERS ALONG RIVERS AND RESERVOIRS. AN ESTIMATED 200 TO 300 BIRDS WINTER IN ARIZONA. ONCE ENDANGERED (32 FR 4001, 03-11-1967; 43 FR 6233, 02-14-78) BECAUSE OF REPRODUCTIVE FAILURES FROM PESTICIDE POISONING AND LOSS OF HABITAT, THIS SPECIES WAS DOWN LISTED TO THREATENED ON AUGUST 11, 1995. ILLEGAL SHOOTING, DISTURBANCE, LOSS OF HABITAT CONTINUES TO BE A PROBLEM. SPECIES HAS BEEN PROPOSED FOR DELISTING (64 FR 36454) BUT STILL RECEIVES FULL PROTECTION UNDER ESA.

NAME: **CACTUS FERRUGINOUS PYGMY-OWL** *GLAUCIDIUM BRASILIANUM CACTORUM*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: No CFR: 62 FR 10730, 3-10-97

DESCRIPTION: SMALL (APPROX. 7"), DIURNAL OWL REDDISH BROWN OVERALL WITH CREAM-COLORED BELLY STREAKED WITH REDDISH BROWN. SOME INDIVIDUALS ARE GRAYISH BROWN

ELEVATION RANGE: <4000 FT.

COUNTIES: MARICOPA, YUMA, SANTA CRUZ, GRAHAM, GREENLEE, PIMA, PINAL, GILA, COCHISE

HABITAT: MATURE COTTONWOOD/WILLOW, MESQUITE BOSQUES, AND SONORAN DESERTSCRUB

RANGE LIMIT IN ARIZONA IS FROM NEW RIVER (NORTH) TO GILA BOX (EAST) TO CABEZA PRIETA MOUNTAINS (WEST). ONLY A FEW DOCUMENTED SITES WHERE THIS SPECIES PERSISTS ARE KNOWN, ADDITIONAL SURVEYS ARE NEEDED. CRITICAL HABITAT IN PIMA, COCHISE, PINAL, AND MARICOPA COUNTIES (64 FR 37419).

NAME: **MEXICAN SPOTTED OWL** *STRIX OCCIDENTALIS LUCIDA*

STATUS: THREATENED CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 56 FR 14678, 04-11-91; 66 FR 8530, 2/1/01

DESCRIPTION: MEDIUM SIZED WITH DARK EYES AND NO EAR TUFTS. BROWNISH AND HEAVILY SPOTTED WITH WHITE OR BEIGE.

ELEVATION RANGE: 4100-9000 FT.

COUNTIES: MOHAVE, COCONINO, NAVAJO, APACHE, YAVAPAI, GRAHAM, GREENLEE, COCHISE, SANTA CRUZ, PIMA, PINAL, GILA, MARICOPA

HABITAT: NESTS IN CANYONS AND DENSE FORESTS WITH MULTI-LAYERED FOLIAGE STRUCTURE

GENERALLY NESTS IN OLDER FORESTS OF MIXED CONIFER OR PONDERSA PINE/GAMBEL OAK TYPE, IN CANYONS, AND USE VARIETY OF HABITATS FOR FORAGING. SITES WITH COOL MICROCLIMATES APPEAR TO BE OF IMPORTANCE OR ARE PREFERED. CRITICAL HABITAT WAS REMOVED IN 1998 BUT RE-PROPOSED IN JULY 2000 AND FINALIZED IN FEB 2001 FOR APACHE, COCHISE, COCONINO, GRAHAM, MOHAVE, PIMA COUNTIES; ALSO IN NEW MEXICO, UTAH, AND COLORADO.

NAME: **SOUTHWESTERN WILLOW FLYCATCHER** *EMPIDONAX TRAILLII EXTIMUS*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: No CFR: 60 FR 10694, 02-27-95

DESCRIPTION: SMALL PASSERINE (ABOUT 6") GRAYISH-GREEN BACK AND WINGS, WHITISH THROAT, LIGHT OLIVE-GRAY BREAST AND PALE YELLOWISH BELLY. TWO WINGBARS VISIBLE. EYE-RING FAINT OR ABSENT.

ELEVATION RANGE: <8500 FT.

COUNTIES: YAVAPAI, GILA, MARICOPA, MOHAVE, COCONINO, NAVAJO, APACHE, PINAL, LA PAZ, GREENLEE, GRAHAM, YUMA, PIMA, COCHISE, SANTA CRUZ

HABITAT: COTTONWOOD/WILLOW & TAMARISK VEGETATION COMMUNITIES ALONG RIVERS & STREAMS

MIGRATORY RIPARIAN OBLIGATE SPECIES THAT OCCUPIES BREEDING HABITAT FROM LATE APRIL TO SEPTEMBER. DISTRIBUTION WITHIN ITS RANGE IS RESTRICTED TO RIPARIAN CORRIDORS. DIFFICULT TO DISTINGUISH FROM OTHER MEMBERS OF THE EMPIDONAX COMPLEX BY SIGHT ALONE. TRAINING SEMINAR REQUIRED FOR THOSE CONDUCTING FLYCATCHER SURVEYS. CRITICAL HABITAT ON PORTIONS OF THE 100-YEAR FLOODPLAIN ON SAN PEDRO AND VERDE RIVERS; WET BEAVER AND WEST CLEAR CREEKS, INCLUDING TAVASCI MARSH AND ISTER FLAT; THE COLORADO RIVER, THE LITTLE COLORADO RIVER, AND THE WEST, EAST, AND SOUTH FORKS OF THE LITTLE COLORADO RIVER, REFERENCE 60 CFR:62 FR 39129, 7/22/97.

NAME: **YUMA CLAPPER RAIL** *RALLUS LONGIROSTRIS YUMANENSIS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 32 FR 4001, 03-11-67; 48 FR 34182, 07-27-83

DESCRIPTION: WATER BIRD WITH LONG LEGS AND SHORT TAIL. LONG SLENDER DECURVED BILL. MOTTLED BROWN ON GRAY ON ITS RUMP. FLANKS AND UNDERSIDES ARE DARK GRAY WITH NARROW VERTICAL STRIPES PRODUCING A BARRING EFFECT.

ELEVATION RANGE: <4500 FT.

COUNTIES: YUMA, LA PAZ, MARICOPA, PINAL, MOHAVE

HABITAT: FRESH WATER AND BRACKISH MARSHES

SPECIES IS ASSOCIATED WITH DENSE EMERGENT RIPARIAN VEGETATION. REQUIRES WET SUBSTRATE (MUDFLAT, SANDBAR) WITH DENSE HERBACEOUS OR WOODY VEGETATION FOR NESTING AND FORAGING. CHANNELIZATION AND MARSH DEVELOPMENT ARE PRIMARY SOURCES OF HABITAT LOSS.

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
2221 WEST GREENWAY ROAD, PHOENIX, AZ 85023-4399
(602) 942-3000 • WWW.AZGFD.COM

June 19, 2001

Mr. Phil Hackney
ENSR International
1601 Prospect Parkway
Fort Collins, CO 80525-9769

Re: Special Status Species Information for **Township 1 South, Range 6 West, Section 17; Arlington Valley Energy Facility II (AVEF II) Project, Maricopa County.**

Dear Mr. Hackney:

The Arizona Game and Fish Department (Department) has reviewed your request, dated June 1, 2001, regarding special status species information associated with the above-referenced project area. The Department's Heritage Data Management System (HDMS) has been accessed and current records show that the special status species listed on the attachment have been documented as occurring in the project area. In addition, this project does not occur in the vicinity of any proposed or designated Critical Habitats.

The Department's HDMS data are not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity.

Making available this information does not substitute for the Department's review of project proposals, and should not decrease our opportunities to review and evaluate new project proposals and sites. The Department is also concerned about other resource values, such as other wildlife, including game species, and wildlife-related recreation. The Department would appreciate the opportunity to provide an evaluation of impacts to wildlife or wildlife habitats associated with project activities occurring in the subject area, when specific details become available.

If you have any questions regarding the attached species list, please contact me at (602) 789-3618. General status information and county distribution lists for special status species are also available on our web site at http://www.azgfd.com/frames/fishwild/hdms_site/Home.htm.

Sincerely,

Sabra S. Schwartz
Heritage Data Management System, Coordinator

SSS:ss

Attachment

cc: Bob Broscheid, Project Evaluation Program Supervisor
Russ Haughey, Habitat Program Manager, Region VI

AGFD #6-4-01(07)

Special Status Species within 5 Miles of T1S,R6W Sec 17

Arizona Game and Fish Department, Heritage Data Management System

June 19, 2001

Scientific Name	Common Name	ESA	USFS	BLM	WSCA	NPL
OPUNTIA ECHINOCARPA	STRAW-TOP CHOLLA					SR

No Critical Habitats in project area; AGFD # 6-4-01(07); Arlington Valley Energy Facility II (AVEF II) Project, Maricopa

STATUS DEFINITIONS

ARIZONA GAME AND FISH DEPARTMENT (AGFD)
HERITAGE DATA MANAGEMENT SYSTEM (HDMS)

FEDERAL US STATUS

ESA **Endangered Species Act** (1973 as amended)
US Department of Interior, Fish and Wildlife Service (http://arizonaes.fws.gov)

Listed

- **LE** Listed Endangered: imminent jeopardy of extinction.
- **LT** Listed Threatened: imminent jeopardy of becoming Endangered.
- **XN** Experimental Nonessential population.

Proposed for Listing

- **PE** Proposed Endangered.
- **PT** Proposed Threatened.

Candidate (Notice of Review: 1999)

- **C** Candidate. Species for which USFWS has sufficient information on biological vulnerability and threats to support proposals to list as Endangered or Threatened under ESA. However, proposed rules have not yet been issued because such actions are precluded at present by other listing activity.
- **SC** Species of Concern. The terms "Species of Concern" or "Species at Risk" should be considered as terms-of-art that describe the entire realm of taxa whose conservation status may be of concern to the US Fish and Wildlife Service, but neither term has official status (currently all former C2 species).

Critical Habitat (check with state or regional USFWS *office for location* details)

- **Y** Yes: Critical Habitat has been designated.
- **P** Proposed: Critical Habitat has been proposed.

[\N No Status: certain populations of this taxon do not have designated status (check with state or regional USFWS office for details about which populations have designated status)**]**.

USFS **US Forest Service** (1999 Animals, 1999 Plants)
US Department of Agriculture, Forest Service, Region 3 (http://www.fs.fed.us/r3/)

- **S** Sensitive: those taxa occurring on National Forests in Arizona which are considered sensitive by the Regional Forester.

BLM **US Bureau of Land Management** (2000 Animals, 2000 Plants)
US Department of Interior, Bureau of Land Management, Arizona State Office (http://azwww.az.blm.gov)

- **S** Sensitive: those taxa occurring on BLM Field Office Lands in Arizona which are considered sensitive by the Arizona State Office.
- **P** Population: only those populations of Banded Gila monster (*Heloderma suspectum cinctum*) that occur north and west of the Colorado River, are considered sensitive by the Arizona State Office.

TRIBAL STATUS

NESL **Navajo Endangered Species List** (1997)
Navajo Nation, Navajo Fish and Wildlife Department
(http://www.heritage.tnc.org/nhp/us/navajo/esl.html)

The Navajo Endangered Species List contains taxa with status from the entire Navajo Nation which includes parts of Arizona, Utah, and New Mexico. In this notebook we provide NESL status for only those taxa whose distribution includes part or all of the Arizona portion of the Navajo Nation.

Groups

1 Those species or subspecies that no longer occur on the Navajo Nation.

2 Any species or subspecies which is in danger of being eliminated from all or a significant portion of its range on the Navajo Nation.

3 Any species or subspecies which is likely to become an endangered species, within the foreseeable future, throughout all or a significant portion of its range on the Navajo Nation.

4 Any species or subspecies for which the Navajo Fish and Wildlife Department (NF&WD) does not currently have sufficient information to support their being listed in Group 2 or Group 3 but has reason to consider them. The NF&WD will actively seek information on these species to determine if they warrant inclusion in a different group or removal from the list.

MEXICAN STATUS

MEX **Mexican Federal Endangered Species List** (May 16, 1994)
Secretaría de Desarollo Social, NORMA Oficial Mexicana NOM-059-ECOL-1994

The Mexican Federal Endangered Species List contains taxa with status from the entire Mexican Republic and waters under its jurisdiction. In this notebook we provide MEX designations for only those taxa occurring in Arizona and also in Mexico.

P En Peligro de Extinción(Determined Endangered in Mexico): in danger of extinction.

A Amenazada (Determined Threatened in Mexico): could become endangered if factors causing habitat deterioration or population decline continue.

R Rara (Determined Rare in Mexico): populations viable but naturally scarce or restricted to an area of reduced distribution or very specific habitats.

Pr Sujeta a ProtecciónEspecial (Determined Subject to Special Protection in Mexico): utilization limited due to reduced populations, restricted distribution, or to favor recovery and conservation of the taxon or associated taxa.

[| = One or more subspecies of this species has status in Mexico, but the HDMS does not track it at the subspecies level (most of these subspecies are endemic to Mexico). Please consult the NORMA Oficial Mexicana NOM-059-ECOL-1994 for details.]

STATE STATUS

NPL Arizona Native Plant Law (1993)
Arizona Department of Agriculture (http://agriculture.state.az.us/PSD/nativeplants.htm)

- **HS** Highly Safeguarded: no collection allowed.
- **SR** Salvage Restricted: collection only with permit.
- **ER** Export Restricted: transport out of State prohibited.
- **SA** Salvage Assessed: permits required to remove live trees.
- **HR** Harvest Restricted: permits required to remove plant by-products.

WSCA Wildlife of Special Concern in Arizona (1996 in prep)
Arizona Game and Fish Department (http://www.azgfd.com)

- **WC** Wildlife of Special Concern in Arizona. Species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the Arizona Game and Fish Department's listing of Wildlife of Special Concern in Arizona (WSCA, in prep). Species indicated on printouts as WC are currently the same as those in **Threatened Native Wildlife in Arizona** (1988).

EXHIBIT D
BIOLOGICAL RESOURCES

EXHIBIT D

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 in the vicinity of the proposed site or route and describe the effects, if any, other proposed facilities will have thereon."

BIOLOGICAL RESOURCES

Tables D-1, D-2, D-3, and D-4 list the mammal, bird, reptiles and amphibians, and plant species, potentially occurring within the vicinity of the project. Because no flowing streams are present within the project area, fish species have not been listed.

Construction of the project is expected to have negligible impacts to native vegetation since the plant site is characterized by sparse, primarily non-native plant species. Agricultural lands and creosote bush flats are common in the region.

Impacts to wildlife populations in the vicinity of the project are expected to be minimal due to the low quality habitat of the agricultural lands affected. Additionally, construction will not impact unique vegetation or wildlife species, habitat, or movement corridors for wildlife.

REFERENCES

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Kearney, T. H. and R. H. Peebles. 1960. *Arizona flora.* University of California Press.

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National Geographic Society. 1999. *Field guide to the birds of North America.* Third edition. National Geographic Society, Washington, D.C.

Stebbins, R. C. 1985. *A field guide to western reptiles and amphibians.* Petersen Field Guides. Houghton Mifflin Co., Boston.

Witzeman, J., S. Demaree and E. Radke. 1997. *Birds of Phoenix and Maricopa County, Arizona.* Maricopa Audubon Society, Phoenix, Arizona.

Table D-1

Mammals Potentially Present in the Project Area

Common Name	Scientific Name[1]	Habitat Type[1]
Desert shrew	*Notiosorex crawfordi*	Desert with adequate hiding/nest cover
Western pipistrelle	*Pipistrellus hesperus*	Desert with nearby cliffs or rock outcrops; summer only
Big brown bat	*Eptesicus fuscus*	Pine forests to desert with caves, mine shafts, or saguaro cavities for roosting; summer only
Pallid bat	*Antrozous pallidus*	Desert with buildings, bridges, mine shafts, or cliffs for roosting
Brazilian free-tailed bat	*Tadarida brasiliensis*	Desert with caves or mine shafts
Desert cottontail	*Sylvilagus audubonii*	Desert to juniper woodlands in areas with dense shrub cover
Black-tailed jackrabbit	*Lepus californicus*	Desert to juniper woodlands
Harris' antelope squirrel	*Ammospermophilus harrisii*	Saltbush-creosote bush-bursage desert
Round-tailed ground squirrel	*Spermophilus tereticaudus*	Creosote-bush-saltbush desert
Botta's pocket gopher	*Thomomys bottae*	All environments with adequate plant cover
Arizona pocket mouse	*Perognathus amplus*	Sonoran, and Mojave deserts
Little pocket mouse	*Perognathus longimembris*	Sandy creosote bush desert
Desert pocket mouse	*Perognathus penicillatus*	Sonoran desert
Rock pocket mouse	*Chaetodipus intermedius*	Rocky areas of Sonoran desert
Desert kangaroo rat	*Dipodomys deserti*	Sandy areas of Sonoran desert
Merriam's kangaroo rat	*Dipodomys merriami*	Creosote bush-mesquite desert
Western harvest mouse	*Reithrodontomys megalotis*	Wide variety of environments with grassy or weedy areas
Cactus mouse	*Peromyscus eremicus*	Variety of desert environments
Southern grasshopper mouse	*Onychomys torridus*	Desert with mesquite and cacti
Arizona cotton rat	*Sigmodon arizonae*	Desert with mesquite
White-throated wood rat	*Neotoma albigula*	Wide variety of desert environments
Desert wood rat	*Neotoma lepida*	Variety of environments from creosote bush to pine
Coyote	*Canis latrans*	All environments
Kit fox	*Vulpes macrotis*	Desert with sandy or diggable clay soils
Gray fox	*Urocyon cinereoargenteus*	Wide variety of environments including open desert
Collared peccary	*Tayassu tajacu*	Sonoran desert with shrub and tree thickets and cactus patches
Mule deer	*Odocoileus hemionus*	Variety of environments from desert to pine forests

Source:
[1]Hoffmeister 1986

Table D-2

Common Bird Species Potentially Present in the Project Area[1]

Common Name	Scientific Name[2]	Habitat Type[3]
Red-tailed hawk	*Buteo jamaicensis*	Habitat variable
American kestrel	*Falco sparverius*	Open country
Gambel's quail	*Callipepla gambelii*	Desert scrublands and thickets
White-winged dove	*Zenaida asiatica*	Dense mesquite, mature citrus groves, riparian woodlands, saguaro-paloverde desert
Mourning dove	*Zenaida macroura*	Wide variety of habitats; often near drainages
Greater roadrunner	*Geococcyx californianus*	Scrub desert, mesquite groves
Great horned owl	*Bubo virginianus*	Habitat variable
Burrowing owl	*Athene cunicularia*	Open country
Lesser nighthawk	*Chordeiles acutipennis*	Dry open country, scrubland, desert
Common poorwill	*Phalaenoptilus nuttali*	Sagebrush and chaparral slopes
Costa's hummingbird	*Calypte costae*	Desert washes, dry chaparral
Gila woodpecker	*Melanerpes uropygialis*	Scrub desert, cactus country, streamside woods
Gilded flicker	*Colaptes chrysoides*	Low desert woodlands, saguaros
Ash-throated flycatcher	*Myiarchus cinerascens*	Wide variety of habitats
Western kingbird	*Tyrannus verticalis*	Dry open country
Loggerhead shrike	*Lanius ludovicianus*	Open or brushy areas
Common raven	*Corvus corax*	Variety of habitats
Verdin	*Aurilparus flaviceps*	Mesquite and other dense thorny shrubs or southwestern desert
Cactus wren	*Campylorhynchus brunneicapillus*	Cactus country and arid hillsides and valleys
Black-tailed gnatcatcher	*Polioptila melanura*	Desert resident, partial to washes
Northern mockingbird	*Mimus polyglottos*	Variety of habitats
European starling	*Sturnis vulgaris*	Wide variety of habitats
Curve-billed thrasher	*Toxostoma curvirostre*	Canyons, semiarid brushland
Phainopepla	*Phainopepla nitens*	Mesquite brushland
Lucy's warbler	*Vermivora luciae*	Mesquite and cottonwoods along watercourses
Black-throated sparrow	*Amphispiza bilineata*	Desert, especially rock slopes
Northern cardinal	*Cardinalis cardinalis*	Taller and denser Lower Sonoran brush[4]
Brown-headed cowbird	*Molothrus ater*	Woodlands, farmlands, suburbs
House finch	*Carpodacus mexicanus*	Habitat variable
Turkey vulture	*Cathartes aura*	Habitat variable
Northern harrier	*Circus cyaneus*	Habitat variable

Sources:
[1]Potential for occurrence based on Monson and Phillips 1981 and Witzeman et al. 1997
[2]American Ornithological Union 1998
[3]National Geographic Society 1999
[4]Monson and Phillips 1981

Table D-3

Reptile and Amphibian Species Potentially Present in the Project Area[1]

Common Name	Scientific Name	Habitat Type[2]
TOADS		
Couch spadefoot	*Scaphiopus couchi*	Shortgrass plains, mesquite savannah, creosote bush desert, and other areas of low rainfall
Western spadefoot	*Scaphiopus hammondii*	Washes, floodplains, alluvial fans, playas, alkali flats
Red-spotted toad	*Bufo punctatus*	Desert streams, open grassland and scrubland, oak woodland, rocky canyons
LIZARDS		
Western banded gecko	*Coleonyx variegatus*	Variety of habitats, from creosote bush flats to pinon-juniper belt
Desert iguana	*Dipsosaurus dorsalis*	Creosote bush desert
Zebratail lizard	*Callisaurus draconoides*	Washes, desert pavement, hardpan
Desert spiny lizard	*Sceloporus magister*	Arid/semiarid plains and lower mountain slopes
Side-blotched lizard	*Uta stansburiana*	Sand, rock, hardpan or loam with grass, shrubs, and scattered trees
Desert horned lizard	*Phrynosoma platyrhinos*	Sandy flats, alluvial fans, washes, dune edges
Western whiptail	*Cnemidophorus tigris*	Desert and semiarid areas with sparse vegetation
SNAKES		
Spotted leaf-nosed snake	*Phyllorhynchus decurtatus*	Open desert plains
Coachwhip	*Masticophis flagellum*	Variety of habitats
Western patch-nosed snake	*Salvadora hexalepis*	Grasslands, chaparral, sagebrush plains, pinon-juniper woodland, desert scrub
Glossy snake	*Arizona elegans*	Variety of open desert and grassland areas
Gopher snake	*Pituophis melanoleucus*	Variety of habitats
Common kingsnake	*Lampropeltis getulus*	Variety of habitats
Long-nosed snake	*Rhinocheilus lecontei*	Desert, prairies, shrubland
Ground snake	*Sonora semiannulata*	Arid and semiarid regions; river bottoms, desert flats, sand hummocks, rocky hillsides
Western shovel-nosed snake	*Chionactus occipitalis*	Washes, dunes, sandy flats, loose soils, rocky hillsides
Night snake	*Hypsiglena torquata*	Variety of habitats
Arizona coral snake	*Micruroides euryxanthus*	Arid and semiarid thornscrub, brushland, woodland, grassland, farmland
Western diamondback rattlesnake	*Crotalus atrox*	Variety of habitats in arid and semiarid regions
Sidewinder	*Crotalus cerastes*	Sand hummocks topped with creosote bushes, mesquite, or other desert plants; also windswept flats, barren dunes, hardpan, rocky hillsides

Sources:
[1]Potential for occurrence based on Stebbins 1985
[2]Stebbins 1985

Table D-4

Plant Species Potentially Present in the Project Area

Common Name	Scientific Name[1]	Habitat Type[2]
Red brome	*Bromus rubens*	Roadside and waste places
Arabian grass	*Schismus arabicus*	Sandy soil
Mediterranean grass	*Schismus barbatus*	Open desert
Wingscale	*Atriplex canescens*	Sandy, sometimes saline soil
Quail brush	*Atriplex lentiformes*	Moist or dry saline soil
All scale	*Atriplex polycarpa*	Moderately saline to nonsaline soil
Russian thistle[3]	*Salsola iberica*	Roadsides, overgrazed ranges
Yellow tansy mustard	*Descurainia pinnata*	Open ground
London rocket	*Sisymbrium irio*	Abundant in irrigated areas
Catclaw acacia	*Acacia greggi*	Along streams and washes
Velvet mesquite[3]	*Prosopis velutina*	Along watercourses, on grasslands and lower mountain slopes
Blue paloverde	*Cercidium floridum*	Along washes, on floodplains
Filaree	*Erodium cicutarium*	Common on plains and mesas
Creosote bush	*Larrea tridentata*	Dry plains and mesas
Corona de Cristo	*Castela emoryi*	Desert plains
Graythorn	*Ziziphus obtusifolia*	Dry mesa, plains, slopes
Alkali pink, globemallow[3]	*Sphaeralcea parviflora*	Roadsides, fields, edges of sandy washes, well-drained slopes
Tamarisk, salt cedar[3]	*Tamarix pentandra*	Along streams and disturbed sites
Wolfberry	*Lycium* spp.	Washes and dry slopes in desert or semidesert areas
Desert willow	*Chilopsis linearis*	Along washes in deserts and foothills
Triangle-leaf bursage	*Ambrosia deltoidea*	Plains and mesas
White bursage	*Ambrosia dumosa*	Dry plains and mesas
Desert broom	*Baccharis sarothroides*	Hillsides and bottomlands, sometimes in saline soil
Alkali goldenbush	*Isocoma acradenius*	Various habitats, often in saline soils
Jimmy weed	*Isocoma heterophyllus*	Mesas and plains, often in saline soil and on overgrazed rangeland
Prickly lettuce	*Lactuca serriola*	Waste land and roadsides
Bermuda grass[3]	*Cynodon dactylon*	Fields, washes, disturbed sites
Pigweed	*Amaranthus sp.*	Disturbed sites
Cholla cactus	*Opvutia* sp.	Creosote bush flats, washes
Brittle bush	*Encelia farinosa*	Creosote bush flats, washes
Nightshade[3]	*Solanum* sp.	Disturbed sites, fields
Purslane	*Portulaca* sp.	Disturbed sites, fields
Annual sunflower[3]	*Helianthus annuus*	Disturbed sites, fields, roadsides
Canarygrass[3]	*Phalaris canariensis*	Disturbed sites, fields, roadsides
Johnsongrass[3]	*Sorghum halepense*	Disturbed sites, fields, roadsides
Ragweed	*Ambrosia* sp.	Disturbed sites, fields, washes

Sources:
[1]Lehr 1978
[2]Kearney and Peebles 1960
[3]Observed during June 2001 site visit

EXHIBIT E
SCENIC AREAS, HISTORIC SITES AND STRUCTURES, AND ARCHAEOLOGICAL SITES

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 AND VISUAL RESOURCES

The visual resource study addressed the inherent aesthetics of the landscape, public value of viewing the landscape, and sensitivity to visual effects from the proposed AVEF II project. The visual analysis was conducted by Duke Energy-Flour Daniel in June 2001 and included an evaluation of the existing visual conditions, scenic quality, and visual sensitivity.

The project area is located within the Basin and Range physiographic province in southwest Arizona (USDA 1989). More specifically it is within the Sonoran Desertscrub – Lower Colorado Subdivision (Lowe 1964). The topographic features within and surrounding the project area can be characterized as flat, with isolated hills occurring within 1 to 2 miles of the proposed project. The Palo Verde Hills and Yellow Medicine Hills are located 5 to 7 miles northwest and southwest of the project, respectively. The White Tank Mountains and Gila Bend Mountains are 12 to 15 miles northeast and south of the project, respectively. The average elevation above mean sea level is approximately 875 feet in the project area.

The vegetation in the project vicinity is dominated by agricultural land. Along Winters Wash and Centennial Wash, located east and south of the plant site, respectively, mesquite, salt cedar, ironwood, and acacia dominate the landscape. The proposed project site is located on vacant agricultural land.

At present, the most dominant man-made features within the project area include the PVNGS, the AVEF I and Redhawk power plants, and Hassayampa switchyard currently under construction, high-voltage transmission line corridors, numerous aboveground electrical subtransmission and distribution lines, a distribution substation, the Union Pacific Railroad, a few occupied residences and unoccupied structures, concrete irrigation canals, abandoned structures, paved and unpaved road surfaces, range gates, signs, as well as other man-made elements (e.g., abandoned water tanks) that have significantly altered the natural setting.

Visual Quality

The scenic value or visual quality of the landscape is a function of the attributes or amenities that naturally occur within that setting (land forms, rock formations, topography, presence of water, vegetation patterns) which add to or diminish its value. Within the project area, the landscape is lacking in natural amenities and could be described as common or non-distinctive. Exhibit E-1 provides a photosimulation of the proposed AVEF II site looking south from Elliot Road. This photosimulation includes the approved AVEF I as it is expected to appear during operation in 2002.

Sensitive Viewpoints

The sensitivity of a viewpoint reflects the degree of public concern for change in the scenic quality of the landscape visible from that location. Sensitivity is measured by evaluating the type of viewpoint and viewer concern for change in the landscape, volume of use, viewing duration, public concerns, and influence of adjacent land use. Sensitive viewpoints that were identified within the project area include residences and the old U.S. 80. Exhibit E-2 presents a photosimulation of the proposed AVEF II (with the approved AVEF I in the foreground) looking south from Elliot Road. Exhibit E-3 presents a photosimulation of the proposed AVEF II (with the approved AVEF I) looking southeast, approximately 1.5 miles down Elliot Road.

Residences - Residences are considered high sensitivity viewpoints since their occupants have a high concern for change in the landscape and have long-term viewing conditions. There are two ranch residents located approximately 0.7 to 0.8 mile northwest of the proposed project site. It is anticipated that residential views of the proposed project would be unobstructed due to insufficient topographic variances to effectively screen the site. However, the presence of existing high-voltage transmission lines between these viewers and the proposed project site has already altered the landscape setting.

Another 2 ranch residences are located approximately 1.0 to 1.5 miles west and northwest of the proposed project site. A residential area is located approximately 1.8 miles west-northwest of the project site. Variation in topography between the proposed project and these residences will partially screen the majority of the power plant. It is anticipated that portions of the stacks will be visible from these residences.

Large-scale residential and supporting infrastructure (schools, regional parks, churches, retail services) developments are not expected to occur in the reasonable foreseeable future within the project area. The majority of lands within the immediate vicinity of the proposed project are currently planned for Rural Residential High-Density use. According to Maricopa County's

EXHIBIT E-1. PHOTOSIMULATION OF PROPOSED PROJECT SITE (AVEF I AFTER CONSTRUCTION)

EXHIBIT E-2. PHOTOSIMULATION OF PROPOSED AVEF II (WITH AVEF I) FROM ELLIOT RD

EXHIBIT E-3. PHOTOSIMULATION OF PROPOSED AVEF II (WITH AVEF I) 1.5 MILES DOWN ELLIOT RD

Tonopah Area Land Use Plan, this residential category denotes areas where single-family residential development is desirable but urban services (e.g., water, sewer, schools, parks, law enforcement, fire protection) are limited. The County recently updated its *Tonopah/Arlington Area Plan* (2000) (see Exhibit B-3, Land Use Study).

Travel Routes – The old U.S. 80 alignment has not been designated by the State Historic Preservation Office as being eligible as a listed historic property. Further, the distance from this road to the proposed project site is in excess of 2 miles. It is not anticipated that the proposed project will significantly affect this road.

Mitigation

In an effort to blend with the background landscape setting, dark hues of browns, greens, and grays will be utilized to the extent feasible in the painting of the proposed project facility.

REFERENCES

Lowe, C. H. 1964. *Arizona's Natural Environment.* The University of Arizona Press: Tucson, Arizona.

U.S. Department of Agriculture. 1989. Landscape Character Types of the National Forests in Arizona and New Mexico.

U.S. Geological Survey. 1981. 1:100,000 Scale Metric Topographic Map of Phoenix South, Arizona.

HISTORIC SITES AND STRUCTURES AND ARCHAEOLOGICAL SITES

Methods

In November 1999, a comprehensive literature search and records review was conducted by the Arizona State Museum and through the Arizona State Historic Preservation Office. The file search identified previously completed cultural resources surveys, all previously recorded archaeological sites and historic properties listed on the National Register of Historic Places (NRHP), and previously recorded standing structures situated within a 2-mile radius of the proposed project site. The goal of the review was to determine whether the construction and operation of the proposed project might affect archaeological or historic cultural resources.

Findings

The review of agency and museum files documented 8 cultural resource surveys previously conducted within a 2-mile radius of the project site (Table E-1). The earliest of these surveys was conducted in 1972 and 1973 at geotechnical boring locations associated with the PVNGS. The plant site and buffer zone were intensively surveyed and the results were summarized in a report (Trott 1974). This report does not document the full extent and methods of this survey work, but a large block encompassing approximately 8,360 acres apparently was surveyed intensively (Stein 1981). At least 31 archaeological and historical sites were identified and recorded within this block, and 22 additional sites were recorded in adjacent areas. These sites include aboriginal archaeological sites containing approximately 20 lithic scatters, 10 trails, 2 petroglyphs, 5 rock enclosures, and 16 historic sites consisting primarily of 1920's-1930's homestead remnants. Five of these sites, designated AZ T:9:25, 27, 29, 37, and 49 (MNA), are located within a 2-mile radius of the proposed project site, but not within the project site.

In 1975, studies were conducted at 13 sites to mitigate the impacts of construction of the PVNGS (Stein 1981). Two of these sites, AZ T:9:25 (MNA) and AZ T:9:29 (MNA), are aboriginal archaeological sites recorded by Trott (1974) and are located within a 2-mile radius of the proposed project site, but not within the project site. Site AZ T:9:25 (MNA) consists of seven rock enclosures ranging from circular to rectangular in form; no artifacts or other cultural remains were found in association with these rock enclosures. Site AZ T:9:29 (MNA) consists of a trail leading up the southwestern side of a basalt hill; one plainware sherd was located at the base of the trail. The function of the trail is interpreted as an intaglio art-form rather than a transportation route.

In 1976, the Museum of Northern Arizona surveyed two alternate transmission line corridors that extend from the PVNGS to the Colorado River (Berry 1978). Of the 73 recorded sites, only two (AZ T:9:21 and 22[ASM]) are located within a 2-mile radius of the proposed project site; neither of these lie within the project site. Both sites are identified as temporary camps of Patayan cultural affiliation. The sites contain numerous basalt lithics, millingstone fragments, flakes, and ceramics. Neither of the sites is recommended as eligible to the NRHP due to off-road vehicle and cattle grazing disturbance.

Several studies were conducted for the transmission lines that were constructed to connect the PVNGS to the regional power grid. Surveys for the Palo Verde-Kyrene line (Powers et al. 1978) covered a 200-foot-wide corridor that falls within a 2-mile radius of the proposed project site, but not within the project site. The survey documented a single site, AZ T:9:5 (ASM), located on the south side of Centennial Wash. The site is a scatter of fewer than 50 artifacts including a few pieces of flaked stone and six types of ceramic sherds, including both Hohokam and Patayan varieties.

Table E-1

Previous Cultural Resource Surveys

Project Name and Number	Scope	Sites	Reference
All American pipeline survey	145 miles x 200 feet (3,515 acres)	No sites within 2-mile radius of project site	Batcho 1985
Palo Verde-Devers transmission line survey	190 miles x 400 feet (9,212 acres)	AZ T:9:21 and 22 (ASM) within 2-mile radius but not within project site	Berry 1978
Yuma 500kV transmission line	119.8 miles x 200 feet (2,904 acres)	AZ T:9:1, 2, and 3 (ASM) within 2-mile radius but not within project site	Effland and Green 1982
All American pipeline survey	95 miles x 200 feet (2,303 acres)	No sites within 2-mile radius of the project site	Higgins and Brunson 1985
Palo Verde to Kyrene transmission line	73.3 miles x 100-330 feet (~1,777 acres)	AZ T:9:5 (ASM) - within 2-mile radius but not within the project site	Powers et al 1978
PacifiCorp turbine pipeline survey	6.8 miles x 200 feet (165 acres)	No sites within 2-mile radius of the project site	Rogge and Darrington 1994
Devers-Palo Verde transmission line No. 2 survey	385 acres	AZ R:8:61 (ASM), AZ S:6:20 and 21 (ASM) - not within 2-mile radius of project site	Swartz and Dongoske 1987
Palo Verde plant survey	9,300 acres	AZ T:9:25, 27, 29, 37, and 49 (MNA) within 2-mile radius but not within project site	Trott 1974
Arlington Valley Energy Project survey	94 acres	No sites within the project site	Ellis and Copeland 2000
Arlington Valley Energy Project survey	285 acres	No sites within the project site	Copeland and Breternitz 2000

In 1981, twenty-three cultural resources were inventoried during the intensive 100 percent survey of the Yuma 500 kV transmission line (Effland and Green 1982). Three sites (AZ T:9:1, 2, and 3) are located within a 2-mile radius of the proposed project site; none of these sites lie within the project site. Site AZ T:9:1 (ACS) is an historic homestead circa 1920's - 1930's and includes structures in various stages of disrepair, irrigation canals, and domestic debris. AZ T:9:2 (ACS) is the site of the Crag railroad station building complex (dismantled) and associated debris. The remaining site, AZ T:9:3 (ACS) is an aboriginal lithic scatter consisting of cores, flakes, and angular waste occurring in low densities. None of the sites is recommended as eligible to the NRHP.

Two pedestrian surveys were conducted by New Mexico State University for the All American Pipeline right-of-way. The first survey was conducted in the spring of 1985 between Oracle, Arizona and a point 145 miles to the west (Batcho 1985). The survey resulted in the documentation of 13 sites, 9 low-density artifact scatters, and 49 isolated occurrences. None of the recorded sites is located within a 2-mile radius of the proposed project site. Between March and August 1985, the second cultural resources survey was conducted between Ward Road and a point 95 miles to the west (Higgins and Brunson 1985). The inventory identified 20 sites and 25 isolated occurrences. Aboriginal lithic debris, rock rings, and trails without artifacts characterize nineteen of the 20 sites. The remaining site is the La Paz Pumping Station in which 3 small modern rock cairns were discovered. None of the sites is situated within a 2-mile radius of the project site.

The Institute for American Research conducted a non-collection survey for the Devers-Palo Verde No. 2 Transmission Line in May to June of 1987 (Swartz and Dongoske 1987). Thirty-four previously recorded sites were located and three additional sites were recorded. The 3 newly recorded sites (AZ R:8:61, AZ S:6:20 and 21[ASM]) are characterized by prehistoric lithic scatter of unknown cultural affiliation and a single trail segment with no artifacts or additional features. None of the 37 sites lies within a 2-mile radius of the project site.

In 1994, a Class III cultural resource survey was conducted for the Pacificorp Turbine Pipeline Project Wintersburg Alternatives (Rogge and Darrington 1994). No archaeological sites, isolated finds, or other types of cultural resources were encountered during the survey.

A Class III cultural resources survey of approximately 94 acres of state and private land scheduled for development as part of AVEF I was conducted in January 2000 (Ellis and Copeland 2000). Six isolated occurrences of prehistoric artifacts were found. No archaeological sites were located. An additional 285 acres of private land surrounding the project area was surveyed in August 2000 (Copeland and Breternitz 2000). A single isolated occurrence consisting of a basalt slab metate was found. No archaeological sites were located. The area surveyed in 2000 for the AVEF I project included the proposed AVEF II project site.

Conclusion

A total of 11 archaeological and historic sties have been discovered within a 2-mile radius of the proposed project site, but not within the project site. Nine of these are aboriginal sites, consisting of lithic scatters, or features such as trails, intaglios, rock enclosures, and hearths. One site appears to be the remnants of a homestead dating to the first half of the twentieth century, and the remaining site is the historic Crag railroad station. No traditional cultural properties were identified.

Today, the significance of archaeological, historical, and traditional cultural properties commonly is evaluated by using the criteria (36 CFR 60.4 [a-d]) for inclusion on the National Register of Historic Places and the counterpart Arizona Register of Historic Places. Criteria for both of these registers are essentially the same. When the PVNGS studies were conducted in the late 70s, the use of register criteria to evaluate significance was not standard procedure. However, field recommendations for further study in order to mitigate project impacts or protect resources in place are a good indication of resource significance.

Of the 11 sites located within a 2-mile radius of the project, mitigation studies were conducted on 5 of them, 5 sites were recommended as not eligible for inclusion to the NRHP, and the remaining site was not recommended for further study.

Many of the aboriginal archaeological sites were found along major washes or clustered around the volcanic hills scattered throughout the area. The proposed project site lacks both of these topographic features. In addition, no aboriginal sites were found within those portions of the proposed project area that had been farmed.

In summary, little potential exists for the proposed project to affect archaeological or historical sites. No additional Class III surveys are required.

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Batcho, D. G. 1985. A Preliminary Report of Archaeological Sites found along the All American Pipeline Right-of-Way between Oracle, Arizona and a Point 145 Miles to the west. Cultural Resources Management Division, Sociology and Anthropology Department, New Mexico State University, Las Cruces, New Mexico.

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Rogge, A. E. and G. P. *Darrington*. 1994. PacifiCorp Turbine Pipeline Project Wintersburg Alternatives: A Class III Cultural Resource Survey. Dames & Moore, Phoenix, Arizona.

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Trott, J. J. 1974. Final Report for Phase II Investigations at the Palo Verde Hills Plant Site Location (A-75-141). Museum of Northern Arizona, Flagstaff.

EXHIBIT F
RECREATIONAL PURPOSES AND ASPECTS

EXHIBIT F
RECREATIONAL PURPOSES AND ASPECTS

As stipulated 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

Duke is unaware of any officially approved plans for the development of recreational facilities within the vicinity of the proposed project. The construction, operation, and maintenance of proposed project facilities will be consistent with safety considerations, and will not be open to public access.

EXHIBIT G
CONCEPT OF PROJECT FACILITIES

EXHIBIT G
CONCEPT OF PROJECT 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."

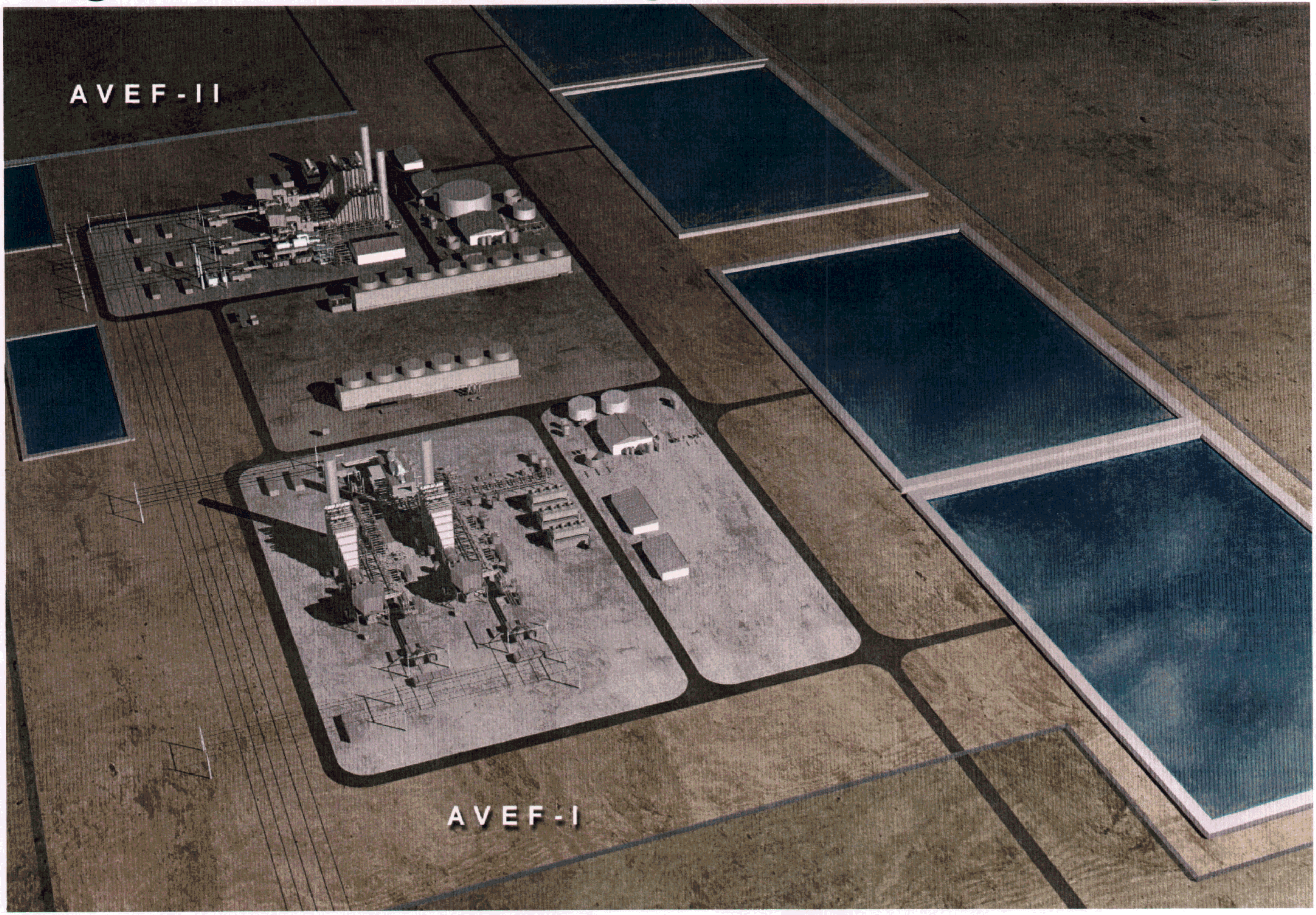

EXHIBIT G-1. PHOTOSIMULATION OF AVEF II LAYOUT (WITH AVEF I IN FOREGROUND)

EXHIBIT H
EXISTING PLANS

EXHIBIT H
EXISTING PLANS

As stated in Arizona Corporation Commission Rules of Practice R-14-3-219:

"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 future land uses are described in Exhibits A and B-3. A record search conducted at Maricopa County's Planning and Development Department revealed that no residential subdivisions have been approved for the area immediately surrounding the proposed project. Only two residential subdivisions (Horseshoe Trails and Horseshoe Trails Phase II) have been approved within a two-mile radius of the project site.

A satellite switchyard (Hassayampa) is currently under construction and is located approximately 1.5 miles east of the proposed AVEF II, immediately south of Elliot Road (near the intersection of Elliot Road and 375th Avenue). This switchyard will be flanked by the existing Kyrene and North Gila 500kV transmission lines. The Hassayampa switchyard will provide interconnections for new and existing transmission lines as an alternative to direct connections with the existing PVNGS switchyard. In addition, the Pinnacle West (Redhawk) facility (under construction) and the approved Sempra (Mesquite) power plant are located within the 2-mile radius of the proposed project.

Based on information received to date, Duke is unaware of any other planned developments within the vicinity of the proposed project.

EXHIBIT I

ANTICIPATED NOISE/INTERFERENCE WITH COMMUNICATION FACILITIES

EXHIBIT I
ANTICIPATED NOISE/INTERFERENCE WITH COMMUNICATION FACILITIES

As stated in Arizona Corporation Commission Rules of Practice and Procedures R14-3-219:

"Describe the anticipated noise emission levels and any interference with communication signals which will emanate from the proposed facilities."

ANTICIPATED NOISE

The expected noise levels generated during full load operation of AVEF I and AVEF II at the nearest residences have been evaluated by means of a detailed analytical noise model. The model results indicate that plant noise will be insignificant at all of the residential locations within 2 miles of the project site (see attached Sound Impact Assessment report).

There are 3 private residences located outside the project site and within a 2-mile radius of the site. Plant noise emissions were modeled for each of these locations. The locations of the nearest occupied residences and the expected noise levels from the facility operating at base load are provided below.

Table I-1
Anticipated Facility Noise Emissions
at the Nearest Residences

	Potential Sensitive Noise Receptor Location	Expected Plant Noise Level During Full Load Operation in Decibels (dBA)
1	Single residence approximately 5,200 feet northwest from center of the facility	43
2	Single residence approximately 6,000 feet north-northwest from center of the facility	41
3	Single residence approximately 6,500 feet north from center of the facility	40

The low noise levels are basically attributable to the large distances between the project facilities and the receptor points. Despite the remote location of the site and the strong likelihood that current background sound levels are quite low, the probability of disturbance from facility sound levels is minimal. Under normal circumstances plant noise should be negligible regardless of the existing ambient sound level and no adverse impact is expected at any of the residences evaluated.

INTERFERENCE WITH COMMUNICATION SIGNALS

No interference with communication signals will be caused by the project.

Arlington Valley Energy Facility I & II
Maricopa County, AZ

Sound Impact Assessment

May 31, 2001

CAVANAUGH TOCCI ASSOCIATES, INC.
CONSULTANTS IN ACOUSTICS
Architectural ■ Structural ■ Mechanical ■ Environmental

INTRODUCTION

Duke Energy Maricopa, LLC is proposing to construct and operate a baseload, combined-cycle power plant adjacent to the Arlington Valley Energy Facility I power plant, in Maricopa County, Arizona. The proposed facility, the Arlington Valley Energy Facility II (the Project) is located approximately 5 miles south of Wintersburg, Arizona. The proposed power plant will consist of two combustion turbine generators (CTGs) in series with dedicated heat recovery steam generators (HRSGs). Steam from the HRSGs will drive a steam turbine generator (STG). The facility will use air inlet chilling and duct firing to augment power output. Natural gas will serve as the primary source of fuel for the Project. The facility will have a nominal electrical capacity of 620 megawatts (MW). The Arlington Valley Energy Facility I is a similar sized power plant using the same combined-cycle technology.

The Project area is bordered on the north by Elliot Road and on the south by Narramore Road. The east and west sides of the site are bounded by 387th Avenue and 391st Avenue respectively. The site is located in a desert region on clear flat ground with minor topographic relief. The base elevation of the power plant will be approximately 880 feet above mean sea level.

Land use near the Project site is primarily agricultural with some residential properties. The nearest residence is located approximately 1 mile from the center of the power plants. There are two other residential properties located within 8000 feet of the Project site. The Palo Verde Nuclear Generating Station is approximately 2 miles northeast of the project site.

This sound impact assessment evaluates the acoustic impact of the combined operation of the Arlington Valley Energy I & II facilities. This report includes basic sound measurement terminology and a brief discussion of noise regulatory criteria. This report also identifies significant project related sound sources and describes computer modeling techniques used to estimate facility sound levels in the surrounding community.

SOUND MEASUREMENT TERMINOLOGY

In order to quantify the amplitude, frequency, and temporal characteristics of sound, various acoustical descriptors are used. The following is an introduction to acoustic terminology that is used in this report.

Sound Level

Sound levels are typically quantified using a logarithmic decibel (dB) scale. Generally, the sensitivity of human hearing is restricted to the frequency range of 20 Hz to 20,000 Hz. However, the human ear is most sensitive to sound in the 500 Hz to 5,000 Hz frequency range. Above and below this range, the ear becomes progressively less sensitive. To account for this feature of human hearing, sound level meters incorporate filtering of acoustic signals that corresponds to the varying sensitivity of the human ear to sound at different frequencies. This filtering is called A-weighting. Sound level measurements that are obtained using this filtering are referred to as A-weighted sound levels and are signified by the identifier, dBA. A-weighted sound levels are widely used for evaluating human exposure to environmental sounds. To help place A-weighted sound levels in perspective, Figure 1 contains a scale showing typical sound levels for common interior and environmental sound sources.

Octave Band Sound Levels

To characterize a sound, it is often necessary to evaluate the frequency distribution of the sound energy. As mentioned before, the frequencies of most interest where human exposure is concerned range between 20 Hz and 20,000 Hz. This frequency range is commonly divided into octave bands, where an octave band is a range of frequencies. Each octave band is referred to by its center frequency and has a bandwidth of one octave (a doubling of frequency). For example, the 125 Hz octave band encompasses the range of frequencies from 89 Hz to 178 Hz. Note that the upper limit of an octave band is twice the value of the lower limit. To cover the full range of human hearing, it is necessary to measure sound in 10 separate octave bands. Typically, the lowest frequency band measured has a center frequency of 31.5 Hz. The next frequency band has a center frequency of 63 Hz. This geometric series continues to the highest frequency band that has a center frequency of 16,000 Hz. A set of octave band sound levels to describe a particular sound is called an octave band spectrum. Covering the full range of hearing, an octave band spectrum would have 10 values, one for each band.

Environmental Noise Descriptors

Sound levels in the environment are continuously fluctuating and it is difficult to quantify these time-varying levels with single number descriptors. Statistical approaches, which use *percentile* sound levels and *equivalent* sound levels, are often used to quantify the temporal characteristics of environmental sound.

Percentile sound levels (L_n) are the A-weighted sound levels that are exceeded for specific percentages of time within a noise measurement interval. For example if a measurement interval is one hour long, the 50th percentile sound level (L_{50}) is the A-weighted sound level that is exceeded for 30 minutes of that interval. Similarly, the 90th percentile sound level (L_{90}) is the A-weighted sound level that is exceeded for 54 minutes of the same one-hour long interval. The 90th percentile sound level represents the nominally lowest level reached during the monitoring interval and is typically influenced by sound of relatively low level, but nearly constant duration, such as distant traffic or continuously operating industrial equipment. The L_{90} is often used in standards to quantify the existing background or residual sound level. Conversely, the L_{10} represents the nominally highest sound levels reached during a monitoring interval. The L_{10} is typically influenced by sound of high level, but short duration, such as that produced by vehicles passing on a nearby road. The L_{10} is sometimes called the intrusive sound level. By using percentile sound levels, it is possible to characterize the sound environment in terms of the steady-state background sound (L_{90}) and occasional transient sound (L_{10}).

The *equivalent sound level* (L_{eq}) is the energy average of the A-weighted sound level for the measurement interval. Sounds of low level and long duration, as well as sounds of high level and short duration influence this sound level descriptor.

The *day-night average sound level* (L_{dn}) is a 24-hour average A-weighted sound level where a 10-dB "penalty" is applied to sound occurring between the hours of 10:00 p.m. and 7:00 a.m. The 10-dB penalty accounts for the heightened sensitivity of a community to noise occurring at night.

Because of their sensitivity to the temporal characteristics of sound, the L_{eq} and L_{dn} descriptors have become widely accepted for use in environmental noise regulations and criteria. Among the federal agencies using energy average sound levels are the U.S Environmental Protection Agency, the Federal Highway Administration, the U.S Department of Housing and Urban Development, the Federal Aviation Administration and the Department of Defense.

NOISE REGULATIONS AND GUIDELINES

County & State

There are no County or State noise regulations that define limits for environmental sound produced by an electric power plant at the proposed Project site.

Federal

There are no federal regulations that define limits for environmental sound produced by an electric power plant. However, the U.S. Environmental Protection Agency (EPA) has taken the lead among federal agencies in studying the general impact of environmental noise, and has issued guidelines that identify yearly L_{dn} sound levels sufficient to protect public health and welfare from the effects of environmental noise. The EPA carefully guards against the misuse of these guidelines by stating:

On the basis of available scientific information, EPA has identified a range of yearly day-night sound levels sufficient to protect public health and welfare from the effects of environmental noise. It is very important that these noise levels summarized in Table VIII not be misconstrued. Since protective levels were derived without concern for technical or economic feasibility and contain a margin of safety to ensure the protective value, they must not be viewed as standards, criteria, regulations or goals. Rather, they should be viewed as levels below which there is no reason to suspect that the general population will be at risk from any of the identified effects of noise.

Table 1 presents EPA's suggested levels to protect public health and welfare. Of these levels, the most widely cited is the day-night average sound level (L_{dn}) of 55 dB for outdoors in residential areas. Based on extensive review of available data, EPA has concluded that a L_{dn} of 55 dB (outdoors) will not interfere with speech intelligibility (outdoors or indoors) and should in most cases protect against sleep interference. Because the plant is expected to operate continuously over any 24-hour period, a continuous average sound level (L_{eq}) of 49 dBA is required to produce a day-night average (L_{dn}) of 55 dB.

TABLE 1

Yearly Ldn Values That Protect Public Health and Welfare with a Margin of Safety

Effect	L_{dn}	L_{eq}**(24hrs)**	**Area**
Hearing		≤ 70 dBA	All areas (at the ear)
Outdoor activity	≤ 55 dB		Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places where quiet is a basis for use
		≤ 55 dBA	Outdoor areas where people spend a limited amounts of time such as schoolyards, playgrounds, etc.
Indoor activity	≤ 45 dB		Indoor residential areas
		≤ 45 dBA	Other indoor areas with human activities such as schools, etc.
Source: Table VIII, Protective Noise Levels – Condensed Version of EPA Levels Document, EPA 500/9-79-100 November 1978			

PROJECT OPERATIONAL SOUND LEVELS

Operational noise impacts will be associated with sound from several individual noise sources. The total noise impact is the result of the combined impact of each individual noise source located on-site. Environmental sound modeling was conducted for each significant noise source at the plant assuming full operation (100% load). These individual impacts were then combined to determine overall sound levels as a result of the Project. The modeling requires information on equipment noise emission levels, the location of the source relative to the receiver, and information on how the noise may propagate from the source to the receiver.

The primary Project noise sources used to model facility sound impact include:

Arlington Valley I

- Combustion turbine exhaust sound transmitted out HRSG stack (2 stacks),
- Heat recovery steam generator (2 HRSGs),
- Combustion turbine air inlets (2 inlets),
- Mechanical draft cooling tower (6 cells),
- Transformers (2 CTG,1 STG),
- Turbine inlet air chillers (3 units),
- Combustion Turbine Package (2 units),

    Generator compartment,

    Load compartment,

    Air inlet plenum,

    Combustion turbine compartment,

    Exhaust diffuser,

    Accessory compartment,

- Steam Turbine Package (1 unit).

Arlington Valley II

- Combustion turbine exhaust sound transmitted out HRSG stack (2 stacks),
- Heat recovery steam generators (2 HRSGs),
- Combustion turbine air inlets (2 inlets),
- Mechanical draft cooling tower (8 cells),
- Transformers (2 CTG,1 STG),
- Turbine inlet air chillers (3 units),
- Combustion Turbine Package (2 units),

    Generator compartment,

    Load compartment,

    Air inlet plenum,

    Combustion turbine compartment,

    Exhaust diffuser,

    Accessory compartment,

- Steam Turbine Package (1 unit).

Operational sound levels produced by the power plant have been calculated using SoundPlan® Wins Version 5.0 environmental sound modeling software. For this project, the CONCAWE method was used to calculate facility A-weighted sound levels in an area of 20-square-miles surrounding the Project site. In addition, specific calculations of facility sound levels were performed for the three nearest residential receptor locations that surround the Project. As a worst case noise impact scenario, all facility equipment was assumed to be operating simultaneously at full load. Receptor sound levels for each of the sources listed above were calculated using the following data and corrections:

- Source sound power level (in octave bands),
- Source directivity,
- Distance between source and receptor,
- Air absorption (15°C and 70% relative humidity),
- Ground effect,
- Reflections from building and tank structures,
- Barrier attenuation (from earth contours and or man-made structures).

The equipment sound levels are based on noise data provided by the equipment vendor or the design engineer when available. For equipment where vendor data were not available, the noise levels were either calculated from the procedures described in the Electric Power Plant Environmental Noise Guide (Edison Electric Institute (EEI) 1984) using site-specific ratings and specifications, or from consultants' data collected on other similar projects. The noise methodology contained in the EEI Guide is derived from extensive measurement programs at a variety of electric generation facilities.

The acoustic modeling of the facility was performed with standard acoustic treatment. Inherent in the standard facility design are several noise control features. These include enclosing significant sources of sound (the combustion turbines, steam turbine and generators) in sound attenuating enclosures. These enclosures are designed to reduce emitted sound levels to less than 90 dBA immediately adjacent to the enclosure. The gas turbine exhaust sound will be reduced by the sound absorptive properties of the HRSG, and gas turbine inlets will include sound absorptive parallel baffle silencers. In addition, facility orientation and plant layout have been optimized to minimize sound impact at residential properties.

Table 2 provides a summary of the A-weighted sound levels generated by each individual piece of equipment used to model facility sound impact.

Figure 2 graphically presents estimated isopleths of facility operational sound levels in the area surrounding the Project. Table 3 presents estimates of facility sound levels at the three nearest residential receptors. Appendix A contains listings of the sound modeling results.

TABLE 2
Source Sound Level (dBA) at 400 feet with an Unobstructed View

Sound Source	Description	Sound Level (dBA)
Cooling Tower (AV II)	8 cell tower	62
Cooling Tower (AV I)	6 cell tower	61
Combustion Turbine Package	per CT package	62
Steam Turbine Package	per ST package	61
HRSG Stack	per stack	59
HRSG Walls	per HRSG unit	58
Inlet Air Chillers	per chiller unit	55
Transformers	NEMA Sound Rating77	51
Combustion Turbine Inlet	per CT air inlet	41

TABLE 3
Estimates of Facility Sound Levels (dBA) at Nearest Residential/Recreational Receptors

Location	Approximate Distance and Direction from Center of Facility	Sound Level (dBA)
Location R-1	5,200 feet Northwest	43
Location R-2	6,000 feet West Northwest	41
Location R-3	6,500 feet North	40

The maximum sound level from worst-case operation of the plant is estimated to be 43 dBA at the nearest residential receptor that is located northwest of the facility. This sound level corresponds to a day-night average sound level (L_{dn}) for a continuously operating facility of 49 dB. Facility sound levels at all other residential receptors surrounding the Project are expected to be lower. As such, facility sound impact will be well below the EPA's guidelines for outdoors sound exposure at all surrounding residences. The low noise levels are attributable to the large distances between the Project and the receptor points. Despite the remote location of the site and the strong likelihood that current background sound levels are quite low, the probability of disturbance from facility sound is minimal.

Figures

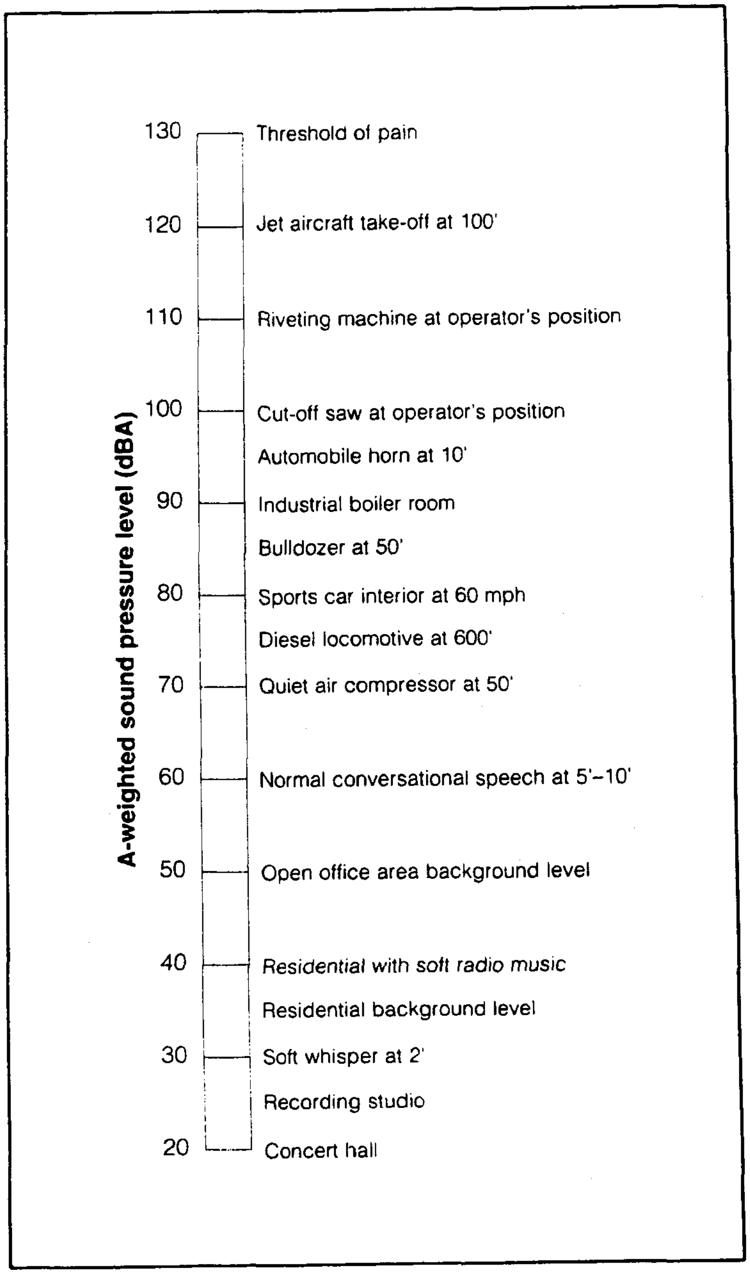

Figure 1

Typical Sound Levels for Common Interior and Environmental Sources

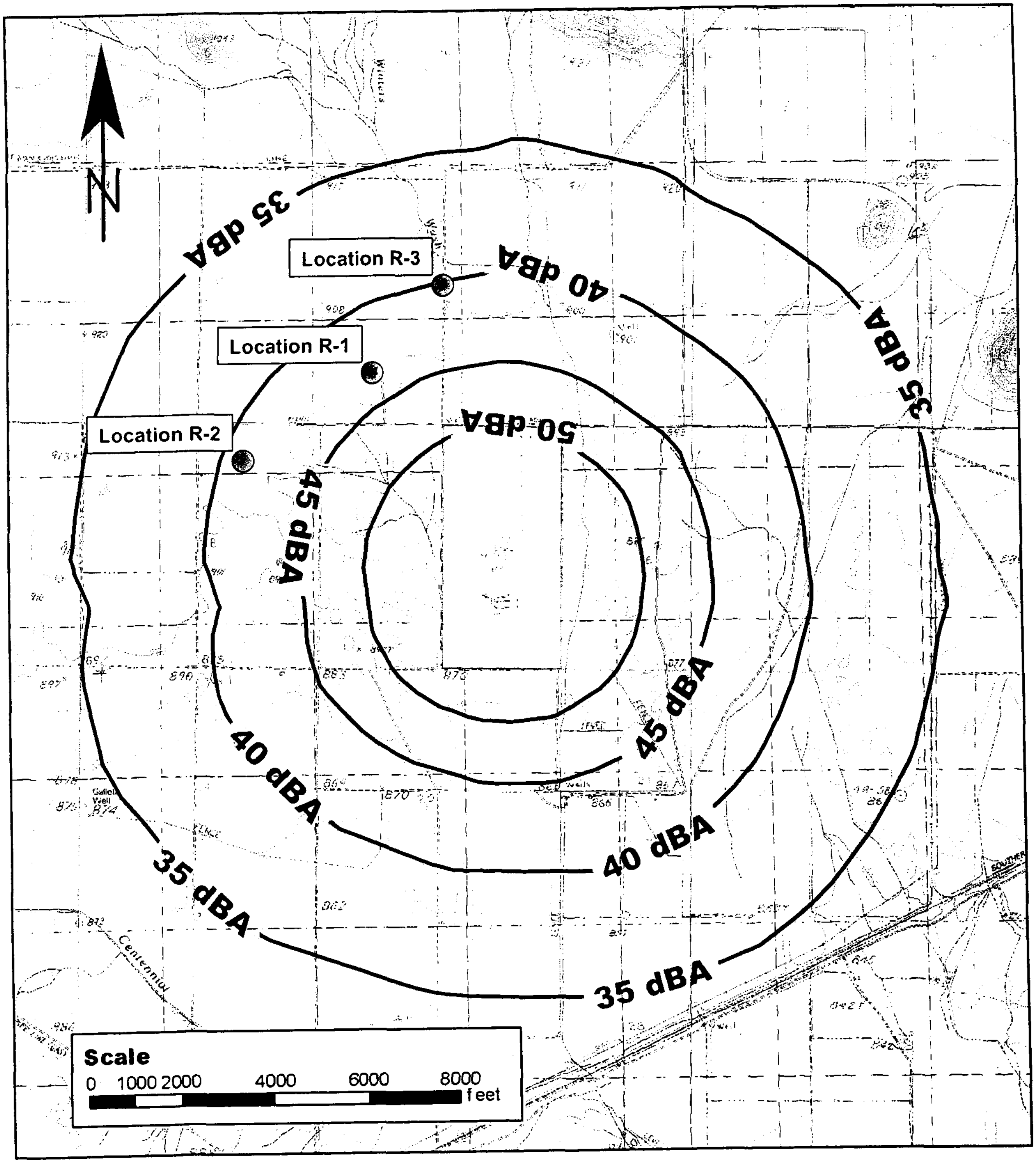

Figure 2

Calculated Estimates of Facility Sound Levels (dBA)

Arlington Valley Energy Facilities I & II

Appendix A

Facility Operational Sound Model

Arlington Valley Energy Facility
Mean propagation - SPS AV1 + AV2

Source	Lw dB(A)	Lw' dB(A)	s m	Adiv dB	Agr dB	Abar dB	Aatm dB	DI dB	Re dB(A)	Ls dB(A)
R1 Leq 43.3	dB(A)									
AV1 West Stack	114.6	114.6	1461.95	74.3	-1.0		1.7	6.2		33.4
AV1 East Stack	114.6	114.6	1488.53	74.5	-0.9		1.7	6.2		33.1
AV1 West HRSG W	107.6	80.2	1444.61	74.2	1.7		2.1	0.0	9.5	32.6
AV1 East HRSG W	107.6	80.2	1472.00	74.4	1.7		2.1	0.0	10.3	32.4
AV1 ST Generator Comp	112.1	112.1	1495.31	74.5	0.8		5.7	0.0	21.7	31.6
AV2 Cooling Tower Inlet N	115.1	88.4	1601.11	75.1	0.8	0.3	10.4	0.0	7.0	31.6
AV2 South Stack	114.6	114.6	1750.00	75.9	-0.3		2.0	6.1		30.9
AV1 Cooling Tower Inlet N	113.9	88.5	1536.84	74.7	0.8		10.6	0.0	1.2	30.9
AV2 North HRSG N	107.6	79.2	1718.47	75.7	2.1	0.8	2.5	0.0		29.5
AV1 West Exhaust Diffuser	108.2	108.2	1429.71	74.1	0.8		6.3	0.0	5.8	27.1
AV1 East Exhaust Diffuser	108.2	108.2	1457.59	74.3	0.8		6.3	0.0	9.9	26.9
AV2 South HRSG N	107.6	79.3	1755.81	75.9	2.1	3.3	2.5	0.0		26.8
AV1 North Inlet Chiller	105.1	105.1	1395.29	73.9	0.9		3.6	0.0		26.8
AV1 Center Inlet Chiller	105.1	105.1	1408.93	74.0	0.9		3.6	0.0		26.6
AV2 North Stack	114.6	114.6	1713.32	75.7	3.9		2.1	6.2		26.6
AV1 South Inlet Chiller	105.1	105.1	1422.38	74.1	0.9		3.6	0.0		26.5
AV1 West Turbine Comp	107.2	107.2	1425.85	74.1	0.4		8.4	0.0	7.8	24.5
AV1 East Turbine Comp	107.2	107.2	1453.84	74.3	0.4		8.5	0.0	11.9	24.3
AV2 North Exhaust Diffuser	108.2	108.2	1734.88	75.8	1.0	0.2	7.5	0.0	2.1	23.8
AV2 West Inlet Chiller	105.1	105.1	1780.97	76.0	1.3		4.3	0.0		23.5
AV2 Center Inlet Chiller	105.1	105.1	1789.40	76.1	1.3	0.0	4.4	0.0		23.5
AV1 West CT Generator	104.0	104.0	1413.64	74.0	0.5		6.2	0.0	2.6	23.3
AV1 East CT Generator	104.0	104.0	1441.77	74.2	0.5		6.3	0.0	6.7	23.1
AV1 ST Transformer	102.4	102.4	1525.08	74.7	1.6		3.8	0.0	15.6	23.1
AV1 Cooling Tower Inlet S	113.9	88.4	1553.40	74.8	0.8	20.0	10.5	0.0	21.4	21.8
AV1 West CT Transformer	100.4	100.4	1380.31	73.8	1.6		3.5	0.0	-10.1	21.5
AV2 ST Generator Comp	112.1	112.1	1711.20	75.7	0.9	9.5	4.8	0.0		21.3
AV1 East CT Transformer	100.4	100.4	1409.40	74.0	1.6		3.6	0.0		21.2
AV2 North Turbine Comp	107.2	107.2	1736.78	75.8	0.6	0.0	9.8	0.0	-2.0	21.0
AV2 ST Transformer	102.4	102.4	1720.75	75.7	1.7	0.0	4.3	0.0	-9.3	20.6
AV1 West CT Acc Comp	102.2	102.2	1412.88	74.0	0.4		7.5	0.0		20.4
AV1 East CT Acc Comp	102.2	102.2	1441.61	74.2	0.4		7.6	0.0	6.8	20.3
AV2 North CT Generator	104.0	104.0	1744.10	75.8	0.7	0.0	7.3	0.0		20.1
AV2 South CT Generator	104.0	104.0	1780.76	76.0	0.7	0.0	7.3	0.0		19.9
AV1 West Load Comp	101.4	101.4	1419.78	74.0	0.7		6.9	0.0	0.7	19.9
AV1 East Load Comp	101.4	101.4	1447.46	74.2	0.7		7.0	0.0	4.8	19.7
AV2 South CT Transformer	100.4	100.4	1788.94	76.1	1.8	0.1	4.5	0.0		17.9
AV2 North CT Acc Comp	102.2	102.2	1733.77	75.8	0.6	0.1	8.9	0.0	-6.2	16.9
AV1 Cooling Tower Discharge	102.9	102.9	1522.84	74.7	0.7		3.8	7.3		16.5
AV1 Cooling Tower Discharge 5	102.9	102.9	1532.11	74.7	0.7		3.8	7.3		16.4
AV1 Cooling Tower Discharge 4	102.9	102.9	1540.68	74.8	0.7		3.8	7.3		16.3
AV2 North Load Comp	101.4	101.4	1741.50	75.8	0.9	0.1	8.3	0.0	-5.3	16.3
AV1 Cooling Tower Discharge 3	102.9	102.9	1549.72	74.8	0.7		3.8	7.3		16.2
AV1 Cooling Tower Discharge 2	102.9	102.9	1558.39	74.9	0.7		3.8	7.3		16.2
AV1 Cooling Tower Discharge	102.9	102.9	1567.56	74.9	0.7		3.9	7.3		16.1
AV2 Cooling Tower Discharge	102.9	102.9	1582.74	75.0	0.7		3.9	7.3		16.0

Arlington Valley Energy Facility
Mean propagation - SPS AV1 + AV2

Source	Lw dB(A)	Lw' dB(A)	s m	Adiv dB	Agr dB	Abar dB	Aatm dB	DI dB	Re dB(A)	Ls dB(A)
AV2 Cooling Tower Discharge 7	102.9	102.9	1589.50	75.0	0.7		3.9	7.3		15.9
AV2 Cooling Tower Discharge 6	102.9	102.9	1596.62	75.1	0.7		3.9	7.3		15.8
AV2 Cooling Tower Discharge 5	102.9	102.9	1604.68	75.1	0.8		3.9	7.3		15.8
AV2 Cooling Tower Discharge 4	102.9	102.9	1613.38	75.2	0.8		4.0	7.3		15.7
AV2 Cooling Tower Discharge 3	102.9	102.9	1621.13	75.2	0.8		4.0	7.3		15.6
AV2 Cooling Tower Discharge 2	102.9	102.9	1629.09	75.2	0.8		4.0	7.3		15.6
AV2 Cooling Tower Discharge	102.9	102.9	1638.16	75.3	0.8	0.0	4.0	7.4		15.4
AV1 West Inlet Plenum	99.2	99.2	1422.17	74.1	0.1		9.9	0.0	1.7	15.3
AV1 East Inlet Plenum	99.2	99.2	1449.86	74.2	0.1		10.0	0.0	5.8	15.3
AV1 West HRSG E	107.6	80.1	1450.02	74.2	1.7	19.7	1.9	0.0		13.0
AV1 East HRSG E	107.6	80.3	1477.42	74.4	1.8	19.7	2.0	0.0		12.7
AV1 West CT Inlet	90.7	90.7	1398.76	73.9	1.5		3.1	0.0	-24.6	12.1
AV1 East CT Inlet	90.7	90.7	1427.91	74.1	1.6		3.1	0.0	-21.8	11.8
AV2 Cooling Tower Inlet S	115.1	88.7	1617.64	75.2	0.8	20.0	10.3	0.0	-21.7	11.8
AV2 North Inlet Plenum	99.2	99.2	1738.88	75.8	0.3	0.0	11.7	0.0	-13.8	11.3
AV2 North CT Transformer	100.4	100.4	1752.76	75.9	1.7	8.2	3.4	0.0	-20.7	11.1
AV2 North HRSG S	107.6	79.5	1726.44	75.7	2.1	19.8	2.3	0.0		10.7
AV2 South HRSG S	107.6	79.2	1762.42	75.9	2.1	19.7	2.3	0.0		10.5
AV2 South CT Inlet	90.7	90.7	1787.88	76.0	2.0	0.2	3.8	0.0		8.6
AV2 North CT Inlet	90.7	90.7	1751.53	75.9	2.0	0.6	4.1	0.0		8.1
AV2 East Inlet Chiller	105.1	105.1	1796.12	76.1	1.3	17.4	2.8	0.0		7.5
AV2 South Exhaust Diffuser	108.2	108.2	1772.12	76.0	1.1	19.6	5.9	0.0		5.7
AV2 South Turbine Comp	107.2	107.2	1773.13	76.0	0.6	19.9	8.8	0.0		2.0
AV2 South Load Comp	101.4	101.4	1777.20	76.0	0.9	19.7	6.7	0.0		-1.9
AV2 South CT Acc Comp	102.2	102.2	1768.38	76.0	0.6	19.9	8.1	0.0		-2.3
AV2 South Inlet Plenum	99.2	99.2	1776.04	76.0	0.4	20.0	11.7	0.0		-8.9
R2 Leq 41.4	dB(A)									
AV1 West Stack	114.6	114.6	1783.45	76.0	-0.3		2.0	6.1		30.6
AV1 East Stack	114.6	114.6	1826.27	76.2	-0.2		2.1	6.1		30.3
AV2 Cooling Tower Inlet N	115.1	88.4	1782.87	76.0	0.9		10.9	0.0		30.3
AV1 West HRSG W	107.6	80.2	1773.84	76.0	2.1		2.5	0.0		30.0
AV2 South Stack	114.6	114.6	1874.36	76.5	-0.1		2.1	6.1		29.9
AV2 North HRSG N	107.6	79.2	1870.33	76.4	2.2		2.6	0.0		29.2
AV2 South HRSG N	107.6	79.3	1890.14	76.5	2.2		2.7	0.0		29.1
AV2 ST Generator Comp	112.1	112.1	1891.23	76.5	1.0	0.0	6.7	0.0	22.5	29.0
AV1 Cooling Tower Inlet N	113.9	88.5	1787.89	76.0	0.9		11.2	0.0		28.7
AV1 ST Generator Comp	112.1	112.1	1800.69	76.1	0.9		6.5	0.0		28.6
AV2 North Stack	114.6	114.6	1855.34	76.4	4.0		2.3	6.1		25.8
AV1 South Inlet Chiller	105.1	105.1	1726.96	75.7	1.2		4.2	0.0	18.2	25.0
AV1 West Exhaust Diffuser	108.2	108.2	1772.00	76.0	1.1		7.0	0.0		24.1
AV1 North Inlet Chiller	105.1	105.1	1717.01	75.7	1.2		4.2	0.0		24.0
AV1 Center Inlet Chiller	105.1	105.1	1722.11	75.7	1.2		4.2	0.0		24.0
AV1 East Exhaust Diffuser	108.2	108.2	1815.35	76.2	1.1		7.1	0.0		23.8
AV2 North Exhaust Diffuser	108.2	108.2	1896.00	76.6	1.1		7.3	0.0		23.2
AV2 South Exhaust Diffuser	108.2	108.2	1915.70	76.6	1.1		7.3	0.0		23.1
AV2 West Inlet Chiller	105.1	105.1	1889.10	76.5	1.3		4.5	0.0		22.7
AV2 Center Inlet Chiller	105.1	105.1	1904.43	76.6	1.4		4.6	0.0		22.6

Arlington Valley Energy Facility
Mean propagation - SPS AV1 + AV2

Source	Lw dB(A)	Lw' dB(A)	s m	Adiv dB	Agr dB	Abar dB	Aatm dB	DI dB	Re dB(A)	Ls dB(A)
AV2 East Inlet Chiller	105.1	105.1	1917.72	76.7	1.4		4.6	0.0		22.5
AV1 West Turbine Comp	107.2	107.2	1771.01	76.0	0.6		9.6	0.0		21.1
AV1 East HRSG W	107.6	80.2	1816.70	76.2	2.1	9.5	2.1	0.0	4.3	20.7
AV1 East Turbine Comp	107.2	107.2	1814.40	76.2	0.7		9.7	0.0		20.7
AV1 West CT Generator	104.0	104.0	1766.57	75.9	0.7		7.2	0.0		20.1
AV2 North Turbine Comp	107.2	107.2	1899.09	76.6	0.7		10.0	0.0		20.0
AV1 ST Transformer	102.4	102.4	1829.41	76.2	1.8		4.5	0.0		19.9
AV2 South Turbine Comp	107.2	107.2	1918.84	76.7	0.7		10.0	0.0		19.8
AV1 East CT Generator	104.0	104.0	1810.36	76.2	0.7		7.4	0.0		19.7
AV2 North CT Generator	104.0	104.0	1911.59	76.6	0.8		7.6	0.0		18.9
AV2 South CT Generator	104.0	104.0	1931.18	76.7	0.8		7.7	0.0		18.8
AV1 West CT Transformer	100.4	100.4	1746.49	75.8	1.7		4.3	0.0		18.5
AV1 East CT Transformer	100.4	100.4	1790.69	76.1	1.8		4.4	0.0		18.2
AV2 North CT Transformer	100.4	100.4	1937.43	76.7	1.8	0.0	4.7	0.0		17.1
AV1 West CT Acc Comp	102.2	102.2	1760.73	75.9	0.6		8.6	0.0		17.1
AV1 West Load Comp	101.4	101.4	1768.63	76.0	0.9		7.8	0.0		16.7
AV1 East CT Acc Comp	102.2	102.2	1805.72	76.1	0.6		8.8	0.0		16.7
AV2 ST Transformer	102.4	102.4	1921.84	76.7	1.8	6.4	4.1	0.0	13.3	16.4
AV1 East Load Comp	101.4	101.4	1812.25	76.2	0.9		7.9	0.0		16.4
AV2 North CT Acc Comp	102.2	102.2	1900.74	76.6	0.7		9.1	0.0		15.9
AV2 South CT Acc Comp	102.2	102.2	1918.92	76.7	0.7		9.1	0.0		15.7
AV2 North Load Comp	101.4	101.4	1906.95	76.6	1.0		8.1	0.0		15.7
AV2 South Load Comp	101.4	101.4	1925.24	76.7	1.0		8.2	0.0		15.5
AV1 West HRSG E	107.6	80.1	1782.05	76.0	2.1	19.7	2.4	0.0	12.9	14.8
AV2 Cooling Tower Discharge	102.9	102.9	1737.25	75.8	0.9		4.2	7.3		14.7
AV2 Cooling Tower Discharge 7	102.9	102.9	1751.06	75.9	0.9	0.0	4.2	7.3		14.6
AV1 Cooling Tower Discharge	102.9	102.9	1753.92	75.9	0.9		4.3	7.3		14.6
AV2 Cooling Tower Discharge 6	102.9	102.9	1764.62	75.9	0.9	0.0	4.3	7.3		14.5
AV1 Cooling Tower Discharge 5	102.9	102.9	1769.79	76.0	0.9	0.0	4.3	7.3		14.5
AV2 Cooling Tower Discharge 5	102.9	102.9	1779.77	76.0	0.9	0.0	4.3	7.3		14.4
AV1 Cooling Tower Discharge 4	102.9	102.9	1784.70	76.0	0.9	0.0	4.3	7.3		14.4
AV2 Cooling Tower Discharge 4	102.9	102.9	1795.20	76.1	0.9	0.0	4.3	7.3		14.3
AV1 Cooling Tower Discharge 3	102.9	102.9	1799.79	76.1	0.9	0.0	4.3	7.3		14.3
AV2 Cooling Tower Discharge 3	102.9	102.9	1809.35	76.2	0.9	0.0	4.4	7.3		14.2
AV1 Cooling Tower Discharge 2	102.9	102.9	1814.98	76.2	0.9	0.0	4.4	7.3		14.2
AV2 Cooling Tower Discharge 2	102.9	102.9	1824.35	76.2	0.9	0.0	4.4	7.2		14.1
AV1 Cooling Tower Discharge	102.9	102.9	1830.35	76.3	0.9	0.0	4.4	7.2		14.1
AV2 Cooling Tower Discharge	102.9	102.9	1839.84	76.3	0.9	0.0	4.4	7.2		14.0
AV1 West Inlet Plenum	99.2	99.2	1769.43	76.0	0.4		11.8	0.0		11.1
AV1 East Inlet Plenum	99.2	99.2	1812.73	76.2	0.4		12.0	0.0		10.6
AV2 Cooling Tower Inlet S	115.1	88.7	1791.05	76.1	0.9	20.0	10.8	0.0		10.3
AV1 East HRSG E	107.6	80.3	1825.18	76.2	2.2	19.7	2.4	0.0		10.1
AV2 North Inlet Plenum	99.2	99.2	1903.21	76.6	0.4		12.5	0.0		9.7
AV2 North HRSG S	107.6	79.5	1874.66	76.5	2.2	19.8	2.5	0.0		9.6
AV2 South HRSG S	107.6	79.2	1893.45	76.5	2.2	19.8	2.5	0.0		9.5
AV2 South Inlet Plenum	99.2	99.2	1922.83	76.7	0.5		12.6	0.0		9.5
AV1 West CT Inlet	90.7	90.7	1761.37	75.9	2.0		3.5	0.0		9.3

Arlington Valley Energy Facility
Mean propagation - SPS AV1 + AV2

Source	Lw dB(A)	Lw' dB(A)	s m	Adiv dB	Agr dB	Abar dB	Aatm dB	DI dB	Re dB(A)	Ls dB(A)
AV1 East CT Inlet	90.7	90.7	1805.18	76.1	2.0		3.5	0.0		9.0
AV1 Cooling Tower Inlet S	113.9	88.4	1795.82	76.1	0.9	20.0	11.2	0.0		8.8
AV2 North CT Inlet	90.7	90.7	1924.74	76.7	2.1		3.7	0.0		8.2
AV2 South CT Transformer	100.4	100.4	1955.99	76.8	1.8	19.4	4.0	0.0		-1.6
AV2 South CT Inlet	90.7	90.7	1944.40	76.8	2.1	15.9	1.7	0.0		-5.8
R3 Leq 40.2	dB(A)									
AV1 West Stack	114.6	114.6	1799.80	76.1	-0.2		2.1	6.1		30.5
AV1 East Stack	114.6	114.6	1809.92	76.2	-0.2		2.1	6.1		30.4
AV1 West HRSG W	107.6	80.2	1781.07	76.0	2.1		2.5	0.0	7.0	29.9
AV1 East HRSG W	107.6	80.2	1792.18	76.1	2.1		2.5	0.0	6.9	29.8
AV2 South Stack	114.6	114.6	2157.69	77.7	0.4		2.5	6.0		28.0
AV1 Cooling Tower Inlet N	113.9	88.5	1905.05	76.6	1.0		11.5	0.0	2.7	27.8
AV2 Cooling Tower Inlet N	115.1	88.4	1999.28	77.0	1.0	1.7	11.2	0.0	9.7	27.1
AV2 North HRSG N	107.6	79.2	2115.26	77.5	2.4	0.8	3.0	0.0	-15.5	26.8
AV1 West Exhaust Diffuser	108.2	108.2	1760.60	75.9	1.0		7.0	0.0	18.8	25.3
AV2 North Stack	114.6	114.6	2116.44	77.5	4.1		2.6	6.1		24.3
AV1 East Exhaust Diffuser	108.2	108.2	1771.81	76.0	1.1		7.0	0.0		24.1
AV1 North Inlet Chiller	105.1	105.1	1747.54	75.8	1.2		4.3	0.0		23.8
AV1 Center Inlet Chiller	105.1	105.1	1763.72	75.9	1.3		4.3	0.0		23.7
AV1 South Inlet Chiller	105.1	105.1	1779.83	76.0	1.3		4.3	0.0		23.5
AV1 ST Generator Comp	112.1	112.1	1837.02	76.3	1.0	19.9	6.3	0.0	22.3	22.5
AV1 West Turbine Comp	107.2	107.2	1755.65	75.9	0.6		9.5	0.0	15.5	22.2
AV2 South Exhaust Diffuser	108.2	108.2	2165.81	77.7	1.3	0.0	8.0	0.0	-2.3	21.1
AV1 East Turbine Comp	107.2	107.2	1766.92	75.9	0.6		9.5	0.0		21.1
AV2 West Inlet Chiller	105.1	105.1	2193.39	77.8	1.6	0.0	5.1	0.0		20.7
AV2 North Exhaust Diffuser	108.2	108.2	2123.88	77.5	1.3	0.2	8.6	0.0	4.6	20.6
AV1 West CT Generator	104.0	104.0	1740.85	75.8	0.7		7.2	0.0	0.1	20.3
AV1 East CT Generator	104.0	104.0	1751.88	75.9	0.7		7.2	0.0	0.0	20.2
AV1 ST Transformer	102.4	102.4	1861.56	76.4	1.8		4.5	0.0		19.7
AV2 ST Generator Comp	112.1	112.1	2092.71	77.4	1.1	8.2	5.9	0.0		19.6
AV1 East CT Transformer	100.4	100.4	1717.79	75.7	1.7		4.2	0.0	7.8	19.1
AV1 West CT Transformer	100.4	100.4	1706.00	75.6	1.7		4.2	0.0	-7.4	18.8
AV2 ST Transformer	102.4	102.4	2088.22	77.4	1.9	0.1	5.1	0.0		17.9
AV2 South Turbine Comp	107.2	107.2	2165.45	77.7	0.9	0.0	10.8	0.0	-3.0	17.8
AV2 North Turbine Comp	107.2	107.2	2124.80	77.5	0.8	0.1	11.2	0.0	4.0	17.8
AV1 West CT Acc Comp	102.2	102.2	1743.72	75.8	0.6		8.6	0.0	0.2	17.3
AV1 East CT Acc Comp	102.2	102.2	1754.89	75.9	0.6		8.6	0.0	0.0	17.2
AV1 Cooling Tower Inlet S	113.9	88.4	1923.91	76.7	1.0	20.0	11.5	0.0	16.6	17.2
AV2 South CT Generator	104.0	104.0	2169.27	77.7	0.9	0.0	8.4	0.0	2.5	17.1
AV2 North CT Generator	104.0	104.0	2128.02	77.6	0.9	0.0	8.4	0.0		17.1
AV2 South HRSG N	107.6	79.3	2157.11	77.7	2.4	11.4	2.6	0.0	6.7	16.9
AV1 West Load Comp	101.4	101.4	1748.41	75.9	0.9		7.8	0.0		16.9
AV1 East Load Comp	101.4	101.4	1758.98	75.9	0.9		7.8	0.0		16.8
AV2 North CT Transformer	100.4	100.4	2125.23	77.5	1.9	0.0	5.0	0.0	-19.1	15.9
AV2 South CT Transformer	100.4	100.4	2166.59	77.7	1.9	0.0	5.1	0.0	-15.1	15.7
AV1 Cooling Tower Discharge 2	102.9	102.9	1919.18	76.7	1.0		4.6	7.2	5.7	14.1
AV1 Cooling Tower Discharge	102.9	102.9	1922.75	76.7	1.0		4.6	7.2	5.6	14.1

Arlington Valley Energy Facility
Mean propagation - SPS AV1 + AV2

Source	Lw dB(A)	Lw' dB(A)	s m	Adiv dB	Agr dB	Abar dB	Aatm dB	DI dB	Re dB(A)	Ls dB(A)
AV2 South CT Acc Comp	102.2	102.2	2158.61	77.7	0.8	0.0	10.0	0.0	-0.1	13.9
AV2 South Load Comp	101.4	101.4	2167.60	77.7	1.1	0.0	8.9	0.0	-2.2	13.7
AV2 Cooling Tower Discharge	102.9	102.9	2018.51	77.1	1.1	0.0	4.8	7.2	6.6	13.7
AV1 Cooling Tower Discharge	102.9	102.9	1905.93	76.6	1.0		4.6	7.2		13.6
AV1 Cooling Tower Discharge 5	102.9	102.9	1909.47	76.6	1.0		4.6	7.2		13.5
AV1 Cooling Tower Discharge 4	102.9	102.9	1912.55	76.6	1.0		4.6	7.2		13.5
AV1 Cooling Tower Discharge 3	102.9	102.9	1916.18	76.6	1.0		4.6	7.2		13.5
AV2 North CT Acc Comp	102.2	102.2	2119.53	77.5	0.8	0.3	10.9	0.0	-0.6	13.0
AV2 North HRSG S	107.6	79.5	2124.13	77.5	2.4	19.7	2.7	0.0	11.2	12.9
AV2 Cooling Tower Discharge	102.9	102.9	1999.66	77.0	1.1		4.7	7.2		12.9
AV2 North Load Comp	101.4	101.4	2127.00	77.6	1.1	0.2	9.6	0.0		12.9
AV2 Cooling Tower Discharge 7	102.9	102.9	2001.31	77.0	1.1		4.8	7.2		12.9
AV2 Cooling Tower Discharge 6	102.9	102.9	2003.57	77.0	1.1		4.8	7.2		12.9
AV2 Cooling Tower Discharge 5	102.9	102.9	2006.22	77.0	1.1		4.8	7.2		12.9
AV2 Cooling Tower Discharge 4	102.9	102.9	2009.57	77.1	1.1		4.8	7.2		12.9
AV2 Cooling Tower Discharge 3	102.9	102.9	2012.28	77.1	1.1	0.0	4.8	7.2		12.8
AV2 Cooling Tower Discharge 2	102.9	102.9	2014.76	77.1	1.1	0.0	4.8	7.2		12.8
AV2 Cooling Tower Inlet S	115.1	88.7	2017.83	77.1	1.1	20.0	11.3	0.0	10.7	12.8
AV1 West Inlet Plenum	99.2	99.2	1751.35	75.9	0.4		11.7	0.0		11.2
AV1 East Inlet Plenum	99.2	99.2	1762.20	75.9	0.4		11.7	0.0		11.1
AV1 West HRSG E	107.6	80.1	1783.46	76.0	2.1	19.8	2.4	0.0		10.2
AV1 East HRSG E	107.6	80.3	1794.34	76.1	2.1	19.8	2.4	0.0		10.2
AV1 West CT Inlet	90.7	90.7	1722.68	75.7	1.9		3.5	0.0	-24.1	9.6
AV1 East CT Inlet	90.7	90.7	1734.96	75.8	1.9		3.5	0.0	-24.2	9.5
AV2 South HRSG S	107.6	79.2	2164.64	77.7	2.5	19.7	2.8	0.0		7.9
AV2 North Inlet Plenum	99.2	99.2	2125.42	77.5	0.6	0.0	13.7	0.0	-5.6	7.5
AV2 South Inlet Plenum	99.2	99.2	2167.33	77.7	0.6	0.0	13.7	0.0	-4.2	7.4
AV2 North CT Inlet	90.7	90.7	2130.98	77.6	2.3	0.1	4.0	0.0	-29.6	6.8
AV2 South CT Inlet	90.7	90.7	2171.84	77.7	2.3	0.0	3.9	0.0	-32.0	6.7
AV2 Center Inlet Chiller	105.1	105.1	2196.82	77.8	1.6	17.7	3.4	0.0		4.6
AV2 East Inlet Chiller	105.1	105.1	2198.93	77.8	1.6	17.7	3.4	0.0		4.6

Arlington Valley Energy Facility
Contribution Spectra - SPS AV1 + AV2

Name	*Sum	31Hz dB(A)	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1000Hz dB(A)	2000Hz dB(A)	4000Hz dB(A)	8000Hz dB(A)
R1 Leq 43.3	dB(A)									
AV1 West Stack	33.36	4.25	19.22	27.96	30.12	26.16	11.61	-15.52	-43.29	
AV1 East Stack	33.11	4.04	19.02	27.74	29.86	25.91	11.32	-15.92	-44.06	
AV1 West HRSG W	32.60	13.95	23.00	26.32	27.47	26.80	20.31	13.37	-16.42	
AV1 East HRSG W	32.35	13.73	22.77	26.08	27.21	26.55	20.11	13.08	-17.16	
AV1 ST Generator Comp	31.63	-1.77	11.27	15.25	18.11	27.78	28.06	20.16	-3.66	-55.05
AV2 Cooling Tower Inlet N	31.57	0.99	15.01	21.75	21.37	25.28	27.64	22.94	3.18	-48.97
AV2 South Stack	30.89	2.17	17.13	25.69	27.53	23.62	8.70	-19.71	-51.40	
AV1 Cooling Tower Inlet N	30.87	-0.35	13.69	20.41	21.06	24.98	26.44	23.06	4.16	-46.00
AV2 North HRSG N	29.49	8.12	18.91	23.42	24.54	23.92	16.76	8.48	-24.91	
AV1 West Exhaust Diffuser	27.05	1.75	14.80	17.77	18.67	22.31	20.76	17.22	-3.45	-54.33
AV1 East Exhaust Diffuser	26.85	1.53	14.57	17.54	18.43	22.08	20.49	17.35	-3.98	-55.97
AV2 South HRSG N	26.78	6.50	16.75	20.80	21.72	21.07	13.79	5.32	-28.53	
AV1 North Inlet Chiller	26.78	-4.56	11.48	15.90	21.14	22.38	20.60	6.87	-9.06	-58.76
AV1 Center Inlet Chiller	26.65	-4.68	11.37	15.78	21.01	22.26	20.46	6.67	-9.45	-59.59
AV2 North Stack	26.64	0.19	15.15	21.78	22.20	20.29	6.72	-21.52	-52.86	
AV1 South Inlet Chiller	26.52	-4.79	11.26	15.67	20.88	22.14	20.33	6.47	-9.84	-60.40
AV1 West Turbine Comp	24.48	-5.22	9.83	10.80	14.70	18.34	18.80	19.26	-4.34	-57.10
AV1 East Turbine Comp	24.34	-5.44	9.60	10.57	14.46	18.11	18.52	19.38	-4.89	-58.75
AV2 North Exhaust Diffuser	23.77	-4.56	8.63	12.32	15.14	19.99	17.96	12.62	-12.00	
AV2 West Inlet Chiller	23.52	-7.42	8.59	12.97	17.92	19.29	16.96	1.40	-19.83	
AV2 Center Inlet Chiller	23.46	-10.42	8.53	12.92	17.86	19.23	16.89	1.29	-20.06	
AV1 West CT Generator	23.29	-11.12	1.93	7.90	9.81	18.44	19.92	14.42	-10.01	
AV1 East CT Generator	23.07	-11.34	1.70	7.67	9.56	18.21	19.64	14.49	-10.59	
AV1 ST Transformer	23.07	-15.10	3.93	12.81	12.57	20.38	16.94	6.49	-19.56	
AV1 Cooling Tower Inlet S	21.75	-14.64	-3.43	0.54	0.92	4.85	20.15	16.01	-5.03	-59.86
AV1 West CT Transformer	21.46	-15.95	3.10	11.95	11.79	18.52	15.11	5.61	-18.22	
AV2 ST Generator Comp	21.33	-8.34	4.45	8.07	10.09	18.66	16.01	4.64	-24.15	
AV1 East CT Transformer	21.20	-16.19	2.86	11.71	11.54	18.27	14.83	5.06	-19.08	
AV2 North Turbine Comp	21.03	-11.57	3.63	5.34	11.23	15.98	15.95	14.60	-13.06	
AV2 ST Transformer	20.61	-20.55	-0.61	10.99	11.10	17.91	13.96	2.96	-25.58	
AV1 West CT Acc Comp	20.35	-10.11	5.94	5.90	8.81	14.45	15.92	14.14	-11.05	
AV1 East CT Acc Comp	20.26	-10.34	5.70	5.67	8.56	14.21	15.64	14.51	-11.58	
AV2 North CT Generator	20.13	-18.00	-4.61	2.26	6.41	15.92	16.87	9.49	-19.26	
AV2 South CT Generator	19.95	-17.71	-3.56	5.24	6.94	15.66	16.56	9.00	-20.26	
AV1 West Load Comp	19.86	-10.17	4.88	11.85	11.75	13.39	13.86	12.34	-10.17	
AV1 East Load Comp	19.68	-10.39	4.65	11.62	11.51	13.16	13.59	12.44	-10.73	
AV2 South CT Transformer	17.88	-23.36	-3.91	6.05	8.62	15.44	11.38	-0.22	-29.59	
AV2 North CT Acc Comp	16.92	-17.04	-0.52	-0.07	3.92	12.00	12.97	9.64	-19.97	
AV1 Cooling Tower	16.47	-8.49	4.48	10.85	10.00	11.28	7.55	-7.79	-33.46	
AV1 Cooling Tower	16.39	-8.56	4.41	10.78	9.92	11.20	7.46	-7.93	-33.73	
AV1 Cooling Tower	16.32	-8.63	4.34	10.71	9.84	11.13	7.37	-8.06	-33.97	
AV2 North Load Comp	16.28	-16.99	-1.37	6.37	8.41	10.95	10.91	7.53	-19.18	
AV1 Cooling Tower	16.24	-8.69	4.27	10.64	9.76	11.05	7.28	-8.20	-34.23	
AV1 Cooling Tower	16.17	-8.76	4.21	10.57	9.69	10.98	7.19	-8.33	-34.48	
AV1 Cooling Tower	16.09	-8.83	4.14	10.50	9.61	10.91	7.10	-8.46	-34.74	

Arlington Valley Energy Facility
Contribution Spectra - SPS AV1 + AV2

Name	*Sum	31Hz dB(A)	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1000Hz dB(A)	2000Hz dB(A)	4000Hz dB(A)	8000Hz dB(A)
AV2 Cooling Tower	15.96	-8.94	4.02	10.38	9.48	10.78	6.95	-8.69	-35.17	
AV2 Cooling Tower	15.91	-8.99	3.97	10.32	9.42	10.72	6.88	-8.79	-35.36	
AV2 Cooling Tower	15.85	-9.04	3.92	10.27	9.36	10.67	6.81	-8.89	-35.57	
AV2 Cooling Tower	15.78	-9.10	3.86	10.21	9.29	10.60	6.73	-9.01	-35.80	
AV2 Cooling Tower	15.71	-9.16	3.79	10.14	9.22	10.53	6.64	-9.14	-36.04	
AV2 Cooling Tower	15.65	-9.22	3.74	10.08	9.15	10.47	6.56	-9.25	-36.26	
AV2 Cooling Tower	15.58	-9.28	3.68	10.02	9.09	10.41	6.49	-9.37	-36.49	
AV2 Cooling Tower	15.43	-12.70	2.44	9.95	9.01	10.33	6.40	-9.50	-36.74	
AV1 West Inlet Plenum	15.28	-27.19	-11.14	-7.17	-0.27	5.37	8.83	13.31	-16.24	
AV1 East Inlet Plenum	15.26	-27.41	-11.37	-7.40	-0.51	5.14	8.56	13.42	-16.79	
AV1 West HRSG E	13.00	-1.17	5.09	6.66	7.36	6.71	-0.08	-7.06	-36.75	
AV1 East HRSG E	12.66	-1.54	4.64	6.09	7.14	6.50	-0.33	-7.45	-37.51	
AV1 West CT Inlet	12.09	-10.94	6.11	6.13	6.09	4.67	-0.87	-9.46	-20.54	
AV1 East CT Inlet	11.85	-11.18	5.87	5.89	5.83	4.43	-1.16	-9.75	-21.36	
AV2 Cooling Tower Inlet S	11.75	-13.17	-1.97	2.03	1.43	5.37	7.69	2.92	-17.09	
AV2 North Inlet Plenum	11.33	-33.98	-17.38	-12.68	-3.82	2.97	5.93	8.57	-25.11	
AV2 North CT Transformer	11.12	-23.73	-4.94	3.61	2.55	8.22	2.57	-10.54	-42.05	
AV2 North HRSG S	10.66	-3.44	2.71	4.18	5.10	4.53	-2.66	-10.96	-44.45	
AV2 South HRSG S	10.55	-3.45	2.78	4.32	4.84	4.27	-2.98	-11.45	-45.43	
AV2 South CT Inlet	8.60	-17.54	0.89	3.29	3.01	1.69	-4.45	-15.04	-31.39	
AV2 North CT Inlet	8.14	-17.80	-0.15	1.51	3.27	1.95	-4.14	-14.56	-30.41	
AV2 East Inlet Chiller	7.55	-15.64	-1.55	0.54	2.87	1.45	-3.17	-18.80	-40.24	
AV2 South Exhaust Diffuser	5.71	-11.89	-1.42	-1.07	-3.22	-0.28	-2.37	-7.89	-33.02	
AV2 South Turbine Comp	1.96	-18.97	-6.51	-8.15	-7.32	-4.29	-4.38	-5.90	-34.05	
AV2 South Load Comp	-1.86	-23.88	-11.40	-7.04	-10.20	-9.32	-9.41	-12.95	-40.16	
AV2 South CT Acc Comp	-2.30	-24.30	-10.88	-13.56	-13.73	-8.25	-7.34	-10.84	-40.92	
AV2 South Inlet Plenum	-8.88	-40.87	-27.39	-26.03	-22.19	-17.31	-14.40	-11.94	-46.13	
R2 Leq 41.4	dB(A)									
AV1 West Stack	30.63	1.95	16.90	25.45	27.26	23.35	8.39	-20.17	-52.32	
AV1 East Stack	30.31	1.67	16.62	25.15	26.92	23.01	7.99	-20.77	-53.50	
AV2 Cooling Tower Inlet N	30.26	-0.08	13.92	20.76	20.30	24.24	26.28	20.72	-1.53	-59.34
AV1 West HRSG W	29.97	11.55	20.56	23.88	24.78	24.21	16.94	8.42	-25.72	
AV2 South Stack	29.95	1.35	16.30	24.82	26.54	22.64	7.54	-21.42	-54.81	
AV2 North HRSG N	29.24	10.89	19.89	23.20	24.03	23.49	16.08	7.10	-28.36	
AV2 South HRSG N	29.15	10.79	19.78	23.12	23.94	23.39	15.93	6.87	-28.87	
AV2 ST Generator Comp	29.00	-8.61	5.23	11.68	16.34	26.06	24.77	14.66	-14.20	
AV1 Cooling Tower Inlet N	28.71	-2.12	11.89	18.73	19.26	23.21	24.24	19.65	-2.69	-60.78
AV1 ST Generator Comp	28.62	-3.94	9.06	13.11	15.80	25.52	24.39	14.73	-12.80	
AV2 North Stack	25.75	-0.76	14.19	20.94	21.30	19.36	5.52	-23.40	-56.69	
AV1 South Inlet Chiller	24.96	-7.05	10.00	14.38	19.35	20.71	18.43	3.04	-17.68	
AV1 West Exhaust Diffuser	24.14	-0.75	12.25	15.30	16.00	19.72	17.63	12.12	-13.02	
AV1 North Inlet Chiller	24.02	-6.98	9.03	13.41	18.40	19.76	17.52	2.27	-18.08	
AV1 Center Inlet Chiller	23.98	-7.02	9.00	13.37	18.36	19.72	17.48	2.20	-18.22	
AV1 East Exhaust Diffuser	23.81	-1.04	11.96	15.02	15.70	19.42	17.26	11.54	-14.19	
AV2 North Exhaust Diffuser	23.22	-1.56	11.44	14.53	15.15	18.88	16.59	10.49	-16.35	
AV2 South Exhaust Diffuser	23.08	-1.68	11.31	14.41	15.02	18.75	16.43	10.23	-16.88	

Arlington Valley Energy Facility
Contribution Spectra - SPS AV1 + AV2

Name	*Sum	31Hz dB(A)	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1000Hz dB(A)	2000Hz dB(A)	4000Hz dB(A)	8000Hz dB(A)
AV2 West Inlet Chiller	22.72	-8.12	7.88	12.27	17.14	18.52	16.03	-0.03	-22.75	
AV2 Center Inlet Chiller	22.61	-8.22	7.78	12.18	17.04	18.42	15.90	-0.23	-23.16	
AV2 East Inlet Chiller	22.52	-8.30	7.69	12.09	16.94	18.33	15.79	-0.41	-23.51	
AV1 West Turbine Comp	21.07	-7.75	7.26	8.30	12.00	15.73	15.64	14.13	-13.99	
AV1 East HRSG W	20.73	4.56	12.70	15.31	15.34	13.87	5.90	-3.19	-38.10	
AV1 East Turbine Comp	20.70	-8.03	6.97	8.03	11.70	15.43	15.27	13.55	-15.16	
AV1 West CT Generator	20.08	-13.72	-0.71	5.33	7.04	15.76	16.68	9.19	-19.87	
AV2 North Turbine Comp	20.00	-8.58	6.42	7.51	11.13	14.86	14.56	12.45	-17.43	
AV1 ST Transformer	19.90	-17.24	1.76	10.75	10.35	17.16	13.04	1.25	-28.68	
AV2 South Turbine Comp	19.84	-8.70	6.29	7.39	11.00	14.73	14.40	12.19	-17.96	
AV1 East CT Generator	19.72	-14.01	-1.01	5.05	6.73	15.46	16.30	8.61	-21.06	
AV2 North CT Generator	18.93	-14.66	-1.66	4.44	6.05	14.78	15.46	7.29	-23.77	
AV2 South CT Generator	18.78	-14.78	-1.79	4.32	5.92	14.65	15.30	7.03	-24.29	
AV1 West CT Transformer	18.50	-18.69	0.32	9.27	8.92	15.73	11.74	0.35	-28.44	
AV1 East CT Transformer	18.18	-18.98	0.02	8.99	8.61	15.43	11.37	-0.24	-29.64	
AV2 North CT Transformer	17.13	-23.73	-3.45	8.10	7.64	14.46	10.15	-2.15	-33.56	
AV1 West CT Acc Comp	17.05	-12.68	3.33	3.37	6.08	11.80	12.73	9.27	-20.71	
AV1 West Load Comp	16.72	-12.73	2.28	9.32	9.02	10.74	10.66	7.16	-19.93	
AV1 East CT Acc Comp	16.67	-12.98	3.03	3.08	5.76	11.49	12.34	8.67	-21.93	
AV2 ST Transformer	16.40	-22.67	-3.75	5.13	7.46	14.04	9.35	-3.51	-35.66	
AV1 East Load Comp	16.38	-13.02	1.98	9.04	8.72	10.44	10.29	6.58	-21.11	
AV2 North CT Acc Comp	15.89	-13.59	2.41	2.50	5.12	10.85	11.55	7.43	-24.48	
AV2 South CT Acc Comp	15.74	-13.70	2.29	2.39	5.00	10.73	11.40	7.19	-24.96	
AV2 North Load Comp	15.65	-13.63	1.37	8.46	8.08	9.81	9.50	5.35	-23.64	
AV2 South Load Comp	15.52	-13.74	1.25	8.35	7.96	9.69	9.35	5.11	-24.13	
AV1 West HRSG E	14.83	-3.75	6.69	8.97	9.41	8.50	1.34	-5.61	-40.59	
AV2 Cooling Tower	14.75	-10.05	2.90	9.26	8.25	9.57	5.47	-10.89	-39.49	
AV2 Cooling Tower	14.64	-10.90	2.80	9.17	8.14	9.47	5.35	-11.08	-39.87	
AV1 Cooling Tower	14.62	-10.16	2.78	9.15	8.12	9.45	5.32	-11.11	-39.95	
AV2 Cooling Tower	14.54	-11.04	2.71	9.08	8.04	9.37	5.22	-11.26	-40.24	
AV1 Cooling Tower	14.50	-11.83	2.67	9.04	8.01	9.33	5.18	-11.33	-40.38	
AV2 Cooling Tower	14.43	-11.18	2.60	8.98	7.93	9.26	5.09	-11.47	-40.66	
AV1 Cooling Tower	14.39	-12.03	2.57	8.95	7.90	9.23	5.04	-11.53	-40.79	
AV2 Cooling Tower	14.32	-11.66	2.50	8.88	7.82	9.15	4.95	-11.68	-41.08	
AV1 Cooling Tower	14.29	-12.38	2.47	8.85	7.79	9.12	4.91	-11.74	-41.20	
AV2 Cooling Tower	14.22	-11.80	2.40	8.79	7.72	9.05	4.83	-11.87	-41.46	
AV1 Cooling Tower	14.18	-12.40	2.36	8.75	7.68	9.01	4.78	-11.94	-41.62	
AV2 Cooling Tower	14.11	-11.62	2.30	8.69	7.62	8.94	4.69	-12.07	-41.87	
AV1 Cooling Tower	14.07	-12.58	2.26	8.65	7.57	8.90	4.64	-12.15	-42.03	
AV2 Cooling Tower	14.00	-12.07	2.20	8.59	7.51	8.83	4.56	-12.28	-42.29	
AV1 West Inlet Plenum	11.05	-29.74	-13.73	-9.69	-2.98	2.74	5.65	8.15	-25.95	
AV1 East Inlet Plenum	10.59	-30.02	-14.02	-9.96	-3.29	2.44	5.28	7.58	-27.12	
AV2 Cooling Tower Inlet S	10.30	-14.37	-3.18	0.90	0.21	4.17	6.20	0.59	-21.79	
AV1 East HRSG E	10.07	-3.92	2.24	3.82	4.38	3.83	-3.52	-12.28	-47.13	
AV2 North Inlet Plenum	9.66	-30.60	-14.61	-10.51	-3.89	1.83	4.53	6.39	-29.54	
AV2 North HRSG S	9.60	-4.44	1.69	3.19	4.02	3.48	-3.94	-12.94	-48.46	

Arlington Valley Energy Facility
Contribution Spectra - SPS AV1 + AV2

Name	*Sum	31Hz dB(A)	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1000Hz dB(A)	2000Hz dB(A)	4000Hz dB(A)	8000Hz dB(A)
AV2 South HRSG S	9.49	-4.52	1.61	3.10	3.89	3.35	-4.10	-13.19	-48.96	
AV2 South Inlet Plenum	9.47	-30.73	-14.74	-10.63	-4.02	1.70	4.37	6.14	-30.07	
AV1 West CT Inlet	9.28	-13.63	3.38	3.46	3.20	1.88	-4.23	-14.69	-30.68	
AV1 East CT Inlet	8.98	-13.92	3.08	3.18	2.89	1.57	-4.60	-15.27	-31.86	
AV1 Cooling Tower Inlet S	8.76	-16.34	-5.16	-1.08	-0.81	3.14	4.16	-0.47	-22.93	
AV2 North CT Inlet	8.19	-14.69	2.30	2.45	2.09	0.77	-5.60	-16.83	-35.06	
AV2 South CT Transformer	-1.64	-30.41	-13.85	-7.43	-10.72	-5.66	-10.00	-22.38	-54.06	
AV2 South CT Inlet	-5.80	-23.76	-8.91	-11.20	-14.29	-18.46	-25.76	-37.09	-55.59	
R3 Leq 40.2	dB(A)									
AV1 West Stack	30.51	1.84	16.79	25.33	27.13	23.22	8.23	-20.40	-52.77	
AV1 East Stack	30.43	1.77	16.73	25.26	27.05	23.14	8.14	-20.54	-53.05	
AV1 West HRSG W	29.94	11.50	20.51	23.83	24.73	24.16	17.26	8.62	-25.78	
AV1 East HRSG W	29.85	11.42	20.43	23.74	24.63	24.07	17.16	8.45	-26.10	
AV2 South Stack	28.00	-0.37	14.57	23.04	24.50	20.59	5.08	-25.17	-62.41	
AV1 Cooling Tower Inlet N	27.79	-2.87	11.12	18.02	18.49	22.44	23.27	18.22	-5.77	
AV2 Cooling Tower Inlet N	27.14	-2.62	11.29	18.17	17.51	21.31	23.06	16.41	-8.90	
AV2 North HRSG N	26.77	5.82	16.60	20.77	21.77	21.22	13.34	3.25	-35.60	
AV1 West Exhaust Diffuser	25.32	-0.68	12.33	16.54	17.24	20.97	18.89	13.41	-11.62	
AV2 North Stack	24.27	-2.37	12.57	19.57	19.81	17.77	3.43	-26.71		
AV1 East Exhaust Diffuser	24.14	-0.75	12.25	15.30	16.00	19.72	17.63	12.12	-13.02	
AV1 North Inlet Chiller	23.78	-7.19	8.82	13.20	18.17	19.53	17.25	1.85	-18.92	
AV1 Center Inlet Chiller	23.66	-7.30	8.71	13.09	18.05	19.41	17.11	1.64	-19.36	
AV1 South Inlet Chiller	23.53	-7.41	8.60	12.98	17.93	19.30	16.97	1.42	-19.80	
AV1 ST Generator Comp	22.51	-15.40	-4.95	-3.57	2.85	20.01	18.41	7.68	-22.48	
AV1 West Turbine Comp	22.25	-7.64	7.36	8.40	13.26	16.98	16.91	15.44	-12.55	
AV2 South Exhaust Diffuser	21.15	-7.22	6.64	12.39	13.50	17.19	14.45	7.35	-23.29	
AV1 East Turbine Comp	21.11	-7.72	7.29	8.33	12.03	15.76	15.67	14.18	-13.88	
AV2 West Inlet Chiller	20.66	-13.00	5.91	10.51	15.17	16.54	13.57	-3.90	-30.78	
AV2 North Exhaust Diffuser	20.61	-7.52	5.65	9.24	10.66	17.20	15.08	8.10	-22.07	
AV1 West CT Generator	20.33	-13.54	-0.53	5.50	7.22	15.94	16.90	10.00	-19.01	
AV1 East CT Generator	20.24	-13.62	-0.61	5.43	7.14	15.86	16.80	9.85	-19.31	
AV1 ST Transformer	19.68	-17.44	1.55	10.55	10.13	16.95	12.77	0.83	-29.54	
AV2 ST Generator Comp	19.63	-10.65	2.19	6.13	8.19	17.11	14.25	1.47	-32.28	
AV1 East CT Transformer	19.05	-18.49	0.52	9.46	9.55	16.34	12.29	1.24	-27.54	
AV1 West CT Transformer	18.81	-18.41	0.60	9.53	9.20	16.01	12.09	1.49	-27.20	
AV2 ST Transformer	17.90	-23.09	-3.52	7.04	8.72	15.51	10.96	-2.05	-35.53	
AV2 South Turbine Comp	17.84	-14.23	1.61	5.25	9.49	13.19	12.45	9.35	-24.29	
AV2 North Turbine Comp	17.78	-14.52	0.65	2.26	6.71	13.41	13.07	10.09	-23.09	
AV1 West CT Acc Comp	17.29	-12.56	3.45	3.48	6.20	11.92	12.87	9.97	-20.08	
AV1 East CT Acc Comp	17.19	-12.64	3.37	3.41	6.12	11.84	12.78	9.83	-20.38	
AV1 Cooling Tower Inlet S	17.16	-17.16	-5.98	0.79	0.48	3.80	15.74	9.75	-16.49	
AV2 South CT Generator	17.14	-20.23	-6.37	2.39	4.47	13.17	13.73	4.30	-30.40	
AV2 North CT Generator	17.13	-20.43	-7.15	-0.27	3.04	13.41	13.74	4.55	-29.47	
AV2 South HRSG N	16.92	1.14	8.89	11.64	11.40	9.92	2.44	-7.84	-47.46	
AV1 West Load Comp	16.88	-12.60	2.41	9.45	9.16	10.89	10.83	7.43	-19.38	
AV1 East Load Comp	16.80	-12.67	2.34	9.38	9.09	10.81	10.74	7.29	-19.67	

Arlington Valley Energy Facility
Contribution Spectra - SPS AV1 + AV2

Name	*Sum	31Hz dB(A)	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1000Hz dB(A)	2000Hz dB(A)	4000Hz dB(A)	8000Hz dB(A)
AV2 North CT Transformer	15.91	-24.82	-4.54	7.07	6.50	13.29	8.67	-4.36	-38.45	
AV2 South CT Transformer	15.67	-24.55	-3.21	6.86	6.26	13.04	8.35	-4.61	-39.37	
AV1 Cooling Tower	14.13	-11.26	1.68	8.87	7.68	8.98	4.47	-12.93	-44.32	
AV1 Cooling Tower	14.10	-11.28	1.65	8.85	7.66	8.95	4.44	-12.98	-44.41	
AV2 South CT Acc Comp	13.91	-19.28	-2.58	-0.44	3.53	9.23	9.81	4.68	-30.97	
AV2 South Load Comp	13.72	-19.23	-3.38	6.34	6.48	8.18	7.74	2.57	-30.20	
AV2 Cooling Tower	13.67	-15.24	1.06	8.48	7.25	8.53	3.89	-13.92	-45.76	
AV1 Cooling Tower	13.55	-11.17	1.76	8.18	7.05	8.37	3.98	-13.16	-44.08	
AV1 Cooling Tower	13.53	-11.20	1.74	8.16	7.03	8.34	3.95	-13.20	-44.17	
AV1 Cooling Tower	13.51	-11.22	1.72	8.14	7.01	8.32	3.93	-13.25	-44.26	
AV1 Cooling Tower	13.48	-11.24	1.70	8.12	6.98	8.30	3.90	-13.29	-44.35	
AV2 North CT Acc Comp	12.96	-19.57	-3.50	-3.11	-0.19	6.54	10.11	4.91	-30.10	
AV2 North HRSG S	12.95	-1.96	5.36	7.57	7.31	5.88	-2.05	-12.65	-52.29	
AV2 Cooling Tower	12.93	-11.77	1.17	7.63	6.44	7.73	3.19	-14.38	-46.59	
AV2 North Load Comp	12.93	-19.52	-4.34	3.29	3.81	8.42	7.75	2.56	-29.44	
AV2 Cooling Tower	12.92	-11.78	1.16	7.62	6.43	7.72	3.18	-14.41	-46.63	
AV2 Cooling Tower	12.90	-11.79	1.14	7.61	6.41	7.71	3.16	-14.43	-46.69	
AV2 Cooling Tower	12.89	-11.81	1.13	7.59	6.40	7.69	3.14	-14.47	-46.76	
AV2 Cooling Tower	12.87	-11.83	1.11	7.57	6.37	7.67	3.11	-14.51	-46.85	
AV2 Cooling Tower	12.77	-15.21	-0.10	7.56	6.36	7.65	3.09	-14.55	-46.92	
AV2 Cooling Tower	12.75	-15.22	-0.12	7.55	6.34	7.63	3.07	-14.58	-46.99	
AV2 Cooling Tower Inlet S	12.75	-15.79	-3.07	3.27	3.19	7.21	8.72	1.49	-24.94	
AV1 West Inlet Plenum	11.25	-29.62	-13.61	-9.57	-2.86	2.86	5.81	8.39	-25.46	
AV1 East Inlet Plenum	11.13	-29.69	-13.68	-9.64	-2.93	2.79	5.71	8.25	-25.75	
AV1 West HRSG E	10.24	-3.82	2.32	3.81	4.66	4.11	-3.17	-11.74	-46.01	
AV1 East HRSG E	10.21	-3.80	2.34	3.79	4.61	4.05	-3.25	-11.87	-46.28	
AV1 West CT Inlet	9.56	-13.37	3.64	3.72	3.48	2.15	-3.89	-13.75	-29.49	
AV1 East CT Inlet	9.47	-13.45	3.56	3.64	3.39	2.06	-4.00	-13.91	-29.82	
AV2 South HRSG S	7.91	-5.95	0.21	1.81	2.21	1.59	-6.29	-16.64	-56.13	
AV2 North Inlet Plenum	7.55	-36.52	-20.36	-15.76	-8.33	0.25	3.07	3.84	-35.26	
AV2 South Inlet Plenum	7.44	-36.22	-19.37	-12.63	-5.52	0.18	2.74	3.57	-36.20	
AV2 North CT Inlet	6.77	-19.12	0.44	1.29	0.80	-0.54	-7.24	-19.04	-40.30	
AV2 South CT Inlet	6.69	-18.88	0.82	1.08	0.56	-0.78	-7.55	-19.68	-41.40	
AV2 Center Inlet Chiller	4.63	-18.26	-4.28	-2.13	-0.11	-1.55	-6.45	-23.94	-50.87	
AV2 East Inlet Chiller	4.59	-18.30	-4.32	-2.17	-0.16	-1.60	-6.47	-23.97	-50.92	

Arlington Valley Energy Facility
Assessed receiver spectra in dB(A) - SPS AV1 + AV2

Time Slice	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
R1 Leq 43.3	dB(A)									
Leq	19.1	30.3	35.8	37.5	37.7	35.7	30.7	9.1	-42.4	
R2 Leq 41.4	dB(A)									
Leq	17.5	28.6	34.0	35.4	36.2	33.9	27.2	2.4	-56.5	
R3 Leq 40.2	dB(A)									
Leq	16.5	27.6	33.2	34.6	34.8	31.9	25.7	-1.0		

EXHIBIT J
SPECIAL FACTORS

EXHIBIT J
SPECIAL FACTORS

Prior to constructing AVEF I, Duke conducted an extensive public involvement program to introduce Duke and the project to the community. Subsequently, the community has been notified of Duke's plans to expand its Arlington Valley Energy Facility (AVEF II) (see Notice at Exhibit J-1). Elected officials and community leaders have indicated their support for the AVEF II as demonstrated in the letters attached at Exhibit J-2.

Duke has made significant investments in the community and has continued its public involvement as AVEF I is being built. A list of Duke charitable contributions to the community is attached as Exhibit J-3.

In December 1999, Duke commissioned a study showing the fiscal and economic benefits to the community of AVEF I. In June 2001, Duke commissioned an update of that study to include the additional fiscal and economic benefits of AVEF II. A copy of the original study and the June 2001 update is attached as Exhibit J-4.

EXHIBIT J-1

COMMUNITY NOTICE LETTERS

Duke Energy®
Arlington Valley Energy

Duke Energy Maricopa, LLC
P.O. Box 26
Arlington, Arizona 85322
623/327-1314 OFFICE
623/327-1315 FAX

June, 2001

Dear Neighbor,

Let me begin with saying that with each passing month Duke Energy North America and the Kellam family in particular, are reminded how pleased we are that we chose to locate in Arizona. The community has been very supportive and we hope that you feel we have responded in kind.

Since the last letter to the community, we have had several positive developments regarding the progress of our Arlington Valley Energy project.

First of all, construction continues on schedule and activity has increased recently. We now have approximately 150 workers on site, and the number will continue to grow to a peak of 600 this fall. Two construction milestones are coming up shortly. In the next few weeks you will be able to see steel erected as the plant begins to go up from the foundation work we have been doing. Also, specialized transport will begin to deliver the heavy components for the plant. These include the gas and steam turbines and the steam boiler.

Secondly, our very positive experience in Arizona has prompted us to commit to an expansion of the capacity of the Arlington facility. The critical power needs of metropolitan Phoenix, and the west in general will remain for some time. Duke has the ability to construct and deliver additional power quickly. For those reasons and others, expanding the capacity of Arlington Valley Energy seems to be the right thing to do. Our current construction will be able to provide 570 MW of power in the summer of 2002. The expansion will double the overall output and we plan to have it all on-line by the summer of 2003. This additional construction, we believe, will further enhance the economy in Arizona with additional jobs and investment and at the same time, insure that there is sufficient power produced in Arizona for future needs.

Finally, we are pleased to announce that Arlington Valley Energy now has its own website dedicated to providing the community with up-to-date news and information about Duke Energy and Arlington Valley in particular. We invite you to visit the site and check it in the future for progress reports and photos of construction and our re-vegetation project with the University of Arizona. The address is:

http://dena.duke-energy.com//arlington/

In closing, let me just restate that my wife Kathy and I are proud to be your neighbors and I hope that you will contact me with any questions or comments you may have regarding the Arlington Energy project.

Sincerely,

Rufus

Rufus Kellam
Director

EXHIBIT J-2

SUPPORT LETTERS

Buckeye Union High School District No. 201

902 Eason Avenue
Buckeye, Arizona 85326
Phone 623-386-4423 Fax 623-386-9705

June 21, 2001

Mary Rose Wilcox
Maricopa County Board of Supervisors
301 W. Jefferson
Phoenix, AZ 85003

Dear Supervisor Wilcox,

It is my understanding that Duke Energy is seeking approval from Maricopa County to expand their generating facility in Western Maricopa County, i.e., Arlington, Arizona.

Buckeye Union High School District receives students from the three Elementary School Districts surrounding the Duke plant. Serving a composite community as we do, we have a partnership interest in a good neighbor policy for the whole of Buckeye Valley.

When Duke Energy first arrived, they confidently announced that they would be good neighbors, keep us informed, and try to respond to our concerns and community needs. Even before they had even filed a permit application, company personnel made a genuine and credible effort to communicate with and support our communities. They also said they would be "straight" with us. Well, not all of us believed them.

It is my pleasure to report that this company has been true to its word. In particular, Rufus Kellam, the Project Director for Duke, has been very active in the communities.

While their first phase is still under construction, based on their record so far, I would like to voice support for their expansion. I believe the power plant and its employees are, and will continue to be, an asset to the Buckeye Valley.

Sincerely,

Dr. Henry E. Schmitt
Superintendent

HES/ph

Ruth Fisher School District #90

38201 West Indian School Road
Tonopah, AZ 85354

Phone 623-386-5688
Fax 623-386-3364

June 20, 2001

Honorable, Mary Rose Wilcox
301 W. Jefferson 10th floor
Phoenix, Arizona 85003

Dear Supervisor Wilcox:

Let me begin by thanking you for the representation and support you have given the Tonopah Community as a member of the Board of Supervisors. Your commitment to the entire district is greatly appreciated.

It is my understanding that Duke Energy of the Arlington Valley is applying for expansion of their electrical generating plant. To that end, I feel that Duke's track record in support of Ruth Fisher School and the Tonopah Community should be noted. I find it very refreshing to work with a company who is committed to the formation of a lasting partnership. As you are aware, rural Western Maricopa County has not had the luxury of many opportunities to establish working partnerships with industry. Duke has "Stepped up to the plate". Our school has, in a short time , reaped the benefits of a good neighbor.

Duke has contributed in excess of $15,000 over two years in funding a teacher vanpool, which has made the recruitment and retention of teachers much easier. They have also provided several pieces of equipment to assist us in exposing our students to new technology.

Sincerely,

Ruben S. Jimenez
Superintendent

cc:Rip Wilson, SRW Consulting

Buckeye Water Conservation & Drainage District

205 ROOSEVELT AVENUE
P.O. BOX 1726
BUCKEYE, ARIZONA 85326-0160
PH: (623) 386-2196
FAX (623) 386-7789

July 10, 2001

Arizona Corporation Commission
Commissioner Jim Irvin
1200 West Washington
Phoenix, Arizona 85007

Re' Duke Energy-Arlington Facility
Arlington, Arizona

Dear Commissioner Irvin:

We have been notified that Duke Energy is planning on expanding their Arlington Plant. This letter is in complete support of Duke's planned expansion. Since Duke has arrived in this community, they have joined in community affairs both as individuals and as financial Corporate sponsors. They have made every effort to keep our communities informed as to their plans and have bent over backwards in order to be a "good neighbor."

They are very conscience of the environment and their technology is state of the art. They are in the process of planting the 2000 acres of prior farmland back into its original desert landscape.

Again we are in complete support of Duke Energy, Max Shilstone and Rufus Kellam. I stand ready to stand up and speak on behalf of my community.

Sincerely,

Jackie A. Meck, General Manager

EXHIBIT J-3

CHARITABLE CONTRIBUTIONS

EXHIBIT J-3
CHARITABLE CONTRIBUTIONS SUMMARY

CHAMBERS OF COMMERCE	
Arizona Chamber of Commerce	Table Sponsorship
Arizona Chamber of Commerce	Senatorial Sponsorship
Arizona Chamber of Commerce	Annual Membership Dues
Arizona Chamber of Commerce	The Classic Golf Tournament
Arizona Hispanic Chamber of Commerce	Table Sponsorship
Buckeye Valley Chamber of Commerce	Rodeo Ticket Sponsorship
Buckeye Valley Chamber of Commerce	Bluegrass Sponsorship
Buckeye Valley Chamber of Commerce	Demolition Derby Sponsorship
Buckeye Valley Chamber of Commerce	Chamber Luncheon Dues
Buckeye Valley Chamber of Commerce	Annual Sweat Golf Tournament
Greater Phoenix Chamber of Commerce	Annual Membership Dues
Phoenix Chamber of Commerce	Fundraising Event Contribution
Tonopah Valley Association	Community Fireworks Display
SCHOOLS	
Arlington Elementary School	Desks and Chairs
Arlington Elementary School	New Computer Lab
Buckeye Union High School	Music Program Donation
Buckeye Union High School	Student Eye Glass Fundraiser
Buckeye Union High School	Band Booster - Uniforms
Ruth Fisher Elementary School	Van Pool Project
Ruth Fisher Elementary School	Van Pool Project
FIRE AND POLICE DEPARTMENTS	
Avondale Professional Firefighters	Sponsorship 2001 World Police and Fire Games
Buckeye Valley Fire Department	Fire Suppression Agreement
Buckeye Valley Fire Department	Buckeye Pioneer Days-Parade Candy
Buckeye Valley Fire Department	Parade Candy
Buckeye Valley Fire Department	Computer Upgrades for New Software for Dispatch
Tonapah Valley Fire District	Contribution
COMMUNITY	
Arizona Order of Women's Legislators	Table Sponsorship
Avondale-Goodyear Hispanic Forum	Scholarship Sponsorship
Avondale-Goodyear Hispanic Forum	Contribution
Ayso Region 225 Far West Classic	Field Sponsorship
Buckeye Elks Lodge	Golf Tee Sponsorship
Buckeye Lions Club	Family Crisis Center
Buckeye Valley Public Library	Friends of the Library Sponsorship
The Nature Conservancy-Arizona Chapter	Corporate Council Membership Dues
Society of St. Vincent De Paul	School Clothes for Arlington School Children
St. Henry's Church	Needy Families
United We Win	United We Win Golf Tournament
Valley Citizens League	California Electrical Crisis
MAJOR GIFTS	
Buckeye Union High School	Construction of All Weather Track

Buckeye Union High School District No. 201

902 Eason Avenue
Buckeye, Arizona 85326
Phone 623-386-4423 Fax 623-386-9705

July 2, 2001

Rufus D. Kellam, Director
Duke Energy
Arlington Valley Project
Duke Energy Maricopa, LLD
P.O. Box 26
Arlington, AZ 85322

Dear Mr. Kellam:

Your call to confirm Duke Energy's generous donation of $170,000.00 for the all-weather track at Buckeye Union High School represents a hallmark contribution in the storied history of the District. Indeed, Duke Energy is a gold metal Corporate Neighbor!

This bountiful contribution will make it possible for the District to immediately commence on the construction of the all-weather track. With the collection of $89,000.00 from various prior donors, the additional $170,000.00 will ensure a state-of-the-art track for our high school scholar/athletes coupled with use by our feeder schools, public agencies and our community. It is extremely timely as the District is rebuilding 75 percent of Buckeye Union High School with an anticipated completion date of June 2003.

Consistent with our earlier conversation, this letter will serve as an invoice for receipt of the $170,00.00 which will be made in two payments of $85,000.00. The first installment will be received by the District on July 15, 2001, and the second installment will be received by the District on December 15, 2001. Please issue the checks to: Buckeye Union High School District No. 201 with a memo (i.e., notation) for the BUHS All-Weather Track. Upon receipt of the first installment the District will commence immediately on the architectural, civil engineering and invitation to bid for the track. Our critical path way is to have the track completed for the 2001-02 season. This is a very aggressive timeline.

Under your leadership Rufus, Duke Energy, has established a bonafide school/corporate partnership that will impact the Buckeye Valley for generations to come. You have been true to your word. You are the shining star!

Respectfully,

Dr. Henry E. Schmitt
Superintendent of Education

cc: Buckeye Union High School Governing Board

RECEIVED
JUL 02 2001
Duke Energy Maricopa, LLC

EXHIBIT J-4

ECONOMIC AND FISCAL IMPACT STUDY AND UPDATE

Economic and Real Estate Consulting

JUL 5 2001

June 25, 2001

Mr. H. Max Shilstone
Duke Energy
5400 Westheimer
Houston, TX 77056

Re: Economic Impact of Arlington Valley Generating Facility Expansion

Dear Mr. Shilstone:

This firm prepared an economic and fiscal impact report for Duke Energy in December 1999 concerning the proposed construction of an electrical generating facility in the Arlington Valley area of Maricopa County. We understand Duke Energy intends to expand that generating facility by doubling its size, i.e. constructing a second plant that is similar to the first. The purpose of this letter is to outline the expected additional economic and fiscal impacts that may result due to the expansion. Our original report has been used as the basis for estimating the expected impact of a second generating facility.

If the assumptions of our original report still apply, the second generating facility would be expected to create approximately the same impact as the original generating plant. The economic impact of a particular facility or land use is typically proportional to the spending and employment associated with that facility or use. In other words, if Duke Energy's investment in a generating facility doubles, the economic impact would be expected to double as well.

In our December 1999 report, we assumed that the initial investment by Duke Energy would be $250 million, with local construction spending estimated at $67 million. The operation of the facility was expected to generate 25 full-time jobs.

We understand that the expansion of the site will require a similar investment by Duke Energy of $250 million and that the local construction cost occurring in Maricopa County will be similar to the original $67 million. The total investment in the generating plant is important since it establishes the market value for the site for property tax purposes. The plant is then depreciated over 30 years, straight-line. The only difference between the impact of the original plant and the second, additional facility is that number of full-time jobs required to operate second plant is 10, making a total of 35 jobs for the entire expanded generating site. The economic impact of the second facility's operations is, therefore, only 40% as large as the operation of the original generating plant.

Given the above assumptions, the additional generating facility would yield approximately $62 million annually in economic activity in Maricopa County over its two-year construction schedule and an average of $2.1 million annually in economic activity over the first eight years of its operation. The following table summarizes those impacts.

Average Annual Economic Impact
Duke Energy Electric Generating Facility Addition
(in Inflated Dollars)

	Construction[1]	Operations[2]
Local Economic Output		
Direct output	$33,500,000	$1,551,000
Indirect output	$28,225,000	$598,000
Total output	$61,725,000	$2,149,000
Employment		
Direct jobs	298	10
Indirect jobs	345	17
Total jobs	643	27
Wages	$22,718,000	$739,800
Population		
Population supported by project	1,512	63
Households supported by project	577	24

[1]Annual total for each year of two year construction period.
[2]Average annual impact from 2003 - 2010.

Sources: IMPLAN; Duke Energy; Elliott D. Pollack & Co.

The impact of the combined operations of the original and second generating facility is shown on the following table. The site will create an average of $7.5 million in economic activity annually in Maricopa County over the first eight years of combined operations. A total of 94 jobs (35 direct and 59 indirect jobs) will be created by the generating site with wages of nearly $2.6 million. The construction of both generating facilities results in the injection of $134 million in direct spending in the Maricopa County economy over the four years required to construct the two plants, resulting in $247 million in total direct and indirect economic activity.

Average Annual Operations Economic Impact
Duke Energy Expanded Electric Generating Site
(in Inflated Dollars)

	Operations[1]
Local Economic Output	
Direct output	$5,428,000
Indirect output	$2,094,000
Total output	$7,522,000
Employment	
Direct jobs	35
Indirect jobs	59
Total jobs	94
Wages	$2,589,300
Population	
Population supported by project	222
Households supported by project	85

[1]Average annual impact over first eight years of operation.

Sources: IMPLAN; Duke Energy; Elliott D. Pollack & Co.

The fiscal impact of the second generating facility on city, county and state taxing authorities will only be slightly smaller than the original. Most of the fiscal impact of the generating facility is associated with property taxes levied on the capital investment in the facility and sales taxes levied on fuel consumption. The fiscal impact of the additional facility will be essentially the same as the original, if it has the same value and consumes similar amounts of natural gas. The annual operating impact of the second facility is projected to be about 2% lower than the original plant due to the lower employment level at the second facility.

As noted in the earlier impact report, Duke Energy's investment will have a significant impact on the assessed value and property tax rates of local school districts. The expanded site with the two generating facilities will have an assessed value greater than the current value of the entire Buckeye Union High School District. This should lead to significant reductions in property tax rates for local property owners once the facilities are added to the tax rolls.

If you should have any questions or comments about the information contained in the letter, please do not hesitate to contact us. We appreciate the opportunity to consult with you on your expansion plans.

Sincerely,

Richard C. Merritt

Richard C. Merritt, AICP
Senior Vice President

cc: Tom Campbell
Ed Bull

ECONOMIC AND FISCAL IMPACT
OF
DUKE ENERGY'S
ELECTRIC GENERATING STATION
ARLINGTON, ARIZONA

Prepared for:

Duke Energy

Prepared by:

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December 15, 1999

Table of Contents

Economic and Fiscal Impact
of
Duke Energy's Electric Generating Station
Arlington, Arizona

1.0 Executive Summary

Elliott D. Pollack and Company has been retained by Duke Energy to analyze the economic and fiscal impact of a proposed $250 million electric generating station to be located in a rural area southwest of the Town of Buckeye known as Arlington Valley. The plant will use natural gas as its primary fuel and will require a substantial quantity of water to generate steam. Approximately 2,800 acres of land will be purchased to provide a site for the plant and the water rights necessary to operate the facility. Construction is expected to start in February 2001, with completion slated for July 2002. The operation of the plant will generate 25 jobs.

While the investment by Duke Energy is estimated at $250 million, the local construction cost is estimated at about $67 million. Most of the cost of the generating station is associated with the purchase of gas and steam turbines that will be manufactured out of state.

The proposed Duke Energy electric generating station will be located in the Arlington Elementary and Buckeye Union High School Districts. Arlington Elementary (kindergarten through eighth grade) is a small district of approximately 155 students who are fed to the Buckeye Union District for secondary education. Buckeye Union has slightly over 1,000 students and serves a wide rural area of southwest Maricopa County.

This report will evaluate both the economic and fiscal effects of the proposed generating station. Economic impact analysis examines the regional implications of an activity in terms of three basic measures: sales or output, earnings and job creation. Fiscal impact analysis, on the other hand, evaluates the public revenues and costs created by a particular activity. In fiscal impact analysis, the primary revenue sources of a city, county or state are analyzed to determine how the activity may financially affect them. In addition, this report will evaluate the impact of the generating station on the Arlington Elementary and Buckeye Union High School Districts.

1.1 Economic Impact Summary

The economic impact of the Duke Energy generating station is substantial, resulting in the creation of nearly 643 total direct and indirect jobs annually during the two year construction period and 67 total direct and indirect jobs yearly during its operation. Local economic output during construction is $61.7 million annually and about $5 million per year thereafter. The project supports 577 households during construction and 60 households while in operation.

Table 1
Average Annual Economic Impact
Duke Energy Electric Generating Station
(in Inflated Dollars)

	Construction[1]	Operations[2]
Local Economic Output		
Direct output	$33,500,000	$3,877,000
Indirect output	$28,225,000	$1,496,000
Total output	$61,725,000	$5,373,000
Employment		
Direct jobs	298	25
Indirect jobs	345	42
Total jobs	643	67
Wages	$22,718,000	$1,849,500
Population		
Population supported by project	1,512	158
Households supported by project	577	60

[1]Annual total for each year of two year construction period.
[2]Average annual impact from 2003 - 2010.

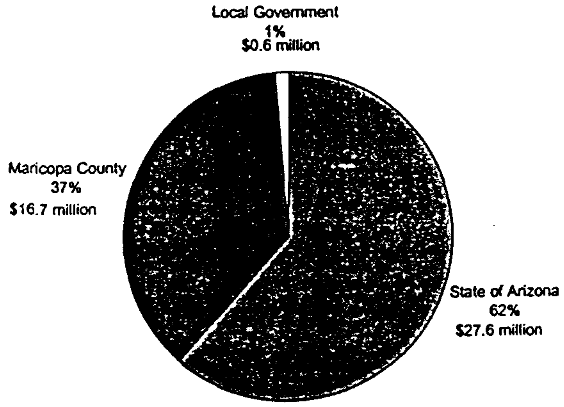
Sources: IMPLAN; Duke Energy; Elliott D. Pollack & Co.

1.2 Fiscal Impact Summary

One of the major benefits of the generating station is the increase in the assessed value of the County and other taxing districts within which the plant is located. The projected assessed value of the generating station and land, when first placed in operation and before deducting depreciation, is $62 million. This represents approximately 0.3% of the total $18 billion 1999 assessed value of the County, a fairly significant figure given the size of the metro area. A project of this magnitude is equivalent to a new regional shopping mall or large manufacturing plant from the standpoint of property tax revenue, even though the plant's value will slowly decline over the years as it is depreciated.

The electric generating station produces significant positive effects for the State of Arizona and Maricopa County totaling nearly $45 million dollars between 2001 and 2010. The majority of the revenue, 62%, accrues to the State, but Maricopa County and its taxing districts also receive $16.7 million. The taxation of real property, construction contracts and natural gas consumption accounts for about 90% of the revenue. Impacts resulting from the spending of workers supported by the plant contribute another $4.5 million over the 10 years. During construction of the plant, approximately $5.8 million accrues to governmental entities. After completion of the generating station, total revenues reach $5 million annually.

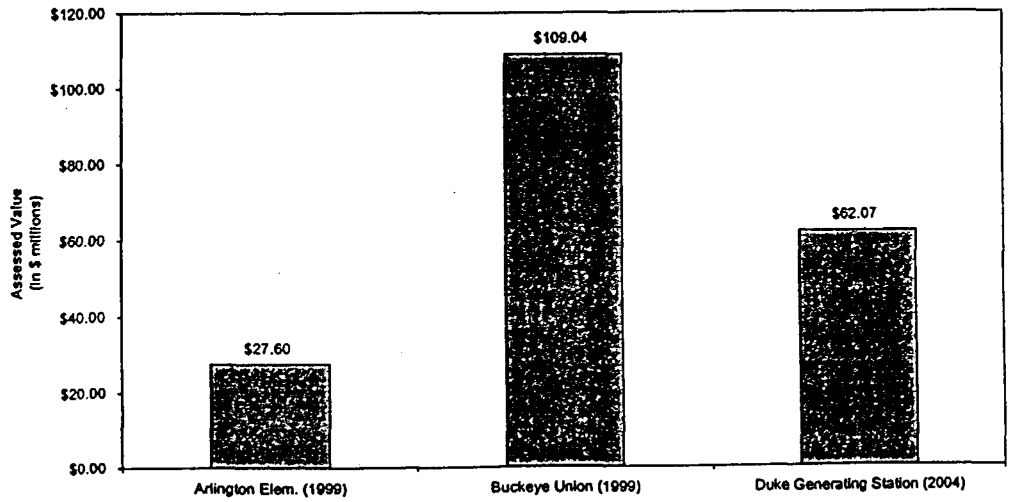
Chart 1
Distribution of Revenues
From Duke Energy Electric Generating Station
2001 - 2010
Sources: Duke Energy, IMPLAN, AZ Dept. of Revenue,
Maricopa County Assessor, Elliott D. Pollack & Co.



1.3 Impact on School Districts

A large capital investment such as that proposed by Duke Energy will have a significant impact on the assessed value and tax rates of a school district. With the high assessment ratio of 25% for utility companies, the financing of schools is transferred in many respects from local residents to private business. When the plant is completed and added to the tax rolls in 2004, its estimated assessed value will be $62 million. Comparatively, this represents 125% of Arlington Elementary's 1999 primary assessed value and 57% of Buckeye Union's 1999 value.

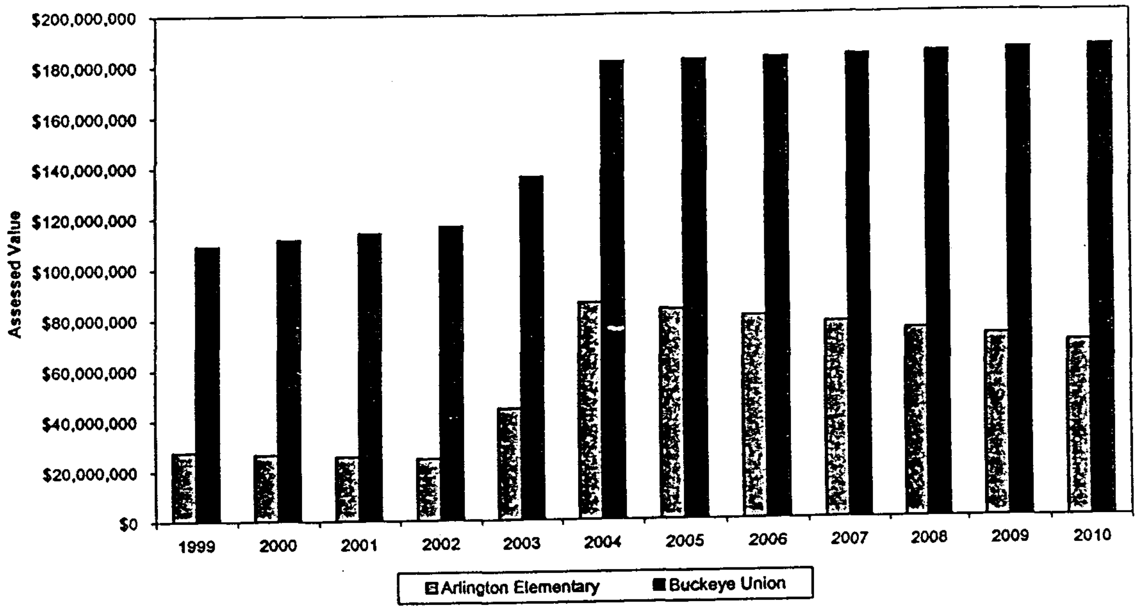
Chart 2
Comparison of Primary Assessed Values
Arlington Elementary District, Buckeye Union H. S. District, Duke
Generating Station
Sources: AZ Dept. of Revenue, Maricopa County Assessor, Elliott D. Pollack & Co.



Duke Energy's investment in the generating station produces a large boost in the assessed valuation of both the Arlington Elementary and Buckeye Union Districts. The projected primary assessed value begins to climb in 2003 with the construction of the plant (there's a two year time lag between construction and the recording of the generating station on the tax rolls). By 2004, the full effect of the plant on assessed values is realized.

Chart 3

Projected Primary Assessed Values
Arlington Elementary and Buckeye Union School Districts
Sources: AZ Dept. of Revenue, Maricopa County Assessor, Elliott D. Pollack & Co.



As a result, the primary and secondary tax rate for both Arlington Elementary and Buckeye Union should experience significant decreases. For instance, Arlington Elementary's primary rate should drop by about 63% between 1999 and 2004 when the plant is completed. The rate is projected to decline from the current $2.2040 to $0.8187, assuming that the school district's revenues needs increase at 3% per year from their current level.

Likewise, Buckeye Union's primary rate is projected to decline by 30% between 1999 and 2004 if revenue needs grow by 3% per year. The primary tax rate falls from $2.1337 in 1999 to a projected $1.4880 in 2004. Similar decreases in the secondary tax rate will also occur.

Individual property owners should see a 46% decline in school district property taxes between 1999 and 2004 as a result of the construction of the electric generating station. The typical annual savings range from $95 for a 40 acre vacant parcel to $421 for a 160 acre agricultural parcel. While these savings seem small for each property owner, the effect across both the Arlington Elementary and Buckeye Union Districts is substantial. Based on the projected future assessed values for the plant and expected property tax rates, Duke Energy will be absorbing over $1.8 million in school district property taxes each year, once the plant is in service. These are expenses that previously accrued to all other property owners located within the school districts.

Table 2

Estimated Annual School District Property Tax Savings Resulting From Duke Energy Electric Generating Station

Property type	Residence on 1 acre lot	40 acre vacant parcel	160 acre parcel in agriculture
Market value	$70,000	$23,280	$103,200
Assessed value	$7,000	$3,725	$16,512
1999 combined school property tax[1]	$282	$206	$914
Projected 2004 combined school property tax[2]	$153	$111	$493
Tax savings	**$129**	**$95**	**$421**
Percentage tax decrease	**45.7%**	**46.0%**	**46.0%**

[1]Combined Arlington Elementary and Buckeye Union tax rate of $5.5364; reduced homeowner rate of $4.0341.

[2]Projected combined rate of $2.9887; reduced homeowner rate of $2.1899.

Note: Tax calculations do not include County or special district property taxes.

Sources: AZ Dept. of Revenue; Maricopa County Assessor, Elliott D. Pollack & Co.

2.0 Methodology and Sources

This report will describe the projected economic and fiscal impact of the construction and operation of a privately-owned electric generating station on metro Phoenix. Economic impact analysis examines the regional implications of an activity in terms of three basic measures: sales or output, earnings and job creation. Fiscal impact analysis, on the other hand, evaluates the public revenues and costs created by a particular activity. In fiscal impact analysis, the primary revenue sources of a city, county or state are analyzed to determine how the activity may financially affect them.

This study will focus on the benefits that would accrue to the State of Arizona, Maricopa County, and the Arlington Elementary and Buckeye Union High School Districts from the construction of the Duke Energy electrical generating station. The site of the plant is not located within an incorporated area, so the effect on local municipalities will be negligible. The analysis assumes that the current tax structure of the State and County would continue at current rates into the future. The impact on the school districts will be evaluated from the standpoint of increased assessed valuation and potential effect on property tax rates.

The fiscal impact figures cited in this report have been generated from information provided by a variety of sources including:

- Arizona Department of Education;
- Arizona Department of Economic Security;
- Arizona Department of Revenue;
- Duke Energy;
- Maricopa County Assessor's office;
- U.S. Consumer Expenditure Survey.

On of the most important effects of the power plant is the impact on assessed values and property taxes. The Arizona Department of Revenue controls the valuation of electric utility company property for property tax purposes. Utility companies, mines, and railroads are known as "centrally assessed" property and are subject to different standards than other types of real property. The plant is placed on the tax rolls at the book cost of investment and then depreciated over the life of the investment. In this case, depreciation is calculated based on a 30 year straight-line plant life. Pollution control equipment receives a 50% market value exemption under state law. Electric utility company property is assessed at 25% of its full cash value.

During construction of the plant, property taxes are calculated based on 50% of the actual cost expended for the year ending December 31st. A two-year time lag occurs between actual construction of the plant and placing it on the tax rolls. For instance, if the plant were started in 2001 as anticipated, the value of the first year's construction activity would not reach the tax rolls until the 2003 tax year. The full value of the plant will not be recorded for tax purposes until 2004, based on the projected completion in 2002.

Elliott D. Pollack and Company has relied upon Duke Energy for construction cost estimates, employment projections and operating expenditures. This firm has not provided any estimate of the projected governmental costs to provide services to the generating station. Such analysis is beyond the scope of this study. Unless otherwise stated, all dollar values are expressed in current, inflated dollars using a 3% annual inflation rate.

This report is organized to provide an overview of economic and fiscal impact analysis and the results attributed to this particular project. The following section describes the proposed generating station and the primary assumptions that will drive the impact analysis. Section 4.0 summarizes the economic impact of the generating station on the metro Phoenix area. The fiscal impact of the plant is outlined in Section 5.0. Lastly, the impact of the generating station on the local school districts is described in the final part of the study.

3.0 Description of Project

Duke Energy is proposing to construct a $250 million electric generating plant in a rural area southwest of the Town of Buckeye known as Arlington Valley. Approximately 2,800 acres valued at $5 million will be purchased to provide a site for the plant and the water rights necessary to operate the facility. The plant will use natural gas as its primary fuel, but will also require a substantial quantity of water to generate steam. Duke Energy expects to purchase approximately $50 million of natural gas per year to operate the plant. Construction is expected to start in February 2001, with completion slated for July 2002.

For property tax analysis, it is necessary to differentiate between various parts of the plant and the company's investment. Of the $250 million cost, approximately $10 million will be spent on pollution control equipment, which is the subject of a 50% property tax exemption.

The land parcels that are subject to purchase are all contiguous and located within the Arlington Elementary and Buckeye Union High School Districts. The property is located within Township Six West, Range 1 South, which will provide rail access to the site.

While the investment by Duke Energy is estimated at $250 million, the local construction cost is estimated at about $67 million. Most of the cost of the generating station is associated with the purchase of gas and steam turbines that will be manufactured out of state. The operation of the plant will generate 25 jobs.

4.0 Economic Impact of Generating Station

This portion of the report will outline the economic impacts of both the construction of the generating station as well as its operations. Analysis of the fiscal impacts of the project is provided in the Section 5.0. All dollar figures, unless otherwise stated, are expressed in current, inflated dollars.

An extensive spreadsheet model was developed to evaluate and calculate the fiscal and economic impacts of the Duke Energy generating station from 2001 to 2010. The first subsection describes the economic impact methodology while subsection 4.2 summarizes the total benefits.

4.1 Economic Impact Analysis Methodology

Economic impact analysis examines the economic implications of an activity in terms of sales or output, earnings, and employment. For this study, the following two economic activities associated with the generating station were evaluated:

- the construction of the plant and
- the operations of the plant once completed.

Construction phase economic impacts are generally short-term effects related to onsite and offsite construction employment and other industries that support the construction. The long-term consequences of a project are the operational phase impacts. These include employment, earnings and expenditures that recur over the long-term.

The different types of economic impacts are known as direct, indirect, and induced, according to the manner in which the impacts are generated. For instance, direct employment consists of permanent jobs held by the project employees. Indirect employment is those jobs created by businesses that provide goods and services essential to the operation or construction of the project. These businesses range from manufacturers (who make goods) to wholesalers (who deliver goods) to janitorial firms who clean the buildings. Finally, the spending of the wages and salaries of the direct and indirect employees on items such as food, housing, transportation and medical services creates induced employment in all sectors of the economy.

Economists have developed multipliers that are used to estimate the indirect and induced impacts of various economic activities. These indirect and induced ripple effects occur as the wages of direct employees are respent in local businesses on retail goods and services. In response to this spending, local businesses hire more staff and expand their operations, creating additional jobs in retailing, wholesaling, manufacturing, transportation and other service sectors. These secondary effects are captured in the analysis conducted in this study.

Multipliers have been developed by both public and private organizations for each state and county in the country. The Minnesota IMPLAN Group developed the multipliers used in this study. The IMPLAN multipliers are used to estimate the impacts of project expenditures on a region (gross receipt or sales), earnings (the sum of wages and salaries, proprietors income, and other labor income), and employment (number of jobs).

4.2 Economic Impact of Duke Energy Electric Generating Station

As noted previously, the local economic impact of the construction of the generating station is significantly less than its full cost since most of the major components are manufactured out-of-state. The local construction contract is estimated at approximately $67 million, spent during 2001 and 2002. Duke Energy projects that 25 direct jobs will be permanently created for the operation of the plant. Plant operators are expected to earn the typical wage for public utility employees in Maricopa County of about $39,000 annually. From this data, the IMPLAN economic multipliers are used to calculate the total impact of the project.

The economic impact of the Duke Energy generating station is substantial, resulting in the creation of nearly 643 total direct and indirect jobs annually during the two year construction period and 67 total direct and indirect jobs yearly during its operation (see Table 3). Local economic output during construction is $61.7 million annually and about $5 million per year thereafter. The project supports 577 households during construction and 60 households while in operation.

The impacts described above are regional in nature and will affect cities throughout the metro Phoenix area. For instance, construction materials will be purchased from local vendors and construction employees might commute long distances to work on the plant. Most likely, these workers and their families will purchase their daily needs at stores close to their place of residence, helping to disperse the Duke Energy generating station's impact throughout many local cities. Full-time workers who operate the plant after construction will most likely live on the west side of Maricopa County, once again distributing the impact among a number of communities.

Table 3

Economic Impact on Maricopa County
Duke Energy Electrical Generating Station
(In Inflated Dollars)

Inflation rate: 3.0%

	Construction		Operations							
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Local Economic Output										
Direct output	$33,500,000	$33,500,000	$3,488,000	$3,592,000	$3,700,000	$3,811,000	$3,926,000	$4,043,000	$4,165,000	$4,290,000
Indirect output	$28,225,000	$28,225,000	$1,346,000	$1,386,000	$1,428,000	$1,471,000	$1,515,000	$1,560,000	$1,607,000	$1,655,000
Total output	$61,725,000	$61,725,000	$4,834,000	$4,979,000	$5,128,000	$5,282,000	$5,440,000	$5,604,000	$5,772,000	$5,945,000
Employment										
Direct jobs	298	298	25	25	25	25	25	25	25	25
Indirect jobs	345	345	42	42	42	42	42	42	42	42
Total jobs	643	643	67	67	67	67	67	67	67	67
Wages	$22,718,000	$22,718,000	$1,664,000	$1,714,000	$1,765,000	$1,818,000	$1,873,000	$1,929,000	$1,987,000	$2,046,000
Population										
Population supported by project	1,512	1,512	158	158	158	158	158	158	158	158
Households supported by project	577	577	60	60	60	60	60	60	60	60

Sources: IMPLAN; Duke Energy; Elliott D. Pollack & Co.

5.0 Fiscal Impact of Generating Station

5.1 Background

Fiscal impact analysis studies the public revenues associated with a particular economic activity. The primary revenue sources of local, county, and state governments (i.e. taxes) are analyzed to determine how an activity may affect the various jurisdictions. This section will only evaluate the impact on the governmental entities. The impact on local school districts will be analyzed in Section 6.0.

Fiscal impacts are categorized by type in this study, similar to economic impact analysis. Construction impacts relate to the revenues generated from construction of the power plant. The primary sources of revenue are the state, county, and local sales taxes levied on the value of construction activity. In this particular case, the project is not located in a municipality, so local sales taxes will not be applicable. Operation phase fiscal impacts result from payment of employee wages and expenditures related to operating the generating station. One of the most important on-going revenues are the property taxes that will be paid by Duke Energy.

In addition to the direct revenues described above, secondary fiscal effects also occur as a result of spending by construction and operations employees. For instance, employees of the plant will live in all parts of Maricopa County, benefiting those communities from their spending on housing, retail goods and services. Indirect and induced employment supported by the plant will also create fiscal impacts resulting from the spending of their wages. Examples of the types of secondary fiscal impacts that will be generated include State income taxes paid on wages and sales taxes paid on retail sales.

5.2 Revenue Sources

This section outlines the applicable tax rates of the various jurisdictions and the types of taxes that will be collected from construction and operation of the Duke Energy electric generating station.

- Tax On Construction Materials
  The State and County levies a sales tax on materials used in the construction of land or building improvements. That tax is calculated by State law under the assumption that 65% of the construction cost of the facility and its land improvements are related to construction materials with the remaining 35% devoted to labor. The sales tax rate is then applied to the 65% materials figure. The sales tax on construction materials is a one-time collection by the governmental entity.

  The State currently levies a 5.0% sales tax on construction activity. Maricopa County levies two sales taxes totaling 0.7%. The freeway tax, which is used to fund the County's freeway program, is levied at a 0.5% rate until 2006 when it expires. In November 1998, the electorate approved a 0.2% levy for the construction of prison facilities that is schedule to expire at the end of 2007.

- Property Taxes

Real estate taxes are typically based on the assessed value of real property as determined by County Assessor. In the case of an electrical generating station, however, the Arizona Department of Revenue conducts the valuation in accordance with State Statute. The market value of the power plant is established as the original cost less accumulated depreciation. For this report, the plant was depreciated over 30 years, straight-line. Pollution control equipment is provided a 50% exemption from taxation.

The assessed value of the plant is calculated by multiplying the assessment ratio, determined by the property's use, by its full cash value. The assessment ratio for an electric utility plant is 25%; vacant land is assessed at 16%. Assessed value is expressed by the following equation:

market value X assessment ratio = assessed value

The property tax rate, expressed in dollars per $100 of assessed value, is then applied to the assessed value to determine the amount of property tax. There are two types of property taxes – primary taxes used to finance general government operations, and secondary taxes used to finance general obligation bonded debt, budget overrides and special districts. The primary tax is based on what is known as the limited property value, calculated under a formula spelled out in State law. Secondary taxes are based on full cash value of property. The limited value cannot exceed full cash value. For an electrical utility, the limited and full cash values are the same.

The combined Maricopa County property tax rate (primary and secondary) for 1999 is $3.4250 per $100 of assessed value comprised of the following taxing entities or districts:

- general County tax,
- Community College tax,
- Flood Control District tax,
- Fire District Assistance tax,
- County Free Library tax,
- Central Arizona Water Conservation tax.

In addition, direct and indirect employees supported by the construction and operation of the plant will also pay city property taxes on homes they occupy. The tax rate used for this analysis is the weighted average rate of the eight largest cities in the metro area or $1.4380 per $100 of assessed value. The value of a typical Maricopa County housing unit has been calculated at approximately $105,000. This value assumes that employees will occupy units in a pattern similar to the current inventory of housing in the Valley. Today, single family homes account for 66.1% of the housing stock, townhouses 8.1%, and apartments 25.8%. The current average sale price of these units is $131,000, $85,000, and $43,800 respectively, with the weighted average of all units at $104,776.

- Sales/Use Tax.
  The electric generating station will consume a large quantity of natural gas, estimated at $50 million per year. The State and County will charge a use or sales tax on this consumption at the 5.0% rate for the State and 0.7% rate for the County.

  Fiscal impacts also result from the spending by direct and indirect employees supported by the construction and operation of generating station. Most of the employees supported by the project will reside within one of Maricopa County's cities or, at the very least, purchase goods from retailers located within a local municipality. Based on data from the U. S. Consumer Expenditure Survey, the projected extent of retail spending and resulting sales tax receipts was calculated.

  State and County sales tax rates for employee spending are the same as cited previously (5.0% for State and 0.7% for County). The retail sales tax receipts for local cities are based on the weighted average tax rate for all cities in Maricopa County or 1.38%.

- State Income Tax
  The State of Arizona collects taxes on personal income. The tax rate used in the analysis averages about 1.7% of gross income for construction-related wages and 1.3% for operations-related earnings. These percentages are based on the most recently available income tax data from the State and the projected wage levels of jobs created by the project. This tax will apply to the wages and earnings of direct and indirect employment resulting from construction and operation of the generating station. Portions of this tax are redistributed through revenue sharing to cities throughout Arizona based on population.

- State Unemployment Tax
  Unemployment insurance tax for employees is 2.7% on the first $7,000 of earned income. This factor is applied to the projected wages and earnings of direct and indirect employees involved in construction and operation of the project.

- Gas Tax
  The State of Arizona collects a motor vehicle fuel tax of $0.18 per gallon. The tax revenue is calculated based on a vehicle traveling 12,000 miles per year at 20 miles per gallon. Portions of this tax are distributed to cities and counties throughout Arizona based on a formula that includes population and the origin of gasoline sales.

- Vehicle License Tax
  The vehicle license tax is a personal property tax placed on vehicles at the time of annual registration. The average tax in Maricopa County is $148 and funds are shared between the cities, county and state in accordance with population based formulas.

The above tax categories represent the largest sources of revenues that will be generated to city, county and state governments.

5.3 Fiscal Impact of Duke Energy Electric Generating Station

One of the major benefits of the generating station is the increase in the assessed value of the County and other taxing districts within which the plant is located. The projected assessed value of the generating station and land, when first placed in operation and before deducting depreciation, is $62 million (see Table 4). This represents approximately 0.3% of the total $18 billion 1999 assessed value of the County, a fairly significant figure given the size of the metro area. A project of this magnitude is equivalent to a new regional shopping mall or manufacturing plant from the standpoint of property tax revenue, even though the generating station's value will slowly decline over the years as it is depreciated.

Table 4
Projected Market and Assessed Values
Duke Energy Electric Generating Station
(in Inflated Dollars)

	Projected Market Value				
	Plant Value	P.C.E.*	Land	Total Value	Assessed Value
2001	$0	$0	$1,680,000	$1,680,000	$268,800
2002	$0	$0	$1,680,000	$1,680,000	$268,800
2003	$73,333,333	$1,527,778	$5,000,000	$79,861,111	$19,515,278
2004	$240,000,000	$5,000,000	$5,150,000	$250,150,000	$62,074,000
2005	$232,000,000	$4,833,333	$5,304,500	$242,137,833	$60,057,053
2006	$224,000,000	$4,666,667	$5,463,635	$234,130,302	$58,040,848
2007	$216,000,000	$4,500,000	$5,627,544	$226,127,544	$56,025,407
2008	$208,000,000	$4,333,333	$5,796,370	$218,129,704	$54,010,753
2009	$200,000,000	$4,166,667	$5,970,261	$210,136,928	$51,996,909
2010	$192,000,000	$4,000,000	$6,149,369	$202,149,369	$49,983,899

*Pollution Control Equipment

Sources: AZ Dept. of Revenue; Maricopa County Assessor; Elliott D. Pollack & Co.

Table 4 shows the projected depreciated value of the plant over time. The analysis assumes there will be no additional capital improvements to the site in the future. The value of the land to be acquired by Duke Energy has been inflated at a 3.0% rate given historical land appreciation trends in the area.

As shown on Table 5 on page 17, the electric generating station will produce significant positive effects for the State of Arizona and Maricopa County totaling nearly $45 million dollars between 2001 and 2010. About 90% of the revenue is derived from taxation of real property, construction contracts and natural gas consumption. Impacts resulting from employment spending and wages contribute another $4.5 million over the 10 years. During construction of the plant, approximately $5.8 million per year accrues to governmental entities. After completion of the generating station, total revenues reach $5 million annually.

The State of Arizona reaps most of the rewards of the plant, accounting for $27.4 million in revenue or 62% of the total. Maricopa County also gains about $16.7 million in tax revenue, primarily from property taxes. It should be noted that most of these revenues do not flow directly to the County's general fund, but rather to county-wide taxing jurisdictions such as the Community College District and Flood Control District. Cities in the county gain the least because the plant is located in a rural area. Any impact on local cities is the result of spending of wages by persons supported by the generating station.

It needs to be emphasized that the above revenue figures are based on the current tax structure of the State and County. Any increase in sales or income tax rates would produce even greater benefits. The high tax valuation of the plant also provides a significant boost to the assessed valuation of the County, helping to stabilize or even reduce County property tax rates. In addition, the figures do not include corporate income taxes that may be paid to the State by Duke Energy.

Table 5

Fiscal Impact on Arizona and Maricopa County
Duke Energy Electrical Generating Station
(In Inflated Dollars)

Inflation rate: 3.0%

	Construction		Operations								
Fiscal Impact of Project	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
State of Arizona											
Construction sales tax	$1,089,000	$1,089,000									$2,178,000
Sales tax on fuel consumption			$2,500,000	$2,575,000	$2,652,000	$2,732,000	$2,814,000	$2,898,000	$2,985,000	$3,075,000	$22,231,000
Maricopa County											
Construction sales tax	$152,000	$152,000									$304,000
Sales tax on fuel consumption			$350,000	$361,000	$371,000	$382,000	$113,000	$0	$0	$0	$1,577,000
Property tax	$9,000	$9,000	$668,000	$2,126,000	$2,057,000	$1,988,000	$1,919,000	$1,850,000	$1,781,000	$1,712,000	$14,119,000
Fiscal Impacts of Employees											
State of Arizona											
Retail sales tax[1]	$483,000	$483,000	$44,000	$45,000	$47,000	$48,000	$49,000	$51,000	$52,000	$54,000	$1,356,000
Income tax[1]	$393,000	$393,000	$22,000	$23,000	$23,000	$24,000	$25,000	$26,000	$26,000	$27,000	$982,000
Unemployment tax	$122,000	$122,000	$13,000	$13,000	$14,000	$14,000	$14,000	$15,000	$15,000	$16,000	$358,000
Gas tax[1]	$69,000	$69,000	$7,000	$7,000	$8,000	$8,000	$8,000	$8,000	$9,000	$9,000	$202,000
Vehicle license tax[1]	$95,000	$95,000	$10,000	$10,000	$11,000	$11,000	$11,000	$12,000	$12,000	$12,000	$279,000
Maricopa County											
Retail sales tax	$80,000	$80,000	$7,000	$8,000	$8,000	$8,000	$2,000	$0	$0	$0	$193,000
Property tax	$166,000	$166,000	$17,000	$18,000	$18,000	$19,000	$20,000	$20,000	$21,000	$21,000	$486,000
Local Government											
Retail sales tax	$158,000	$158,000	$14,000	$15,000	$15,000	$16,000	$16,000	$17,000	$17,000	$18,000	$444,000
Property tax	$70,000	$70,000	$7,000	$8,000	$8,000	$8,000	$8,000	$8,000	$9,000	$9,000	$205,000
Total Impact											
State of Arizona	$2,251,000	$2,251,000	$2,596,000	$2,673,000	$2,755,000	$2,837,000	$2,921,000	$3,010,000	$3,099,000	$3,193,000	$27,586,000
Maricopa County	$407,000	$407,000	$1,042,000	$2,513,000	$2,454,000	$2,397,000	$2,054,000	$1,870,000	$1,802,000	$1,733,000	$16,679,000
Local Government	$228,000	$228,000	$21,000	$23,000	$23,000	$24,000	$24,000	$25,000	$26,000	$27,000	$649,000
Total All Impacts	$2,886,000	$2,886,000	$3,659,000	$5,209,000	$5,232,000	$5,258,000	$4,999,000	$4,905,000	$4,927,000	$4,953,000	$44,914,000

[1] A portion of these taxes are shared with cities, towns and counties under revenue sharing.

Sources: IMPLAN; Duke Energy; Arizona Department of Revenue; Maricopa County Assessor's Office; Elliott D. Pollack & Co.

6.0 Impact of Generating Station on School Districts

6.1 Background

The Duke Energy electric generating station is located in the Arlington Elementary and Buckeye Union High School Districts. Arlington Elementary (kindergarten through eighth grade) is a small district of approximately 155 students who are fed to the Buckeye Union District for secondary eduation. Buckeye Union has slightly over 1,000 students and serves a wide rural area of southwest Maricopa County.

The history of assessed values of the two districts is shown on Table 6. Arlington's assessed value has been declining since 1991 as a result of the large percentage of utility company investments within the District. For 1999, over 50% of the District's assessed value is attributable to utility and pipeline company improvements. Since these properties depreciate over time, the assessed value declines as well. Buckeye Union's assessed value has been growing since the end of the local real estate depression in 1995. Utilities account for about 31% of Buckeye Union's assessed value.

Table 6
Assessed Valuation History
Arlington Elementary and Buckeye Union High School Districts

Arlington Elementary #47

	Primary Property Tax		Secondary Property Tax		Property Tax Revenue	
	Valuation	Tax rate	Valuation	Tax rate	Primary	Secondary
1991	$34,673,905	$2.2854	$37,110,165	$0.0000	$792,437	$0
1992	$33,854,336	$2.4430	$35,455,605	$0.0000	$827,061	$0
1993	$32,074,642	$2.3907	$32,670,713	$0.0000	$766,808	$0
1994	$31,496,043	$2.2549	$32,099,408	$0.1973	$710,204	$63,332
1995	$32,562,122	$1.9804	$33,388,798	$0.3933	$644,860	$131,318
1996	$30,589,918	$2.3780	$31,139,091	$0.2090	$727,428	$65,081
1997	$30,271,539	$2.2309	$31,006,780	$0.4229	$675,328	$131,128
1998	$29,622,791	$2.3097	$30,632,190	$0.4192	$684,198	$128,410
1999	$27,601,070	$2.2040	$28,536,546	$0.4816	$608,328	$137,432
Compound annual change 1996-99	-3.37%		-2.87%			

Buckeye Union High School #201

	Primary Property Tax		Secondary Property Tax		Property Tax Revenue	
	Valuation	Tax rate	Valuation	Tax rate	Primary	Secondary
1991	$115,410,114	$2.5579	$129,471,406	$0.7654	$2,952,075	$990,974
1992	$119,897,053	$2.1808	$127,640,825	$0.5166	$2,614,715	$659,393
1993	$109,944,995	$2.5032	$113,431,370	$0.5817	$2,752,143	$659,830
1994	$107,249,347	$2.6897	$109,847,874	$0.6343	$2,884,686	$696,765
1995	$105,322,499	$2.0479	$109,517,107	$0.5521	$2,156,899	$604,644
1996	$101,996,864	$2.3267	$104,597,699	$0.7058	$2,373,161	$738,251
1997	$102,860,395	$2.5973	$106,842,353	$0.6617	$2,671,593	$706,976
1998	$104,992,419	$2.5043	$109,689,634	$0.7414	$2,629,325	$813,239
1999	$109,037,307	$2.1337	$114,684,129	$0.7171	$2,326,529	$822,400
Compound annual change 1996-99	2.25%		3.12%			

Sources: Maricopa County Assessor; Elliott D. Pollack & Co.

The financing of public education in Arizona is a complex matter. Funding comes from a variety of local, state, and federal sources based on complicated formulas. For fiscal year

1997-98, local property taxes provided 47% of total public school funding within Maricopa County while the State contributed 45%. Federal and County sources contributed the remaining revenue. Two types of property taxes accomplish funding at the local level:

- Primary taxes used to finance school operations; and
- Secondary taxes used to finance general obligation bonded debt and budget overrides.

According to the Arizona Department of Education, local property taxes provided about 86% and 62%, respectively, of the Arlington and Buckeye Union Districts' total budgets during fiscal year 1997-98. The proposed Duke Energy electric generating station will increase the assessed value of the school districts and provide two primary benefits:

- Funding for schools can be increased without raising tax rates or, alternatively, current funding levels can be maintained while reducing the tax rate; and
- The districts' bonding capacities will be increased to support new capital improvements.

Both of the above benefits are subject to spending and debt limitations provided in State law. In addition, the financing of public school capital facilities and the future of the secondary property tax is currently in a state of flux due to the passing of the Students FIRST bill by the State Legislature in July 1998. A discussion of the implications of Students FIRST is included in the last part of this section.

6.2 Impact of Duke Energy Generating Station on School Districts

A large capital investment such as that proposed by Duke Energy will have a significant impact on the assessed value and tax rates of a school district. With the high assessment ratio of 25% for utility companies, the financing of schools is transferred in many respects from local residents to private business. The analysis contain in this section will illustrate the potential impact of the power plant on local school property taxes.

When the plant is completed and added to the tax rolls in 2004, its estimated assessed value will be $62 million. Comparatively, this represents 125% of Arlington Elementary's 1999 primary assessed value and 57% of Buckeye Union's 1999 value. Clearly, the generating station should have an immediate positive effect, resulting in lower school tax rates.

Chart 4

Comparison of Assessed Values
Arlington Elementary District, Buckeye Union H. S. District, Duke Generating Station

Sources: AZ Dept. of Revenue, Maricopa County Assessor, Elliott D. Pollack & Co.

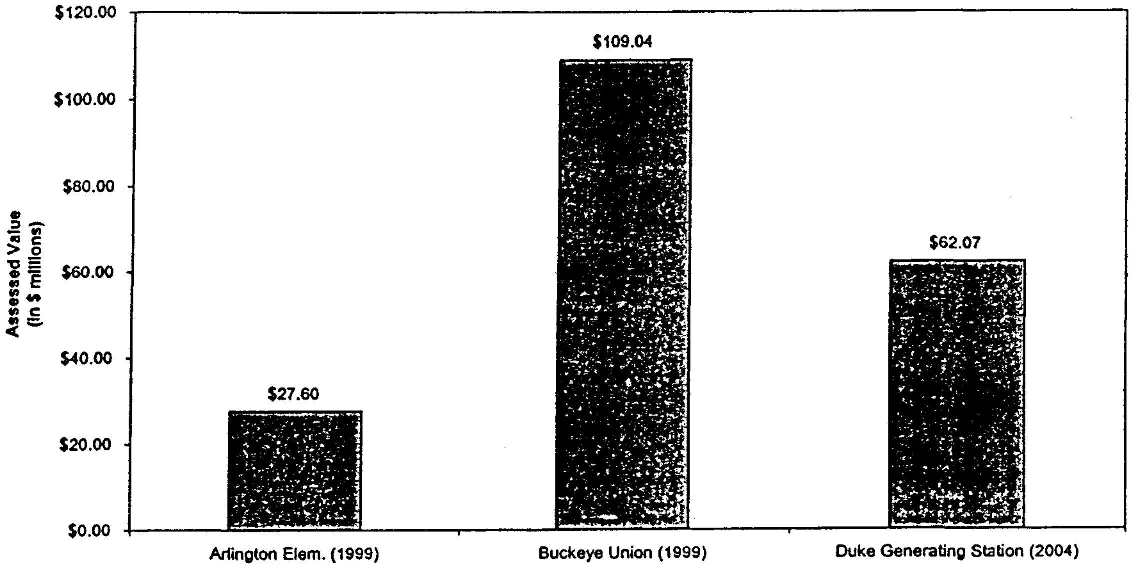


Table 7 has been developed as an example of the effect of the plant on primary tax rates. The primary rate has been used because of the uncertainty on the future of the secondary rate due to Students FIRST. The assumptions are the following:

- The existing primary property tax base for Arlington Elementary continues to decline in the future at the rate of 3.37% per year, similar to the rate experienced between 1996 and 1999. Buckeye Union's primary tax base is assumed to grow at a 2.25% annual rate.

- The Duke Energy generating station is added to the tax rolls in 2003 as partially completed. In 2004, the full value of the completed plant takes effect.

- The "desired revenue" column represents the 1999 primary tax revenue generated to each school district, increased by 3% per year thereafter.

- The "projected tax rate" column is the primary rate that would need to be levied to achieve the desired revenue.

As noted on Table 7, the projected tax rate for both Arlington Elementary and Buckeye Union should experience significant decreases. For instance, Arlington Elementary's rate should drop by about 63% between 1999 and 2004 when the plant is completed. The rate declines from the current $2.2040 to $0.8187. However, if the need for revenues increases at 3% per year, the tax rate would rise to $2.6692 by 2002 before the effects of the generating station are noticed, then drop to $0.8187 by 2004. This represents a decline of about 69%.

Table 7

Impact of Duke Energy Electric Generating Station On Local School Districts' Primary Tax Rate

(In Inflated Dollars)

Arlington Elementary District

	Projected Assessed Value	Desired Revenue	Projected Tax Rate*
1999	$27,601,070	$608,328	$2.2040
2000	$26,671,153	$626,577	$2.3493
2001	$25,772,566	$645,375	$2.5041
2002	$24,904,253	$664,736	$2.6692
2003	$44,419,531	$684,678	$1.5414
2004	$86,139,195	$705,218	$0.8187
2005	$83,311,460	$726,375	$0.8719
2006	$80,511,783	$748,166	$0.9293
2007	$77,739,265	$770,611	$0.9913
2008	$74,993,042	$793,730	$1.0584
2009	$72,272,276	$817,541	$1.1312
2010	$69,576,162	$842,068	$1.2103

Buckeye Union High School District

	Projected Assessed Value	Desired Revenue	Projected Tax Rate*
1999	$109,037,307	$2,326,529	$2.1337
2000	$111,490,505	$2,396,325	$2.1494
2001	$113,998,897	$2,468,215	$2.1651
2002	$116,563,724	$2,542,261	$2.1810
2003	$136,079,002	$2,618,529	$1.9243
2004	$181,260,257	$2,697,085	$1.4880
2005	$181,924,846	$2,777,997	$1.5270
2006	$182,650,509	$2,861,337	$1.5666
2007	$183,438,623	$2,947,177	$1.6066
2008	$184,290,601	$3,035,593	$1.6472
2009	$185,207,884	$3,126,660	$1.6882
2010	$186,191,949	$3,220,460	$1.7296

*Expressed in dollars per $100 or assessed value.

Sources: AZ Dept. of Revenue; Maricopa County Assessor; Elliott D. Pollack & Co.

Likewise, Buckeye Union's rate declines by 30% between 1999 and 2004 and then continues to grow slowly as the desired revenue figure grows by 3% per year. The tax rate falls from $2.1337 in 1999 to a projected $1.4880 in 2004.

Residents of the area will, therefore, see a large decline in their property tax bills for the school districts over the next five years as the burden shifts to the power plant. The impact on County property taxes will not be noticeable because of the large size of the County's tax base. However, as noted previously, the power plant will help to stabilize County tax rates and relieve some of the burden on local residents.

To illustrate the fiscal impact of the power plant on individual property owners, Table 8 outlines the projected school district tax savings for three property types in the Arlington Valley area. The properties include a residence on a one acre lot, a 40 acre vacant, desert parcel and a 160 acre site currently in cultivation. The residence is assessed at a 10% assessment ratio while the larger, unimproved properties have a 16% ratio. Homeowners also receive a 35% discount on the primary school tax under current State law. The projected market values of the properties have been confirmed with the County Assessor's office and through sampling of property tax records. The calculations do not include County property taxes or any special district taxes that may apply to certain parcels.

Table 8

Estimated Annual School District Property Tax Savings Resulting From Duke Energy Electric Generating Station

Property type	Residence on 1 acre lot	40 acre vacant parcel	160 acre parcel in agriculture
Market value	$70,000	$23,280	$103,200
Assessed value	$7,000	$3,725	$16,512
1999 combined school property tax[1]	$282	$206	$914
Projected 2004 combined school property tax[2]	$153	$111	$493
Tax savings	$129	$95	$421
Percentage tax decrease	45.7%	46.0%	46.0%

[1]Combined Arlington Elementary and Buckeye Union tax rate of $5.5364; reduced homeowner rate of $4.0341.

[2]Projected combined rate of $2.9887; reduced homeowner rate of $2.1899.

Note: Tax calculations do not include County or special district property taxes.

Sources: AZ Dept. of Revenue; Maricopa County Assessor; Elliott D. Pollack & Co.

The table shows that property owners should see a 46% decline in school district property taxes between 1999 and 2004 as a result of the construction of the electric generating station. The annual savings range from $95 for the 40 acre vacant parcel to $421 for the agricultural parcel. While these savings seem small for each property owner, the effect across both the Arlington Elementary and Buckeye Union Districts is substantial. Based on the projected future assessed values for the plant and expected property tax rates, Duke Energy will be absorbing over $1.8 million in school district property taxes each year, once the plant is in service. These are expenses that previously accrued to all other property owners located within the school districts.

6.3 Students FIRST Legislation

In July 1998, the State Legislature passed the Students FIRST bill that dramatically reformed the way public schools are constructed. Passage of the bill was in response to the State Supreme Court's finding that Arizona's capital school finance system was unconstitutional. The basis for school construction financing until 1998 had been bonded indebtedness, i.e. the local secondary property tax. The system was found by the courts, however, to be unconstitutional since it failed to treat all school children equally.

Students FIRST establishes that the State must provide the funding for building adequate schools. The use of bonding is still permitted, but only to go above and beyond the minimum standards provided by the State. Capital overrides must be approved in an election.

Students FIRST will eventually have an impact on the revenues that are generated locally for school construction. Previously approved capital improvement bonds will continue to be paid by school districts, but will be phased out as bonds are retired. The extent of override bonds that will be issued in the future to augment the State capital funding is, obviously, unknown.

There are misconceptions by the public that Students FIRST will eventually do away with school property taxes. Nothing could be further from the truth. Students FIRST only affects the secondary school property tax that is used to construct capital facilities. The primary tax levy, representing the majority of the property tax, will continue to provide support for school operations as in the past.

In addition, existing outstanding debt carried by a school district will continue to be paid by the secondary levy in the future. According to the 1997-1998 Annual Report of the Arizona Superintendent of Public Instruction, Arlington Elementary has no outstanding debt while Buckeye Union has $3.25 million. Therefore, even with Students FIRST, Buckeye Union will need to levy a secondary property tax in the future. Students FIRST also permits the issuance of local school district debt to enhance the State's capital improvement funding. Bonding is limited to a maximum of 10% of the district's assessed value compared to a 30% limit prior to Students FIRST.

The financing of public education is an extremely complex and emotional issue. It is too early to tell whether Students FIRST will be able to address all the needs of districts throughout the State. Changes in the system will undoubtedly occur in the future as experience is gained. In the meantime, the local school district property tax will continue to be a primary source of funding.