Transcript Exhibit(s)

Docket #(s): SW-01428A-09-0103

W-01427A-09-0104

W-01427A-09-0116

W-01427A-09-0120

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Exhibit # : R3-R8, R10-R29

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Suite 502
2200 North Central Avenue
Phoenix, AZ 85004-1481
MAIN (602) 274-9944
FAX (602) 277-4264

To: Docket Control

Date: January 26, 2010

Re: Litchfield Park / Rates
SW-01428A-09-0103, etc.
Volumes I through VII, Concluded
January 5 through 15, 2010

STATUS OF ORIGINAL EXHIBITS

FILED WITH DOCKET CONTROL

City of Litchfield Park (LP Exhibits)

1 through 8

Litchfield Park Service Company (A Exhibits)

1 through 40

Residential Utility Consumer Office (R Exhibits)

1 through 8, 10 through 35

Staff (S Exhibits)

2 through 21

EXHIBITS RETURNED TO PARTIES

Residential Utility Consumer Office (R Exhibits)

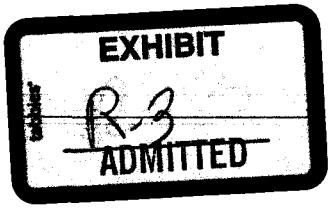
9 Withdrawn

Staff (S Exhibits)

1 Not offered

Copy to:

Mr. Dwight Nodes, Assistant Chief Administrative Law Judge
Mr. Jay L. Shapiro, Litchfield Park Service Co.
Ms. Michelle Wood, RUCO
Mr. Kevin Torrey, Staff
Mr. Larry K. Udall, City of Litchfield Park



County of Maricopa)
) ss.
State of Arizona)

AFFIDAVIT OF CUSTODIAN OF RECORDS OF ADEQ

Affiant, Daniel Borns, upon his oath hereby states:

1. I am the Business Manager for the Arizona Department of Environmental Quality ("ADEQ").

2. I am also Custodian of Record for ADEQ.

3. The records attached hereto which include 269 pages are true and correct copies of documents maintained in the public record of ADEQ.

4. Further affiant sayeth not.

Signed this 18 day of December, 2009.

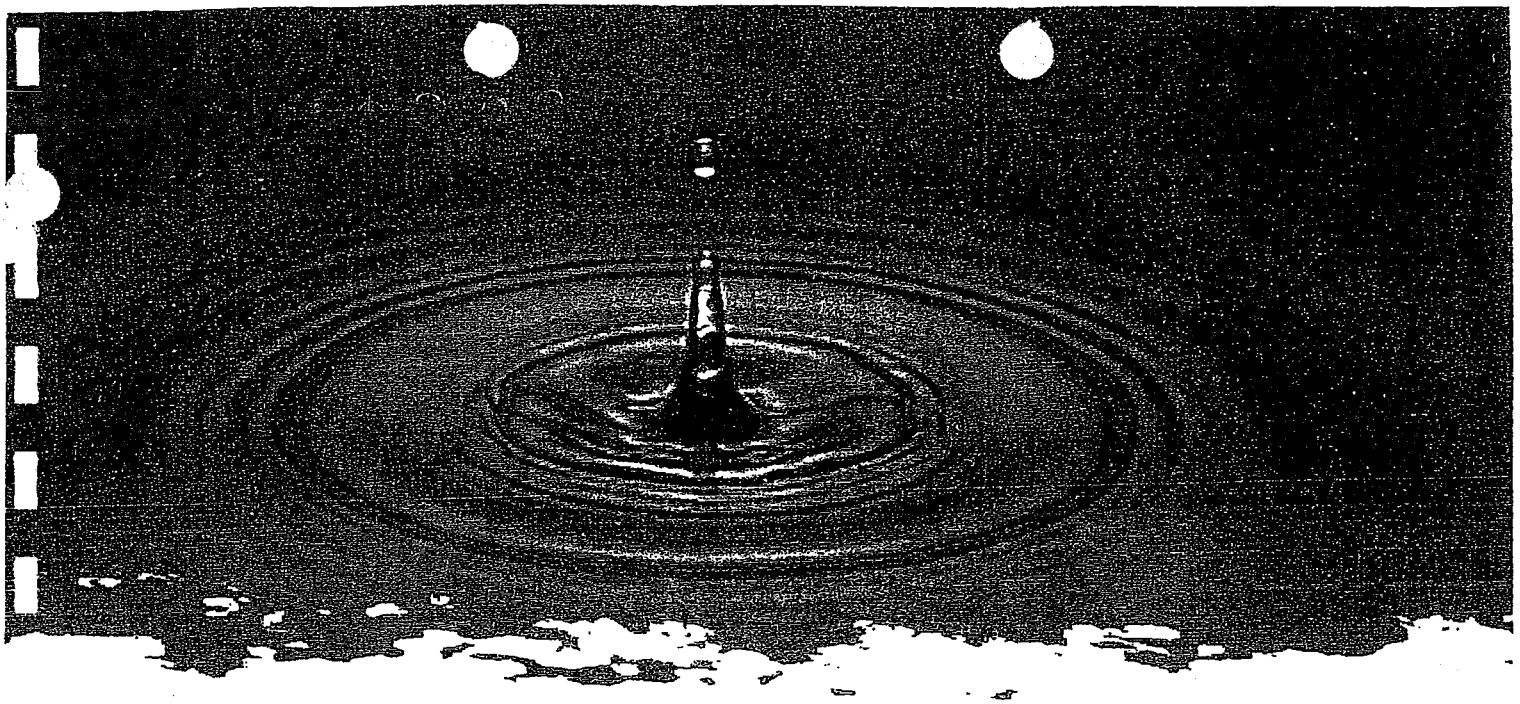
Daniel Borns

Subscribed and sworn to before me this
18 day of December, 2009 by Daniel Borns

Notary Public

My commission expires:

Notary Public State of Arizona
Maricopa County
Brandon Kade Loftin
Expires: October 29, 2011



CLEAN WATER ACT
- 208 AMENDMENT -

APPLICATION FOR
MARICOPA ASSOCIATION OF GOVERNMENTS

PREPARED FOR:

LITCHFIELD PARK SERVICE COMPANY
WATER RECLAMATION FACILITY
&
CITY OF GOODYEAR

PREPARED BY:

PACE
PACIFIC ADVANCED
CIVIL ENGINEERING

AUGUST 2000

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EXECUTIVE SUMMARY

GOODYEAR

August 30, 2000

Ms. Lindy Bauer, Environmental Program Director
Maricopa Association of Governments
302 North 1st Avenue, Suite 300
Phoenix, AZ 85003

RE: MAG 208 AMENDMENT – GOODYEAR, ARIZONA

Dear Ms. Bauer:

Enclosed is a proposed Amendment to the Maricopa Association of Governments (MAG) 208 Water Quality Management Plan point source plan element for the City of Goodyear and Litchfield Park Service Company (LPSCo). We are requesting the County's review comments, and its formal support in this MAG 208 Amendment process.

The proposed amendment will update the plan for wastewater treatment facilities in the central and northern planning area within the City of Goodyear, and will provide additional needed capacity for SunCor, the master developer for most of the north area.

The WRF's are located within three miles of Litchfield Park, Avondale, Glendale, El Mirage, Buckeye, and unincorporated Maricopa County. Support letters are attached from Avondale, Litchfield Park and Glendale.

Council approved the Amendment to MAG 208 Water Quality Management Plan for the addition of Phases I-IV (16.4 MGD total) of the Palm Valley and Sarival Avenue Water Reclamation Facilities (WRF) both located north of McDowell Road, subject to the AGREEMENT FOR MAG 208 AMENDMENT. The agreement, which is attached outlines the City's consent of the revisions to be made to the 208 plan proposed by LPSCo. Part of the agreement however addresses conditions that LPSCo must meet in order to proceed with expansions to the Palm Valley facility (beyond the original 4.1 MGD construction) or construction of the Sarival Avenue facility.

A. The facility must meet State and Federal odor requirements.
B. The operation must meet State and Federal noise control requirements.
C. The facility must produce a Class A Sludge without violations of any State or Federal requirements.
D. Compliance with the Engineering Report prepared by Environmental Utilities International (also attached).

At such time as each phase of the facilities reaches an operating capacity of 3 million gallons per day (3 MGD), of each operating phase, without violation and in compliance with conditions A, B, C and 4 above, LPSCo may commence construction of the next phase. The City's designated consultant shall determine, at each phase, whether LPSCO has complied with the requirements of this Agreement. The Consultant's report of findings shall be submitted to City Council for approval prior to commencement of each phase.

The following are current WWTP's and WRF and the proposed amendment for additional WRF's in this area:

Existing 208 Plan	Proposed Amendment
Goodyear Wastewater Treatment Plant	n/a
Corgett Basin WRF	n/a
Lum Basin WWTP	n/a
Waterman Basin WWTP	n/a
n/a	Palm Valley WRF
n/a	Sarival Avenue WRF

Since, the newly proposed WRF's are located within three miles of the unincorporated Maricopa County wastewater planning area. The City of Goodyear is requesting a written expression of support from the County, confirming that this Amendment will not conflict with any wastewater plans by the County.

We would appreciate a timely review and response so that we can initiate the MAG approval process. Please address your letter of support to my attention. If you have technical questions or comments, you may direct them to Steve Owen of Pacific Environmental Resources Corporation (PERC) at (602) 631-3905 ext. 405.

The City of Goodyear appreciates the County's assistance with this matter.

Sincerely,

CITY OF GOODYEAR

Stephen S. Cleveland

Stephen S. Cleveland
City Manager

Enclosure

cc: Cato Esquivel, Jr., Public Works Director
David W. Ellis, LPSCo
Jay Ellingson, SunCor
Reading File
City Clerk

6.

ENVIRONMENTAL SERVICES
DEPARTMENT

Albert F. Brown, RS, MPA, Director

1001 N. Central Avenue, Suite 150
Phoenix, Arizona 85004

WATER AND WASTE MANAGEMENT
DIVISION

John A. Power, PE, Division Manager

(602) 506-6666
FAX (602) 506-6925
TT (602) 506-6704

August 30, 2000

Maricopa Association of Governments
302 North 1st Avenue, Suite 300
Phoenix, Arizona 85003

Attention: Ms. Lindy Bauer, Environmental Program Coordinator
Re: City of Goodyear Proposed 208 Amendment for Litchfield Park Service Co. (LIPSCO), MCESD #TBD

Dear Ms. Bauer:

Pacific Advanced Civil Engineering (PACE) has submitted a proposed 208 Amendment to the Maricopa County Environmental Services Department (MCESD) for two (2) wastewater treatment facilities in the City of Goodyear for the LIPSCO service area. The service areas includes the City of Litchfield Park and adjacent areas between Perryville Road and 115th Avenue, and between McDowell Road and Glendale Avenue.

In accordance with the MAG 208 Water Quality Management Plan, the proposed 208 Amendment for the facility was submitted to this Department for comment, since the facility is located within three miles of the unincorporated area of Maricopa County.

Based on a review of the proposed 208 Amendment, dated June 2000, the Maricopa County Environmental Services Department, Water and Waste Management Division does not object to the proposed plants for the City of Goodyear and LIPSCO. However, several technical issues remain, which need to be resolved during the design phase of the project. Approval to Construct and Approval of Construction must be obtained from this Department prior to start of construction and startup, respectively.

Maricopa County approved the Dreaming Summit Development, which is part of the proposed LIPSCO service area, with a condition that the existing Casitas Bonitas subdivision be connected to its sewage collection system. Maricopa County expects this provision to be honored. Accordingly, our support is contingent that the failing Casitas Bonitas wastewater treatment plant is abandoned as part of this project, and its customers are connected to the proposed LIPSCO system.

August 30, 2000
Ms. Lindy Bauer
City of Goodyear for LIPSCO, MCESD # TBD

If you have any questions or comments, please feel free to contact Mr. Dale Bodiya, PE, or myself, at 506-6666.

Sincerely,

Dale A. Bodiya

for John A. Power, PE
Manager, Water and Waste Management Division

cc:
Mr. Albert F. Brown, RS, MPA, Director, MC Environmental Services Department
Mr. Dale Bodiya, PE, Manager, Water / Wastewater Treatment Section, MCESD
ADEQ, Manager, Water Permits and Plan Review Section
Steve Owen, PACE
City of Goodyear
Mr. Dave Ellis, General Manager, LIPSCO
File

Town of Buckeye

July 20, 2000

Ms. Lindy Bauer
Environmental Program Director
Maricopa Association of Governments
302 N. 1st Avenue, Suite 300
Phoenix, AZ 85003

Re: MAG 208 Amendment – Goodyear, Arizona

Dear Ms. Bauer:

The Town of Buckeye is aware that the City of Goodyear is submitting an application requesting a Clean Water Act Section 208 Amendment to the Regional Water Quality Management Plan to accommodate two proposed water reclamation facility sites located in the North Planning Service Area of Goodyear. The first site, located near McDowell and Litchfield Roads, is sized for a total capacity of 8.2 MGD and the second site, near Sarival and McDowell Roads, is also sized for a capacity of 8.2 MGD.

The proposed 208 Amendment will update the plan for wastewater treatment facilities in the North Planning Area and will provide additional needed capacity for both Litchfield Park and the City of Goodyear.

The Town of Buckeye expresses its support for this 208 Amendment application. If you should have any questions, please do not hesitate to call me at 623/386-4691.

Sincerely,

Joseph Blanton Jr.

Joseph Blanton, Town Manager

cc: David W. Ellis, LPSCO
Steve Cleveland, City of Goodyear

100 North Apache• Buckeye, Arizona 85326 • (623) 386-4691 •FAX (623) 386-7832

CITY OF AVONDALE

INCORPORATED 1946

525 NORTH CENTRAL AVENUE · AVONDALE, ARIZONA 85323
PHONE: (623) 932-2400 · FAX: (623) 932-2205
INTERNET ADDRESS: www.avondale.org

MAYOR
FRANK J. DRAKE

VICE MAYOR
MARIE LOPEZ ROGERS

COUNCIL MEMBERS
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PEGGY JONES
STEPHANIE KARLIN
BETTY S. LYNCH
RAYMOND H. SHUEY

CITY CLERK
LINDA M. FARRIS

July 24, 2000

Ms. Lindy Bauer
Environmental Program Director
Maricopa Association of Governments
302 N. 1st Avenue, Suite 300
Phoenix, AZ 85003

Re: MAG 208 Amendment – Goodyear, Arizona

Dear Ms. Bauer:

The City of Avondale is aware that the City of Goodyear is submitting an application requesting a Clean Water Act Section 208 Amendment to the Regional Water Quality Management Plan to accommodate two proposed wastewater treatment facility sites located in the North Planning Service Area of Goodyear. The first site is located near McDowell and Litchfield Road and is sized for a total capacity of 8.2 MGD. The second site near Sarival Road and McDowell also is sized for a capacity of 8.2 MGD. It is our understanding that both facilities are to be constructed by the Litchfield Park Service Company (LPSCO).

The proposed 208 Amendment will update the plan for wastewater treatment facilities in the North Planning Area and will provide additional needed capacity for both Litchfield Park and the City of Goodyear.

The City of Avondale has no objection to these facilities and will support the 208 Amendment application as submitted by the City of Goodyear. Your assistance and timely review are appreciated. Please do not hesitate to contact me should you have any questions.

Sincerely,

Paul Adams
City Manager

cc: David W. Ellis, LPSCO
Steve Cleveland, Goodyear City Manager

City of Litchfield Park

City Council

J. Woodfin Thomas, Mayor
Kenneth H. Jones, Vice Mayor
Barbara F. Brainard
Orin "O.K." Fulton
Peter E. Mahoney
Nathan "Bud" Schneider
Max W. Wilson

August 21, 2000

Ms. Lindy Bauer
Environmental Program Director
Maricopa Association of Governments
302 N. 1st Avenue, Suite 300
Phoenix, AZ 85003

Re: MAG 208 Amendment – Goodyear, Arizona

Dear Ms. Bauer:

The City of Litchfield Park is aware that the City of Goodyear is submitting an application requesting a Clean Water Act Section 208 Amendment to the Regional Water Quality Management Plan to accommodate two proposed water reclamation facility sites located in the North Planning Service Area of Goodyear. The first site is located near McDowell and Litchfield Road and is sized for a total capacity of 8.2 MGD and the second site, near Sarival Road and McDowell, also is sized for a capacity of 8.2 MGD.

The proposed 208 Amendment will update the plan for wastewater treatment facilities in the North Planning Area and will provide additional needed capacity for both the Litchfield Park area and the City of Goodyear.

In concept, and after consultation with the City of Goodyear, the City of Litchfield Park does not object to the amendment to the 208 plan. To the extent that the City of Goodyear does not object to the plant site or to the proposed technology, we endorse the amendment. Our endorsement should not be viewed as an approval of Litchfield Park Service Company's (LPSCo) development or financial planning. Therefore, this endorsement should not be used to justify future rate increases to the residents of Litchfield Park.

The City also objects to the expansion of the LPSCo service area to include the Dreaming Summit project, Wigwam Creek and Veranda, and we do not wish this endorsement to be viewed as support for this project.

Additionally, the City would like to keep open for future discussion the possibility of ownership in the wastewater treatment facility, as well as a requirement to return reclaimed water to Litchfield Park.

214 West Wigwam Boulevard • Litchfield Park, Arizona 85340
Phone (623) 935-5033 • Fax (623) 935-5427 • www.litchfield-park.org

With the above conditions, and upon fulfillment of all stipulations requested by the City of Goodyear, we do not object to this 208 Amendment application. We look forward to working with both LPSCO and the City of Goodyear and would appreciate a timely review and response to facilitate the MAG approval process.

Sincerely,

J. Woodfin Thomas
Mayor

cc: David W. Ellis, Litchfield Park Service Company
Steve Cleveland, Goodyear City Manager

12.

GLENDALE

JUL 17 2000

July 7, 2000

David W. Ellis
General Manager
LPSCO
111 W. Wigwam Blvd, Suite B
Litchfield Park, Arizona 85340

Dear Sir:

This letter is in response to the letter you delivered to my office on July 7, 2000 regarding the new LPSCO Water Reclamation Facility in Goodyear, Arizona. After review and consideration, the City of Glendale has no objection to the plan you have proposed. You may be over three miles from our jurisdiction in which case you would not need our comments anyway. Even so, the City of Glendale would like to take this opportunity to wish you luck with your project and offer any assistance we can give in your planning or review process.

Sincerely,

Kenneth A. Reedy
Deputy City Manager, Public Works

13.

JUL 19 2000

GOODYEAR INVESTORS, L.L.C.

Globe Corporation, Managing Member

RAYMOND H. CARTER
Vice President

6730 N. Scottsdale Road, Suite 250
Scottsdale, Arizona 85253

Telephone (480) 991-0500
Facsimile (480) 991-1912

July 17, 2000

Dave Ellis
Litchfield Park Service Company
111 W. Indian School Road
Litchfield Park, AZ 85340

RE: Sewer Service Section 32 Goodyear, AZ

Dear Dave:

We support the installation of the new sewage treatment facility north of the freeway to service our property.

Sincerely,

Raymond H. Carter
Vice President

EXECUTIVE SUMMARY

The Maricopa Association of Governments (MAG) is the Designated Management Agency with the authority under Section 208(2)(b) of the Clean Water Act (CWA) to prepare the Regional Water Quality Management Plan for the Maricopa County Planning Area. The purpose of this application is to request a Clean Water Act Section 208 amendment to the current Regional Water Quality Management Plan. The requested amendments include:

Amendment Item #1:
The construction of a new LPSCo owned and operated 8.2 MGD Palm Valley water reclamation facility (WRF) on McDowell Road between Bullard Avenue and Litchfield Road in the City of Goodyear. The purpose of this new facility is for the reclamation of wastewater flows from the current Litchfield Park Service Company (LPSCo) service area and portions of the Regional Analysis Zone (RAZ) 265 and 266. The expanded service area for the Palm Valley WRF will have a general boundary from the I-10 freeway north past Camelback Road and west from Dysart Road to Bullard Avenue. Permits that will be required for the Palm Valley WRF will include an ADEQ Reuse Permit for irrigation of existing golf courses and parks as well as an APP permit for both reuse and recharge. In the event that not all effluent water can be reused and recharged a NPDES will be in place to allow a secondary point of discharge.

Amendment Item #2:
The construction of a new LPSCo owned and operated 8.2 MGD Sarival WRF at Sarival Avenue and McDowell Road in the City of Goodyear. The purpose of this new facility is for the reclamation of wastewater flows from the remaining portions of RAZ 265. The service area for the Sarival WRF will have a general boundary from the I-10 freeway north to Camelback Road and west from Bullard Avenue to Cotton Lane and sections between Cotton Lane and Perryville Road. Permits that will be required for the Sarival WRF will include an ADEQ Reuse Permit for irrigation of existing golf courses and parks as well as an APP permit for both reuse and recharge. In the event that not all effluent water can be reused and recharged a NPDES will be in place to allow a secondary point of discharge.

Several alternatives have been studied in addition to the construction of independent wastewater treatment plants for accommodation of increasing flows. The alternatives include:

Alternative 1:
LPSCo continued contribution of wastewater flow to the Goodyear 157th Avenue WWTP and purchase of additional capacity to be provided at the 157th Avenue WWTP.

Alternative 2:
Construction of a LPSCo wastewater treatment plant and sale of all interest in the City of Goodyear 157th Avenue WWTP.

Alternative 3:
LPSCo continued contribution of wastewater flow to the Goodyear 157th Avenue WWTP and purchase of additional capacity and process upgrades to be provided at the 157th Avenue WWTP.

Alternative 4:
Deferred construction of a LPSCo wastewater treatment plant until the actual LPSCo wastewater contribution to the Goodyear 157th Avenue WWTP increases to 2.0 MGD.

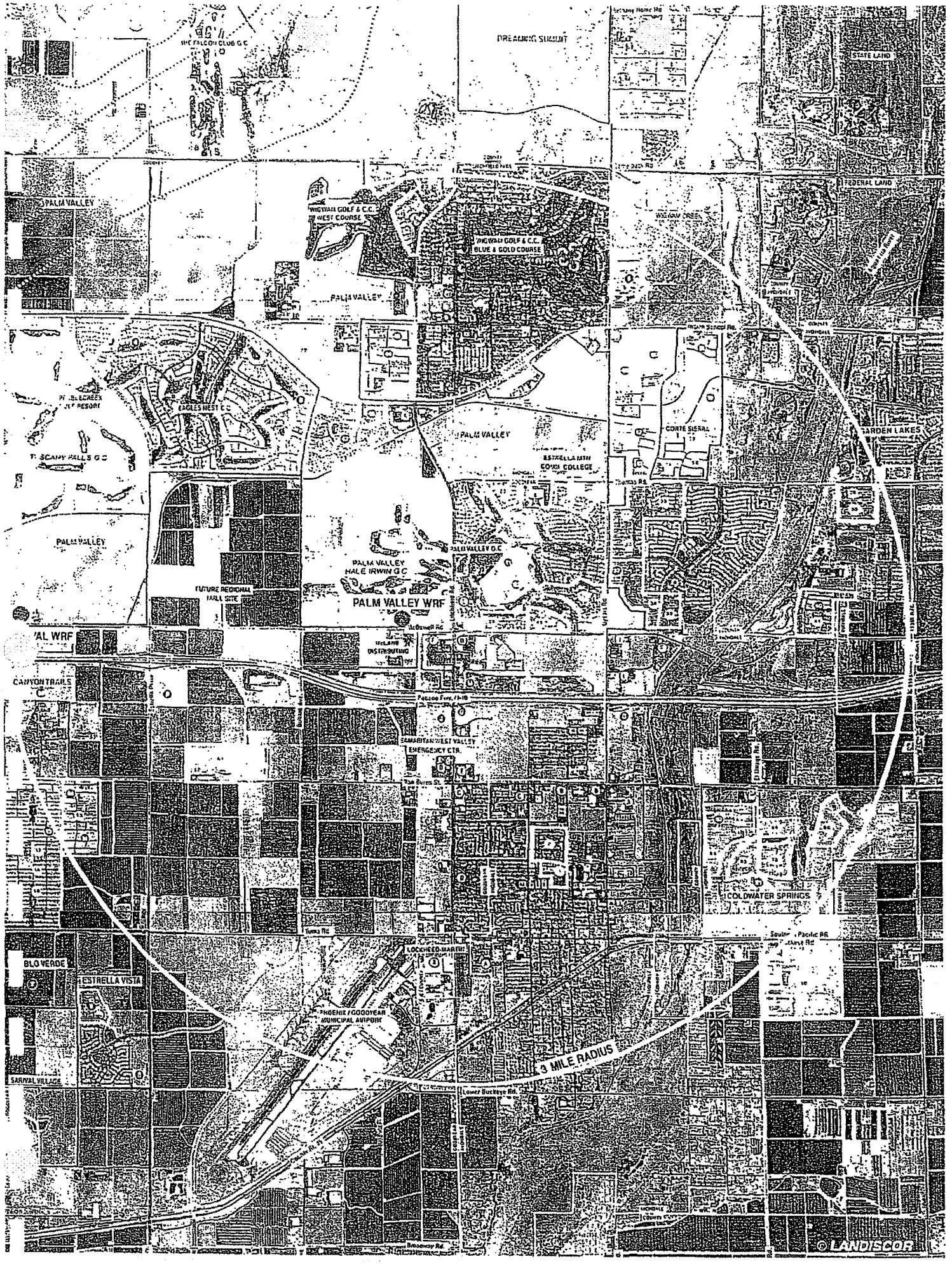
Alternative 5:
Deferred construction of a LPSCo wastewater treatment plant until the actual LPSCo wastewater contribution to the Goodyear 157th Avenue WWTP increases to 1.4 MGD.

Construction of a LPSCo water reclamation plant was considered to be highly cost-effective in comparison to the continued contribution of wastewater to the Goodyear 157th Avenue WWTP. In their 1998 report, Black & Veatch, LLP determined that Alternative 2 of those listed above was the most economically beneficial.

This CWA 208 Amendment application provides information on the proposed independent LPSCo WRFs. The following sections describe how the Section 208 requirements are addressed including alternatives, permitting, pretreatment, sludge management, construction, financing, impacts, and public participation.

ABBREVIATIONS

ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
APP	Aquifer Protection Permit
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
LPSCo	Litchfield Park Service Company
MAG	Maricopa Association of Governments
MGD	Million gallons per day
MSDS	Material Safety Data Sheets
O&M	Operations and maintenance
P.A.C.E.	Pacific Advanced Civil Engineering, Inc.
RAZ	Regional Analysis Zone
WRF	Water Reclamation Facility
WWTP	Wastewater Treatment Plant


PREACHER SUMMIT
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FEDERAL LAND
PALM VALLEY
PALM VALLEY GOLF & C.C. WEST COURSE
PALM VALLEY GOLF & C.C. BLUE & GOLD COURSE
EAGLES WEST G.C.
CORTE SIERRA
GARDEN LAKES
ESTRELLA MTN COMM COLLEGE
PALM VALLEY G.C.
PALM VALLEY HALE IRWIN G.C.
FUTURE REGIONAL JAIL SITE
PALM VALLEY WRF
CANYON TRAILS
SAMARITAN WEST VALLEY EMERGENCY CTR.
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3 MILE RADIUS
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CLEAN WATER ACT
SECTION 208 CHECKLIST SUMMARY

Requirement	Summary of How Requirements are Addressed	Page	Heading
AUTHORITY			
Proposed Designated Management Agency (DMA) shall self-certify that it has the authorities required by Section 208(2)(b) of the Clean Water Act to implement the plan for its proposed planning and service areas. Self-certification shall be in the form of a legal opinion by the DMA or entity attorney.			
20-YEAR NEEDS			
Clearly describe the existing wastewater treatment (WWT) facilities:			
• Describe existing WWT facilities.	There are no existing WWTF facilities in the service area. LPSCo's Current collection system conveys sewage to the 157th Avenue treatment plant located approximately 5.7 miles to the south of LPSCO service area.	10	
• Show WWT certified and service areas for private utilities and sanitary district boundaries, if appropriate.	The two WRF's will serve the Goodyear North Planning area. The service area is located in the northern portion of the City of Goodyear, north of the I-10 freeway to Camelback Rd, west from Dysart Rd. to Perryville Rd.		Appendix A
Clearly describe alternatives, the recommended WWT plan, and factors that affect discharge:			
• Provide POPTAC population estimates (or COG-approved estimates only where POPTAC not available) over 20-year period.	Review of MAG population estimates based on Interim Socioeconomic Report – June, 1997 and calculations performed by Black & Veatch. LLP 1998.	13	
• Provide wastewater flow estimates over the 20-year planning period.	Flow projection based on MAG and Black & Veatch population estimates.	14	
• Illustrate the WWT planning and service areas.	The planning and service areas will include the Goodyear North Planning area. (RAZ265&266)		Appendix A
• Describe the type and capacity of the recommended WRF.	Advanced tertiary treatment including screening, grit removal, nitrification/denitrification, clarification, filtration, ozonation/UV disinfection. The facility will also include bio-solids processing to meet EPA 503 Class-A standards using aerobic digestion. The average day capacity of each facility will be constructed in two phases. The Phase I capacity of each plant will be 4.1 MGD with a phase II capacity of 8.2 MGD.	15	

18.

• Identify water quality problems, consider alternative control measures, and recommend solution for implementation.	No water quality problems are expected to occur. The final effluent will meet current ADEQ open access and proposed ADEQ Class A+ reuse standards. An NPDES permit will be obtained for emergency treated water discharge to the Gila river basin.	10	
• If private WWT utilities with certificated areas are within the proposed regional service area: define who (municipal or private utility) serves what area and when. Identify whose sewer lines can be approved in what areas, when?	Litchfield Park Service Company currently owns and operates the sewage collection system in the proposed service area.	17	
• Describe method of effluent disposal and reuse sites (if appropriate).	Effluent will be stored in lined lakes and used to irrigate golf courses and parks with recharge of excess effluent. Permits that will be required for the WRF will include an ADEQ Reuse Permit for irrigation of existing golf courses and parks as well as an APP permit for both reuse and recharge. In the event that not all effluent water can be reused and recharged a NPDES will be in place to allow a secondary point of discharge.	17	
• Describe other wastewater treatment options that were considered.	Five alternatives were considered: **Alt. #1** – Stay with City of Goodyear WWTP & expand. **Alt. #2** – Construct new WRF(s) in the North Planning Area and sell 1.4 MGD capacity back to City of Goodyear. **Alt. #3** - Stay with City of Goodyear WWTP & use process upgrades and expansion for all LPSCo flows. **Alt. #4** – Purchase additional capacity at the City of Goodyear to 2.0 MGD, then construct a new WRF(s) in the North Planning Area for additional LPSCo flows. **Alt. #5** – Purchase additional capacity at the City of Goodyear to 2.0 MGD, then construct a new WRF(s) in the North Planning Area for additional LPSCo flows.	10	
• If Sanitary Districts are within a proposed planning or service area, describe who services the Sanitary Districts and when.	Litchfield Park Service Company currently owns and operates the sewage collection system in the proposed service area.	17	
• Describe ownership of land proposed for plant sites and reuse areas.	The land proposed for use at both plant sites is owned by SunCor Development Co. & will be sold to LPSCo for the intended WRF use. Storage & reuse will occur on golf courses, parks and lake amenities.	13	

19

• Address time frames in the development of the treatment works.	The Palm Valley WRF consists of two phases of 4.1 MGD each. Phase I will be completed by 2001 with full build-out by 2010. The Sarival. WRF consists of two phases of 4.1 MGD each. Phase I will be completed by 2006 with full build-out by 2020.	9	
• Address financial constraints in the development of the treatment works.	Both facilities will be funded with moneys from LPSCo, connection fees for new home construction & development. No financial constraints are expected for either of the treatment works.	19	
• Describe how discharges will comply with EPA municipal and industrial stormwater discharge regulations (Section 405, CWA).	Neither treated or untreated wastewater will be discharged to Waters of the U.S. & site-specific storm water will be retained on site for up to 100-year storm events.	17	
• Describe how open areas and recreational opportunities will result from improved water quality and how these will be used.	The use of high quality effluent for irrigation will reduce the demand for groundwater. LPSCo plans to sell the reclaimed water to users at a lower cost than raw groundwater to facilitate reuse.	16	
• Describe potential use of lands associated with treatment works and increased access to water-based recreation, if applicable.	Not applicable.	NA	
REGULATIONS			
• Describe types of permits needed, including NPDES, APP and reuse	Both new WRFs will require Aquifer Protection Permits, 401 Water Quality Certification, Reclaimed Water Reuse Permits, NPDES & EPA 503 Sludge Reuse Permits.	18	
• Describe restrictions on NPDES permits, if needed, for discharge and sludge disposal.	The treated municipal wastewater point discharge from the WRFs will be used for emergency only and will not be for daily operations.	18	
• Provide documentation of communication with ADEQ Permitting Section 30 to 60 days prior to public hearing regarding the need for specific permits.	LPSCo has conducted pre-application meetings with Maricopa County Environmental Services & ADEQ.	NA	
• Describe pretreatment requirements and method of adherence to requirements (Section 208 (b)(2)(d), CWA).	Raw wastewater is expected to be nearly 100% residential & light commercial. Industrial service connections will be required to comply with all pretreatment requirements.	18	

RO

• Identify, if appropriate, specific pollutants that will be produced from excavations and procedures that will protect ground and surface water quality (Section 208(b)(2)(K) and Section 304, CWA).	Not applicable.	NA	
• Describe alternatives and recommendations in the disposition of sludge generated (Sections 405, CWA and 40 CFR 503).	Sludge will be treated on-site using processes to significantly reduce pathogens (PSRP) to meet the EPA Class A reuse requirements for sludge of exceptional quality (EQ).	18	
• Define any non-point issues related to the proposed facility and outline procedures to control them.	No non-point discharges are anticipated.	17	
• Describe process to handle all mining runoff, orphan sites, and underground pollutants, if applicable.	Not applicable.	NA	
• If mining related, define where collection of pollutants has occurred, and what procedures are going to be initiated to contain contaminated areas.	Not applicable.	NA	
• If mining related, define what specialized procedures will be initiated for orphan sites, if applicable.	Not applicable.	NA	
CONSTRUCTION			
• Define construction priorities and time schedules for initiation and completion.	The Palm Valley WRF consists of two phases of 4.1 MGD each. Phase 1 will be completed by 2001 with full build-out by 2010. The Sarival WRF consists of two phases of 4.1 MGD each. Phase I will be completed by 2006 with full build-out by 2020.	9	
• Identify agencies that will construct, operate, and maintain the facilities and otherwise carry out the plan.	Litchfield Park Service Company will construct, operate & maintain both WRFs.	19	
• Identify construction activity-related sources of pollution and set forth procedures and methods to control, to the extent feasible, such sources.	Sources of pollution from the construction sites are expected to be from normal construction materials. (i.e. concrete, lumber, paint, etc.) The contractor will be required to maintain a clean, safe working environment & to abide by all rules & regulations covering storage, use & disposal of hazardous materials.	19	

FINANCING AND OTHER MEASURES NECESSARY TO CARRY OUT THE PLAN			
• If plan proposes to take over a certified private utility, describe how and when financing will be managed.	Not applicable.	NA	
• Describe any significant measure necessary to carry out the plan (e.g., institutional, financial, economic, etc.)	Not applicable.	NA	
• Described proposed method(s) of community financing.	The new treatment plants will be constructed using private, tax exempt funding where available, and developer funds.	19	
• Provide financial information to assure DMA has financial capability to operate and maintain wastewater system over its useful life.	LPSCo financial statements are included in the Appendix of this Amendment Application		Appendix E
• Provide a time line that outlines the period of time necessary for carrying out plan implementation.	A draft construction schedule for the Palm Valley facility is provided in Appendix D of this application.		Appendix D
• Provide financial information indicating the method and measures necessary to achieve project financing (Section 201 CWA or Section 604 may apply).	LPSCo financial statements are included in Appendix E of this Amendment Application		Appendix E
IMPLEMENTATION			
Describe impacts and implementation requirements of the Plan:			
• Describe impacts on existing WWTFs (e.g., Sanitary district, infrastructure/facilities, and certificated areas).	The re-routing of 1.1 MGD to the new Palm Valley WRF will impact the City of Goodyear's 157th Ave. WWTP. LPSCo will be selling 1.0 MGD of their current 1.4 MGD capacity allocation back to the City of Goodyear. These impacts will be positive for the city operations allowing Goodyear time to upgrade and expand the 157th Ave. facility.	20	

22.

• Describe how and when existing package plants will be connected to a regional system.	Not Applicable. There are no existing package plants in the LPSCo service area.	NA	
• Describe the impact on communities and businesses affected by the plan.	No significant impacts to the surrounding community or businesses are expected from the implementation of the amended plan.	20	
• If a municipal WWT system is proposed, describe how WWT service will be provided until the municipal system is completed (i.e., will package plants and septic systems be allowed and under what circumstances; interim services).	Not Applicable for the Palm Valley WRF. The Sarival WRF service area will continue to flow to the 157th Ave. plant until LPSCo's remaining 0.4 MGD capacity is exhausted. At which time, the Phase I Sarival WRF will be constructed.	9	
PUBLIC PARTICIPATION			
• Submit copy of mailing list used to notify the public of the public hearing on the 208 amendments. (40 CFR, Chapter 1, part 25.5)	Public Participation will be satisfied through the MAG amendment process.	21	
• List location where documents are available for review at least 30 days before public hearing.	Public Participation will be satisfied through the MAG amendment process.	21	
• Submit copy of the public notice of the public hearing as well as an official affidavit of publication from the area newspaper. Clearly show the announcement appeared in the newspaper at least 45 days before the hearing.	Public Participation will be satisfied through the MAG amendment process.	21	
• Submit affidavit of publication for official newspaper publication.	Public Participation will be satisfied through the MAG amendment process.	21	
• Submit responsiveness summary for public hearing.	Public Participation will be satisfied through the MAG amendment process.	21	

20 YEAR NEEDS

20-Year Needs

The Maricopa Association of Governments (MAG) is the Designated Management Planning Agency with the authority under Section 208(2)(b) of the Clean Water Act to prepare the Regional Water Quality Management Plan for the Maricopa County Planning Area. The purpose of this application is to request a Clean Water Act Section 208 amendment to the current Regional Water Quality Management Plan. The requested amendments include:

Amendment Item #1:
The construction of a new LPSCo owned and operated 8.2 MGD Palm Valley water reclamation facility (WRF) on McDowell Road between Bullard Avenue and Litchfield Road in the City of Goodyear. The purpose of this new facility is for the reclamation of wastewater flows from the current Litchfield Park Service Company (LPSCo) service area and portions of the Regional Analysis Zone (RAZ) 265 and 266. The expanded service area for the Palm Valley WRF will have a general boundary from the I-10 freeway north past Camelback Road and west from Dysart Road to Bullard Avenue. Permits that will be required for the Palm Valley WRF will include an ADEQ Reuse Permit for irrigation of existing golf courses and parks as well as an APP permit for both reuse and recharge. In the event that not all effluent water can be reused and recharged a NPDES will be in place to allow a secondary point of discharge.

Amendment Item #2:
The construction of a new LPSCo owned and operated 8.2 MGD Sarival WRF at Sarival Avenue and McDowell Road in the City of Goodyear. The purpose of this new facility is for the reclamation of wastewater flows from the remaining portions of RAZ 265. The service area for the Sarival WRF will have a general boundary from the I-10 freeway north to Camelback Road and west from Bullard Avenue to Cotton Lane and sections between Cotton Lane and Perryville Road. Permits that will be required for the Sarival WRF will include an ADEQ Reuse Permit for irrigation of existing golf courses and parks as well as an APP permit for both reuse and recharge. In the event that not all effluent water can be reused and recharged a NPDES will be in place to allow a secondary point of discharge.

LPSCo has a current allocation of 1.4 MGD capacity at the City of Goodyear 157th Avenue WWTP. It is estimated that the sewer generation from the LPSCo service area will exceed the current 1.4 MGD capacity allocation beginning in the year 2001. To accommodate existing and future flows, two new wastewater treatment plants are proposed. The proposed LPSCo wastewater treatment plants are the Palm Valley and Sarival WRFs. Combined, the new treatment facilities will provide tertiary wastewater treatment and reclamation for all of the sewage generated in RAZ 265, 266 and two additional developments outside these planning areas (Wigwam Creek and Stardust Development).

The Palm Valley WRF will be designed and constructed in two phases. Phase I will have an average day capacity of 4.1 MGD and a full build-out capacity of 8.2 MGD. Preliminary engineering design of Phase I has begun. The facility is expected to be complete and operational by December 2001.

To conserve time, LPSCo has opted for a design/build approach for the initial phase of this facility. The second phase expansion is anticipated to occur after approximately 2012. The initial flow to the Palm Valley facility will come from diversion of the current 1.1 MGD LPSCo flow to the City of Goodyear's 157th Avenue plant. As part of the original service agreement with the City of Goodyear, LPSCo has the right to sell part of or all of its 1.4 MGD capacity back to the city. At the completion of Phase I of the Palm Valley facility, LPSCo will sell 1.0 MGD of the 1.4 MGD capacity in the 157th Avenue plant back to the City of Goodyear.

This capacity will allow the City of Goodyear time to upgrade and expand their existing facilities to accommodate future flows from the Central Planning area (RAZ 280 and 281) and will provide a minimum of 0.4 MGD capacity surplus for LPSCo at the 157th Avenue plant.

After Phase I completion of the Palm Valley WRF, the second plant will be designed and constructed. This second facility will be constructed near the intersection of Sarival Avenue and McDowell Road. The Sarival WRF will also be designed and constructed in two phases. Phase I will have an average day capacity of 4.1 MGD with a build-out capacity of 8.2 MGD. The first phase of construction for this facility is anticipated to occur in approximately 2006. Until that time, current and near-future flows will use the existing 0.4 MGD surplus LPSCo capacity at the City of Goodyear 157th Avenue treatment plant. Phase II construction is anticipated to occur after 2016.

The following sub-sections describe the proposed wastewater treatment plants, alternatives, and regulatory requirements for implementation.

A. Description of Existing Wastewater Treatment Facilities

There are no existing wastewater treatment facilities in RAZ 265 or 266 to accommodate the increasing wastewater generation from the LPSCo service area. Currently, wastewater from the LPSCo service area is routed approximately 5.7 miles to the City of Goodyear 157th Avenue WWTP. Because the wastewater generation from the LPSCo service area is approaching the current capacity agreement of 1.4 MGD, LPSCo proposes to construct new water reclamation plants in their service area. The addition of the these facilities will reduce the overall capital and operational costs for current and future LPSCo customers by eliminating the need for 6 miles of additional trunk sewer and lift stations. In addition, consumers will benefit from the reduced cost of reclaimed water, which will be processed much closer to the point of reuse.

B. Summary of Alternatives

Five alternatives have been considered to evaluate the treatment of the increasing wastewater flows from the LPSCo service area. Black & Veatch, LLP prepared a study of these alternatives in July 1998. A copy of the *Preliminary Wastewater Planning Study for SunCor and Litchfield Park Service Company* is included in appendix F of this amendment application for further review. The following alternatives were studied:

Alternative 1:
LPSCo continued contribution of wastewater flow to the Goodyear 157th Avenue WWTP and purchase of additional capacity to be provided at the 157th Avenue WWTP.

Alternative 2:
Construction of a LPSCo wastewater treatment plant in the North Planning Area and sale of all interest in the City of Goodyear 157th Avenue WWTP.

Alternative 3:
LPSCo continued contribution of wastewater flow to the Goodyear 157th Avenue WWTP and purchase of additional capacity and process upgrades to be provided at the 157th Avenue WWTP.

Alternative 4:
Deferred construction of a North Planning Area wastewater treatment plant until the LPSCo wastewater contribution to the Goodyear 157th Avenue WWTP increases to 2.0 MGD.

Alternative 5:
Deferred construction of a North Planning Area wastewater treatment plant until the LPSCo wastewater contribution to the Goodyear 157th Avenue WWTP increases to 1.4 MGD.

A more thorough evaluation of these alternatives is presented in the *Preliminary Wastewater Planning Study for SunCor and Litchfield Park Service Company* (Black & Veatch report) provided in Appendix F. This 208 Amendment application is based on the same alternatives presented in the Black & Veatch report with the exception that Alternatives #2, #4 and #5 analyzed construction of a single facility and did not provide analysis for the construction of two "twin" plants. The capacities and locations of the two proposed LPSCo water reclamation facilities are the same as identified in the collection system study as the connection points for outfalls to the City of Goodyear 157th Avenue WWTP. In Black & Veatch's report, Alternative #2 was the recommended alternative from both a capital cost and long-term operational cost analysis. This proposed MAG 208 Amendment is based on Alternative #2 with the exception of the development of twin reclamation facilities. The following paragraphs summarize the five alternatives studied by Black & Veatch in 1998.

Alternative 1 – Continued Participation in Goodyear WWTP

Alternative 1 is based on the continued conveyance of LPSCo wastewater flow to the City of Goodyear 157th Avenue WWTP. Currently, wastewater from the LPSCo service area is conveyed through the Sarival Avenue 24" interceptor sewer. Sewage flows are anticipated to exceed the 24" sewer capacity by 2003. Thus, construction of additional sewer pipelines (approximately 5.7 miles of pipe) and the purchase of additional pipeline capacity from other parties would be required to handle ultimate flows from the service area. In addition, LPSCo would be required to fund or purchase additional treatment capacity at the City of Goodyear 157th Avenue WWTP.

This alternative also requires the construction of effluent pumping facilities and 5.7 miles of transmission mains from the city's treatment facility to the LPSCo service areas for irrigation. This alternative has the highest capital, O&M, and present value costs of any of the other alternatives.

Alternative 2 – Construction of a LPSCo WRF

Alternative 2 provides for the design and construction of a LPSCo wastewater treatment plant in the North Planning Area and the sale of all capacity at the 157th Avenue plant. The existing 1.4 MGD capacity at the 157th Avenue WWTP would be provided in the new facility(s) located in the Northern Planning Area (RAZ 265 and 266). Because of the cost of maintenance and operations of the Goodyear facility and the replacement cost of the 1.4 MGD capacity in the 157th Avenue facility, the cost of this alternative was the lowest of all of the alternatives evaluated, but only slightly lower than Alternatives 4 and 5.

Alternative 3 - Continued Participation in Goodyear WWTP with Process Upgrades

This alternative is similar to Alternative 1 except that the existing City of Goodyear 157th Avenue WWTP aeration and filtration processes would be optimized to provide an increase in treatment capacity from 3.0 MGD to 8.0 MGD. It was estimated the upgrade and expansion would cost approximately $14 million to $16 million. The upgrade would allow LPSCo to obtain a total capacity of 3.0 MGD at the city's treatment facility until the year 2008. At that time, an additional 5.2 MGD capacity would be required to handle additional wastewater flows from the LPSCo service area.

This alternative is less expensive than Alternative 1, but significantly more expensive than Alternatives 2,4 and 5.

Alternative 4 – Participation in Goodyear WWTP to 2.0 MGD; then construction of a LPSCo WRF

Alternative 4 is similar to the recommended alternate to construct a LPSCo wastewater treatment plant in the North Planning Area (Alternate 2). They differ in that the construction of the LPSCo plant(s) would be delayed for approximately 3 years (2003). LPSCo currently has 2.0 MGD of capacity in the Sarival Avenue 24" interceptor sewer. Because LPSCo has a treatment capacity allocation of only 1.4 MGD at the City of Goodyear 157th Avenue WWTP, an additional 0.6 MGD of treatment capacity is required to fully maximize the trunk sewer capacity. LPSCo could fund the additional treatment capacity as stated above in Alternative 3.

This alternative has only slightly higher capital cost as compared to Alternative 2 because it maximizes the use of the existing Sarival Avenue 24" interceptor sewer.

Alternative 5 - Participation in Goodyear WWTP to 1.4 MGD; then construction of a LPSCo WRF

Alternative 5 is similar to Alternative 4 with the exception that wastewater flow from the LPSCo service area will be conveyed to the 157th Avenue WWTP at the LPSCo maximum allocated treatment capacity of 1.4 MGD. As in Alternative 4, the construction of the proposed North Planning Area treatment plant(s) would be delayed 1 to 2 years. The current flow from the LPSCo service area is 1.1 MGD and is expected to exceed the maximum allocated treatment capacity of 1.4 MGD by the year 2001.

Alternative 5 is similar in cost to Alternative 4 but substantially less than Alternatives 1 and 3.

C. Discussion of the Proposed Construction of Two New LPSCo WRFs

1. Site Location and Property Ownership

The proposed wastewater treatment plants will be constructed in City of Goodyear, Maricopa County, Arizona. Figure 2 in Appendix A illustrates the proposed location of the two treatment facilities. Both the Palm Valley WRF and the Sarival WRF will be constructed on property currently owned by SunCor Development Company. The property will be sold to Litchfield Park Service Company for the purpose of maintaining and operating the two facilities. The Palm Valley WRF will be located on McDowell Road between Bullard Avenue and Litchfield Road. The Sarival WRF will be located near the intersection of Sarival Avenue and McDowell Road.

2. Population Estimates

For the purpose of this amendment, four regional areas are used to define the total LPSCo service area. These four areas include the City of Goodyear's Regional Analysis Zone (RAZ) 265, RAZ 266 (Litchfield Park), the Stardust Development service area, and the Wigwam Creek service area. For planning purposes, these areas are expected to contribute wastewater flow to the two proposed wastewater treatment plants. Figure 1 in Appendix A illustrates the areas that make up the complete LPSCo service area.

The following table summarizes the population projection for each of the four service areas in the LPSCo service area through the year 2020. The population numbers presented for RAZ 265 and 266 are taken from the MAG *Socioeconomic Projections Interim Report* (June, 1997). The Stardust Development and the Wigwam Creek Development service areas were assumed to be excluded from the RAZ 265 and 266 population numbers and are taken from separate sewer conveyance studies by SMF Engineering and Black & Veatch LLP.

	Population by Planning Area				
Year	RAZ 265[1]	RAZ 266[1] (Litchfield Park)	Stardust Development[2]	Wigwam Creek Development[2]	Total
2000	8,671	4,876	3,011	3,746	20,304
2005	11,336	6,517	6,500	7,200	31,553
2010	14,410	8,452	8,600	10,700	42,162
2015	20,493	12,561	Built-out	Built-out	52,354
2020	30,139	14,688	Built-out	Built-out	64,127

1 Source: *June 1997 MAG Socioeconomic Projections Interim Report.*

2 Calculated by P.A.C.E. Full build-out AAD flows were taken from the *Draft Stardust/Wigwam Creek Conveyance and Treatment Study.* Full build-out for Stardust and Wigwam Creek was assumed for the years between 2008 and 2010. Calculation assumptions: Unit flows of 100 gpcpd and a 50% population increase every five years.

Future wastewater flows were studied in *Addendum Number 2 to the Wastewater Master Plan Litchfield Master Planned Community* (SMF Report) that was prepared by SMF Engineering Corporation in January 1998. Black & Veatch prepared the *Preliminary Wastewater Planning Study for SunCor and Litchfield Park Service Company* in July 1998. The SMF Report only provides full build-out wastewater flow projections. The Black & Veatch report used the full build-out wastewater flow projections from the SMF Report and calculated the flow projections over time. The following table summarizes wastewater estimates based on MAG and Black & Veatch population estimates:

Year	Wastewater Flow Projections (MGD)			
	Based on MAG Projections		Based on Black & Veatch Report	
	AAD	Peak Hourly[1]	AAD	Peak Hourly[1]
2000	2.03	4.47	1.32	2.90
2005	2.66	5.85	3.12	6.86
2010	3.43	7.55	5.49	12.08
2015	4.79	10.54	7.87	17.31
2020	6.41	14.10	10.24	22.53

[1] Calculated by P.A.C.E. with a peaking factor of 2.2.

The wastewater flow projections from the Black & Veatch Report generally have a higher annual average day flow than the MAG interim projections. For the purpose of this amendment and future planning, the Black & Veatch population numbers are assumed to be more accurate because the Black & Veatch report was specific to the Goodyear North Planning Area where as the MAG projections are based on countywide modeling.

3. Water Reclamation Facility Description

The Palm Valley and Sarival WRFs will be based on biological oxidation by the activated sludge process. Both treatment plants will include screening, grit removal, anoxic/aerobic biological nutrient removal, ozone disinfection, and multi-medium filtration. The treatment process will utilize anoxic mixing, aerobic mixing, and static reaction capabilities to provide biological oxidation, nitrification, denitrification, phosphorous removal, and clarification within one reactor tank. To provide process redundancy and obtain a Phase I average-day capacity of 4.1 MGD, a minimum of two reactor tanks will be constructed.

Wastewater will be treated to exceed the current ADEQ Title 18 requirements for unrestricted irrigation re-use. There currently are four 18-hole golf courses served by LPSCo with four future courses planned and numerous public parks, which will be converted to reclaimed water irrigation. LPSCo plans to provide the reclaimed water at less cost than current groundwater or surface water prices. Effluent from the treatment facilities will be stored in lined golf course lakes and water feature amenities then distributed as needed for irrigation. It is estimated that the irrigation demand in the North Planning Area will not require as much reclaimed water as will be produced, therefore a secondary discharge system will be developed for both plants to allow for groundwater recharge of the underlying aquifer. A summary of water balance calculations for each phase of expansion is presented in the Appendix of this application.

Both facilities will generate waste sludge, which will be directed to an aerobic digestion process. The sludge digestion process will provide pathogen and vector attraction reduction equivalent to the EPA title 40 CFR art 503 regulations for Class A biosolids. Biosolids will be stored and sold or hauled to landfill for disposal.

a) Facility Capacity

Both the Palm Valley WRF and Sarival WRF will be constructed in two general phases. The Palm Valley facility Phase I will have an average day capacity of 4.1 MGD with a second phase expansion to 8.2 MGD. The Sarival facility will have a Phase I average day capacity of 4.1 MGD and a full build-out capacity of 8.2 MGD. The two new wastewater treatment facilities will be capable of treating the projected wastewater flows from the LPSCo service area with a 38% reserve capacity for projection errors and modifications from the assumed modeling land uses. The projected wastewater flows will be divided between the two wastewater treatment plants and development of certain areas will dictate actual facility construction and expansion schedules. The following summarizes the proposed treatment plant capacities and anticipated construction time frames:

Treatment Plant	Annual Average Day Treatment Capacity		
	Phase I (year)	Phase II (year)	Total Capacity
Palm Valley WRF	4.1 MGD (2001)	4.1 MGD (2012)	8.2 MGD
Sarival WRF	4.1 MGD (2006)	4.1 MGD (2016)	8.2 MGD
		TOTAL	**16.4 MGD**

b) Facility Location

The proposed locations of the two treatment plants were based on information provided in the *Addendum Number 2 to Wastewater Master Plan Litchfield Master Planned Community* prepared by SMF Engineering in January 1998 (SMF report). The SMF report is provided in Appendix G for reference. The report evaluated the projected wastewater flows for build-out conditions of the Goodyear North Planning Area and the proposed locations of collection sewers. The report identified two trunk sewer connection locations for conveying wastewater from the North Planning Area to the City of Goodyear 157th Avenue WWTP. The entire North Planning Area could be served by a combination of the existing lift stations and gravity collection sewers with major additions to the two main trunk sewers (approximately 5.7 miles of sewer). These two trunk connections are in the general location of the proposed wastewater treatment facilities.

Currently, wastewater from the eastern portion of the LPSCo service area flows to a junction point near the intersection of Litchfield Road and McDowell Road. From this location, the wastewater is pumped to another lift station at Bullard Avenue and McDowell Road. Additional wastewater flows from the remainder of the LPSCo service area are collected at this lift station and pumped west of the RID Canal and then by gravity to an outfall located at the intersection of Sarival Avenue and McDowell Road. From this point, all wastewater is conveyed to the City of Goodyear 157th Avenue WWTP.

The proposed Palm Valley WRF has been located to eliminate both existing lift station. The flows to the Palm Valley WRF will be by gravity and new gravity trunk line will be built on McDowell Road between the two old lift stations. The proposed Sarival WRF has been located to intercept the remaining wastewater flow at the Sarival Avenue outfall.

c) Wastewater Reclamation Requirements

Treated effluent from the Palm Valley WRF and the Sarival WRF will be reclaimed for irrigation and recharge. The treated effluent is expected to of very high water quality, which will meet or exceed all local, state and federal requirements. A summary of water balance showing the projected reclaimed water production and re-use volumes are provided in Appendix C.

Reclaimed wastewater will be used in non-restricted areas such as parks and golf courses. Treated effluent is expected to exceed Arizona Administrative Code Title 18, Chapter 9 reclaimed water quality criteria for the irrigation of wastewater where public access is not restricted. Reuse activities will comply with the requirements of reuse permits issued through the Arizona Department of Environmental Quality (ADEQ) and Maricopa County Department of Environmental Services. Both facilities will require ADEQ Aquifer Protection Permits (APP).

As the amount of reclaimed water increases and exceeds seasonal irrigation demands, reclaimed wastewater will be directed to recharge facilities. Reclaimed wastewater for recharge will be required to meet the aquifer water quality standards established by ADEQ. These activities will be conducted in compliance with the Underground Storage Facility and Water Recovery Permits issued by the Arizona Department of Water Resources (ADWR).

d) Stormwater Discharges

The construction and operation of the proposed wastewater treatment plants are not anticipated to produce stormwater discharges. The treatment plants will be designed to contain stormwater runoff onsite. There will be no non-point discharges of stormwater from the proposed treatment plants. The EPA and ADEQ will permit any stormwater discharges to Waters of the United States under the National Pollutant Discharge Elimination System (NPDES) program.

4. Sanitary Districts, Private Utilities, and WRF Service Areas

The proposed locations of the Palm Valley WRF and the Sarival WRF are within the current LPSCo service area in the City of Goodyear. Neighboring cities and communities within a 3-mile radius include the City of Avondale, Litchfield Park, and Unincorporated areas of Maricopa County.

The construction of the proposed treatment plants will directly impact the City of Goodyear's 157th Avenue WWTP. 1.1 MGD of existing wastewater flow from the LPSCo service area will be re-routed to the new Palm Valley facility.

LPSCo will sell 1.0 MGD of their 1.4 MGD capacity allocation back to the City of Goodyear. Sewage flow to the 157th Avenue treatment facility is nearing the current plant capacity of 3.0 MGD. The re-routing of the current LPSCo service area flow and the acquisition of 1.0 MGD capacity will allow the City of Goodyear time to upgrade processes and expand the 157th Avenue WWTP to better serve the Central Goodyear Planning Area. In addition, the City of Goodyear will not have to include the North Planning Area when considering expansion to their treatment and collection facilities.

No other existing treatment facilities, sanitary districts or certified service areas would be impacted by the construction of the two treatment plants.

D. Permitting Requirements

The Palm Valley WRF and the Sarival WRF will require the following permits and clearances:

- Aquifer Protection Permit (APP) issued by the Arizona Department of Environmental Quality (ADEQ)
- Reclaimed Wastewater Reuse Permit
- 401 Water Quality Certification issued by ADEQ
- Underground Storage Facility permit and Water Storage permit for groundwater recharge by the Arizona Department of Water Resources (ADWR)
- Archeological and Native Plants clearances through the Arizona State Land Department, and an Environmental Assessment – Phase I clearance
- Right-of-way easement from the Arizona State Land Department
- Biosolids (sewage sludge) re-use requirements as stated in 40 CFR 503 and regulated by the Environmental Protection Agency
- EPA/ADEQ NPDES Permit

E. Pretreatment Requirements

The Code of Federal Regulations Part 403 Section 403.8 states, "any POTW with a total design flow of 5 million gallons per day and receiving from industrial users pollutants which pass through or interfere with the operation of the POTW or are otherwise subject to pretreatment standards, will be required to establish a pretreatment program." No industrial users are anticipated to discharge into the two proposed wastewater treatment plants. Thus, neither facility is required to comply with pretreatment requirements. If industrial users are added to the service area of either facility, a pretreatment program will be developed with the industrial user being subject to pretreatment standards as regulated by the EPA.

F. Sludge Management Requirements

The Palm Valley WRF and the Sarival WRF will be subject to biosolids regulations as promulgated in 40 CFR 503. Sewage sludge will be generated from both treatment plants. As defined in 40 CFR 501, sewage sludge means any solid, semi-solid, or liquid residue removed during the treatment of municipal waste water or domestic sewage. Sewage sludge includes, but is not limited to, solids removed during primary, secondary, or wastewater treatment, scum, septage, portable toilet pumpings, Type III Marine Sanitation device pumpings, and sewage sludge products. Sewage sludge does not include grit, screening, or ash generated during the incineration sewage. The 40 CFR 503 regulatory requirements include standards for the use and disposal of sludge and consist of general requirements, pollutant limits, management practices and operational standards for the final use or disposal of sewage sludge generated during the treatment of domestic sewage. It also includes pathogen and vector attraction reduction requirements for sewage sludge applied to land or placed in a surface disposal site.

The two proposed wastewater treatment plants will meet the 40 CFR Part 32 requirements for classification of sewage sludge as Class A Biosolids. By meeting the most stringent requirements for sludge treated for re-use, the biosoilds produced at the facilities will be available for use by farming operations as well as private residential use.

II. Construction

A. Construction and Operation Responsibility

Litchfield Park Service Company will develop and implement the plan for the construction and operation of the Palm Valley WRF, the Sarival WRF and related service areas. Litchfield Park Service Company will be solely responsible for funding the project. LPSCo's most recent Corporate Financial Statement is presented in Appendix E.

The proposed schedule of construction for the Palm Valley WRF is shown in Appendix D. The permitting phase of the project is anticipated to take approximately 6 months. Construction will follow immediately.

B. Sources of Pollution

The construction of the wastewater treatment plants will not be a significant source of pollution. Anticipated pollution from construction activities include fugitive dust, construction equipment exhaust emissions, and construction related solid waste. Erosion control measures during construction and grading will be implemented to prevent potential storm water runoff to water bodies. The developer and project contractor shall comply with local regulatory requirements and provisions of construction permits issued.

III. Financing and Other Actions to Implement Plan

A. Financing Plan

Litchfield Park Service Company has made financial plans for the construction and operation of the proposed treatment plants. The new facilities will be constructed using private, tax exempt and or developer/development funds.

B. Financing Capability to Construct the Facility

Litchfield Park Service Company has the financial capacity to construct and operate the Palm Valley WRF and the Sarival WRF. A copy of LPSCo's 1999 Corporate Financial Statement is included in Appendix E.

IV. Impact and Implementation Plan

A. Implementation Plan

The implementation of construction and operation of the wastewater treatment plants will be planned and executed by the Litchfield Park Service Company. LPSCo has hired an engineering firm and construction firm to design/build the Palm Valley Wastewater Treatment Plant. Design completion is expected to be finished in September 2000. A draft schedule of construction is provided in Appendix D.

LPSCo will hire ADEQ certified operational staff to properly operate and maintain the new wastewater treatment plants. These staff members will be involved in the planning, design and construction of the two facilities. Upon completion of the Palm Valley WRF, the contractor is required to provide 6 months of operation and maintenance training to LPSCo's treatment plant staff.

B. Impacts of the Proposed Wastewater Treatment Plants

The construction and operation of the Palm Valley WRF and the Sarival WRF are not expected to adversely impact any neighboring municipality, sanitary district, certificated area, community or business. The Palm Valley WRF will initially alleviate excess wastewater flow to the City of Goodyear's treatment facility by re-routing 1.1 MGD currently conveyed to the 157th Avenue WWTP.

Potential environmental issues include odor, noise, vectors and hazardous materials. The following briefly discuss and addresses these issues.

Odors: The biological treatment process utilizes a significant amount of sub-surface aeration reducing the potential for odor problems. Both plants will include odor-scrubbing systems for the headworks and sludge pressing areas. The sludge is in an aerated liquid state while on-site and during removal for sludge disposal, reducing the potential for odor concerns from sludge processing operations.

Noise: All process equipment will be enclosed in insulated masonry buildings. Additionally, the aeration blowers will be provided with critical silencers and housed in sound attenuation enclosures. All pumps and aerators will be submersible type and will not produce noise.

Vectors: The treatment facilities will be properly operated and maintained to reduce vector attraction. Sludge processing facilities will be covered and enclosed in building structures. The irrigation storage areas will be prevented from becoming breeding area for mosquitoes and other insects by circulation of stored water and the introduction of mosquito fish.

Hazardous Materials: The wastewater treatment facility will not accept any hazardous materials. Only municipal sewage from the LPSCo service areas will be accepted. An emergency plan will be developed to isolate and contain any hazardous materials discovered. The proposed treatment system does not require the use of any hazardous materials beyond the storage of liquid sodium hypochlorite, ozone for disinfection and diesel fuel for the back-up power generator. A current set of Material Safety Data Sheets (MSDS) will be maintained for all chemicals, polymers, and bio-augmentation products use at the facilities.

C. Solution for Casitas Bonitas

LPSCo recognizes that a serious situation exists at Casitas Bonitas that has eluded a solution to date. LPSCo is willing to provide wholesale wastewater services to Casitas Bonitas with certain conditions:

- LPSCo to have involvement with closure of existing facility.
- That the ACC grant specific rates to allow the treatment without any economic hardship in existing LPSCo customers or the company.

V. Public Participation

As part of the MAG Water Quality Management Plan Amendment Process, the Maricopa Association of Governments (MAG) with cooperation of the City of Goodyear is responsible for ensuring that the following actions are implemented after submittal of the draft 208 Amendment:

- Notify all parties of a public hearing on the 208 Amendment by sending notices to interested parties at least 30 days prior to the public hearing. The notice may

include the date, time, subject and location of the public hearing for the 208 Amendment.

- Notify public at least 45 days in advance of the public hearing by advertising in a publication. The notice should may the date, time, subject and location of the public hearing for the 208 Amendment.
- Notify public that draft amendments are available for public viewing 30 days before the hearing. This may include the location, days, and time of availability.
- Submittal of an affidavit of publication of the public notice.
- Submittal of a responsiveness summary for the public hearing.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

Received
MAR 0 7 2002
Federal Permits

February 26, 2002

David Ellis, General Manager
Litchfield Park Service Company
111 W. Wigwam Blvd., Suite B
Litchfield, AZ 85340

RE: NPDES Application for Palm Valley WRF Permit No. AZ0024805

Dear Mr. Ellis:

This letter is in response to a letter dated February 21, 2002 from Pacific Advanced Civil Engineering, Inc. (PACE) concerning the applicability of the National Pollutant Discharge Elimination System (NPDES) waste water permitting program to the proposed Palm Valley Wastewater Reclamation Facility (WRF), operated by Litchfield Park Service Company (LPSCO). I have determined that the project as you describe it would not require issuance of a NPDES permit for waste water discharge, for the reasons and subject to the conditions described below. This letter does not address the need for NPDES permit coverage for either construction-related or industrial storm water discharges.

From PACE's correspondence, including a copy of a letter from you, dated February 7, 2002 indicating that LPSCO has more customer demand than it has supply of effluent, and other supporting documents, it appears that the Palm Valley WRF will not be discharging any pollutants from any point source into any waters of the United States. All effluent generated will be re-used for irrigation of crop land and/or recreational facilities in the vicinity. In the event of discharge not being fully re-used it will be stored in a storage facility which based on PACE's assertions will have all the appropriate permits required. In addition, the Palm Valley WRF will comply with section 405 of the Clean Water Act (CWA) in disposal of sludge and the facility itself has not been designated by EPA as requiring a NPDES permit to protect public health and the environment as required by 40 CFR 122.1 (b)(3). Therefore a NPDES permit for waste water discharge is not required for this facility at this time. If however, information is consequently provided to EPA indicating that the various assumptions made by EPA, or assertions made by the facility are not accurate, EPA reserves the authority to require the facility to obtain any appropriate NPDES permit, as the case may be.

I hope that this letter addresses your concerns regarding LPSCO's Palm Valley WRF. If you would like further clarification or if I can be of additional assistance, please contact me at (415) 972-3516.

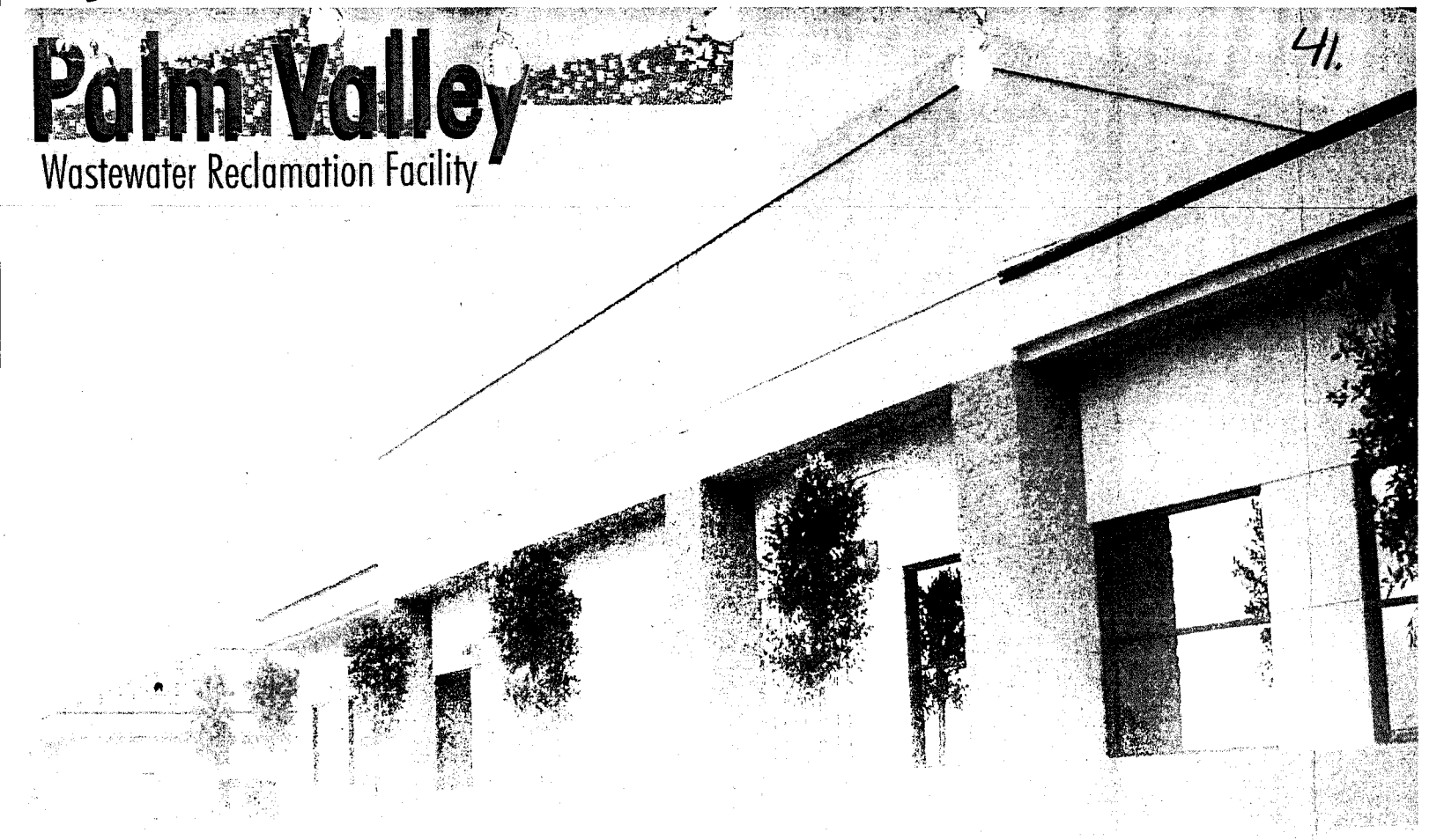
Sincerely,

Gary Sheth
CWA Standards and Permits Office

cc: Chris Varga, ADEQ (with in-coming correspondence)
Erin E. Hubbard, E.I.T., PACE

Palm Valley
Wastewater Reclamation Facility

41.



Design Report
Phase II Expansion

March 2004
Revised August 2004
Job# 7911E

PACE
PACIFIC ADVANCE CIVIL ENGINEERING,

42.

PALM VALLEY WATER RECLAMATION FACILITY
PHASE II EXPANSION
DESIGN REPORT

Prepared for:

Litchfield Park Service Company

Prepared by:

Pacific Advanced Civil Engineering, Inc.
17520 Newhope Street, Suite 200
Fountain Valley, CA 92708

March 2004
#7911E

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I. PROJECT DESCRIPTION

A. Background

The Litchfield Park Service Company (LPSCo) provides water and wastewater services to residents and commercial businesses located in Litchfield Park, Arizona and the adjacent Regional Analysis Zones (RAZ) 265 and 266, as well as two developments (Wigwam Creek and Stardust Development) located outside Litchfield Park. In order to accommodate the expected growth in the LPSCo service area, twin wastewater treatment facilities, the Palm Valley Water Reclamation Facility and the Sarival WRF, were proposed to be constructed. Both the Palm Valley WRF and the Sarival WRF will be constructed in two phases and will have a Phase I and Phase II capacities of 4.1 MGD and 8.2 MGD, respectively. The first phase of the Palm Valley WRF was completed in 2002 and is the only wastewater treatment facility currently servicing the LPSCo service area. Because the wastewater generation from the LPSCo service area has approached the halfway mark capacity for the Palm Valley WRF, LSPCo is initiating the design of the Palm Valley WRF Phase II Expansion. The Phase II Expansion will double the average capacity of the facility to 8.2 MGD. This report details Phase II Expansion of the Palm Valley WRF *only*.

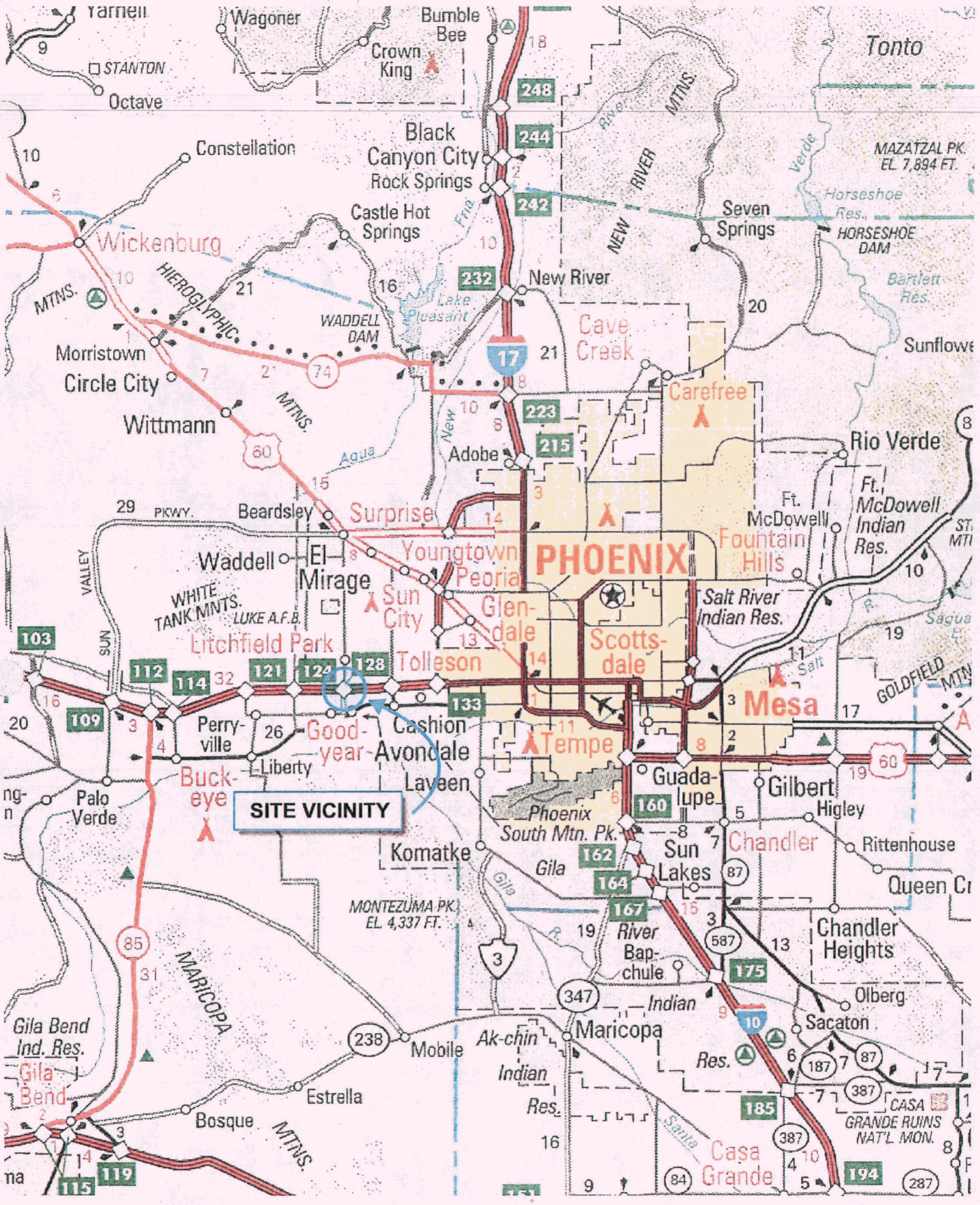
B. Location

The Palm Valley WRF is located at 14222 West McDowell Road, between Bullard Avenue and Litchfield Road in the City of Goodyear, Maricopa County, Arizona, approximately 20 miles west of Phoenix, Arizona, and owned and operated by LPSCo (See *Figure 1*). The Palm Valley WRF treats primarily residential wastewater with some service connection with a local commercial customer in the LPSCo Service Area (See *Figure 2*) .

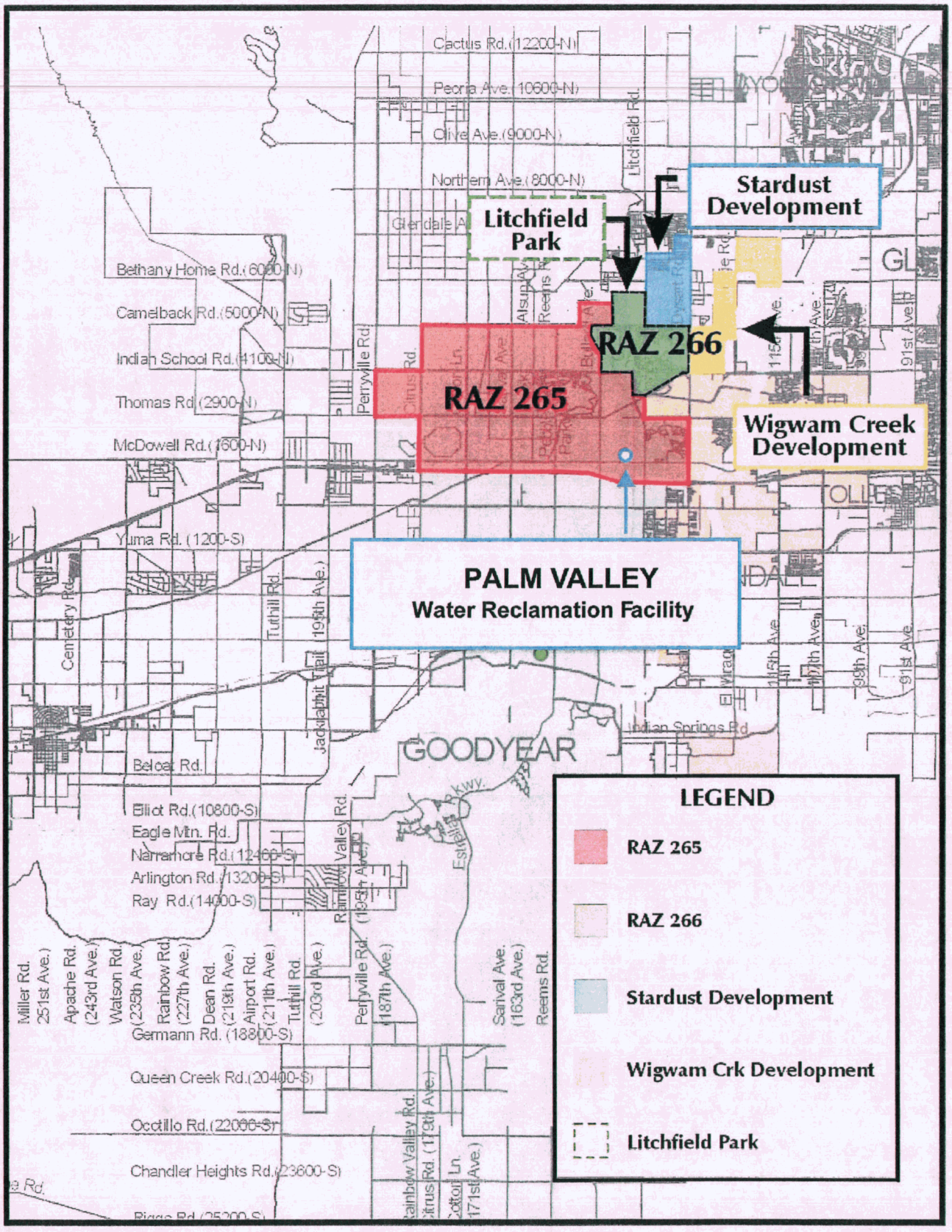
There are no known drainage courses within 1,000 feet of the project site. Wastewater effluent exceeds the current ADEQ Title 18 requirements for class A+ effluent, enabling unrestricted irrigation re-use. All of the effluent is currently being reclaimed and stored at two local golf courses (i.e., The Palm Valley Golf Course and The Pebble Creek Golf Course) and at an irrigation farm sump for irrigation. As the capacity increases with the expansion, the reclaimed water will be used to irrigate two additional golf courses currently served by LPSCo, numerous public parks, school and several residential and public landscape areas. It is estimated that the golf course and park irrigation demand in LPSCo's service area will be less than the quantity produced by the facility. Therefore, remaining effluent will likely be stored in a storage facility for groundwater recharge. *Figure 3* shows the existing and proposed water reclamation distribution system.

C. Proposed Design

The Phase II expansion of the Palm Valley WRF is expected to be completed and operational by 2006. It will be designed by Pacific Advanced Civil Engineering, Inc. (PACE), a licensed Arizona civil engineering firm, and constructed by Pacific Environmental Resources Corporation (PERC), a licensed Arizona contractor.



PACE PACIFIC ADVANCED CIVIL ENGINEERING	DATE 03/04	TITLE VICINITY MAP	FIGURE 1
	PAGE	JOB NAME Palm Valley Phase II Expansion	JOB NO. 7719E



PACE PACIFIC ADVANCED CIVIL ENGINEERING	DATE 03/04	TITLE LPSCo Service Area	Figure 2
	PAGE	JOB NAME Palm Valley Phase II Expansion	JOB NO. 7911E

The proposed Phase II Expansion design for Palm Valley WRF will be based on the existing treatment process using biological oxidation with the activated sludge process. The expansion will include additional screening, grit removal, anoxic/aerobic biological nutrient removal, tertiary filtration, ultraviolet (UV) disinfection, and advance sludge digestion. The Phase II secondary treatment process is a sequential batch reactor (SBR) system, similar to the existing SBR system. The SBR treatment process will utilize anoxic mixing, aerobic mixing, and static reaction capabilities to provide biological oxidation, nitrification, denitrification, phosphorous removal, and clarification within one reactor tank. To provide process redundancy and obtain a Phase II maximum month daily flow (MMDF) capacity of 8.2 MGD, two additional SBR tanks and an additional anoxic reactor tank will be constructed.

D. Project Contacts

Principal Developer:
Litchfield Park Service Company
Joel Wade, P.E. Manager of Engineering & Construction
111 W. Wigwam Blvd., Suite B
Litchfield Park, AZ 85340
(623) 935-9367

Principal Facility Operator:
Litchfield Park Service Company
111 W. Wigwam Blvd. Suite B
Litchfield Park, AZ 85340
(623) 935-9367

Design/Builder:
Pacific Environmental Resources Corp. (PERC)
Mike Krebs

Main Office:	Phoenix Office:
17520 Newhope Street, Ste 140	4620 E. Elwood St., Ste. B14
Fountain Valley, CA 92708	Phoenix, AZ 85040
(714) 481-7270	(480) 557-8525

Engineer of Record:
Pacific Advanced Civil Engineering, Inc. (PACE)
James A. Matthews, P.E. License # 34090

Main Office:	Phoenix Office:
17520 Newhope Street, Ste. 200	4620 E. Elwood St., Ste. B14
Fountain Valley, CA 92708	Phoenix, AZ 85040
(714) 481-7300	(480) 557-8525

Project Site:
14222 W. McDowell Road
Goodyear, AZ 85338
623-935-3005

II. GENERAL REQUIREMENTS

Design and Construction Standards

The design and construction of the Palm Valley WRF Phase II will be in conformance with the following codes:

- MAG – Uniform Details and Standard Specifications for Public Works Construction – 1998
- City of Goodyear Engineering Standards and Policies Manual
- ADEQ Engineering Bulletin 11 – 1978
- Uniform Building Code (UBC) – Latest Edition
- Uniform Plumbing Code (UPC) – Latest Edition
- Uniform Fire Code – Latest Edition

Permits

Table 1 list the permits required for Palm Valley WRF Phase II.

Table 1. Required Permits

Requirement	Regulatory Agency
Permit to Construct (ATC)	Maricopa County Environmental Services Department
Approval of Construction (AOC)	Maricopa County Environmental Service Department
Aquifer Protection Permit (APP) – Amend	Arizona Department of Environmental Quality
Groundwater Savings Facility Permit	Arizona Department of Water Resources
Reclaimed Wastewater Reuse Permit	Arizona Department of Environmental Quality
Air Quality Permit – Amended	Maricopa County Environmental Services Department
Grading Permit	City of Goodyear
Architectural and Zoning Approval – Amended	City of Goodyear
Building Permit	City of Goodyear
Flood Control	Maricopa County/Flood Control

Electrical Power Supply and Controls

The Palm Valley WRF has a 3000 amp service entrance and meter section installed at the north end of the facility. From the service pedestal, power is routed to a 3000 amp Automatic Transfer Switch (ATS). The transfer switch is fed by both the prime APS power source and a 1500 KW diesel powered generator. In the event that prime power is lost due to service provider failure or construction damage, the ATS will automatically start the generator and transfer power to generator service. Once prime power is restored, the ATS will automatically transfer back to prime power. The generator is equipped with a 12-hour fuel tank and automatic exerciser clock, which runs the generator once a week to ensure proper operation when needed.

From the ATS, power is routed to two independent sub-distribution panels, which currently supply power to all existing processes. The power from the sub-distribution

panel runs in parallel. In the event that one sub-distribution panel is out of service, the unit processor will still remain operational.

Similarly, in the Phase II expansion, a new 3000 amp service entrance will be provided along with an emergency generator (expected to be approximately 1500 KW). The new service entrance will be set up similarly to the existing service entrance with ATS, sub-distribution panels and emergency generator.

Currently, each of the buildings has two independent Motor Control Centers (MCC), powered by the sub-distribution panels. For the Phase II expansion, two new, independent MCCs will be installed. The MCCs are controlled by a local programmable logic control (PLC), which communicates via network to other PLC units in the plant. By having the command instruction local to each system, a PLC problem with one controller or network connection will not affect other controllers in the system.

All PLC units are currently, and will be Allen Bradley modular controllers. By providing commonality between PLCs, spare parts and service requirements will be reduced. The following completed Phase II processes will use PLC control:

- SBR Mechanical and Process Controls
- Influent Screening Process
- Effluent Filtration
- UV Disinfection
- Solids Processing and Dewatering

Potable and Non-Potable Water Systems

Potable water is currently available from the city's water mains. However, the new Phase II expansion building will not need a new potable water connection. Only reclaimed water will be plumbed to provide equipment wash down. Water for fire protection is already available from Phase I. Based on the Uniform Fire Code, the required fire flow for the entire facility will be approximately 2000 GPM for a duration of 2 hours.

Reclaimed water will be used to irrigate landscape around the Phase II Expansion, similar to the existing irrigation layout. Purple pipe will be used above and below ground to identify the reclaimed water lines from other potable and non-potable piping systems. Separation between potable and non-potable water lines will be maintain to MAG – Uniform Details and Standard Specifications for Public Works Construction, Detail 404-1.

Plumbing Color Coding and Marking Requirements

All exposed plumbing in the Phase II Expansion will be properly color coded and marked. The following color-coding will be used to identify and distinguish between plumbing and piping systems:

Process or Fluid Description	Color Requirement
Raw Untreated – Wastewater	Dark Gray
Secondary Treated – Wastewater	Gray
Tertiary Treated – Wastewater	Purple
Return Activated Sludge (RAS)	Dark Brown
Waste Activated Sludge (WAS)	Dark Brown
Compressed Air	Dark Green
Backwash / Wash Water Waste	Light Brown
Polymer Feed	Orange
Fire Protection	Red
Potable Water	Dark Blue

In addition, all pipes will be marked with identification markers and indicate direction of flow. All valves will be provided with stamped number identifiers. A list of valves, identifying numbers, intended use, and normal position will be maintained in the facility operation and maintenance manual.

Flood Protection

The Phase II facility will not be susceptible to flooding during a major storm event since the entire facility will be elevated at least five feet above the 100-year flood elevation. The site currently has storm water retention ponds which are adequate to handle the 100-year storm event after the Phase II expansion. Further details on storm water retention are provided in the *Palm Valley WRF Drainage Report* (PACE, Feb 2001).

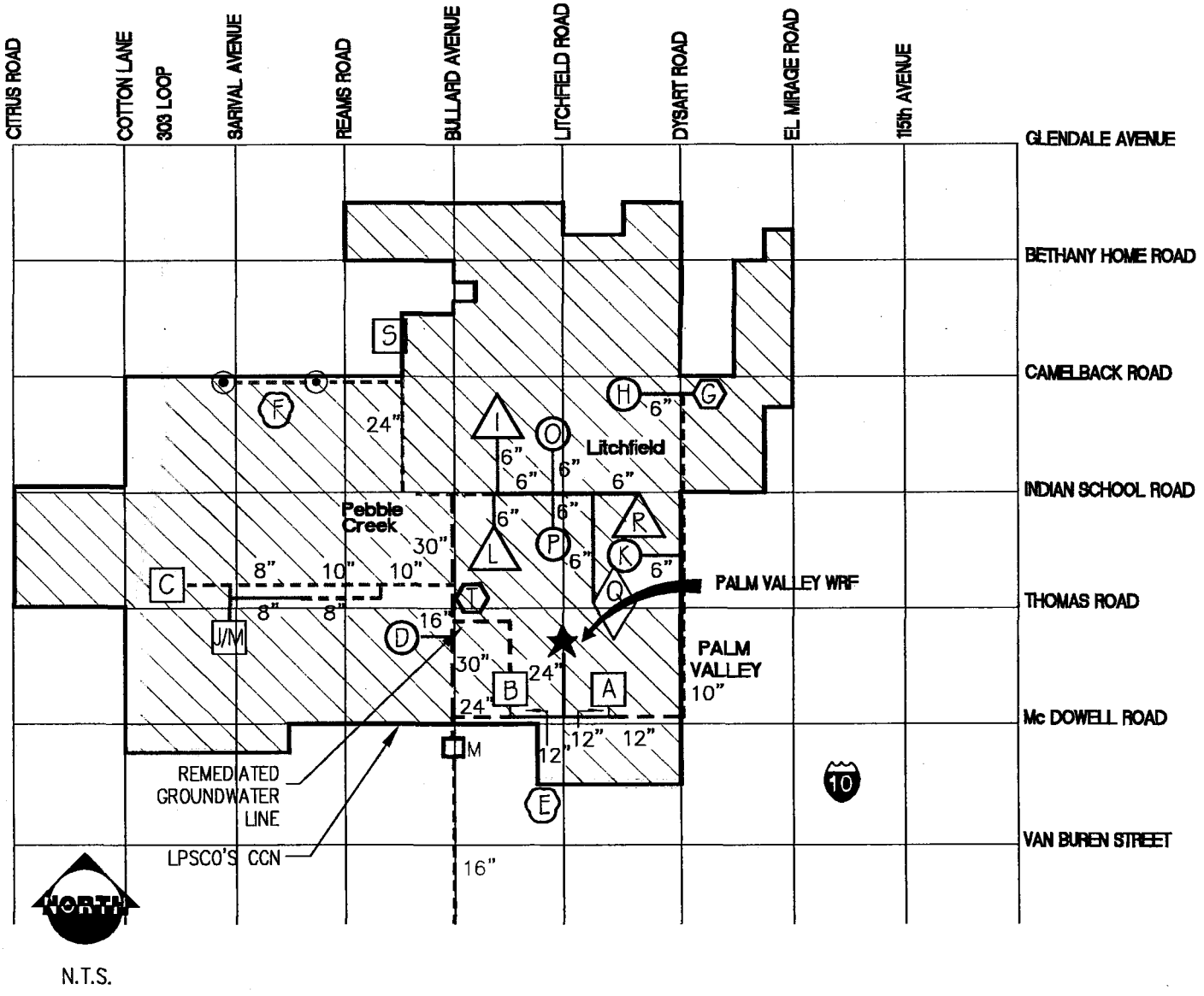
Erosion Control

A Stormwater Pollution Prevention Control program will be prepared in accordance with NPDES requirements. Final design of treatment facility grading, drainage, and erosion control has been submitted to the Maricopa County Flood Control District and has gained approval.

Effluent Disposal and Re-Use

Primarily, effluent will be stored in lined golf lakes within the City of Goodyear and Litchfield Park to be used for irrigation at golf courses and parks located within LPSCo service area. Because golf course and park demand for the reclaimed water will be less than the amount produced, a secondary discharge point to the Roosevelt Irrigation District (RID) Canal. A further detailed discussion on effluent utilization and disposal was provided in the *Litchfield Park Service Company Effluent Management Plan* (PACE, November 2001). *Figure 3* identifies the location of the proposed and existing reuse locations.

The intended reuse application will be for unrestricted access landscape irrigation. Therefore, the mandatory effluent water quality requirement includes disinfection to a non-detectable fecal coliform count (4 of 7 samples), less than 23/100 ml (single sample maximum) and total nitrogen of less than 10 mg/l. Irrigated areas, along with effluent handling and storage systems, will be posted with required signage reading, "CAUTION: RECLAIMED WATER - DO NOT DRINK" on a purple background. All on-site reclaimed water pipelines and sprinkler fixtures shall be color coded purple for reclaimed use identification.



LEGEND

- PROPOSED EFFLUENT PIPELINES
- EXISTING EFFLUENT DELEVERY SYSTEM
- EXISTING SYSTEM NO LONGER USED
- GOLF COURSES
- PARKS
- SCHOOLS/BUISNESSES
- CANALS
- LAKES
- FUTURE RECHARGE WELL/WELLS
- AGRICULTURAL IRRIGATION

PROPOSED DEVELOPMENT

- LPSCO. SERVICE AREA
- EX. PIPE TO BE UPSIZED

EFFLUENT REUSE CUSTOMERS

A. PALM VALLEY PHASE I
B. PALM VALLEY PHASE II
C. PEBBLE CREEK PHASE II
D. GOODYEAR PLANNED REGIONAL CENTER
E. SUNCOR FARMS
F. REEMS AND CAMMELBACK REUSE

EFFLUENT REUSE CUSTOMERS

G. AIRLINE CANAL (WIGWAM GOLF COURSE)
H. LITCHFIELD MUNICIPAL PARK
I. HIGH SCHOOL
J. PEBBLE CREEK PHASE III (9 HOLES)
K. LITCHFIELD MUNICIPAL PARK (TURTLE)
L. MIDDLE SCHOOL
M. PEBBLE CREEK PHASE III (9 HOLES)
O. LITCHFIELD MUNICIPAL PARK (SCOUT)
P. LITCHFIELD MUNICIPAL PARK
R. ELEMENTARY SCHOOL
Q. LITCHFIELD PARK MUNICIPAL LAKE
S. FALCON GOLF COURSE
T. ROOSEVELT IRRIGATION DISTRICT CANAL (RID)

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17802 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-5734 FAX. 848-4822

DATE 07/04

TITLE PROPOSED COMMUNITY AND RECLAIMED WATER DISTRIBUTION SYSTEM - SERVING ALL PROPOSED CUSTOMERS

FIGURE 3

PAGE

JOB NAME EFFLUENT MANAGEMENT PLAN 7911-E

The anticipated high water quality (low BOD, low nutrients) of the discharged effluent, along with the relatively low application rates, suggest no odor problems for spray-irrigated areas. Measures to be implemented for odor control include the discontinuance of irrigation, recirculation of effluent in storage lakes for further treatment, and application of odor reducing agents.

Hazardous Materials

The wastewater treatment facility will not accept any hazardous materials. LPSCo will develop and implement a pre-treatment program for commercial and industrial users and will conduct periodic tests and inspections to identify illegal dumping into the sewage collection system.

Spill Management Plan

The following plan is a recommended course of action **only.** LPSCo staff members will develop a working Spill Management Plan for the Phase II Expansion, as well as other management plans for proper operation and maintenance of the Palm Valley WRF.

This spill management policy is directed by the use of "best management practices" (BMP) for the identification, containment and clean up of any hazardous material spill related to the operation and maintenance of the wastewater treatment facilities.

The operation of the treatment plant and associated facilities will be under the direct supervision of LPSCo. They will provide all necessary materials and funds required for proper operation and maintenance. Proper and routine facility maintenance is the key to preventing unauthorized spills.

At no time, with the exception of the materials listed in *Table 2*, will hazardous materials be stored on-site. The daily plant operations and processes do not require the use of other hazardous chemicals or materials. *Table 2* lists the potential pollutants of concern and sources of contamination:

Table 2. Potential Sources of Hazardous Material Spill at Palm Valley WRF

Hazardous Material Description	Sources of Possible Contamination
Raw Domestic Wastewater	Mechanical or Electrical System Failure Causes System Overflow
Reclaimed Wastewater	Run-off From Irrigation Fields and Plant Hydraulic Overload
Screened Solid Waste Material	Improper Material Handling and Disposal
Sodium Hydroxide (Caustic)	Leak from Storage Tank
Sodium Hypochlorite	Leak from Storage Tank
Fertilizers	Run-off From Irrigation Fields
Activated Carbon	Improper handling/loading at Odor Control
Machine Oil	Improper Maintenance of Mechanical Equipment

As part of the daily operations of the wastewater treatment facility, raw domestic wastewater will enter the plant and be stored on-site for processing. Installed redundant pumping systems have been provided throughout the treatment process. In the event of

electrical failure, emergency back-up power will be provided by the stand-by generator for uninterrupted normal operations of the entire facility.

Solid domestic wastes will be removed daily from the raw domestic wastewater stream by the screening station. These solids will be comprised mostly of solid inorganic material, paper products, and grit. The material will be removed from the screen, conveyed, dewatered, bagged, and placed in a disposal container. All drain water will be directed back to the screening box and reintroduced into the waste stream for treatment. The influent screens, the grit vortex, and associated dumpsters will be located entirely indoors in the headworks room. The air contained within the headworks room will be exchanged and scrubbed continuously. At no time, will the maintenance staff be permitted to leave the container uncovered or otherwise exposed to the elements. The maintenance staff contracted with a licensed waste disposal company to periodically remove the contents of the containers and haul it to a sanitary landfill for proper disposal. LPSCo applied for and obtain a waste disposal permit for hauling and disposal of screened and grit waste.

Caustic, acid, and sodium hypochlorite, used for odor scrubbing, is stored in bermed chemical storage tanks within close proximity to the odor scrubber units. In the event of a release, the chemicals will be confined within surrounding berms, collected, and conveyed directly to the influent lift station.

Certain conditions may arise where the use of fertilizers is required for the maintenance of the on-site irrigation areas. When in use, fertilizer will be used in accordance with the manufacture's specifications and shall not be applied in excess of required dosage.

All materials required for proper maintenance of mechanical machinery will be stored on-site in a dedicated maintenance facility. When lubrication of machinery is required, the maintenance staff will transport the oil directly to the unit and follow the manufacturer's recommended procedure for lubrication. After service is complete, all unused volumes will be returned to their allocated storage area.

Confined Space and Safety Issues

All standard safety requirements will be adhered to during construction, operation and maintenance the Palm Valley WRF. Because the facility has covered tanks and an enclosed headworks area, OSHA Confined Space Entry Requirements will apply to the facility.

Tank entry is not required during normal operation and maintenance of the reactors and associated equipment. The jet aeration manifolds do not require any service or maintenance. The jet mixing pumps will be installed on guide rails for easy retrieval from the top of the tank. The access to each of the SBR pumps is located outside of buildings. Other submersible pumps can be accessed via a forklift from inside of the buildings by full drive approach access.

During tank maintenance, the associated reactor will be drained, cleaned, and the mechanical and structural systems will be inspected. Maintenance personnel performing this service will be required to be thoroughly knowledgeable of OSHA, Title 8, Section

5158 and related requirements including respiratory and fall protection, lockout, and fire prevention. In addition, the tank atmosphere will be continuously monitored for hazardous gas/toxin accumulation. Ancillary air ventilation will be provided prior to entry and an OSHA approved safety hoist will be available in case of emergency exit. OSHA requirements are provided in Title 29 CFR 1910. This includes, but is not limited to, the following:

- 29CFR1910.146 – Confined Space Entry
- 29CFR1910.134 – Respiratory Protection
- 29CFR1910.147 – Lock out – Tag out
- 29CFR1926.500 – Fall Protection

All submersible pumps and mixers will be supplied with FM approval, certified for "Explosion Proof" installation in Class I, Division I service areas. All control panels and associated wiring terminal boxes and pull boxes in the headworks and sludge processing areas will be NEMA 4X (Corrosion Resistant).

III. TREATMENT AND DISPOSAL

A. Existing Project Flows

Existing flows for the Palm Valley WRF are largely residential and expected to remain so based on proposed developments in surrounding regions in the LPSCo service area. Existing flow and biological loading for the Palm Valley WRF is provided in *Appendix A*. From the existing data and composite samples taken, PACE assumed an average biological loading of 300 mg/l BOD, 300 mg/l TSS, and 40 mg/l TKN. The hydraulic design of the Phase II expansion will provide for an additional maximum month daily flow (MMDF) capacity of 4.1 MGD, increasing the Palm Valley Facility MMDF treatment capacity to 8.2 MGD, a peak day flow of 16.4 MGD (2.0 x MMDF) and a peak hour flow of 22.1 MGD (2.7 x MMDF). The peaking factor of 2.7 was conservatively based on flow monitoring.

Table 3.
January -December 2003 Average Influent Flow Characteristics from LPSCo Service Areas

Average Wastewater Flow Influent MGD	1.9
Average Influent BOD5 (mg/l)	250
Average Influent TSS (mg/l)	230

B. Current and Projected Population

For the purpose of the MAG 208 filed in August 2000, four regional areas were used to define the total LPSCo service area. These four areas include the City of Goodyear's RAZ 265, 266 (Litchfield Park), the Stardust Development service area, and the Wigwam Creek service area. For planning purposes, these areas are expected to contribute wastewater flow to the proposed wastewater treatment plants.

Table 4 summarizes the population projection for each of the four service areas through the year 2020. The population numbers presented for RAZ 265 and 266 are taken from the June 1997 Maricopa Association of Governments (MAG) *Socioeconomic Projections Interim Report.* The Stardust Development and the Wigwam Creek Development service areas were assumed to be excluded from the RAZ 265 and 266 population numbers and are taken from separate sewer conveyance studies by SMF Engineering and Black & Veatch LLP.

Table 4. Population Projection for LPSCo Service Area through 2020

Population by Planning Area					
Year	RAZ 265[1]	RAZ 266[1] (Litchfield Park)	Stardust Development[2]	Wigwam Creek Development[2]	Total
2000	8,671	4,876	3,011	3,746	20,304
2005	11,336	6,517	6,500	7,200	31,553
2010	14,410	8,452	8,600	10,700	42,162
2015	20,493	12,561	Built-out	Built-out	52,354
2020	30,139	14,688	Built-out	Built-out	64,127

Notes:
1. Source: *June 1997 MAG Socioeconomic Projections Interim Report.*
2. Calculated by P.A.C.E. Full build-out AAD flows were taken from the Draft Stardust/Wigwam Creek Conveyance and Treatment Study. Full build-out for Stardust and Wigwam Creek was assumed for the years between 2008 and 2010. Calculation assumptions: Unit flow of 100 gpcpd and a 50% population increase every five years.

Future wastewater flows were studied in *Addendum Number 2 to the Wastewater Master Plan Litchfield Master Planned Community* (SMF Report) that was prepared by SMF Engineering Corporation in January 1998. Black and Veatch prepared the Preliminary Wastewater Planning Study for SunCor and Litchfield Park Service Company in July 1998. The SMF Report only provides full build-out wastewater flow projections. The Black & Veatch report used the full build-out wastewater flow projections from the SMF Report and calculated the flow projections over time. *Table 5* summarizes wastewater estimates based on MAG and Black & Veatch population estimates:

Table 5. Wastewater Flow Projections in LSPCo Service Area through 2020

Year	Wastewater Flow Projections (MGD)			
	Based on MAG Projections		Based on Black & Veatch Report	
	AAD	Peak Hourly[1]	AAD	Peak Hourly[1]
2000	2.03	5.48	1.32	3.56
2005	2.66	7.18	3.12	8.42
2010	3.43	9.26	5.49	14.82
2015	4.79	12.93	7.87	21.25
2020	6.41	17.31	10.24	27.65

[1] Calculated by PACE with a peaking factor of 2.7.

The wastewater flow projections from the Black & Veatch Report generally have a higher annual average day (AAD) flow than the MAG interim projects. For the purpose of this design, the Black & Veatch population numbers (and therefore the sewer flow rates) are assumed to be more accurate because the Black & Veatch report was specific to the Goodyear North Planning Area where as the MAG projections are based on countywide modeling. Additionally, recently compiled data for year 2000 and year 2004 measurement indicate that effluent production averaged of 1.02 MGD and 2.1 MGD, respectively, which is consistent with Black & Veatch Report projections.

C. Treatment Alternatives

Several wastewater treatment alternatives were previously evaluated for the Palm Valley WRF, as described in the *Palm Valley Phase I Design Report*, dated October 2001. The SBR treatment process was evaluated as the most viable option due to its small footprint, lower construction costs, ease of expansion and operational flexibility.

D. Project Wastewater Reclamation System Description

The Phase II Expansion facility will provide an average capacity of 8.2 MGD using a Sequential Batch Reactor (SBR) design. This facility will provide screening, grit removal, primary flow/load equalization, secondary biological oxidation, biological nutrient removal, secondary clarification, secondary flow equalization, filtration, UV disinfection, autothermal thermophilic aerobic digestion (ATAD), and sludge dewatering.

The Phase II expansion will continue to provide an advanced level of treatment for reuse in landscape irrigation and groundwater recharge. The design sizing for the SBR treatment facility is listed below.

Design Capacity	- Maximum Month Average Day Flow (MMDF)
Treatment Capacity	- Maximum Day Generation (2.0 x MMDF)
Hydraulic Capacity	- Peak Hour/Storm Flow Condition (2.7 x MMDF)

Note: The 2.7 peaking factor applied is based on current and projected flow patterns identified in both the SMF Engineering and Black and Veatch studies performed on the collection system that ranged from 1.9 to 2.7. Actual flow data from the first quarter of 2004 showed an average daily peaking factor of 1.6 and maximum peaking factor of 1.9 (see *Appendix A*).

The capacity figures for Phase II of the Palm Valley WRF are included in Table 6 and design calculations are provided in *Appendix B*.

Table 6
Basis of Design and
Unit Process Capacity Information

	Palm Valley WRF Phase I Capacity	Palm Valley WRF Phase II Additions	Palm Valley WRF Total Phase II Capacity
Design Flows			
Maximum Month Day Flow (MGD)	4.1	4.1	8.2
Peak Day Flow (MGD)	8.2	8.2	16.4
Peak Hour Flow (MGD)	11.1	11.1	22.1
Influent Parameters			
BOD5 (mg/l)	300	300	300
TSS (mg/l)	250	300	300
TKN (mg/l)	40	40	40
Effluent Parameters			
BOD5 (mg/l)	<5	<5	<5
TSS (mg/l)	<5	<5	<5
TN (mg/l)	<10	<10	<10
Turbidiy (NTU)	<2	<2	<2
Coliform (fecal) (FCU/100ml)	non-detected	non-detected (four of seven samples / not to exceed 23)	non-detected
Influent Lift Station			
Length (feet)	25.25	-	25.25
Width (feet)	25.25	-	25.25
Area (ft^2)	638	-	638
Maximum Liquid Depth (feet)	7	-	7
Minimum Liquid Depth (feet)	3	-	3
Working Volume (gallons)	19,076	-	19,076
Pumping Capacity w/ largest Unit Out of Service (GPM / MGD)	7700 / 11.1	-	7700 / 11.1
Pump #1 Capacity	3850 / 5.55 (Flygt 3300 - 75 HP)	-	3850 / 5.55 (Flygt 3300 - 75 HP)
Pump #2 Capacity	3850 / 5.55 (Flygt 3300 - 75 HP)	-	3850 / 5.55 (Flygt 3300 - 75 HP)
Pump #3 Capacity	3850 / 5.55 (Flygt 3300 - 75 HP)	7116 / 11.1 (Flygt 3306 - 150 HP)	7116 / 11.1 (Flygt 3306 - 150 HP)
Pump #4 Capacity (Flygt 3306 - 150 HP)		7116 / 11.1 (Flygt 3306 - 150 HP)	7116 / 11.1 (Flygt 3306 - 150 HP)
Headworks			
Screen #1 Capacity (GPM / MGD)	3850 / 5.55	-	3850 / 5.55
Screen #2 Capacity (GPM / MGD)	3850 / 5.55	-	3850 / 5.55
Screen #3 Capacity (GPM / MGD)	-	3850 / 5.55	3850 / 5.55
Screen #4 Capacity (GPM / MGD)	-	3850 / 5.55	3850 / 5.55
Total Screening Capacity (GPM / MGD)	7700 / 11.10	7700 / 11.10	15,400 / 22.2
Grit Removal Capacity (GPM / MGD)	7700 / 11.10	7700 / 11.10	15,400 / 22.2

Table 6
Basis of Design and
Unit Process Capacity Information

Anoxic Reactor			
Length (feet)	106.25	118.25	-
Width (feet)	52.25	38.25	-
Normal High Liquid Depth (feet)	15.0	15.0	15.0
Minimum Liquid Depth (feet)	3.5	3.5	3.5
Area of Anoxic Reactor Excluding Lift Station (ft^2)	4,781	4,523	9,305
Total Working Volume (gallons)	536,549	507,555	1,044,104
Average Hydraulic Retention Time (Hours)	6.3	5.9	6.1
Maximum Liquid Depth (feet)	26	26	26
Surge Volume (Including 1 Batch) (gallons)	598,417	577,158	1,175,574
Minutes of Surge Storage @ Peak Hour Flow	78	75	76
Mixing Type	Jet Aeration	Jet Aeration	Jet Aeration
Number of Mixers	1	1	2
Mixing HP	45 HP	45 HP	90 HP
Aeration Capacity (CFM)	1,600 CFM @ 7 PSI	1,600 CFM @ 7 PSI	3,200 CFM @ 7 PSI
Blower HP	*This Capacity is Bled from the Main Aeration Blowers*		
SBR Fill Pumps			
Number of Fill Pumps	3	3	6
Minimum Capacity of Fill Pump Ea. (GPM)	5500	5500	5500
Fill Pump HP (VFD)	45 HP	45 HP	45 HP
SBR Reactors			
Type of Treatment	SBR	SBR	SBR
Number of Reactors	2	2	4
Length (feet)	160.25	148.25	-
Width (feet)	52.25	58.25	-
Maximum Liquid Depth (feet)	25	25	25
Working Volume / Reactor (gallons)	1,565,763	1,614,850	3,180,613
Average Hydraulic Retention Time (Hours)	36.7	37.8	37.2
Total HRT for Anoxic + SBRs	42.9	43.8	43.3
Decant Depth (feet)	6.5	6.3	6.4
Decant Volume / cycle (gallons)	205,000	205,000	205,000
Decant Rate (GPM)	5,694	5,694	22,778
Design MLSS (mg/l)	3500	3500	3500
Cycle Times (min) at Average Day Flow			
Fill	19	19	19
React / Interact	125	125	125
Settle	50	50	50
Decant	36	36	9
Idle	58	58	85
Total Time Per Cycle	288	288	288
Number of Cycles / Day	10.0	10.0	10.0
Total Available Aeration Time per Cycle (Min / Hrs)	202 / 3.4	202 / 3.4	202 / 3.4

Table 6
Basis of Design and
Unit Process Capacity Information

Aeration and Mixing Systems			
Mixing Type	Jet Aeration	Jet Aeration	Jet Aeration
Design Oxygen Transfer Efficiency	0.25	0.25	0.25
Air Requirement per Basin (CFM) Based on BOD & TKN	3,042	3,042	3,042
Total Available Aeration Time per Day (Hrs)	14.4	14.4	14.4
Design Aeration Timer per Day (Hrs)	12.0	12.0	12.0
Number of Mixers / Reactor	3	3	3
Number of Jets per Mixer	16	16	16
Total Number of Jets per Basin	48	48	48
Design CFM per Jet	63.4	63.4	63.4
HP per Mixer	45 HP	45 HP	45 HP
Number of Blowers	5	5	10
Aeration Capacity per Blower (CFM)	1,500 @ 11 PSI	1,500 @ 11 PSI	1,500 @ 11 PSI
Blower HP	125	125	125
Decant Surge Tank			
Number of Surge Tanks	1	0	1
Length (feet)	52.5	-	52.5
Width (feet)	52.5	-	52.5
Max Liquid Depth (feet)	16.9	-	16.9
Minimum Liquid Depth (feet)	3.0	-	3.0
Working Surge Volume (gallons)	286,573	-	286,573
Number of Filter Feed Pumps (all VFD)	2	1	3
Capacity of Each Filter Feed Pump (GPM)	1,000 - 5,700	1,000 - 5,700	1,000 - 5,700
Clearwell			
Length (feet)	52.5	-	52.5
Width (feet)	25.5	-	25.5
Max Liquid Depth (feet)	21.0	-	21.0
Minimum Liquid Depth (feet)	3.0	-	3.0
Working Volume (gallons)	180,249	-	180,249
Effluent Filtration System			
Filter Type	Aquadisk - 8	Aquadisk - 8	Aquadisk - 8
Filter Media Type	Woven Fabric	Woven Fabric	Woven Fabric
Number of Units	3	1	4
Filtration Area per Filter Unit (SF)	430.4	430.4	430.4
Ave. Filtration Capacity @ 4 GPM /SF (all in service)	5,165	1,722	6,886
Peak Filtration Capacity @ 8 GPM / SF	10,330	3,443	13,773
Backwash as % Through Put	0.75%	0.75%	0.75%
Total Backwash Volume / Day (gallons)	30,750	30,750	61,500

Table 6
Basis of Design and
Unit Process Capacity Information

UV Disinfection System			
UV Type	Medium Pressure	Medium Pressure	Medium Pressure
Number of Banks	7	7	14
Capacity / Unit @ 100 mJ/cm^2 and 65% Transmittance (GPM)	1,000	1,000	1,000
Number of Lamps / Bank	6	6	6
Capacity with One Bank Out (GPM)	6,000	6,000	12,000
KW Rating of Lamp	6	6	6
KW Installed	252	252	504
Sludge Digestion and Processing			
Design Sludge Yield Factor	0.8	0.80	0.80
Lbs of Dry Solids / Day from Secondary Treatment @ SYF = .8	8,207	8,207	16,413
Volume of WAS per Day @ 3500 MLSS (gallons)	281,143	281,143	562,286
% concentration after thickening	4	4	4
Volume of Thickened WAS Entering ATAD (gallons)	24,600	24,600	49,200
Type	Autothermal Thermophilic Aerobic Digestion		
Number of Reactor	2	1	3
ATAD Length	52.5	52.5	52.5
ATAD Width	25.5	25.5	25.5
ATAD Working Depth	19.0	19.0	19.0
Working Volume (gallons)	380,526	190,263	570,789
Mixing Type	Jet Aeration	Jet Aeration	Jet Aeration
Number of Mixers per ATAD Chamber	1	1	1
HP per Mixer	45 HP	45 HP	45 HP
Number of Blowers per ATAD Chamber	1	1	1
Aeration Capacity per Blower (CFM)	2,000 @ 8.5 PSI	2,000 @ 8.5 PSI	2,000 @ 8.5 PSI
Blower HP	100 HP	100 HP	100 HP
Type	Aerobic Digestion	Aerobic Digestion	Aerobic Digestion
Number of Reactors	1	1	2
Length (feet)	79.5	79.5	79.5
Width (feet)	52.5	52.5	52.5
Maximum Water Surface (feet)	21	21	21
Aerobic Digester Volume (gallons)	655,613	655,613	1,311,225
Lbs of Sludge after Digestion (40%)	5,580	5,580	11,161
Volume of Sludge after Digestion	16,728	16,728	33,456
On-site Liquid Storage (Days)	147	113	130
Sludge Dewatering			
Type	Decanting Centrifuge	Decanting Centrifuge	Decanting Centrifuge
Number of Units	1	1	2
Ave. Loading Capacity of Centrifuge (GPM)	90	90	180
Pounds of Sludge to Centrifuge per Day	5,580	5,580	11,161
Gal of Sludge to Centrifuge per Day	16,728	16,728	33,456
Design % Solids in Feed	4.0	4.0	4.0
Design % Solids in Cake	20	20	20
Total Hours of Operation / Day	1.5	1.5	1.5

1. Phase II Process Design Description

To provide the required increase capacity, The Phase II Expansion will require constructing a separate second SBR facility containing two SBR basins and an anoxic reactor, along with a blower building and auxiliary equipment. The expansion will also require modifications to the existing facility by providing additional pumping capacities in the existing lift station, surge basin, and clear well; screening and grit removal; and filtration and disinfection. The process flow schematic is shown in *Figure 4*.

Influent Lift Station:

Wastewater will enter the facility through a 36-inch ductile iron pipe to the existing influent lift station located directly underneath the existing headworks building. The lift station is partition inside the facility's anoxic reactor and is approximately 25 feet wide, 25 feet long and 37 feet deep. Because the invert of the sewer connection is 30 feet below grade, the lift station profile extends 7 feet below the sewer influent line to prevent surcharge of the sewer. The 7 feet, including some freeboard, provides a working volume of approximately 19,000 gallons.

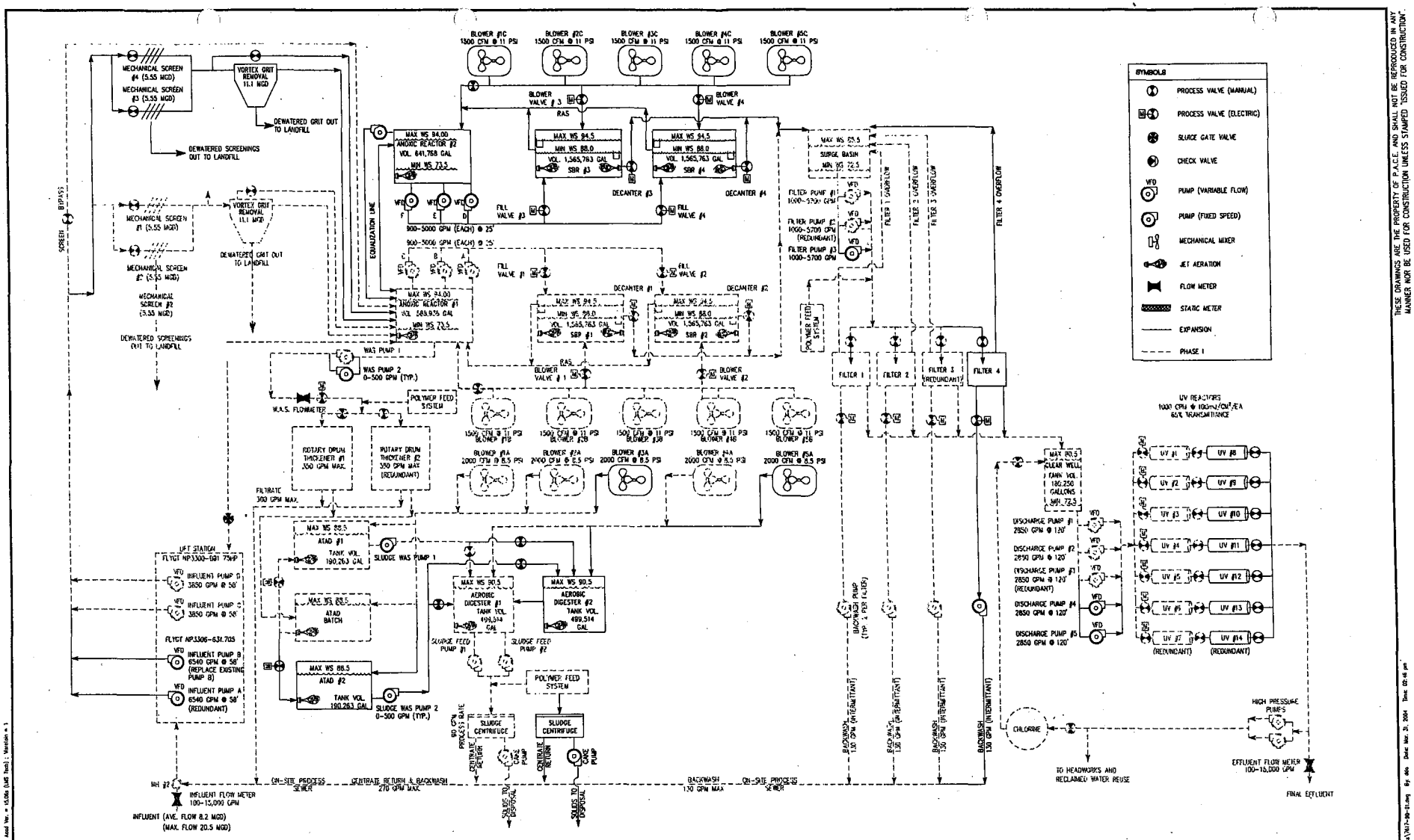
With an anticipated peak hour flow of 22.1 MGD (8.2 MGD x 2.7 peaking factor), one of the existing 75-hp submersible lift station pump will be replaced with a new 150 HP pump. A fourth 150 HP pump will be added to provide 22.2 MGD with the largest pump out of service. The pumps are controlled by a continuous level measurement sensor. The wet well control system automatically rotates operation of the pumps as lead, lag and stand-by, with the lead pump operating as a VFD driven pump. The controller maintains normal operating depths of 5.5 feet above the sump floor (high) and 3.0 feet above the sump floor (minimum).

Headworks – Screening and Grit Removal

The headworks, located inside the operations building, will be expanded to provide approximately twice the treatment capacity of the existing headworks. Two additional mechanical screens with ¼" openings will be installed, along with an additional vortex grit removal unit. Each screening system will include automatically cleaned screen surface, spiral solids conveyer, high pressure solids washer, solids de-watering compactor, and solids bagging unit. Each screen unit will have a capacity of 5.55 MGD. The total screening capacity of the expanded headworks will be 22.2 MGD.

An internal weir within each screen unit will provide for unattended, automatic overflow by-pass of the screens. The screening units will be supplied as matching packaged systems constructed out of 304 and 316 stainless steel and enclosed in a box to reduce odor emissions into the screening room.

From the new screens, wastewater will flow by gravity to the vortex grit removal unit, which will also mirror the existing grit vortex unit. The new grit vortex unit will be identical to the existing unit. The unit will be constructed from stainless steel and be provided complete with a control panel and air circulation blowers. The grit unit will be fully covered with an integrated stainless steel cover. The grit unit will add an additional 12 MGD of peak capacity for a total grit removal capacity of 24 MGD.



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NO	BY	DATE		DATE	APP.

JOB
PALM VALLEY WRF
PHASE II EXPANSION
SBR WASTEWATER RECLAMATION FACILITY
GOODYEAR AZ

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17802 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-3734 FAX. 848-4922

Pacific Environmental Resources Corp.

SCALE	NONE
DESIGNED	JAMES A. MATTHEWS
DRAWN	OAD
CHECKED	JAM
DATE	06/13/02
JOB NO.	7617E

TITLE
PROCESS FLOW SCHEMATIC

FIGURE
04
JOB NO. 7617-E

A by-pass pipeline and manual value will allow the operator to isolate the grit unit for service and cleaning.

Grit will be periodically pumped from the grit hopper located at the bottom of the unit and sent to a grit screw classifier where grit will be conveyed and de-watered for disposal.

Anoxic Reactor

A new anoxic reactor will be constructed as part of the expansion facility. The anoxic reactor will be 38.25 ft by 118.25 ft by 26 ft deep, providing a total volume of approximately 879,645 gallons and a working volume of approximately 507,555 gallons. From the existing headworks, wastewater will flow by gravity to the existing anoxic reactor located directly below the headworks building. Two new 24-inch ductile iron equalization lines will be installed, hydraulically connecting the two anoxic reactors. A mixer pump will be installed on one of the equalization line to induce a completely mixed system between the two anoxic reactors.

The new anoxic reactor will contain three 45 HP SBR fill pumps and two 15 HP mixers. The three submersible SBR fill pumps will be installed with variable frequency drive controllers. The pumps will automatically rotate between lead (VFD), lag, and stand-by. Based on the level in the anoxic reactor, the fill pumps automatically alternate filling the "in-loop" SBR reactor and providing return activated sludge (RAS) back to the anoxic reactor. The fill pumps will be identical to the existing anoxic and SBR jet pumps in Phase I to provide additional reliability and operations flexibility. Each fill pump will have a capacity of 5,570 GPM at 20 feet of head. Therefore, two pumps in operation (11,140 GPM) will be more than capable of meeting the additional peak hourly flow of 7,700 GPM (11.1 MGD) with one unit out of service.

The operation of the Phase II anoxic reactor is similar to the existing anoxic reactor. The liquid level in the anoxic reactor controls the operation of the two new SBR basins (SBR 3 and SBR 4 – to be discussed in the next section). When the level in the anoxic reactor reaches the pre-set high level, the influent valve to SBR 3 is closed and the influent valve to SBR 4 is opened. The mixing and aeration in SBR 3 is turned off and the reactor is sent into timed "settle" mode. When the settle timer times-out, SBR 3 enters the "decant" mode of operation. While SBR 3 is in "settle" and "decant" modes, two of the fill pumps in the anoxic reactor fill SBR 4. When SBR 4 reaches the crest of the RAS weir (constructed as part of the tank cover support structure) aerated mixed liquor spills over the weir and runs in the trough back to the anoxic reactor. SBR 4 is now said to be in "interact" mode because the SBR reactor is "in-loop" with the anoxic tank. This "interact" mode continues until the anoxic pre-set high liquid level is again reached at which time the influent valve to SBR 4 closes and the influent valve to SBR 3 opens and the cycle starts again. The high level set point of 16.0 feet in the anoxic reactor allows for peak hour flow surge storage up to a depth of 25.0 feet. This additional 9 feet of storage allows for the SBRs to maintain fill and draw operation up to the peak hour flow without a fill/decant scenario.

During the "interact" mode, the SBR reactor "in-loop" acts as the aeration basin, providing dissolved oxygen for BOD_5 reduction and ammonia conversion. When the nitrified mixed liquor flows back to the anoxic reactor, the high carbon content, low

D.O. and high degree of mixing provides optimal conditions for denitrification. In addition, as with traditional SBR technology, the operator will have the ability to cycle air delivery on and off in the SBR reactors to facilitate further reduction in total nitrogen and energy savings due to reduced mechanical equipment operation.

The RAS troughs in the SBRs also provide scum removal during the "interact" phase. As scum develops on the water surface of the SBR, it is flushed into the trough and returned to the anoxic reactor. The mixing in the trough and the free-fall into the anoxic reactor will re-entrain the scum into the water, reintroducing it back into the system for subsequent biological food mass.

Sequential Batch Reactors

The Palm Valley Phase II Expansion will add two addition SBR basins to the existing Palm Valley WRF, providing a total of four SBR basins. Each of the two SBR basins, SBR 3 and SBR 4, will be 148.25 feet by 58.25 feet by 26 feet deep (25 foot working depth), providing a working volume of approximately 1.6 million gallons each. Each basin provides mixing and aeration via submerged jet aeration manifolds and positive displacement blowers. Each reactor contains three 45 HP jet mixing pumps, three 16 jet mixing manifolds and six 19 foot long fixed, solids excluding decanters. Each mixing pump provides 5,500 GPM at 20 feet of total dynamic head to drive the jet aeration system. The 1,500 CFM blowers are staged and cycled on and off automatically by the PLC controller based on operator set points. Five blowers are provided for the pair of SBR reactors, two blowers can provide up to 3000 CFM per basin with the fifth blower installed as backup. Because air is not delivered on a continuous basis, electrically actuated valves control how SBR basins will receive air from the blowers. In this respect, all five blowers are available to each of the SBR basins. During normal operation, the aeration system is designed to deliver 63 CFM per nozzle or 3000 CFM per basin. If one of the motor operated valves is out of service, the blowers can be paired and isolated for independent aeration of each SBR at 3000 CFM.

From the anoxic reactor, water is pumped to one of two SBR reactors. Each of the reactors has a total working volume of 1,615,000 gallons. Each blower will be supplied with a sound reduction enclosure. The enclosure will reduce the anticipated noise level of 95 dBA to approximately 80 dBA. In addition, the blowers will be housed in a masonry building, which will provide an additional 6dBA reduction outside of the structure. Operators will be required to wear ear protection when working in and around operational blowers.

The SBR reactors and associated equipment have been designed to reduce the incoming Biological Oxygen Demand (BOD) from an average concentration of 300 mg/l to less than 5 mg/l (more than 98% removal). In addition, the aeration system will provide complete nitrification of average influent ammonia concentrations of 40 mg/l.

The SBR basins will cycle mixing and aeration to provide a significant degree of denitrification. As indicated above, mixed liquor suspended solids will be returned to the anoxic reactor for conditioning and further denitrification.

The facility will be able to self regulate dissolved oxygen levels in both SBR reactors and the anoxic reactor. This will be accomplished by programmable logic control (PLC) and D.O. sensors located in the reactor basins. The control system for the facility will allow both D.O. and timed modes of aeration control.

Based on a level signal from the anoxic reactor, the SBR basins will operate in sequence for the purpose of settling. When an SBR basin enters the settling mode, all inflow is diverted to the other SBR reactor. The timed settle period provides a quiescent tank in which unhindered settling is rapidly achieved. With an anticipated 45 minute settle period, the plant design allows for settle depths of several feet below the 6.3 ft decant depth (approximately 410,000 gallons). During settle and decant, complete isolation (no fill) is maintained up to the peak hour flow rate.

In the scenario where one SBR basin is out of service, the facility can be operated to process wastewater at the design flow rate. The treatment process will be altered slightly by having the anoxic reactor participate in the aerobic wastewater treatment process. Normally, the anoxic reactor will operate at only half its volume (i.e., the high water level is only at 15 feet instead of 26 feet). However, because the additional volume in the anoxic is designed to accommodate one full batch and has all the mixing and aerating capabilities of the SBR, the anoxic reactor would perform as both an equalization tank and an aeration tank. By mixing and aerating the incoming influent prior to sending it to the SBR, it effectively reduces the amount of aeration required in the SBR, hence reducing the overall reaction time needed in the SBR reactor. In addition to volume capacity, the air needed to handle the BOD loading is more than sufficient due of the blower configuration. The blowers that are typically assigned to the SBRs can be reassigned to the anoxic reactor by adjusting manual air valves, supplying up to 1600 CFM of air to the anoxic reactor. In this mode of operation, the anoxic reactor acts as an SBR with no settle or decant and can effectively reduce the BOD and ammonia entering the SBR reactor. The SBR reactor provides cyclic aeration to complete the oxidation of BOD and ammonia and provide denitrification.

In addition, equipment, such as pumps and manifolds, are chosen and sized to allow for equipment redundancy. In cases where an SBR basin has to be taken out of service because of mechanical reasons, the failed equipment can be replaced within a few hours. The jet pumps and fill pumps in the SBRs, ATADs, aerobic digesters, and the anoxic reactor are all the same model. Thus, if one pump is out of service, another pump (such as an installed redundant pump) can be used to replace the failed pump.

Decant Surge Tank

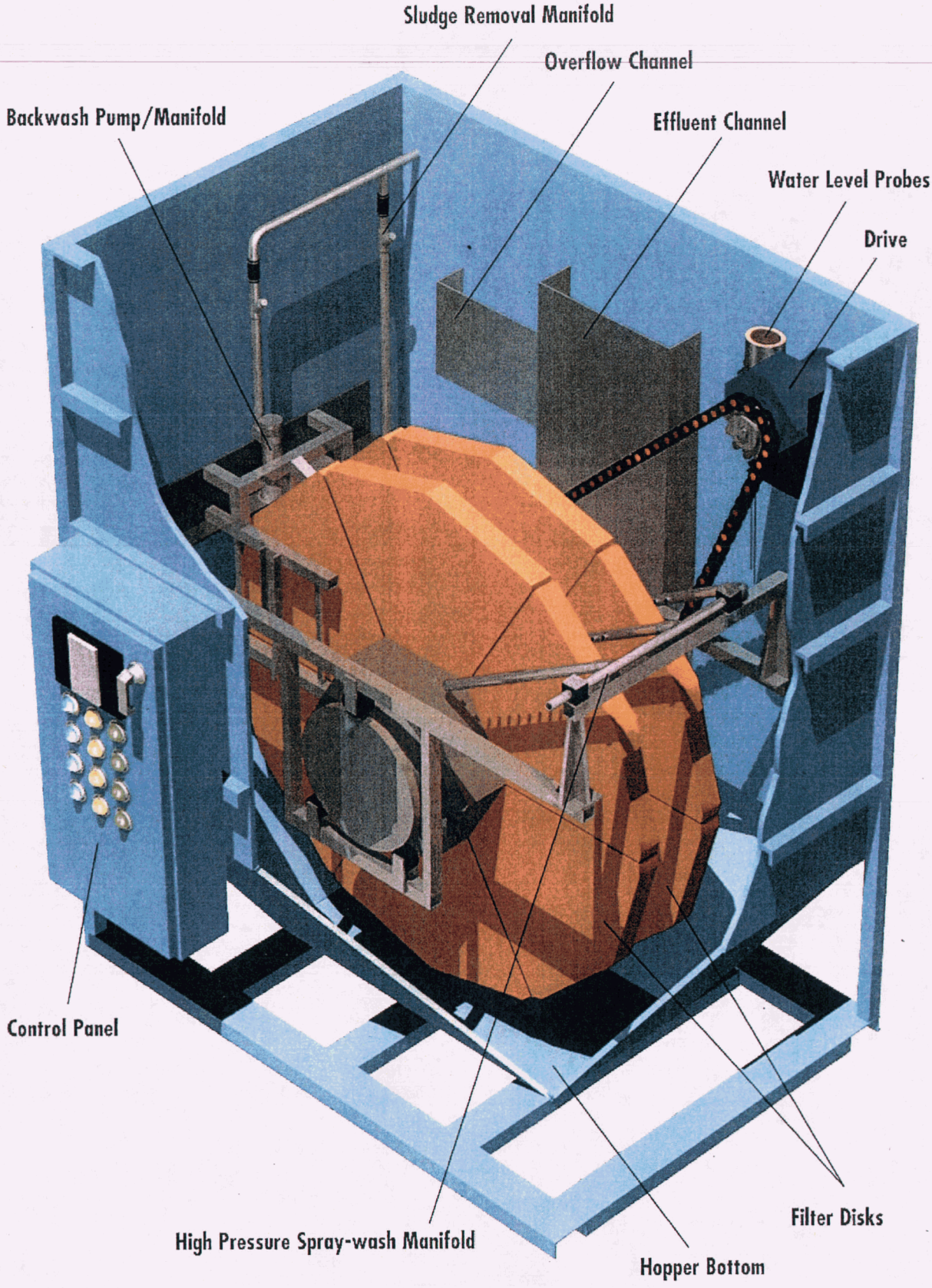
Upon completion of the settle time, 6.3 feet of water will be decanted at a rate of 11,400 GPM from the SBR reactor into a surge tank. The surge tank has a working volume of 286,500 gallons. With this volume, the tank provides a hydraulic buffer for downstream processes. The surge basin contains two VFD vertical turbine pumps (one redundant). Each pump has a peak capacity of 5,700 GPM at 36 feet total dynamic head and a minimum pumping rate of 1000 GPM. One additional, matching pump will be added to provide Phase II capacity. When the level in the surge tank is between the high and low level set points, the discharge rate of the filter feed pumps will be automatically

adjusted based on the average wastewater flow rate into the facility. The average incoming wastewater flow rate will be computed by the main PLC every 15 minutes based on information provided by the influent flow meter located on the discharge to the influent lift station. In the absence of signal from the influent flow meter, the flow will be maintained at an operator pre-set value. When the basin level is below the low set point, the feed pump will operate at the minimum 1000 GPM flow rate. When the level is above the high set point, the filter feed pump will operate at a peak flow rate of 5,700 GPM.

Tertiary Filtration

Secondary treated wastewater will be discharged from the filter feed pumps to the Aquadisk filter units. Currently three pre-packaged 8 disk filter units are in place. A fourth pre-package filter unit will be installed to provide a total of four (4) Aquadisk 8-disk filter units. The Aquadisk filter units use a cloth media, gravity filtration process and are consisted of 8 woven fabric covered disks (see *Figures 5A and 5B*). Secondary wastewater enters the filtration unit through the influent control valve and is distributed evenly in the filter vessel by the influent weir. As water flows through the media, solids are retained on the cloth. Filtered water is collected within the sub-structure of the disk and conveyed to the center collection shaft. The collection shaft is connected to the sidewall of the filter vessel and is free to rotate about its center axis. From this connection, water flows up and out of the discharge port on the other side of the filter unit. As solids accumulate on the media, the difference between the influent and effluent level increases until it reaches 12" at which time automatic backwash is initiated. The backwash process uses a set of two vacuum shoes, which are fixed close to the surface of the media. During backwash, a motor and chain drive unit rotates the disks as the vacuum shoes remove solids from the media. Each 8-disk unit will backwash 2 disks at a time with a maximum backwash waste rate of 130 GPM. The other 6 disks remain in service during backwash. It is estimated that the total backwash volume will be 0.75% (123,000 gallons) of the treated volume at maximum monthly design flow (16.4 MGD). The backwash water will be returned to the head of the plant for re-treatment. Because of the relatively low return rate, the filter operation will not have an impact on secondary treatment capacity.

Each filtration unit has an average day treatment capacity of 2.8 MGD (1950 GPM) and a maximum treatment capacity of 5.33 MGD (3700 GPM). Each filtration unit will be supplied with its own PLC control panel and starters for all packaged equipment. The control system will be networked to the SCADA system for on-line monitoring and data logging. An on-line turbidity monitor will be installed on the discharge from the



PACE PACIFIC ADVANCED CIVIL ENGINEERING	DATE 05/2003	TITLE AquaDisk Filter System	FIGURE 5A
	PAGE	JOB NAME	JOB NO.

Applications

Tertiary Treatment
- Conventional activated sludge
- Extended aeration activated sludge
- SBRs
- Oxidation ditches
- RBCs
- Trickling filters

Reuse/recycle

Industrial process streams

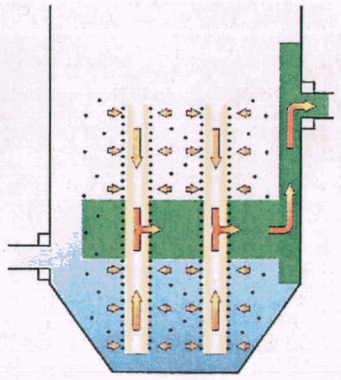
Phosphorus removal

Color removal

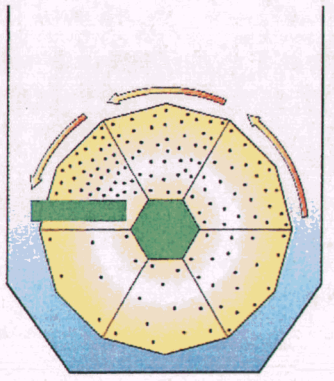
Lagoon effluent

Precipitate removal

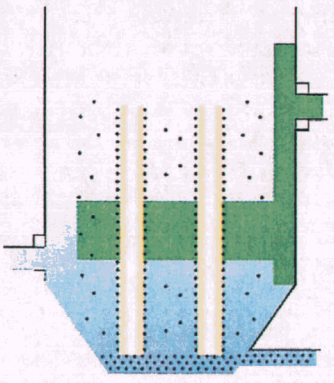
Operation of the AquaDisk



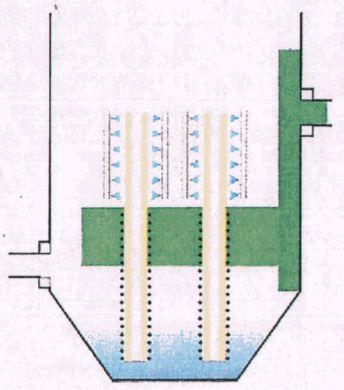
A Inlet wastewater enters the tank or basin. By gravity, liquid passes through the cloth membrane. As solids accumulate on the media, a mat is formed, and the liquid level in the tank or basin increases. The filtered liquid enters the internal portion of the disk where it is directed to final discharge.



C At a predetermined level or time, the backwash cycle will be initiated. Solids are backwashed from the surface by liquid suction from both sides of each disk. During backwash, disks are cleaned in multiples of two, unless a single disk unit is utilized. Disks rotate slowly, allowing each segment to be cleaned. Backwash water is directed to the headworks. Filtration is not interrupted during this cycle.



B The AquaDisk filtration process requires no moving parts during filtration. Tank contents remain in a quiescent environment, allowing heavier solids to settle to the bottom portion of the filter tank. These solids are then pumped on an intermittent basis back to the headworks, digester or other solids collection area of the treatment plant.



D An automatic, intensive cleaning process can be initiated as needed to thoroughly clean and prevent any biogrowth on the cloth media. This cleaning process is achieved by a high-pressure spray which is an integral feature of the AquaDisk. All operational functions are automatic and are controlled by a simple PLC.

PACE
PACIFIC ADVANCED CIVIL ENGINEERING

DATE	TITLE	
05/2003	AquaDisk Filter System	FIGURE 5B
PAGE	JOB NAME	JOB NO.

filtration system to monitor effluent quality. The turbidity meter will be connected to the SCADA and auto-dial alarm system.

The filtration system is designed to receive secondary treated wastewater with an average TSS of 15 mg/l and produce effluent with less than 5 mg/l TSS. The effluent turbidity will be maintained at less than 2 NTU. In addition, a polymer feed system will be provided to ensure that effluent quality is met. If TSS break through occurs, polymer may be added prior to filtration to coagulate the suspended solids for ease of filtration.

Clear Well/Discharge Pump Station to UV Units

From the disc filters, tertiary-treated water will flow by gravity to the existing UV pump station/clear well. For the Phase II Expansion, two additional VFD vertical turbine discharge pumps will be added to provide a total of five (5) identical, 2850 GPM pumps. These pumps will operate based on high and low level set points in the clear well and a variable speed controller to maintain near constant discharge flow independent of discharge pressure. As the level rises in the clearwell, the lead pump will increase it's discharge rate until full speed is achieved at which point the full speed starter on the lead pump will activate and the first lag pump will be called to run at low speed. If the clear well continues to rise, the first lag pump will increase discharge rate up to its maximum speed. This sequence will then be followed by the second and third lag pumps. The fifth pump will act as a redundant pump. With a low water level of 3 feet off the tank floor and a high water level at 21.0 feet, the usable pumping volume in the clear well is 180,250 gallons.

The discharge pump station is equipped with an electronic flow meter to continuously transmit instantaneous and totalized flow to the PLC. This data is used to report final discharge volumes and assist in plant process performance evaluations.

UV Disinfection

Filtered secondary treated wastewater is pumped from the clearwell through a pressurized ultraviolet (UV) disinfection system. The UV system is designed to provide a non-detectable fecal coliform concentration. This level of disinfection exceeds the current Arizona state standards for unrestricted reuse of Class A+ reclaimed water.

The existing UV system consists of seven identical closed vessels, medium pressure units. Seven additional units will be installed in the Phase II Expansion. Identical to the existing units, each of the new UV unit will contain six 6 KW lamps, UV transmission monitor/probe, temperature sensor and automatic cleaning wipers. The UV lamps are controlled by a PLC control panel. Each panel contains six variable output electronic ballasts and touch-screen controls. The PLC receives information from the transmittance probe and flow meter and automatically adjusts the lamp output to maintain the pre-set UV dose. Alternatively, the system can be operated to maintain constant UV output or constant power input. During periods of low flow, the electronic ballasts allow the controller to decrease power input down to 20% and operate in a "warm" state. From this operation mode, the UV units can go to full power within seconds and do not require warm-up time for full capacity. If extended periods of low flow occur (more than 1 hour

in "warm" state), the unit enters shut down mode. All flow to the unit will be automatically stopped and the system will turn off. From a complete shut down, the UV system requires approximately 5 minutes to re-develop full UV output.

Each unit is sized to provide a dose of 100 mJ/cm^2 at a maximum flow rate of 1000 GPM and a wastewater transmittance of 65% at 1 cm. Each of the seven new UV units will be paired with one of the existing UV units. Each UV pair will be connected in series (i.e., the effluent port of the existing UV unit will be connected to the influent port of the new UV unit). With one pair out of service, the total UV capacity will be 12,000 GPM at 100 mJ/cm2 and 65% transmittance at 1 cm. Each of the units will be provided with a control panel and touch-screen interface.

On-site Reclaimed Water Distribution

Reclaimed water for the Phase II expansion building will be supplied by the existing on-site reclaimed water booster station located in the UV disinfection room. Reclaimed water will be use primarily for equipment wash-down. Process water is not expected to be used in the new building. All new reclaimed water piping will be properly color-coded purple.

Sludge Storage, Processing and Disposal

The Palm Valley WRF Phase II Expansion will double the amount of waste activated sludge produced from the WRF. Currently, the existing facility is constructed with three Autothermal Thermophilic Aerobic Digestion (ATAD) chambers and two aerobic digesters placed in series with the ATAD units. However, only two ATAD chambers and one aerobic digester are plumbed. The Phase II Expansion will utilize all the basins, thus requiring the inactive basins to be fully equipped for full operation.

The ATAD basins are capable of providing > 38% reduction in volatile suspended solid (VSS) and reducing pathogen, bacteria, and other parasites to below detection limits as required by EPA 503 Requirements for Class A sludge reuse.

Each ATAD chamber is approximately 52.5 feet in length and 25.5 feet in width, with a working depth of 19 feet. The total volume for each chamber is 190,263 gallons. The post-ATAD aerobic digesters are 79.5 feet in length and 52.5 feet in width, with a maximum fluid depth of 21 feet. The total volume for each aerobic digester is 655,600 gallons. At a sludge production rate of 23,580 gallons per day (after digestion), the second aerobic digester provides 27.8 days of sludge storage.

Waste sludge (mixed liquor at a concentration of 0.35%) from the anoxic reactor will be fed to one of two rotary drum thickeners before entering the ATAD batch reactor via two self-priming sludge pumps. At the design average day flow rate of 8.2 MGD, influent BOD_5 of 300 mg/l, and a sludge yield factor of 0.8, the facility will produce approximately 16,400 pounds of dry solids per day or 562,000 gallons of waste sludge at 0.35%. When thickened to approximately 4.0% with a rotary drum thickener and polymer, the total volume of sludge produced is approximately 49,150 gallons per day.

Once thickened, the sludge will be fed to the ATAD batch reactor. Since the ATAD process requires that sludge be batch fed into an isolated chamber within 30 minutes and kept isolated for 23.1 hours at temperature greater than 55 °C, the first chamber will be used as a receiving basin or batch holding tank while the other two ATAD reactors operate as a quick fill / quick discharge reactors.

The ATAD process works by maintaining aerobic digestion at an elevated temperature (55 °C to 70 °C) using heat produced by microbes during volatile solid oxidation. In order for the ATAD process to work, the available heat produced by microbial metabolism must be greater than the required heat needed to raise the temperature of the incoming sludge (batch) to 55 °C and overcome the heat loss of the tankage system. With approximately 49,150 gallons of sludge treated per day, the heat required to raise the temperature of incoming sludge from ambient (68 °F / 20 °C) to 131 °F/ 55 °C is calculated to be 28.9 x 10^6 BTU/ day. The heat loss through the chamber walls is estimated to be 3 x 10^6 Btu/ day. Therefore, the total heat required is 31.9 x 10^6 BTU/ day. The heat produced through microbial oxidation is calculated to be 34.1 x 10^6 BTU/ day or 2.2 x 10^6 BTU / day more than the heat required. In addition to the heat produced by biological activity, heated air is added to the system from the blowers. The air is introduced to the system via the aeration blowers is at an elevated temperature of 180 °F.

Once the sludge has been stabilized in the ATAD chambers, the sludge is discharged to the aerobic digesters. The sludge digester system also provides flexibility in that it gives the operator the option to run the plant using traditional aerobic digestion (no thermal treatment) to meet Class B sludge. In Class B mode of operation, the sludge follows the same flow path, with the ATAD reactors operated to maintain the reactor temperature in the mesophilic range by reducing the oxidation and therefore heat generation.

In Phase II, one additional 90 GPM centrifuge will be installed in the building above the ATAD reactors and will be used to dewater the sludge stored in Aerobic Digester No. 1. Each centrifuge has a maximum solids loading rate of approximately 1600 pounds per hour. The amount of dry solids wasted from the digestion process to the centrifuge has been estimated to be 11,150 lbs per day, requiring 7.0 hours of centrifuge operation per day or 3.5 hours per day if both centrifuges are used.

Polymer requirement for the centrifuge will be approximately 50 to 60 pounds of polymer per ton of solids, producing a cake output of greater than 20%. Assuming 11,150 pounds of solids going to the centrifuge per day, the average polymer consumption will be about 300 pounds per day.

The dewatered sludge will be discharged to 20 cubic yard roll-off containers. At LPSCo's discretion, the sludge will be tested to meet EPA 503 class A bio-solids requirements for reuse.

Odor Control

The treatment facility will be provided with passive (covers) and active (mechanical) odor control systems. All basins are constructed with concrete covers to reduce odor emissions and provide a ventilation conduit for collecting off gases.

In the new Phase II SBR building, foul air from the anoxic reactor and the SBRs will be directed to a mechanical odor scrubbing system. The system will utilize a water-regenerative type activated carbon for odor removal. The fan supplied with the odor scrubbing unit will create a negative pressure, drawing air through the plenum between the water surface and the tank cover in each reactor. The fan will be designed to provide18,000 cfm to the odor control system. Each intake will have a manually adjusted damper to equalize airflow. The new odor scrubber will be designed to reduce incoming average H2S concentrations from an average of 25 ppm by 99.5%. *Tables 7* summarize airflow requirements for the Phase II Expansion SBR Building.

Table 7. Airflow Requirements for the Phase II Expansion SBR Building

Description of Area	Tank Floor Surface Area (A)	Average Plenum Height (H) (ft)	Total Air Volume (V) (ft^3)	Air Changes per Hour (X)	Air Volume per Hour (Q) (ft^3/hr)
Anoxic Reactor	4500	10	45,000	6	270,000
SBR Reactors	17,270	7.5	129,500	6	777,000
				Total	**1,047,000**
				Required CFM	17,450
				CFM Provided	18,000

Note: V = A x H
Q = V x X
CFM = ft^3/hr / 60

2. Phase II Facility Operations

The 8.2 MGD treatment facility will have a high degree of automation and will provide unmanned operation for a significant amount of the workday. Most of the operations will be controlled by PLCs that receive set point and operational parameters from the operator interface (PC). A detailed Supervisory Control and Data Acquisition (SCADA) system will provide on-line monitoring of plant process and automated dial-in/dial-out capability from the PC terminal located in the operations building.

The expansion facility will require the following major mechanical equipment:

- (2) 150 HP VFD Influent Pumps (Replace one 75 HP pump)
- (3) 45 HP VFD Fill Pumps (one redundant)
- (2) 4.2 HP Anoxic Mixer (anoxic reactor)
- (6) 45 HP Submersible Jet Pumps (three per SBR basin)
- (5) 100 HP Positive Displacement Blowers (two per SBR basin and one redundant)
- (1) 45 HP Submersible Jet Pump (ATAD # 2 reactor)
- (2) 100 HP Blowers (1 for ATAD # 2 reactor and 1 for post-ATAD Digester # 2)
- (2) 45 HP Submersible Jet Pumps (Pos-ATAD aerobic digester # 2)
- (1) 75 HP VFD Turbine Filter Feed Pump (one redundant)
- (2) 125 HP VFD Turbine Discharge Pumps (one redundant)
- (1) Package Aquadisk 8 Disk Filter Unit (one redundant)
- (7) 36 KW Medium Pressure UV Lamp Banks (one redundant)
- (1) 18,000 CFM Activated Carbon Odor Control System
- (1) 90 GPM / 1600 lbs per hour Centrifuge
- (1) Polymer Feed Systems (one for centrifuge)

The Palm Valley WRF will have an average power consumption of approximately 5.5 KW-Hr/1000 gal of operation at full-flow capacity. Assuming $0.075/Kw-Hr, the anticipated power cost is approximately $0.41/1000 gallons treated.

The plant will continue to be operated by a State of Arizona Class 4 or higher certified operator. Testing and regularly scheduled maintenance of the plant should require 240 hours per week from a well-trained team of individuals with major maintenance and operations assistance, as required. The Engineer, in accordance with ADEQ requirements, will provide a detailed operation and maintenance manual including regularly scheduled maintenance items, design and operational instructions, and equipment service manuals.

The licensed plant operator will provide water samples to an approved laboratory for testing as required by state standards. Coliform testing will be performed at least once daily and turbidity will be monitored continuously at the discharge of the filtration system. The WRF will be furnished complete with all equipment necessary to perform on-site water analysis for the following:

- Settlability
- Temperature
- Conductivity
- pH
- BOD_5
- COD
- Total Solids
- Total Suspended Solids
- Volatile Suspended Solids
- MLSS
- MLVSS
- Fecal Coliform
- Ammonia
- Nitrate

3. Commissioning of Phase II

Phase II will be commissioned in 2006 and will provide a maximum month average day treatment capacity of 8.2 MGD. Water, power (prime and stand-by), control, telephone and effluent systems will be provided by local utility companies off of the existing connections.

To commission the facility, power will be turned on at the distribution panel, all mechanical and control systems will be checked, and the flow will be directed to each SBR based on the process controls. Existing waste activated sludge from SBR 1 and 2 will be diverted to the new SBRs for seeding.

Palm Valley Water Reclamation Facility
Phase II
Design Calculations
Duong Do, P.E.
March 30, 2004

Calculation Methods Adapted from:
H. David Stensel, Ph.D., P.E.
University of Washington

DESIGN CONDITION

Flow:	
Average	4.1 Mgal/d
Peak Day	8.2 Mgal/d
Peak Hour	11.07 Mgal/d
Wastewater Parameters:	
BOD5	300 mg/L
TSS	300 mg/L
TKN	40 mg/L
Plant Design Load:	
BODs	10,258 lb/d
TKN	1,368 lb/d
Water Temp.	25° C
Ambient Air Temp.	38° C
Effluent Parameters:	
BOD5	< 5.0 mg/L
TSS	< 5.0 mg/L
TN	< 10.0 mg/L
Turbidity	< 2 NTU
Coliform (FCU/100 ml.)	non-detect

PROCESS OPERATION (TWO AEROBIC SBR TANKS)

Operation description:
A sequencing batch reactor (SBR) is operated with alternating cycles, or sequences of fill, interact, react, settle, decant, and idle. The hybrid PERC-ASP SBR system for Phase II of the Palm Valley WRF includes two SBRs with pre-SBR anoxic reactors which provide enhanced flow equalization and denitrification capability. The anoxic reactor is continuously fed raw primary wastewater and return activated sludge from the lift station and two aerobic SBRs respectively. When an SBR cycle starts the aerobic tank receives an initial input from an anoxic tank (i.e. "fill") equivalent to approximately ¼ of the SBR tank volume. Mixed liquor combined with raw influent from the anoxic reactor is pumped to the aerobic tank at a higher rate than the

influent feed rate. Thus, the anoxic volume is drawn down during fill. Following the fill cycle, the SBR water level is at the top of the tank and interact phase is initiated. In the interact phase, mixed liquor and influent from the anoxic reactor continue to be transferred to the SBR. With the SBR full, activated sludge flows back to the anoxic tank via the RAS weir. The overflow from the aerobic SBR tank feeds NO_3-N to the anoxic tank, which was produced by aerobic nitrification of NH_4-N. During interact the anoxic reactor again begins to fill with in coming raw wastewater. Once the anoxic reactor level reaches a pre-determined set-point, the SBR stops interact and initiates settle, followed by decant and idle to complete its cycle. At the point when the first SBR goes to settle, the other SBR starts a new cycle by initiating fill.

The following tables show the time sequence and volume changes during a complete cycle for each aerobic SBR tank.

1. Cycle Times Per Aerobic Tank – From Table 6.0:

Fill		37 min (mix during fill)
Interact		107 min
Settle		50 min
Decant		36 min
Idle		58 min
Total Time		288 min/cycle
Number of cycles/day/tank	=	1440 min/day / 288 min/cycle
	=	5 cycles/day
@ 2 tanks	=	10 fills/day

2. Fill volume at average design load:

Average volume/fill	=	4.1 MGD / 10 fills
	=	410,000 gal/fill

Fill Volume = Aerobic Tank Decant Volume
Decant volume = 410,000 gallons

Aerobic Tank Area = 148.25 ft x 58.25 ft
= 8,635 ft^2

3. Determine Decant depth:

Decant Depth (ft) = (Decant Volume, ft^3) / (Aerobic tank area ft^2)
= (410,000 gal / 7.48 gal/ft^3) / (8,635 ft^2)

Decant Depth (ft) = 54,813 ft^3 / (8,636 ft^2)

Decant Depth = *6.3 ft*

4. Determine change in anoxie depth at design flow (using both anoxic tanks):

Assume:
Total surface area of Anoxic Tank = (38.25' x 118.25') = 4,523 ft^2
Average day flow of 4.1 MGD = 2917 gpm into Anoxic Tank

Average Flow out of Anoxic Tanks = 11,000 gpm[a] (using one pump)
[a] – fill pumping rate conservatively calculated @ 20' TDH

Actual flow out of Anoxic Tanks = 11,000 gpm – 2,917 gpm
= 8083 gpm

SBR fill time = 410,000 gallons / 11,000 gpm = 37 min.

Therefore: Volume change in anoxic tanks = 8,083 gpm x 37 min = 299,071 gallons
Calculated depth change at the end of Fill for 4.1 MGD = (299,071 gal / 7.48) / (4523 ft^2) = 8.8 ft

5. The following shows the changes in anoxic volume and the cycle operation:

CYCLE DESCRIPTION

Δ t min	Total Time (min)	Anoxic Volume	Aerobic 1 Volume/Condition	Aerobic 2 Volume/Condition
	0	Top Water Start Fill #1	Bottom Water Stop Idle/Start Fill	Top Water Start Settle
+37	37	Bottom Water Draining	Top Water Start Interact	Top Water Settling
+13	50	Filling	Top Water Interact	Stop Settle Start Decant
+36	86	Filling	Top Water Interact	Bottom Water Stop Decant/Start Idle
+58	144	Top Water Start Fill #2	Top Water Start Settle	Bottom Water Stop Idle/Start Fill
+37	181	Bottom Water Draining	Top Water Settling	Top Water Start Interact
+13	194	Filling	Stop Settle Start Decant	Top Water Interact
+36	230	Filling	Bottom Water Stop Decant/Start Idle	Top Water Interact
+58	288	Top Water Start Fill #1	Bottom Water Stop Idle/Start Fill	Top Water Start Settle

@ 4.1 MGD, Flow = 2,917 gpm

AEROBIC TANK NITRIFICATION DESIGN

Average Daily Load To Each Aerobic SBR Tank:

BOD = 10,258 lb/d ÷ 2 = 5,129 lb/d/t

TKN = 1368 lb/d ÷ 2 = 684 lb/d/t

SBR Tank Volume at Full

= (25 ft Depth) 8636 ft^2
= 215,900 ft^3
= 1,614,932 gallons

1. Determine equivalent hydraulic retention times

Equivalent Hydraulic Retention Time (HRT):

HRT = 1,614,932 gal / (4.1 MGD / 2 tanks) x 24 hrs = **18.9 hrs**

Equivalent Anoxic HRT
Maximum Depth = 25 ft
Normal Max. Depth : 25 – 9.0 = 16.0 ft (volume of full batch avail.)
Anoxic tank depth (Average): = 16.0 ft – (8.8 / 2) = 11.6 ft

Anoxic Volume = (11.6 ft) (4,523 ft^2)
= 52,467 ft^3
= 392,452 gallons

HRT = (392,452 gal / 4.1 MGD) x 24 hrs = 2.3 **hrs**

2. Determine Aerobic Tank SRT
Assume that MLSS = 3500 mg/L – typical of SBR operations

Check for sufficient depth in aerobic reactor during settling to handle a MLSS of 3500 mg/L, based on typical SVI achieved:

Assume SVI = 120 mg/L

Thickened MLSS during settling = $\frac{10^6}{SVI}$ = 8333 mg/L

MLSS mass full = MLSS mass in settled volume

25 ft (3500 mg/L) = sludge depth (8333 mg/L)
Sludge depth = 10.5 ft.

Liquid level above sludge depth after settling: 25 ft – 10.5 ft = 14.5 ft

Decant depth = 6.3 ft, so liquid depth below decanter is 14.5– 6.3 ft = 8.2 ft
So sufficient depth in settle and decant period to handle MLSS of 3500 mg/L

To determine system SRT, a solids balance is needed accounting for solids yield and BOD removal. The following is a standard equation for solids yield that accounts for biomass production and inert solids that enter with wastewater and are not degraded and accumulate in the system:

Net Solids Yield: $\left(\frac{Y}{1+bSRT}+Y_I\right)=Y_N$

Y	=	g VSS/g BOD removal ≈ 0.60 g/g
B	=	0.08 g/g-d
SRT	=	Solids retention time, days
Y_I		g non-biodegradable solids / g BOD ≈ 0.50 g/g

V(MLSS)	=	Y_N (ΔBOD)Q (SRT)
Q	=	2.05 Mgal/d/tank
ΔBOD	=	300 mg/L
V	=	1.61 Mgal
Y_N	=	$\left(\frac{0.6}{1+.08\,SRT}+0.50\right)$
MLSS	=	3500 mg/L

Solve for SRT
Use spreadsheet:

$$(3500)(1.61) = \left(\frac{0.6}{1+.08\,SRT}+0.50\right)(300)(2.05)\,SRT$$

SRT = 14.4 days

3. What is the net solids yield?

Y_N = (0.60 / (1 + 0.08 x 14.4) + 0.50 = **0.8 gTSS/g BOD**

4. Determine the aerobic SRT, which accounts for the time that the mixed liquor is under aeration (accounts for fraction of aeration time per cycle):

Design for 12 hrs/day/tank,

Aeration Fraction = 12 hours aeration / 24 per day = 0.5 hours aeration/day/tank

Aerobic SRT @ 3500 mg/L MLSS	= 0.5 (14.4 d)
	= 7.2 days

5. Determine if this aerobic SRT is sufficient to result in satisfactory nitrification and maintain concentrations of nitrifiers in the system (i.e. the minimum nitrifier growth rate must exceed the wasting rate) – the design goal is to achieve is NH4-N concentration less than 0.5 mg/L.

Because of recirculation through the anoxic tank with continuous feeding, the aerobic SBR tank can be considered equivalent to a continuously stirred tank reactor (CSTR). Thus, we can consider that the minimum nitrifying bacteria growth rate (i.e. growth rate is minimized at the lowest substrate concentration) is related to the aerobic SRT as follows. From this we can determine the NH4-N concentration expected in the SBR related to the nitrifier growth rate and sludge wasting rate (i.e. SRT).

$$\frac{1}{SRT} = \mu = \frac{\mu_m N}{K_N + N}$$ Nitrification Monod Kinetics

where:
- μ = specific growth rate of nitrifiers, g/g-d
- N = NH_4-N Conc., mg/L
- μm = Maximum specific growth rate, 0.72 g/g-d @ 25° C
- K_N = 0.75 mg/L

(EPA Nitrogen Control Manual, 1993)

From above the aerobic SRT = 7.2 days

$\mu = 1 / SRT = 1/ 7.2 = 0.139$
$0.139 = 0.72 \times N / (0.75 + N)$
$N = NH_4\text{-}N = 0.18$ mg/L

Sufficient capacity for complete nitrification

Check safety factor for NH_4-N = 0.50 mg/L treatment goal.

$$\frac{1}{SRT} = \mu = \frac{(0.72)(0.50)}{(0.75 + 0.50)} = 0.28 / day$$

SRT = 1 / 0.28 = 3.5 days
Safety factor = 7.2/3.5 = 2.1 (okay)

PERFORM NITROGEN BALANCE TO GET AMOUNT OF N OXIDIZED

Nitrogen N = nitrogen for synthesis + effluent N + N oxidized to nitrate

Nitrogen for synthesis: SRT = 14.4 days @ 3500 mg MLSS

Biomass Yield = Y / (1 + b x SRT) = 0.8 / (1 + 0.08 x 14.4) = 0.37 g VSS / g BOD

Biomass Produced = (0.37 g VSS/g BOD) * (300 mg/L – 5 mg/L BOD) = 109 mg/L

@ 10% nitrogen, N synthesis = 0.10 (109) = 10.9 mg/L

Assume 30% N for synthesis is returned/recycled during digestion/dewatering of sludge:

10.9 mg/L – (0.3 * 10.9 mg/L) = **7.6 mg/L**

Nitrate Produced:

TKN – Nsyn – NH_4-N = NO_3-N

40 – 7.6 – 0.5 = NO_3-N

NO_3-N = **31.9 mg/L**

NO_3-N Produced Per Feed Cycle:

= 31.9 mg/L (0.41 Mgal / cycle) * 8.34 = **109 lb/cycle**

EVALUATE NITROGEN REMOVAL CAPACITY

1. Determine NO3-N balance:

Since the reactor approaches a complete mix operation with the internal recycle, we can assume a relatively constant NO3-N concentration in the aerobic reactor. The nitrate produced has to be accounted for as follows:

NO3-N produced = (**109 lb/cycle**)

= ***A.*** - NO3-N removed in aerobic reactor (during settle and decant)
+
B. - NO3-N removed in aerobic reactor (during anoxic mix)
+
C. - NO3-N allowed in effluent discharge (< 9.5 mg/l)
+
D. - NO3-N removed in overflow to anoxic reactor (during interact)

A. - Aerobic reactor nitrate loss (denitrification) will occur in the mixed liquor during the decant, settle, and idle periods when oxygen is depleted.

Use SDNR for endogenous respiration per the following reference:

Biological Nutrient Removal, Randall, Barnard, and Stensel, Technomics, 1992

$$SDNR = \left(\frac{0.50}{2.86}\right)\left(\frac{An}{Yn}\right)\left(\frac{1}{SRT}\right)$$

$$An = 1.5 - 1.42Y + \frac{1.42bYSRT}{1+bSRT}$$

$$Yn = \frac{Y}{1+bSRT} + Y_I$$

An = 1.5 – (1.42 * 0.6) + ((1.42)(0.08)(0.6)(7.2) / (1 + (0.08)*(7.2))) = 0.96

Yn = (0.6 / (1 + (0.08)*(7.2))) + 0.50 = 0.88

SDNR = (0.5/2.86) * (0.90/0.92) * (1/14.4) = **0.013 g/g-d**

Removed = SDNR(V)(MLSS)(8.34)(time),

Time = 50 min (Settle)
+ 36 min (Decant)
+ 25 min (half of idle)
= 111 min (Total)

= (0.013)(1.61)(3500)(8.34)(111)/60/24

= **47.1 lb/cycle**

B. - Denitrification occurs in the SBR during anoxic mix throughout the cycle of interact when air is periodically turned off. For conservative purposes, the denitrification value from this process is not used.

C. - NO3-N allowed to be in the effluent is < 9.5 mg/l;

Assume 5 mg/L of NO3-N is discharge:

Removed = (5 mg/l) * (0.410) * (8.34)

= 17.1 lbs/cycle

D. - Determine how much NO3-N must be removed in anoxic zone:

NO3-N to be removed on anoxic zone = 109 lb/cycle – 47.1 – 17.1

= 44.8 lb/cycle

D. (continued) Determine amount of nitrate fed to anoxic reactor:
To evaluate the nitrate removal capacity we have to determine the amount of nitrate that flows from the aerobic reactor to the anoxic tank and use the SDNR to determine if it can be sufficiently reduced.

Nitrate return feed rate to anoxic zone (using only one fill pump):
Flow to anoxic = 11000 gpm (107 min) = 1,177,000 gallons/cycle
Average initial nitrate concentration in the recycle flow:

NO3-N (mg/L) = ((109 lbs N / 1.61 Mgal) / 8.34) = 8.1 mg/L

Assume 60% of this concentration = 5 mg/l

At 5 mg/L NO3-N = 5 * (1.177) * (8.34) = 49.1 lb/cycle

As 49.1 lb/cycle > 44.8 lb/cycle, the system is not limited by recycle rate

Determine NO3-N removal capacity of anoxic reactor:

Specific Denitrification Rate in the Anoxic Reactor can be related to BOD F/M Ratio. (EPA Nitrogen Control Manual)

SDNR = 0.03 F/M + 0.029
SDNR = Specific NO_3-N reduction rate, g NO_3-N / g MLSS-d
F/M = g BOD / g MLSS-d

$$F/M = \frac{4.1 \text{ Mgal/d} \times 300 \text{ mg/L BOD}}{3500 \text{ mg/L} \times 0.392 \text{ Mgal (average depth)}}$$

F/M = 0.89 g/g-d
SDNR = 0.056 g/g-d

The SDNR ≅ 0.056 g NO_3-N/g MLSS-d

$$NO_3\text{-N removal} = (\text{Volume})\ (\text{MLSS})\ (\text{SDNR})\ \frac{\Delta t}{\text{cycle}}\ (8.34)$$

Average Anoxic Volume = 0.392 Mgal

Δt = 107 min = 1.78 hours = 0.074 days/cycle
NO_3-N removed = (0.392) (3500) (0.056) (0.074) (8.34)

= 47.4 **lbs/cycle**

= 47.4 lb/cycle > 44.8 lb/cycle required
Therefore, sufficient capacity in anoxic is available to remove the necessary amount of NO_3-N

DETERMINE OXYGEN REQUIRED

Flow/Tank	= 2.05 MGD
BOD	= 300 mg/L
NO_3-N Produced	= 31.9 mg/L
Effluent TN	= < 5 mg/L

Oxygen for BOD Removal:

$$O_2 = [1.5]\frac{gO_2}{gBOD}(BOD)Q - 1.42P_{XBio}$$

P_{XBio} = Biomass sludge wasted/day

Biomass yield = 0.37 gVSS/gBOD

P_{XBio}/Tank = 0.37 g/g x 300 mg/L x 2.05 MGD x 8.34
= 1,897.8 lb/d

Lbs O_2/day = 1.5 g O_2 / g BOD x (300 mg/L – 5 mg/L) x 2.05 MGD x 8.34 – 1.42 x 1,897.8 lb/d

= 4,871 lb O_2/day

Max Aeration Time Available

= 37 min (fill) + (107 min) (interact) + 29 min (idle) / 288 (cycle) = 0.6

0.6 (24 hr/d) = 14.4 hrs/day available aeration

Design Aeration Time = **12.0 hrs/day**

Lbs O_2 / hr aeration = 4,871 lb/d / 12.0 hrs/d = **406 lb O_2/hr (AOR)**

Nitrification O_2:

NO_3-N produced = 31.9 mg/L

O_2 = 4.3 g O_2 / g N x (31.9 mg/L - 5 mg/L) x 2.05 MGD x 8.34

Lbs O_2 / hr aeration = 1978 lbs/d / 12.0 hrs/d = **165 lbs O_2 /hr (AOR)**

Denitrification O_2 Credit:

NO_3-N reduced = 34.1 mg/L (accounts for 5 mg/L in effluent)

O_2 credit = 2.86 (34.1) (2.02) 8.34

Lbs O_2 / hr aeration = 1,643 / 12.0 = **137 lbs/hr (AOR)**

Net O_2 Require:

Net O_2 req'd/Tank = 406 (BOD) + 165 (Nitro) – 137 (De-nitro)

= 434 $lbsO_2/hr$

AOR = **434 $lbsO_2/hr$**

Determine Clean Water Transfer Rate

$$SOR = \frac{AOR(C_{Sat20a})}{\propto (BC_{Sat,TH} - DO)(1.024^{T-20})}$$

$$C_{Sat,TH} = (C_{Sat})(0.5)\left[\frac{P_d}{P_{Atm,H}} + \frac{O_t}{21}\right]$$

$$C_{Sat20a} = (C_{Sat20})(0.5)\left[\frac{P_d}{P_{Atm20}} + \frac{O_t}{21}\right]$$

SOR = standard oxygen transfer rate

$\propto = 0.6$ $\beta = 0.95$

$T = 25°C$ $C_{Sat} = 7.96$ mg/L (at 1000 ft Elevation)

$DO = 2.0$ mg/L $C_{Sat20} = 9.08$ mg/L

$P_d = 25$ psi $P_{Atm,H} = 14.17$ psi Please note: P_d = depth + atmospheric pressure

$O_t = 18\%$

$$C_{Sat,TH} = (7.96)(0.5)\left[\frac{25}{14.17} + \frac{18}{21}\right] = 10.43 \text{ mg/L}$$

$$C_{Sat20a} = (9.08)(0.5)\left[\frac{25}{14.69} + \frac{18}{21}\right] = 11.6 \text{ mg/L}$$

$$SOR = \frac{AOR(C_{Sat20a})}{\propto (BC_{Sat,TH} - DO)(1.024^{T-20})}$$

$$SOR = \frac{43.4(11.6)}{0.6[(0.95)(10.43) - 2)](1.024^{25-20})}$$

SOR = 942 lbs/hr

Determine air rate @ 30% O_2 transfer efficiency

Blower CFM = SOR / (60 min/hr x Transfer Eff. x 0.0172 $lbO_2/ft3$)

Blower CFM = 942 / (60 * 0.3 * 0.0172)

Blower CFM = **3,042 SCFM @ 12.0 hours**

Each SBR requires one blower per tank with rated capacity of 3,042 scfm @ 11 psi using 12.0 hours aeration to provide design capacity. Provide (5) five blowers at capacity of **1,500 SCFM at 11** psi – two per tank with one redundant.

SURGE TANK AND FILTER DESIGN REQUIREMENTS

Decant Time = 36 min

Decant Volume = 0.410 Mgal
= 410,000 gal

Decant Rate = 410,000 gal / 36 min
= 11389 gpm

Using Decanters @ 110 gpm/ft – requires (6) 19 ft of weir length

---

Filter area: 53.8 ft^2/disc
8 Disc x 53.8 = 430.4 ft^2

Four filters in service

Flux rate (peak) = 11388 gpm / (430.4 ft^2 x 4 filter)
= 6.6 gpm/ ft^2 (< 8.0 gpm/ ft^2 - okay)

SLUDGE PRODUCTION

1. Waste to Aerobic Storage for Thickening (to 1.5%)
2. Aerobic Digestion for Solids reduction (assume 30%)
3. Dewater with centrifuge (polymer addition)
4. Haul to disposal

1. Pre-Thickened Sludge Volume
   16,413 lb/day / (0.0088 x 8.34) = 223,635 gallons/day wasted

   Therefore 223,635 / (5 cycles/day/tank x 2 tanks) = 22,363 gallons/cycle

   After Thickening:
   TS = 16413 lb/d @ 4% = 49,200 gallons

2. After Solids Reduction
   Assume 80% VSS = 16,413 lb TS x 0.8 = 13,130 lbs VSS
   Assume 40% VSS reduction in storage.
   TS after reduction = (16,413 lb TS – 13,130 lb VSS) + (13,130 lb VSS x (1 – 0.40))
   = 11,161 lb TS @ 4% = 33,456 gallons/day wet sludge

   Calculate Solids Storage in Aerobic Storage:

   ATAD storage = 52.5' x 25.5' x 19' = 25,436 ft^3 = 190,263 gallons
   3 ATAD = 570,789 gallons
   Aerobic Digester Area = 79.5ft x 52.5 ft = 4174ft^2 = 31,219 gallons/ft

   Total water depth in reactor = 21 feet
   21 ft x 31,219 gal/ft = 655,612 gal
   Therefore the available storage volume = 655,612gal x 2 ft = 1,311,224 gallons

   Total storage = 570,789 + 1,311,224 = 1,882,013 gallons
   1,882,013 gal / 33,456gal/day = 56 days

3. Final sludge for dewatering

   Volume = 33,456 gal/d @ 4%

   Provide 1 additional Centrifuge Unit @ 90 gpm loading rate

   Hours of operation per day @ design flow = 33,456 gal/d / 180 gpm x 60 min/hr
   = 3.0 hours per day @ 4%

4. Final sludge for disposal

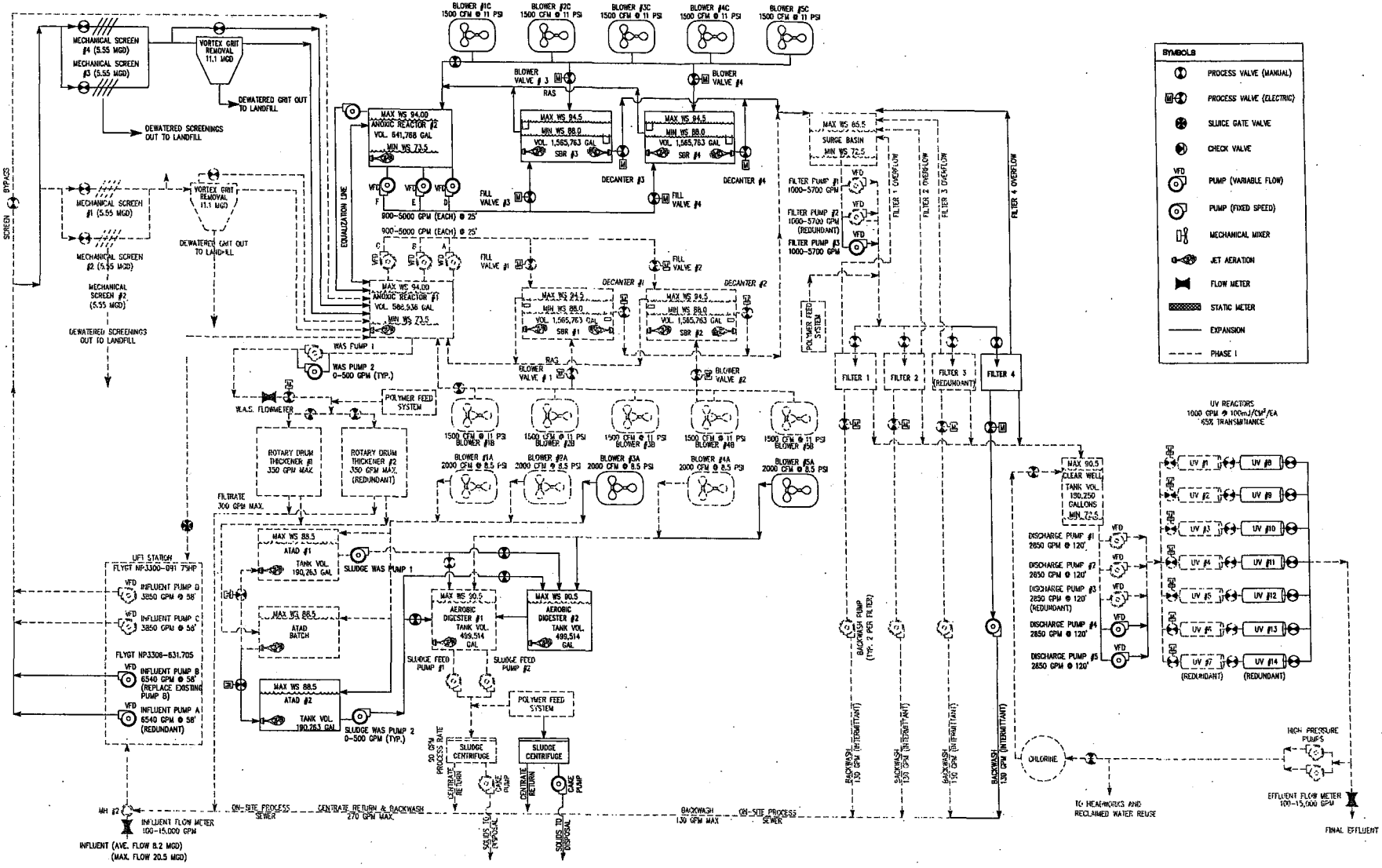
   Assume:
   Solids concentration from centrifuge = 25%
   Solids feed concentration = 4%

   Total volume of dewater sludge = 33,456 gallons x 4% / 25% / 7.48 gal/ft^3 / 27 ft^3/yd
   = 26.5 yd/day

2003

MONTHLY REPORT OF OPERATION
PALM VALLEY WATER RECLAMATION FACILITY
14222 W. McDowell Road, GOODYEAR, ARIZONA 85338

	APS	RAW						SBR				WAS	CENT.	DECANT					EFFLUENT									
	meter dif	FLOW	pH	TSS	BOD	TN	AMM	MLSS	D. O.	SET. SOL.	SVI	1000 GAL.	GALLONS	Number	MGD	TSS	BOD	TURB	FLOW	Ph	TSS	BOD	AVE. TURB	PEAK TURB	AMM	NITRATE	TN	F. COLI
Jan.	157	1.734	7.40	271.3	205.8		35.0	2418		498	209	297.1	19,751	4	1.820				1.879	7.73	1.6	<2	0.90	2.26	1.17	1.7	2.9	1.4
Feb.	211	1.796	7.431	282.2	219	43.4	32.64	2364		287	129	290.889	9182	5	1.9143				2.171	7.75	2.6	4	1.90	2.87	0.69	1.8	6.1	1.6
Mar.	204	1.914	7.461	270.2	340.3		32.71	2908		325	108	72.9097	3097	5	1.9226				1.938	7.94	4.9	<2	1.48	2.92	2.724	1.4	1.1	1.2
Apr.	194	1.829	7.551	255.2	303.6		34.54	3623		455	126	128.957	6287	5	1.8405				2.050	7.87	1.6	<2	1.24	2.29	0.093	0.8	2.8	<1
May	202	1.771	7.514	249.8	262.7		35.72	3741		388	103	90.6903	10192.7	5	1.8466	4.6		2.973	2.019	7.95	3.0	<2	1.16	1.86	0.20	1.1	1.7	<1
June	179	1.765	7.452	224.1	246.2		26.92	3790		432	114	166.15	8399	5	1.8541	3.3		2.40	1.851	7.97	1.3	<2	0.80	1.45	0.175	1.0	1.5	<1
July	139	1.867	7.461	199.1	250		24.57	3081		363	118	209.229	10349.5	5	1.950	2.8		1.32	1.828	7.89	0.7	<2	0.76	1.22	0.192	1.1	0.3	<1
Aug.	124	2.026	7.692	149.7	202.9		29.41	2986		340	112	145.342	15410.6	5	2.0791	10.5		8.933	1.989	7.97	2.1	3	2.00	3.21	0.597	1.6	3.5	2.8
Sept.	139	2.075	7.451	189.2	225.3		26.71	3575		563	159	81.0967	20507.9	5	1.9946	2.7		2.554	2.075	7.81	1.0		0.89	1.43	0.164	1.9	1.3	<1
Oct.	153	2.107	7.512	230.8	236.5		23.33	3179		567	178	170.652	20869.9	5	2.107	2.0		1.30	2.163	7.79	1.5	2	0.85	1.60	0.019	1.1	0.3	<1
Nov.	186	2.097	7.535	216.9	246.7		27.0	3185		413	116	204.563	9329	6	2.2321	2.7		2.023	2.237	7.81	1.2		1.27	1.76	0.089	1.1	1.8	<1
Dec.	199	2.066	7.541	225.3	256.5		33.62	2961		378	126	211.106	9035	5	2.2184	2.6			2.269	7.76	1.6	<2	1.37	2.00	0.067	1.2	1.4	<1
TOTAL	63474	701.0										62921.8	4331653	1796	723.3				744.2									
AVE.	174	1.921	7.50	230	250	43.4	30.2	3151		417	133	172.389	11868	5	1.982	3.9		3.07	2.039	7.85	1.9	<2	1.22	2.07	0.52	1.3	2.1	1.2
HIGH	211	2.107	7.69	282.2	340.3	43.4	35.72	3790		567	209	297.077	20869.9	6	2.232	10.5		8.933	2.269	7.97	4.9	4	2.00	3.21	2.724	1.9	6.1	2.8
LOW	124	1.734	7.40	149.7	202.9	43.4	23.33	2364		287	103	72.9097	3097	4	1.8203	2.0		1.30	1.828	7.73	0.7	<2	0.76	1.22	0.019	0.8	0.3	<1



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NO	BY	DATE	DATE APP.

JOB
PALM VALLEY WRF PHASE II EXPANSION
SBR WASTEWATER RECLAMATION FACILITY
GOODYEAR AZ

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17802 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-5734 FAX. 848-4822

Pacific Environmental Resources Corp.
17802 Georgetown Lane Huntington Beach, CA 92647 tel. 714.375.5088 fax. 714.375.5947

SCALE	NONE
DESIGNED	JAMES A. MATTHEWS
DRAWN	DAD
CHECKED	JAM
DATE	06/13/02
JOB NO.	7617E

TITLE
PROCESS FLOW SCHEMATIC

FIGURE 01

JOB NO. 7617-E

Xrefs: 7617-30-TBLK.dwg
Dimscale = 1 ; Ltscale = 0.5 ; PSltscale = 1 ; Acad Ver. = 15.0s (LMS Tech) ; Worldview = 1
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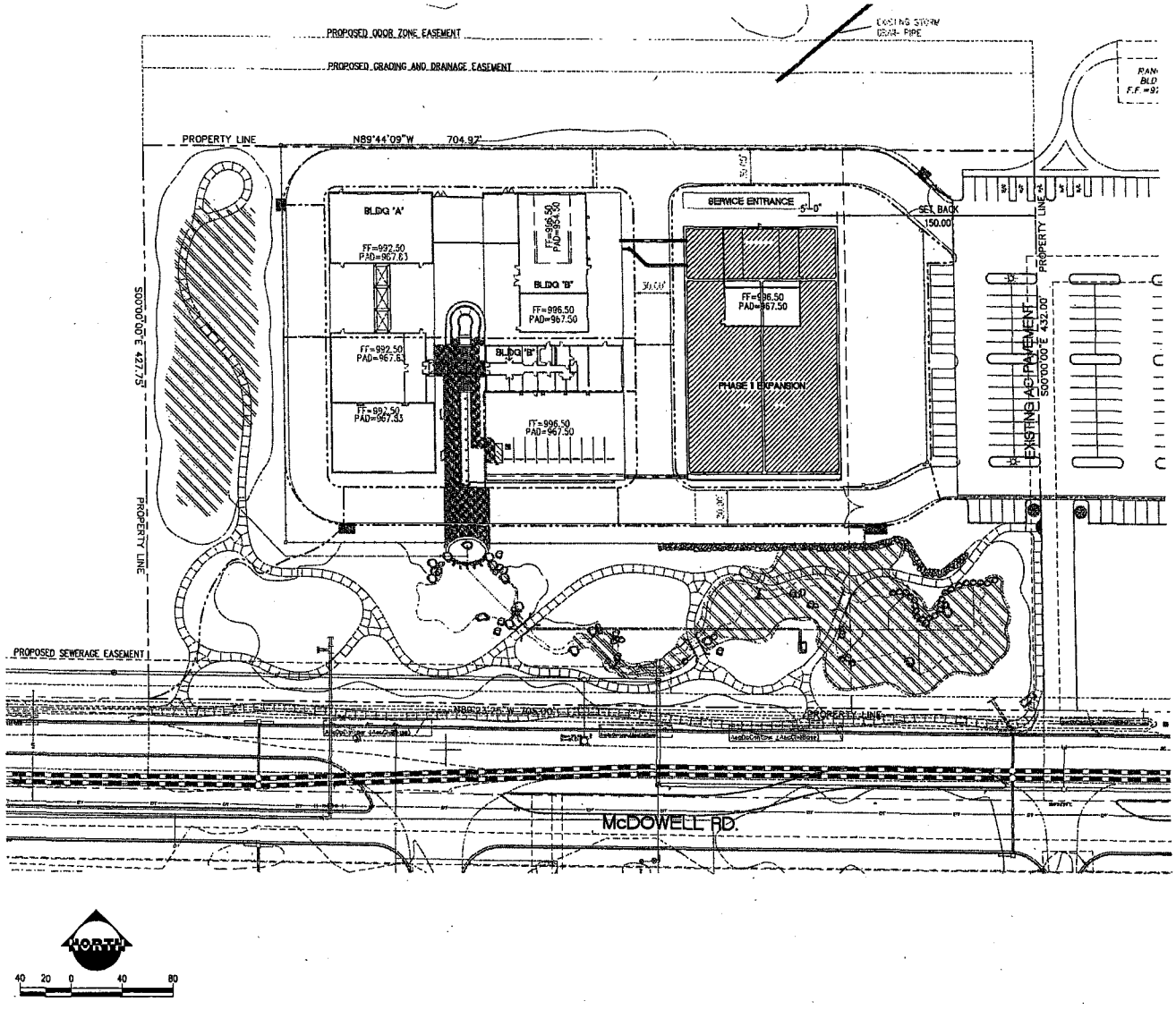

LEGEND

- EXIST. DECORATIVE CONCRETE PER LANDSCAPE PLANS
- PROP. UNDERGROUND TANK (PHASE II EXPANSION)
- ESTIMATED RUNOFF PONDING

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NO	BY	DATE		DATE	APP.

JOB
PALM VALLEY WRF
PHASE II EXPANSION
SBR WASTEWATER
RECLAMATION FACILITY
GOODYEAR AZ

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17802 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-5734 FAX. 848-4922

PERC
Pacific Environmental Resources Corp.
17802 Georgetown Lane
Huntington Beach, CA 92647
tel: 714.375.5588 fax: 714.375.5967

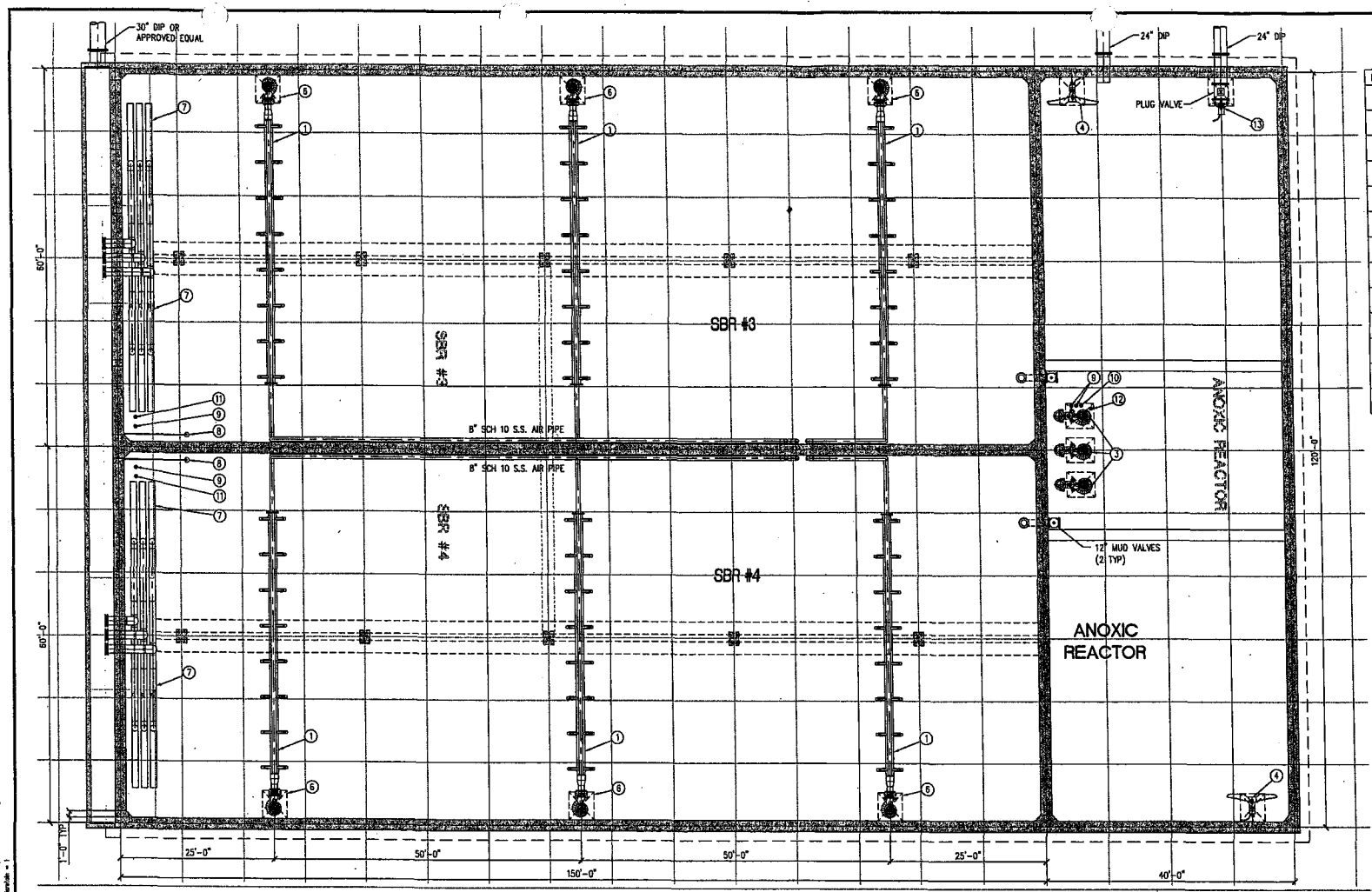
SCALE	1" = 40'
DESIGNED	JAMES A. MATTHEWS
DRAWN	DAD
CHECKED	JAM
DATE	06/13/02
JOB NO.	7617C

TITLE
PROPOSED
SITE LAYOUT

FIGURE
02

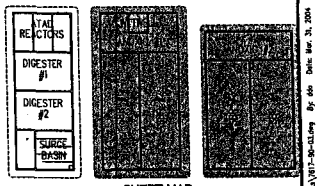
JOB NO. 7617-E

95



ITEM	DESCRIPTION
1	JET AERATION MANIFOLD PER MTS MODEL MT4DM, 16 NOZZLES, FRP CONSTRUCTION
2	- NOT USED -
3	SBR FILL PUMP PER FLYGT MODEL NP3300.181/821, 5500 GPM @ 20' TDH, 45 HP, 3ø, 60 HZ
4	ANOXIC MIXER PER FLYGT MODEL 4430-410, 4.2 HP, 3ø, 4 POLES
5	- NOT USED -
6	JET MOTIVE PUMP PER FLYGT MODEL NP3300.091/821, 5500 GPM @ 20' TDH, 45 HP, 3ø, 60 HZ.
7	19' EFFLUENT DECANTER PER FLUIDYNE MODEL SED-19 STAINLESS STEEL CONSTRUCTION
8	D.O. PROBE PER DANFOSS MODEL EVITA OXY 4100
9	LEVEL INDICATOR/PRESSURE TRANSDUCER 0-10 PSI
10	D.O. PROBE PER DANFOSS MODEL EVITA OXY 4150
11	pH PROBE PER SIGNET MODEL 2716 WITH TRANSMITTER MODEL 8750
12	WARRICK PUMP SHUT OFF SWITCH MODEL #
13	MIXER PUMP PER FLYGT MODEL PP-4660-15 HP (PIPE FLANGE MOUNT)

PLAN - SBR TANKS



SHEET MAP
1"=80'

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96

NO	BY	DATE		DATE	APP.
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△					
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△					
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JOB
PALM VALLEY WRF
PHASE II EXPANSION
SBR WASTEWATER
RECLAMATION FACILITY
GOODYEAR AZ

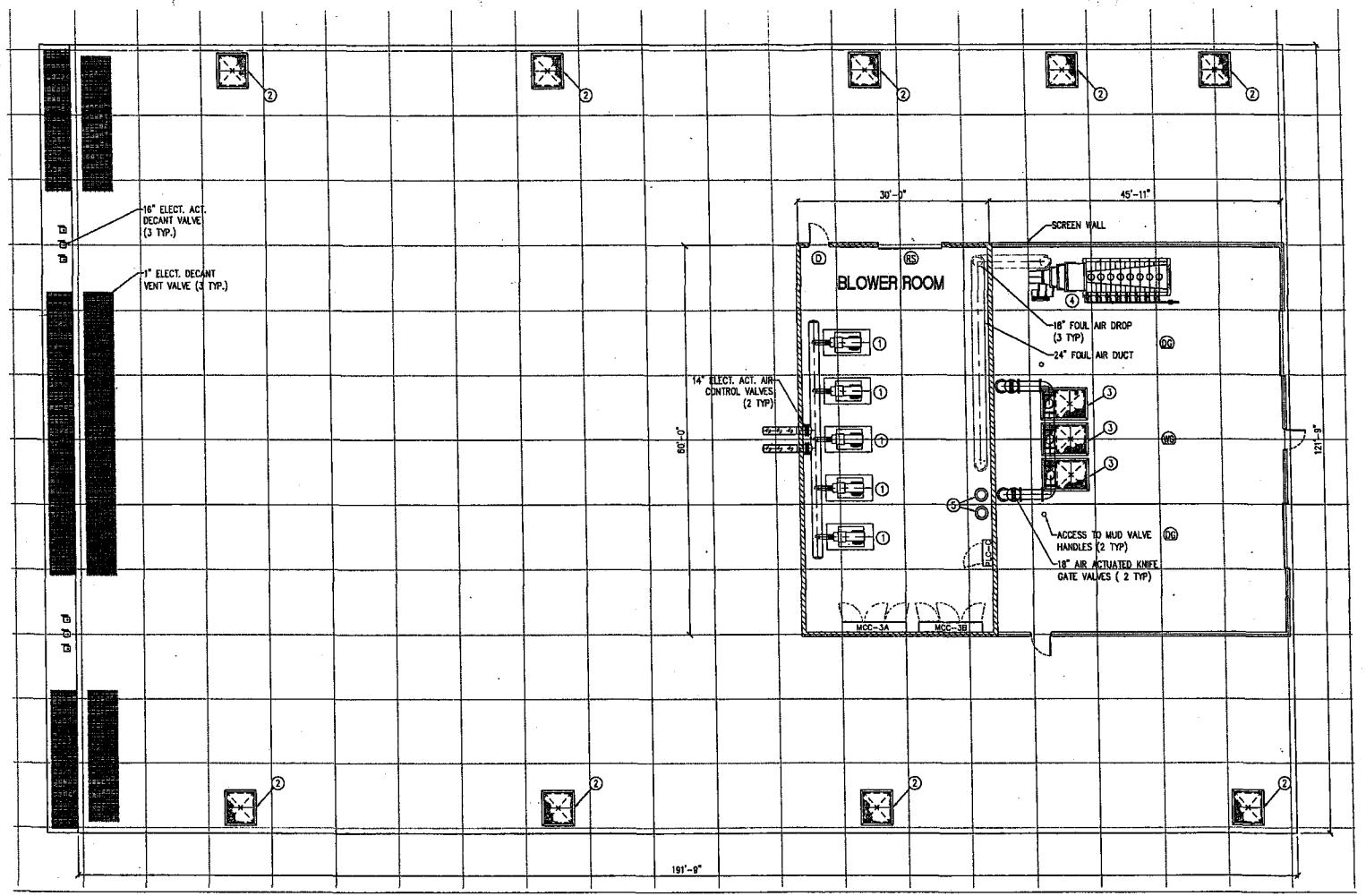
PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17902 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-5734 FAX. 848-4922

PERC
Pacific Environmental Resources Corp.
17802 Georgetown Lane
Huntington Beach, CA 92647
tel: 714.375.5338 fax: 714.375.9367

SCALE 1/8" = 1'
DESIGNED JAMES A. MATTHEWS
DRAWN DAD
CHECKED JAM
DATE 06/13/02
JOB NO. 7617E

TITLE
PROPOSED SBR TANK MECHANICAL LAYOUT

FIGURE 03
JOB NO. 7617-E



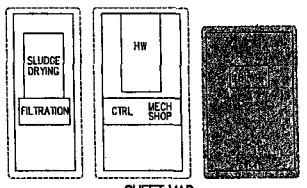
PLAN - SBR BUILDING

EQUIPMENT LIST

ITEM	DESCRIPTION
1	BLOWER PER KAESER MODEL FB-620 WITH SOUNDPROOF ENCLOSURE 1500 CFM @ 11 PSIG
2	PUMP ACCESS HATCH FRAME PER FLYGT - 4'-0" X 4'-6" CLEAR ACCESS.
3	PUMP ACCESS HATCH FRAME PER FLYGT - 5' X 7' WITH 18"ø PIPE OPENING, 4'-0"X4'-6" CLEAR ACCESS.
4	CALGON ODOR CONTROL SYSTEM, 18,000 CFM
5	80 GALLON AIR COMPRESSOR, 175 PSI PER SPEEDAIRE (2 TYP)

DOOR SCHEDULE

DOOR NUMBER	DESCRIPTION
D	3' WIDE DOOR
RS	10' WIDE ROLLING SHUTTER
DG	10' WIDE DRIVE GATE
WG	3' WIDE WALK GATE



SHEET MAP
1"=80'

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97

NO	BY	DATE		DATE	APP.

JOB
PALM VALLEY WRF
PHASE II EXPANSION
SBR WASTEWATER
RECLAMATION FACILITY
GOODYEAR AZ

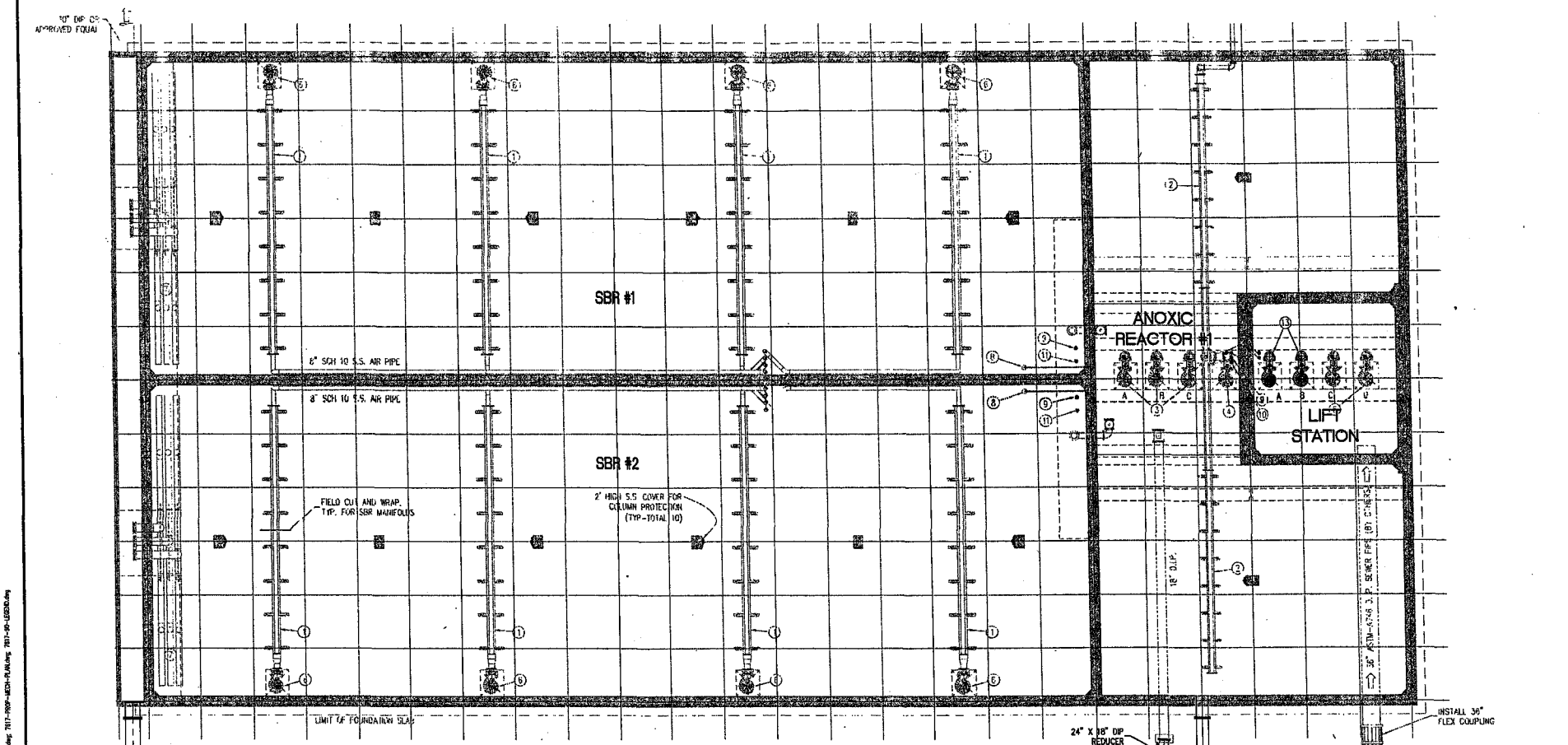
PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17902 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-5734 FAX. 848-4922

PERC
Pacific Environmental Resources Corp.
17862 Georgetown Lane
Huntington Beach, CA 92647
tel: 714.375.5338 fax: 714.375.9367

SCALE 1/8" = 1'
DESIGNED JAMES A. MATTHEWS
DRAWN DAD
CHECKED JAM
DATE 06/13/02
JOB NO. 7617E

TITLE
PROPOSED SBR BUILDING
MECHANICAL LAYOUT

FIGURE
04
JOB NO. 7617-E



PLAN - SBR TANKS

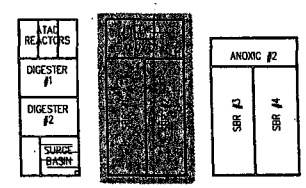
ITEM	DESCRIPTION
1	JET AERATION MANIFOLD PER MTS MODEL MT4DM. 16 NOZZLES, FRP CONSTRUCTION
2	JET AERATION MANIFOLD PER MTS MODEL MT2DM. 16 NOZZLES, FRP CONSTRUCTION
3	SBR FILL PUMP PER FLYGT MODEL NP3300.181/821. 5500 GPM @ 20' TDH, 45 HP, 3ø, 60 HZ
4	ANOXIC JET PUMP PER FLYGT MODEL NP3300.181/821, 5500 GPM @ 20' TDH, 45 HP, 3ø, 60 HZ
5	INFLUENT LIFT PUMP PER FLYGT MODEL NP3300.091/623. 4150 GPM @ 55' TDH, 75 HP, 3ø, 60 HZ.
6	JET MOTIVE PUMP PER FLYGT MODEL NP3300.091/821, 5580 GPM @ 22' TDH, 45 HP, 3ø, 60 HZ.
7	19' EFFLUENT DECANTER PER FLUIDYNE MODEL SLD-19 STAINLESS STEEL CONSTRUCTION

ITEM	DESCRIPTION
8	D.O. PROBE PER DANFOSS MODEL EVITA OXY 4100
9	LEVEL INDICATOR/PRESSURE TRANSDUCER 0-10 PSI PER DETAIL B/7
10	D.O. PROBE PER DANFOSS MODEL EVITA OXY 4150
11	pH PROBE PER SIGNET MODEL 2716 WITH TRANSMITTER MODEL 8750
12	WARRICK PUMP SHUT OFF SWITCH
13	LIFT PUMP PER FLYGT #3306-610-380. 7100 GPM @ 55' TDH

LEGEND

PROPOSED

EXISTING



SHEET MAP
1"=80'

NO	BY	DATE		DATE	APP.

JOB
PALM VALLEY WRF
PHASE II EXPANSION
SBR WASTEWATER
RECLAMATION FACILITY
GOODYEAR AZ

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17902 GEORGETOWN LANE, H.B. CA. 92847
(714) 843-5734 FAX. 848-4922

PERC
Pacific Environmental Resources Corp.
17862 Georgetown Lane
Huntington Beach, CA 92647
tel. 714.375.5388 fax. 714.375.9967

SCALE 1/8" = 1'
DESIGNED JAMES A. MATTHEWS
DRAWN DAD
CHECKED JAM
DATE 06/13/02
JOB NO. 7617E

TITLE
SBR TANK
MECHANICAL LAYOUT

FIGURE
05

JOB NO. 7617-E

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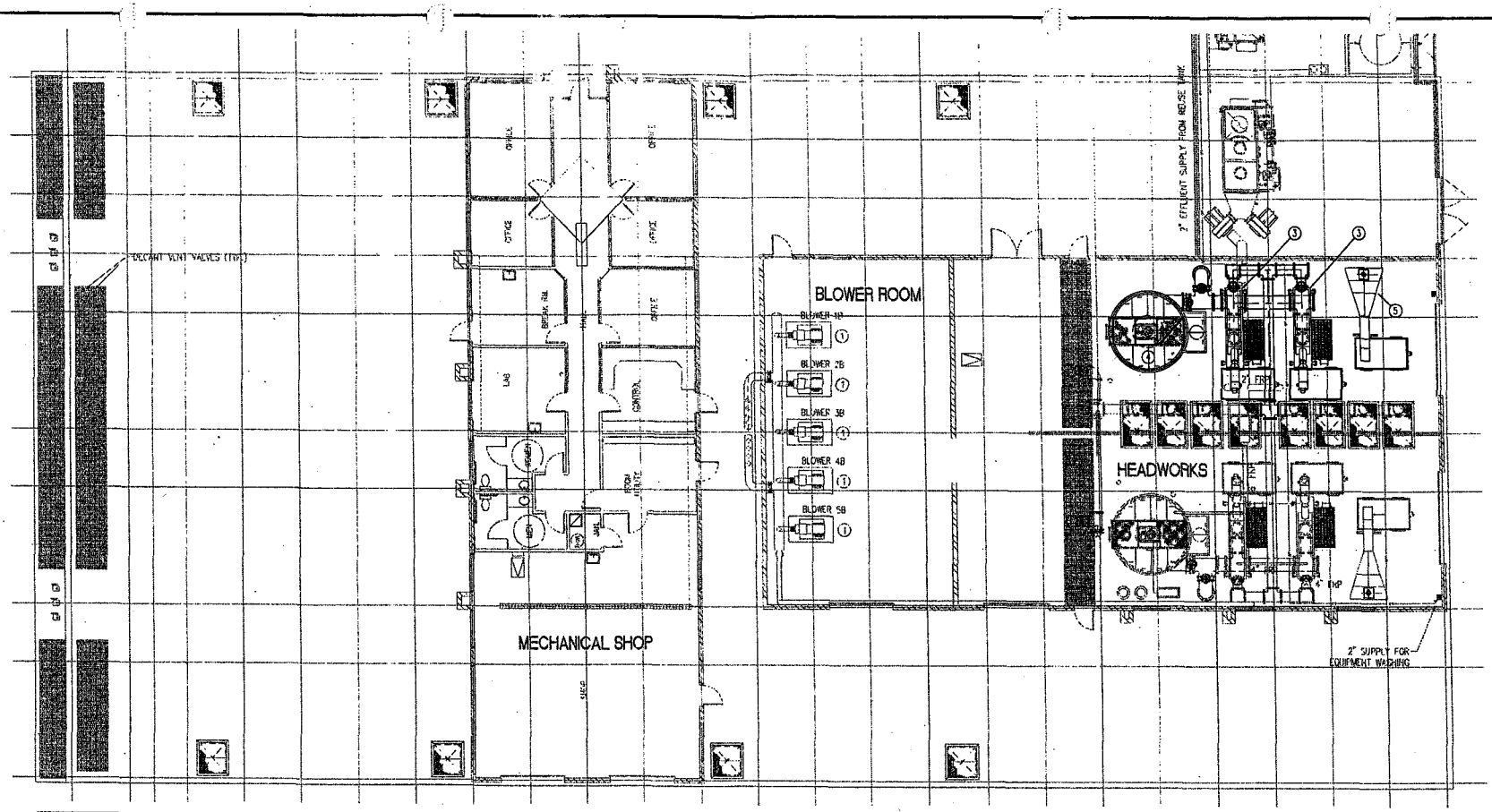
P:\7617E\Engineering\7617-90 (Proposed)\sheets\7617-90-05.dwg By: ddo Date: May. 31, 2004 Time: 04:33 pm

98.



PLAN - SBR BUILDING

EQUIPMENT LIST		EQUIPMENT LIST	
ITEM	DESCRIPTION	ITEM	DESCRIPTION
①	BLOWER PER KAESER MODEL FB-620 WITH SOUNDPROOF ENCLOSURE 1600 CFM @ 11 PSIG	⑧	PUMP ACCESS HATCH FRAME PER FLYGT – 5' X 7' WITH 18"ø PIPE OPENING, 4'-0"X4'-6" CLEAR ACCESS.
②	ODOR CONTROL SYSTEM PER RJ ENVIRONMENTAL MODEL LO-PRO, LP-9000 (10,000 CFM)	⑨	PUMP ACCESS HATCH FRAME PER FLYGT – 5' X 7' WITH NO PIPE OPENING, 4'-0" X 4'-6" CLEAR PUMP ACCESS
③	5.5 MGD PACKAGE SCREEN STATION PER WESTECH MODEL NO. FSS-600	⑩	FOUL AIR LOUVER WITH DAMPER
④	VORTEX GRIT REMOVAL UNIT PER WESTECH MODEL GVA-12	⑪	COMBUSTIBLE GAS SENSOR PER ATT MODEL 812
⑤	GRIT CLASSIFIER PER WESTECH MODEL GRITT MITT GSF3	⑫	GRIT BLOWER UNIT SUPPLIED BY WESTECH – 5 HP
⑥	– NOT USED –	⑬	SLUICE GATE CRANK THROUGH HATCH
⑦	PUMP ACCESS HATCH FRAME PER FLYGT – 4'-0" x 4'-6" CLEAR ACCESS.		

LEGEND

PROPOSED

EXISTING

SLUDGE DRYING

FILTRATION

BLWR

SHEET MAP
1"=80'

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NO	BY	DATE

JOB
PALM VALLEY WRF
PHASE II EXPANSION
SBR WASTEWATER
RECLAMATION FACILITY
GOODYEAR AZ

DATE APP.

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17802 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-5734 FAX. 848-4822

Pacific Environmental Resources Corp.
17862 Georgetown Lane
Huntington Beach, CA 92647
tel: 714.375.5508 fax: 714.375.5567

SCALE 1/8" = 1'
DESIGNED JAMES A. MATTHEWS
DRAWN DAD
CHECKED JAM
DATE 06/13/02
JOB NO. 7617E

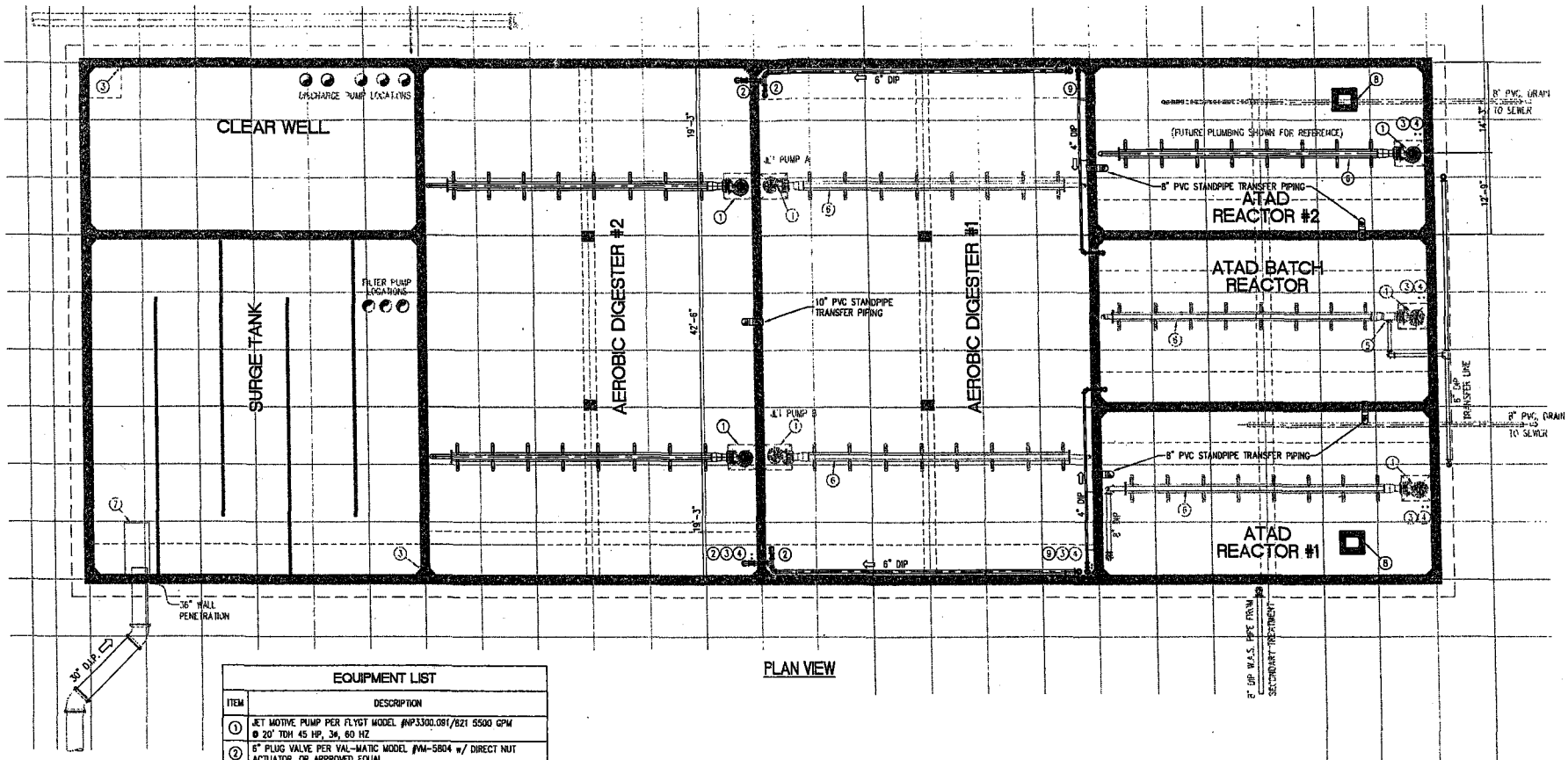
TITLE
SBR BUILDING
MECHANICAL LAYOUT

FIGURE
06

JOB NO. 7617-E

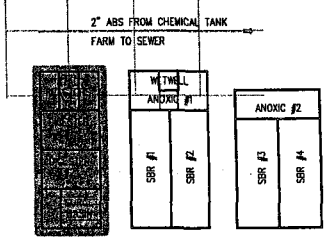
Scale: 7617-SHEET-MAP.dwg 7617-E3-SBR.dwg 7617-E3-MECH-PLAN.dwg 7617-E3-MECH-PLAN.dwg 7617-S0-TBLE.dwg 7617-M0-MECH-PLAN.dwg 7617-S0-LEGEND.dwg
Standard = 1 ; Blocks = 1.5 ; Plotstyle = 1 ; Xlref No. = 1.5386 (US Inch) ; Version = 1

P:\7617\Engineering\7617-S0 (Proposed)\plotted\7617-M0-MECH.dwg By: dds Date: Mar. 31, 2004 Time: 04:34 pm



PLAN VIEW

EQUIPMENT LIST	
ITEM	DESCRIPTION
1	JET MOTIVE PUMP PER FLYGT MODEL #NP3300.091/821 5500 GPM @ 20' TDH 45 HP, 3ø, 60 HZ
2	6" PLUG VALVE PER VAL-MATIC MODEL #VM-5804 w/ DIRECT NUT ACTUATOR, OR APPROVED EQUAL
3	LEVEL PRESSURE TRANSDUCER PER KPSI #730 (0-10 psi)
4	O.R.P. PROBE / CONTROLLER PER ROYCE INSTRUMENTS MODEL 5000
5	6" DIP SADDLE
6	JET AERATION MANIFOLD PER MTS MODEL # MT4DM – 16 NOZZLE FRP CONSTRUCTION
7	WEIR BOX SIZE 8' X 4' X 4'
8	FLOATING FOAM CUTTER
9	4" PLUG VALVE PER VAL-MATIC WITH DIRECT NUT ACTUATOR OR APPROVED EQUAL



SHEET MAP
1"=80'

LEGEND
PROPOSED
EXISTING

NO	BY	DATE		DATE	APP.

JOB
PALM VALLEY WRF
PHASE II EXPANSION
SBR WASTEWATER
RECLAMATION FACILITY
GOODYEAR AZ

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17902 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-5734 FAX. 848-4922

PERC
Pacific Environmental Resources Corp.
17802 Georgetown Lane
Huntington Beach, CA 92647
tel. 714.375.5356 fax. 714.375.9567

SCALE 1/8" = 1'
DESIGNED JAMES A. MATTHEWS
DRAWN DAD
CHECKED JAM
DATE 06/13/02
JOB NO. 7617E

TITLE
DIGESTER & DISINFECTION TANKS MECHANICAL LAYOUT

FIGURE 07
JOB NO. 7617-E

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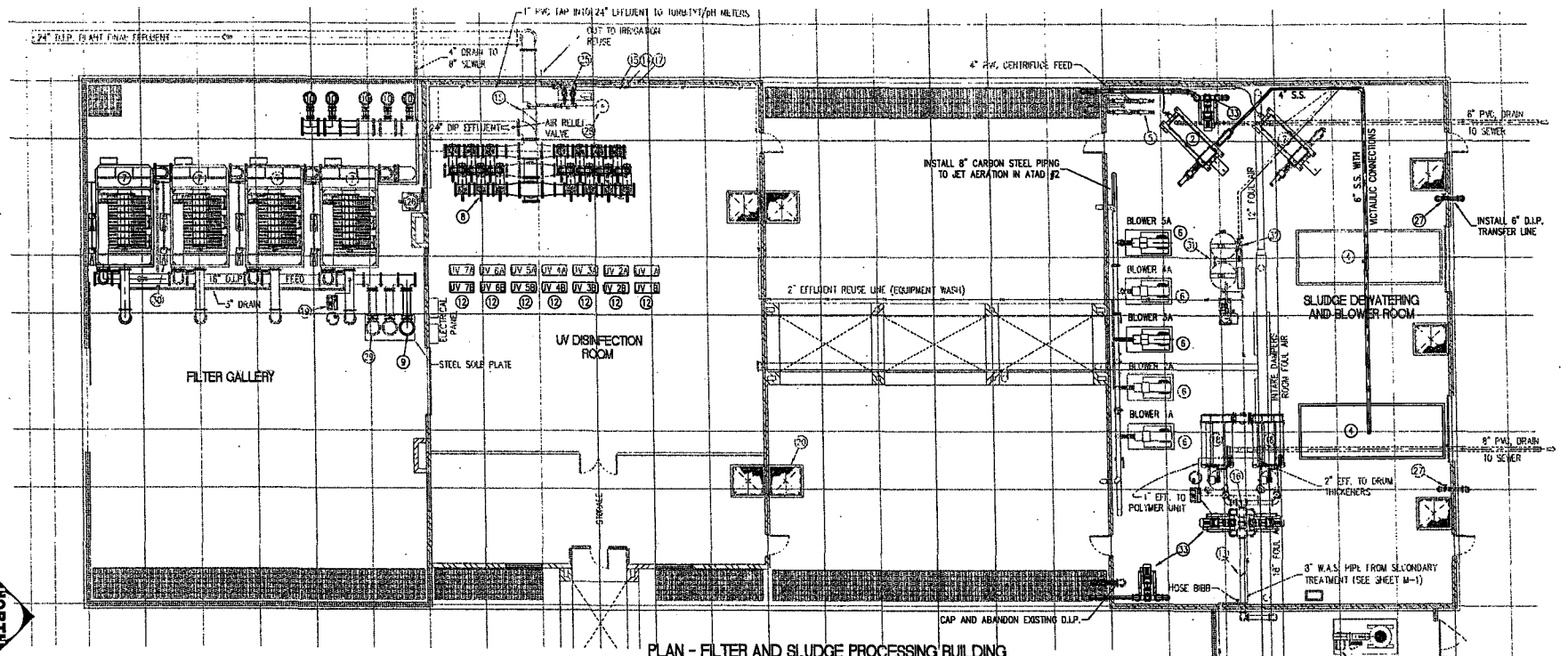
100



PLAN - FILTER AND SLUDGE PROCESSING BUILDING

SHEET MAP
1"=80'

EQUIPMENT LIST

ITEM	DESCRIPTION
1	ODOR CONTROL SYSTEM PER LO-PROP, MODEL NO. LP-4000-SP
2	DECANTING CENTRIFUGE PER WATERLINK NOXON #DC20FC OR APP'D EQ. (90 GPM @ 3% SOLIDS FEED) w/ ALLWEILER SEZP750.2 8HP CAKE PUMP
3	NOT USED
4	20 CU. YARD ROLL OFF DISPOSAL CONTAINER PER LOCAL WASTE MANAGEMENT REQUIREMENTS
5	SLUDGE PUMP PER ALWEILER #AEIE-550, 7HP (2 TYP)
6	BLOWER PER KAESER MODEL FB- 620 W/ SOUNDPROOF ENCLOSURE 2000 CFM @ 8.5 PSIG (100 HP)
7	AQUADISK MODEL #ADFP-54XBE-PC 8-DISK FILTER PER AQUA-AEROBIC SYSTEMS (3 TYP)
8	MEDIUM PRESSURE UV SYSTEM PER OZONIA/TRIOGEN MODEL #UV018106, 1000 GPM/EA @ 100 mJ/CM^2 (7 ADDITIONAL THIS PHASE)
9	FILTER FEED PUMPS PER FLOWAY MODEL #18TKH, 23'-3" OAL SINGLE STAGE (5700 GPM @ 36' TDH, 75 HP, VFD). 2 THIS PHASE.
10	DISCHARGE PUMPS PER FLOWAY MODEL #16MKL, 23'-3" OAL 2-STAGE (2850 GPM @ 120' TDH, 125 HP, VFD). 2 THIS PHASE.

EQUIPMENT LIST

ITEM	DESCRIPTION
11	ACTIVATED CARBON SCRUBBER PER CARBTROL MODEL #GK-7 WITH CORROSION RESISTANT FAN, SKID MOUNTED (MOBILE BACKUP)
12	UV SYSTEM CONTROL AND BALLAST CABINET PER OZONIA
13	WASTE SLUDGE FLOW METER PER DYNASONIC, DOPPLER TYPE M-901
14	TURBIDITY METER PER HF SCIENTIFIC MICRO-20W BW
15	TRANSIT TIME FLOW METER PER DYNASONIC TFX-1
16	PLUG VALVE PER VAL-MATIC #VM-5804 w/ ELECTRIC ACTUATOR (BETRS #EM 830-30) AND HANDWHEEL (OR APPROVED EQUAL)
17	pH PROBE PER SIGNET MODEL 2714 WITH TRANSMITTER MODEL 8750
18	SLUDGE ROTARY DRUM THICKENER PER IPEC MODEL #FT-200-4872 OR APPROVED EQUAL (350 GPM @ 0.25% SOLIDS)
19	AUTOMATIC POLYMER FEEDER PER DYNA-BLEND MODEL L4-D OR APPROVED EQUAL
20	PUMP ACCESS FRAME & HATCH PER FLYGT. 4'x4½' CLEAR ACCESS, H-20 LOADING, (TYP 7)

EQUIPMENT LIST

ITEM	DESCRIPTION
21	200 GAL. SULFURIC ACID TANK (DOUBLE WALL CONTAINMENT)
22	500 GAL. SODIUM HYDROXIDE TANK (DOUBLE WALL CONTAINMENT)
23	1000 GAL. SODIUM HYPOCHLORITE TANK (DOUBLE WALL CONTAINMENT)
24	EYEWASH STATION
25	GRUNDFOS BOOSTER PUMP 180 GPM @ 86 PSI, 460 V, 3Ø, 60 HZ
26	TABLET CHLORINATION SYSTEM
27	6" PLUG VALVE PER VAL-MATIC MODEL #VM-5804 W/ELECTRIC ACTUATOR OR APPROVED EQUAL
28	34 GAL DIAPHRAGM - TYPE WELL TANK
29	FEED PUMP SOLE PLATE PER (17)
30	BACKWASH PUMP PER GORMAN-RUPP MODEL #12B20-B, 1.5 GPM @ 25' TDH, 3 HP, 60Hz, 3Ø, 230/460 VAC

EQUIPMENT LIST

ITEM	DESCRIPTION
31	POLYMER FEED SYSTEM SUPPLIED WITH CENTRIFUGE BY WATERLINK-NOXON
32	POLYMER PUMP PER ALLWEILER #ACB1ESO
33	SLUDGE PUMP PER VOGELSANG MODEL #VX136- 210Q HD ROTARY LOBE PUMP, 500 GPM @ 70 PSI

NO	BY	DATE		DATE	APP.

JOB
PALM VALLEY WRF PHASE II EXPANSION
SBR WASTEWATER RECLAMATION FACILITY
GOODYEAR AZ

PACE
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17802 GEORGETOWN LANE, H.B. CA. 92647
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Pacific Environmental Resources Corp.
17842 Georgetown Lane, Huntington Beach, CA 92647
tel. 714.375.0388 fax. 714.375.9367

SCALE 1/8" = 1'
DESIGNED JAMES A. MATTHEWS
DRAWN DAD
CHECKED JAM
DATE 06/13/02
JOB NO. 7617E

TITLE
DIGESTOR & DISINFECTION BUILDING MECHANICAL LAYOUT

FIGURE
08

JOB NO. 7617-E

THESE DRAWINGS ARE THE PROPERTY OF P.A.C.E. AND SHALL NOT BE REPRODUCED IN ANY MANNER NOR BE USED FOR CONSTRUCTION UNLESS STAMPED "ISSUED FOR CONSTRUCTION".

Xrefs: 7617-SHEET-MAP.dwg 7617-DX-SHEET-PLAN.dwg 7617-DX-MECH-PLAN.dwg 7617-DX-ARCH-PLAN.dwg 7617-SD-SBR.dwg 7617-SD-TEBC.dwg 7617-PROF-MECH-PLAN.dwg 7617-SD-LEGEND.dwg
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Date: Dec. 31, 2004 Time: 04:39 pm By: dds
P:\PROJECTS\engineering\2617-SD-08.dwg

Janet Napolitano
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.adeq.state.az.us

Stephen A. Owens
Director

September 9, 2004

Mr. Mike Weber, General Manger
Litchfield Park Service Company
111 West Wigwan Blvd., Suite B
Litchfield, Arizona 85340

RE: Palm Valley Reclamation Facility - Phase II
APP Significant Amendment – Notice of Administrative Deficiencies
Inventory #100310 / LTF # 33467

Dear Mr. Weber:

The Water Permits Section of the Arizona Department of Environmental Quality (ADEQ) has reviewed the APP Significant Amendment application dated July 2004 and response dated August 16, 2004 for the above referenced facility. The response was received by ADEQ on August 18, 2004. Based on this review, ADEQ has determined that additional information or clarification is necessary in order to deem the application administratively complete. The licensing time frame running of days are suspended until all of the issues are adequately addressed.

The review was conducted by the Project Hydrologist and the Project Engineer and the comments provided below are separated as such. Please provide separate responses to the engineering comments and the hydrology comments. The response to the engineering comments shall be included in a revised Design Report or a submittal that is signed, dated, and stamped (sealed) by an Arizona registered professional engineer, as per Arizona Administrative Code (A.A.C.) R18-9-B202.A.

Engineering Comments

1. Technical Capability Information (A.A.C. R18-9-A202.B)

   Provide a copy of the WWTP Operator's Certificate.

2. Wastewater Characterization (A.A.C. R18-9-B202.A.1)

   Submit wastewater characterization that includes BOD, TSS, total nitrogen, and pH. See

attached example of the complete wastewater composition.

3. Industrial Pretreatment (A.A.C. R18-9-B204.A.6)

Is there a possibility of the presence of industrial, hazardous, or mining wastewater, or pesticides, PCBs, or radionuclides in the wastewater that will be treated at the WWTP? Does the City or Town have a pretreatment ordinance?

4. Impact of Increased Flows (A.A.C. R18-9-B202.A.1)

Discuss the impact of increased flows as the facility reaches design flow.

5. Site Conditions (A.A.C. R18-9-A202.A.8.c)

Are there any landfills, LUSTs, existing groundwater or soil contaminated sites or on-going groundwater or soil remediation sites, near the WWTP or its discharge sites?

6. Proposed Facility Design Documents (A.A.C. R18-9-B202.A.3)

A list of the proposed WWTP modifications or a list of the treatment and storage units proposed to be added in the WWTP for its expansion/modification.

7. Contingency Plan (A.A.C. R18-9-B204)

Add the following to the list of emergency contacts, their titles, and their telephone numbers and resubmit:

WWTP Operator
WWTP Owner
Pumper Truck Companies
Automation Repairmen
Electricians
Plumbers
Pump Repairmen
ADEQ Compliance: Central/Phoenix Office: (602) 771-4841
WWTP Consulting Engineer
WWTP Designer
County Health Department
APS

8. Construction Management Controls (A.A.C. R18-9-B202.A.6)

A description of the construction management controls. See attached example.

9. System Startup Plan (A.A.C. R18-9-B202.A.7)

Provide a description of the system startup plan that includes the following:

a. start-up procedures for every WWTP unit and equipment

b. pre-operational testing

c. description/specifications for hydraulic leakage testing of all WWTP units

d. expected effluent quality during startup

e. monitoring requirements during startup

f. expected time-frame for meeting performance requirements specified in R18-9-B204(C), i.e. the WWTP design effluent quality

g. any other special startup condition that may merit consideration in the individual permit

10. Setbacks (A.A.C. R18-9-B202.A.8)

Submit a site diagram depicting compliance with the setback requirements on all four sides of the WWTP, as established in R18-9-B201.I., and not just the east side, as shown in the submitted Figure 02, Appendix A, of the APP Application.

11. Noise Controls (A.A.C. R18-9-B202.A.8)

Discuss what noise controls have been proposed in the WWTP design.

12. Aesthetic Controls (A.A.C. R18-9-B202.A.8)

Discuss what aesthetic controls have been proposed in the WWTP design. Will the expanded WWTP be surrounded by an aesthetic fence? If so, what will be the material of construction and height of this fence.

13. Floodplain Information (A.A.C. R18-9-B203.A.4.a)

A copy of the flood control approval from Maricopa County.

14. Power Source (A.A.C. R18-9-B203.A.4.c)

A letter sealed by an Arizona registered Electrical Engineer that states that the provided standby generator capacity of 1500 KW is adequate for the expanded 8.2 MGD capacity WWTP.

15. Containment Structures (A.A.C. R18-9-B204.A.7)

Resubmit the list of all the new, proposed WWTP units, with their material of construction and thickness, after adding the word 'reinforced' to the word 'concrete', if this is the case.

16. Equalization Basin Information (A.A.C. R18-9-B202.A.3)

Discuss why an equalization basin (EQB) is not provided in the design.

17. Calculations for SBR (A.A.C. R18-9-B202.A.3)

Several pages of the SBR design calculations have been cut off at the bottom. Please resubmit these.

18. Specifications (A.A.C. R18-9-B202.A.3)

Please provide the manufacturer's specifications for the aeration diffusers that clearly state the oxygen transfer efficiency (OTE) %.

19. Calculations for Filter Backwash (A.A.C. R18-9-B202.A.3)

Design calculations for the filter backwash (influent and effluent) tanks.

20. Calculations for UV (A.A.C. R18-9-B202.A.3)

Ultraviolet (UV) Disinfection Bioassay design calculations or similar that clearly states the design conditions and calculated results including the following:

a. the design flow (peak daily flow)

b. the design effluent fecal coliform level after the UV disinfection

c. the contact time in seconds

d. the UV dosage

e. % transmittance

f. the number of UV bulbs required.

21. One Comprehensive Site Map (A.A.C. R18-9-A202.A.2)

Please resubmit a facility site plan that includes all of the following on <u>one</u> map:

a. the WWTP location with its latitude and longitude labeled

b. the Lift Station

c. all known property lines and structures

d. all known water wells and their uses (please indicate the usage on a separate page)

e. all known injection wells and their uses (please indicate the usage on a separate page)

f. all known drywells and their uses (Label the drywells separately and please indicate the usage on a separate page.)

g. topography

h. the Effluent Pump Station with its latitude and longitude labeled

i. all the locations of points of effluent discharge (Reuse, Recharge, NPDES etc), with their latitude and longitude labeled, and all the effluent disposal sites (Golf Courses, Recharge Basins, Washes, Rivers, etc)

j. all known borings unless the Department determines that borings are numerous and the requirement may be satisfied by a narrative description of the number and location of the borings

k. the existing and proposed points of compliance (POCs) with their latitude and longitude labeled.

22. Clarification and Justification of Proposed Changes (A.A.C. R18-9-B202.A.3/A211.A)

Include on the WWTP Site Plan with the existing units in regular lines and proposed units in bold lines; with the design flow capacity and the effluent flow-meter labeled.

23. Hydraulic Profile (A.A.C. R18-9-B202.A.3)

Submit the hydraulic profile of the WWTP with the level of the 100-year flood labeled on it.

24. Site Grading Plan (A.A.C. R18-9-B202.A.3)

Include a site grading plan with contours and flow direction arrows.

25. Land Use Map – Figure 1 (A.A.C. R18-9-B202.A.9)

Please submit the Land Use Map Figure 1, Appendix B of the Application after showing the location of the WWTP on it.

Hydrologic Comments

1. Groundwater Information (A.A.C. R18-9-A202.A.10)

Please submit documentation on the depth and direction of groundwater flow.

2. Site Map (A.A.C. R18-9-A202.A.10)

Include a site map of the facility's pollutant management area (including all effluent treatment structures, effluent storage ponds, and the discharge into the Roosevelt Irrigation District canal) and the location of the point of compliance (including latitude-longitude coordinate) at the discharge into the RID canal.

3. Liner Information (A.A.C. R18-9-A202.A.10)

Please provide information (type of material, etc.) on the liner system, if any, for the effluent storage ponds lined and the RID canal.

4. Flows (A.A.C. R18-9-A202(A)(10))

What is the proposed treatment design flow of the expanded facility and the total treatment capacity of both phases?

If you have any questions or comments about this letter, please feel free to contact me at 602-771-4465 or (lr2@azdeq.gov) or the project engineer, Kaumil Parghi at 602-771-4578 or (khp@azdeq.gov).

Sincerely,

Lisa A. Richey, Project Manager
Wastewater, Recharge & Reuse Unit
Water Permits Section, Water Quality Division

Attachments: Example Wastewater Characterization
Example Construction Management Controls

cc: Asif Majeed, Manager, Wastewater, Recharge & Reuse Unit
Erin Hubbard, Project Engineer, PACE, Inc.

WRR04:0788

108.

AQUIFER PROTECTION PROGRAM
Technical Support Request

☐ Hydrological Review ☒ Engineering Review

DATE: 10/14/04

TO: PARGH

FROM: LISA

PHONE: 1-4465

FACILITY NAME: PALM VALLEY

INVENTORY NO: 100310

SITE OP NO: 070372-00

LTF NO: 33467

PLACE ID:

FACILITY TYPE: WWTP

This request is (check one) **BILLABLE** X or **NON-BILLABLE** ____

ACTIVITY CODE: 8002

SUBACTIVITY CODE: ~~4404~~ 4302

MEETING
__ Date and Time
__ Where/Room #
__ Purpose

DOCUMENT REVIEW
X Permit Application - Completeness
__ Permit Application - Technical
__ Clean Closure
__ Permit Modification
__ Draft Permit
__ Response to Public Comment
__ Other (Sample Plan, Site Investigation Report, etc.)

Date Response Requested
WITHIN 15-DAY RESPONSE TIMEFRAME
(BY 10/~~29~~ 30/04)

Complete APP file is (check one) **attached** ____ or **available upon request** √.

COMMENTS:
- JUST REVIEW RESPONSE TO NAOS
- RESPONSE & DEF LTR ATTACHED.

ADEQ Arizona Department of Environmental Quality

Memorandum

Date: October 19, 2004
To: Ms. Lisa Richey, Project Officer
From: Mr. Kaumil H. Parghi, EE KHP
Subject Palm Valley WWTP APP ER Compl. – Inv 100310 LTF 33467

I have conducted an engineering review of the above referenced facility's application for an individual APP and the response submittal dated October 12, 2004 (Response). Please request the applicant to submit a revised Design Report, or a submittal that is signed, dated, and stamped (sealed) by an Arizona registered professional engineer, as per Arizona Administrative Code (A.A.C.) R18-9-B202.A., that includes the following information.

1. (A.A.C. R18-9-B202.A.3) **One** WWTP Site Plan with the existing units in regular lines and proposed units in bold lines, all labeled; along with the design flow capacity and the effluent flow-meter labeled.

FYI, the WWTP expansion will not meet the setbacks of 350 feet required by R18-9-B201.I. This may be okay since this is an existing WWTP that was approved for setbacks under the old APP rules, or it may not. Please consult management about this issue.

Cancelled by Asif Majeed on 10/28/2004. ASM told us that a facility can show different WWTP units on different maps, rather than all of them on the same one single map.

WRR04:0890

110.

ADEQ Arizona Department of Environmental Quality

Memorandum

Date: November 12, 2004
To: Ms. Lisa Richey, Project Officer, Wastewater, Recharge, and Reuse Unit
From: Mr. Kaumil H. Parghi, Environmental Engineer, Wastewater, Recharge, and Reuse Unit KHP
Subject Palm Valley WRF APP Inv. No. 100310 LTF # 33467
Final Engineering Review Memo

I have conducted an engineering review of the above referenced facility's application for a Significant Amendment to Individual Aquifer Protection Permit (APP) 100310 and determined that it meets with the Arizona Administrative Code (A.A.C.) R18-9-PART B. Best Available Demonstrated Control Technology (BADCT) requirements for an APP for new facilities.

However, one item remains that requires resolution.

1. Please ask the applicant to apply for a General Permit for the expanded influent lift station.

Regarding the WRF setbacks, I am aware that these are presently in the process of being decided and approved by the Water Permits Section management, and therefore, have not been included in my engineering review.

A summary of the WWTP engineering can be found at:
J:\APP\Permits\Process\100310\040719SigAm\'EngRevSumm.doc' on the computer.

WRR04:0979

ADEQ Arizona Department of Environmental Quality

Memorandum

November 12, 2004

Name: Palm Valley Water Reclamation Facility (WRF)
City: Goodyear County: Maricopa
Owner & Applicant: Litchfield Park Service Company (LPSCo)
Aquifer Protection Permit (APP) P-100310 LTF # 33467
Significant Amendment for WRF Expansion from 4.1 to 8.2 MGD
Final Engineering Review Summary

Technical Capability: The applicant has demonstrated the technical competence necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A202(B).

WRF Design Engineer: The WRF was designed as per the design report prepared and stamped, dated, and signed (sealed) by Duong T. Do, P.E. (Professional Engineer), Pacific Advanced Civil Engineering Inc. (PACE), dated August 14, 2004, and subsequent sealed submittals that served as additions to the design report.

WRF Operator Grade: Provided Grade 4

WRF Capacity: The WRF will have a total capacity to collect and treat a maximum average monthly wastewater flow of 8.2 million gallons per day (MGD), and a maximum daily wastewater flow of 16.2 MGD.

Service Area: The City of Goodyear, Maricopa County, Arizona

Type of Wastewater Treated: Typical domestic wastewater from residential and commercial areas of the Litchfield Park Service Company (LPSCo) service area that includes RAZ 265 266 (Litchfield Park), the Stardust Development Service area, and the Wigwam Creek service area, City of Goodyear. Any industrial, mining, or hazardous wastewater will be pretreated prior to being treated at the WRF, as per the federal, state, and local pretreatment ordinance/program.

Treatment Process Description: The WRF process will consist of headworks with bar screens and grit removal, anoxic reactors and sequencing batch reactors (SBRs) for nitrification-denitrification, disc filters, ultraviolet (UV) disinfection system, aerobic sludge digesters, and sludge dewatering centrifuges.

Package Plant Brand Name: PACE

Design Software Used: None

Odor, Noise, & Aesthetic Controls and Setbacks: All treatment units upstream of the filters will be covered with concrete or aluminum covers or housed inside buildings and air scrubbers will be provided for odor control. All pumps, blowers, and electrical equipment will be housed

within buildings for noise control. The entire WRF site will be surrounded by a 6 feet high chain-link fence and/or a masonry wall, for aesthetic control.

ADEQ Management will finally decide what setbacks to require for this expanded full build-out capacity of 8.2 MGD WRF.

Effluent Quality: The WRF is designed to produce Reclaimed Water Reuse Class A+ effluent.

Amendment Description: This permit amendment is for increasing the flow limit in the existing APP from 4.1 MGD to 8.2 MGD. The following new WRF units will be added to the existing WRF as part of the WRF expansion: one bar screen, one grit chamber, one anoxic reactor, two SBRs, one filter, equivalent pumps and blowers, and seven UV disinfection units.

Effluent Disposal: The effluent may be disposed of by either reuse under valid Reclaimed Water Reuse Permits, or discharged to the Roosevelt Irrigation District (RID) Canal, the Waters of the U.S., under a valid AZPDES permit.

Sludge Disposal: All the sludge including screenings, grit, and scum, will be hauled off-site for disposal in accordance with State and Federal regulations.

WRF Leaking Potential: All the WRF units will be constructed of reinforced concrete, therefore, there will be no leakage of wastewater in the WRF.

Emergency Operation: The SBRs have a hydraulic capacity for storing wastewater in the order of 3 times the design flow, i.e. 3 X 4.1 MGD = 12.3 MGD, for approximately 3 hours. This would be adequate time to repair/replace any process unit or equipment because the WRF operation is completely automated and there is provision for a standby unit for each process equipment.

Overall BADCT: The WRF is designed to meet the treatment performance criteria for new facilities as specified in Arizona Administrative Code R18-9-B204.

Storm Water and Surface Water Considerations: The WRF is outside the 100-year flood plain.

Discharge Monitoring Requirements in the APP: Over and above the regular BADCT monitoring, require the following.

Since the design WRF flow is equal to or greater than 250,000 gallons per day (gpd), a fecal coliform limit of less than or equal to a seven (7) sample median of 2.2 CFU/100 ml sample and less than a single sample maximum of 23 CFU/100 ml sample, is required for the discharge going to recharge or to the AZPDES.

Use the Reuse Class A+ limits for the discharge going to Reuse. Since there is provision of chemical addition in conjunction with filtration, Enteric Virus monitoring will not be required in the discharge.

Also, since this a permit having a flow limit greater than 1.0 MGD and is for a city, Radionucleids monitoring is required in the discharge.

The monitoring frequencies should be as per the latest policies decided in our Unit.

Discharge Sampling Point in the APP: Separate sampling will be required at each different point of discharge for each different method of disposal. Sampling shall be conducted at the point downstream of the UV disinfection system.

Other Permits: The applicant will acquire/renew the AZPDES permit for discharge to the RID Canal.

Special Permit Requirements: None.

Permit Compliance Schedule Requirements: None.

114.

WATER PERMITS

OCT 14 2004

RECEIVED

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

17520 Newhope Street, Suite 200 • Fountain Valley, California 92708 • 714.481.7300 • fax: 714.481

October 12, 2004

Ms. Lisa Richey, Project Manager
Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, Arizona 85007
Phone (602) 771-4465
Fax (602) 771-4674

RE: Palm Valley Reclamation Facility – Phase II #7911E
APP Significant Amendment – Notice of Administrative Deficiencies
Inventory # 100310 / LTF # 33467

Dear Ms. Richey:

Pacific Advanced Civil Engineering, Inc. ("PACE") has received and reviewed your comments and questions dated September 9, 2004 regarding the *Palm Valley Reclamation Facility – Phase* II *Aquifer Protection Permit Application (APP)*. The following are our responses to your comments.

Engineering Comments

1. *Technical Capability Information (A.A.C. R18-9-A202B)*
Provide a copy of the WWTP Operator's Certificate.

A copy of the WWTP Operator's Certificate is in Attachment A.

2. *Wastewater Characterization (A.A.C. R18-9-B202.A.1)*
Submit wastewater characterization that includes BOD, TSS, total nitrogen, and pH
See attached example of the complete wastewater composition.

Attachment B contains the existing influent wastewater characterization from the Palm Valley WRF Phase I. This data was provided in the Palm Valley WRF Phase II APP Application, Appendix C. It is anticipated that the existing influent wastewater characterization will be similar in Phase II. As far as other constituents listed in the Table 3-16 (provided by ADEQ), we do not have data available for them, but we anticipate that the concentrations are medium in strength based on a comparison with the available constituents.

3. *Industrial Pretreatment (A.A.C. R18-9-B204.A.6)*

Is there a possibility of the presence of industrial, hazardous, or mining wastewater, pesticides, PCBs, or radionuclides in the wastewater that will be treated at the WWTP? Does the city or town have a pretreatment ordinance?

The wastewater treated at the Palm Valley WRF is and will be residential in nature with light commercial. The presences of industrial, hazardous, or mining wastewater, pesticides, PCBs, or radionuclides are not expected to be in the wastewater. If future industrial users are connected to the system, the industrial user will be required to meet EPA pretreatment standards prior to discharging to the WRF.

4. *Impact of increased flows (A.A.C. R18-9-B202.A1)*
Discuss the Impact of increased flows as the facility reaches design flow.

The Palm Valley WRF Phase II will come online to handle the increased wastewater flow from LPSCO service area. As the wastewater flow exceeds the Phase I capacity of 4.1 MGD, one of the Phase II's two SBR basins will come into service, creating a three tank SBR configuration. As the flow increases, the fourth tank will then be put online, allowing for a full treatment capacity of 8.2 MGD.

5. *Site Conditions (A.A.C. R18-9-A202.A.8.c)*
Are there any landfills, LUSTs, existing groundwater or soil contaminated sites or on-going groundwater or soil remediation sites, near the WWTP or its discharge sites?

The Phoenix Goodyear Airport (PGA) North site is a Superfund site located within the vicinity of the Palm Valley WRF. The PGA North site consists of an existing contaminated groundwater plume that is undergoing groundwater treatment for chlorinated solvents, such as trichloroethylene (TCE), perchlorate, and methyl ethyl ketone. The groundwater treatment is conducted by the Crane Company.

6. *Proposed Facility Design Documents (A.A.C. R18-9-B204)*
A list of proposed WWTP modifications or a list of the treatment and storage units proposed to be added in the WWTP for its expansion/modification.

Attachment C contains a list of the additional process tankage and equipment necessary for the Palm Valley WRF Phase II Expansion. Attachment C also contains the preliminary layout of the mechanical plans, showing the location of the equipment. The new equipment additions are in bold type with the existing equipment faded back for clarity.

7. *Contingency Plan (A.A.C. R18-9-B204)*

Add the following to the list of emergency contacts, their titles, and their telephone numbers and resubmit:

WWTP Operator
WWTP Owner
Pumper Truck Companies
Automation Repairman
Electricians
Plumbers
Pump Repairmen
ADEQ Compliance: Central/ Phoenix Office: (602) 771-4841

WWTP Consulting Engineer
WWTP Designer
Country Health Department
APS

Slip pages for the above emergency contacts are provided in Attachment D

8. *Construction Management Controls (A.A.C. R18-9-B202.A.6)*
A description of the construction management control. See attached example.

Attachment E has the table of contents for the specifications, which will include construction management controls.

9. *System start up plan (A.A.C. R18-9-B202.A.7)*

Provide a description of the system startup plan that includes the following:

a. *start-up procedures for every WWTP unit and equipment*

A 6-day performance testing will be conducted to ensure proper operation of all equipment. The equipment will be tested individual by hand and auto, as well as tested for alarm by simulating fault conditions. The equipment will be monitored in the field, as well as through the SCADA and PLC. This will ensure that the equipment and instrumentations are operating per the design.

b. *pre-operational testing*

See reply to 9a.

c. *description/specification for hydraulic leakage testing of all WWTP units*

As part of the Start-up procedure, all concrete tankage shall undergo a 3-day clean water hydraulic testing that will be described in the Specifications (See Attachment E). In addition, equipment and piping involved in the hydraulic process will also undergo hydraulic testing.

d. *expected effluent quality during startup*

The effluent quality will meet ADEQ Class A+ Reclaimed Water requirements at all times (i.e., BOD, TSS, TN <10 mg/L; <2 NTU Turbidity; and non-detect for fecal coliform for 4 of 7 sample, not to exceed 23).

e. *monitoring requirements during startup*

Effluent is monitored daily to ensure compliance with discharge requirements and Title 18 Class A+ Standards.

f. expected time-frame for meeting performance requirements specified in R18-9-B204 (C), i.e. the WWTP design effluent quality.

Effluent is expected to meet Title 18 A+ Reclaimed Water Standards on first day of discharge and thereafter.

g. any other special startup condition that may merit consideration in the individual permit.

None

10. *Setbacks (A.A.C. R18-9-B202.A.8)*
Submit a site diagram depicting compliance with the setback requirements on all four sides of the WWTP, as established in R18-9-B201.I., and not just the east side, as shown in the submitted Figure 02, Appendix A, of the APP Applications.

Please see Attached F, Figure 1 – Site Map.

11. *Noise Controls (A.A.C. R18-9-B202.A.8)*
Discuss what noise controls have been proposed in the WWTP design.

All major equipment for the Phase II expansion will either be housed inside a CMU building or will be submerged. The new blowers will be equipped with sound attenuating enclosure, in addition to being housed inside the CMU process building.

12. *Aesthetic Controls (A.A.C. R18-9-B202.A.8)*
Discuss what aesthetic controls have been proposed in the WWTP design. Will the expanded WWTP be surrounded by an aesthetic fence? If so, what will be the material of construction and height of this fence?

The Palm Valley WRF is a very aesthetically pleasing WRF. Please see photos of the existing WRF in Attachment G.

13. *Floodplain Information (A.A.C. R18-9-B203.A.4.a)*
A copy of the flood control approval from Maricopa County.

The Palm Valley WRF is located outside the 500-year flood zone. Therefore, the flood level is not provided for this area. See FEMA map in Appendix D of the Palm Valley WRF Phase II APP.

14. *Power Source (A.A.C. R18-9-B203.A.4.c)*
A letter sealed by an Arizona registered Electrical Engineer that states that the provided standby generator capacity of 1500 KW is adequate for the expanded 8.2 MGD capacity WWTP.

A new 1500 KW emergency generator, along with a new 3000 amp service entrance will be installed for the Palm Valley WRF Phase II expansion. The existing 3000 amp service

entrance and the existing emergency generator will remain in service. Attachment H has the revised write up for the Design Report.

15. *Containment Structures (A.A.C. R18-9-B204.A.7)*
Resubmit the list of all the new, proposed WWTP units, with their material of construction and thickness, after adding the word 'reinforced' to the word 'concrete,' if this is the case.

All tank structures will be constructed of reinforced concrete. The mat foundation will be 24-inch thick; the structural walls will be 21-inch thick; and the top slab will be constructed with 8-inch pre-cast plank and 4-inch reinforce concrete topping for a combined total of 12-inch thick top slab.

16. *Equalization Basin Information (A.A.C. R18-9-B202.A.3)*
Discuss why an equalization basin (EQB) is not provided in the design.

An "equalization basin" is used to equalize the flow and attenuating any peak loading or peak flow coming into the facility. The Palm Valley WRF design incorporates two "equalization basins", which are referred to as the anoxic reactor and the surge basin. The anoxic reactor equalizes the flow at the head of the plant before the SBRs and the surge basin equalizes the flow at the end of the plant prior to filtration and disinfection.

17. *Calculations for SBR (A.A.C. R18-9-B202.A.3)*
Several pages of the SBR design calculations have been cut off at the bottom. Please resubmit these.

Attachment I contains a full copy of the design calculations.

18. *Specifications (A.A.C. R-18-9-B202.A.3)*
Please provide the manufacturer's specifications for the aeration diffusers that clearly state the oxygen transfer efficiency (OTE)%.

Attachment J shows the standard oxygen absorption efficiency versus air flow per nozzle based on surface water depth. At the design air flow rate of 40 to 50 scfm per nozzle, the SOTE is approximately 30% at 20 ft water depth. The Palm Valley WRF will have a water depth of 25 ft; which will increase the SOTE percentage. However, to be conservative, the design used only 30% SOTE (See Design Report – Appendix A).

19. *Calculations for Filter Backwash (A.A.C. R18-9-B202.A.3)*
Design calculations for the filter backwash (influent and effluent) tanks.

The filtration system to be used for the Palm Valley Phase II Expansion will be the same as the existing filters, which are the Aqua Aerobic AquaDisk Filters. These filters do not need a filter backwash tank. The backwash process uses vacuum shoes located on the outside of the cloth media within the filter tanks. During backwash, the cloth disk rotates allowing the shoes to pull off solids that have accumulated on the media. Because the backwash process occurs in the filter tank, filtration and backwash can occur simultaneously without reduction in filtration capacity. Please see Figures 5a and 5b of the Design report.

20. *Calculations for UV (A.A.C. R18-9-B202.A.3)*
Ultraviolet (UV) Disinfection Bioassay design calculations or similar that clearly states the design conditions and calculated results including the following:

a. *the design flow (peak daily flow)*

The design flow is 1000 gpm per vessel. There will be seven pressure vessels installed to handle the peak day flow of approximately 5700 gpm with one unit on standby.

b. *the design effluent fecal coliform level after the UV disinfection*

The design effluent fecal coliform will be for non-detect in 4 of 7 samples, not to exceed 23 CFU/100 ml.

c. *the contact time in seconds*

The design contact time will be approximately 2.6 seconds.

d. *the UV dosage*

The UV dosage is 100 mJ/cm2 @ 65% transmittance at 1 cm.

e. *% transmittance*

The transmittance is 65% at 1 cm.

f. *the number of UV bulbs required.*

There will be six 6KW lamps per vessel.

21. *One Comprehensive Site Map (A.A.C. R18-9-A202.A.2)*
Please resubmit a facility site plan that includes all of the following on one map:

a. *the WWTP location with its latitude and longitude labeled*
b. *the Lift Station*
c. *all known property lines and structures*
d. *all known water wells and their uses (please indicate the usage on a separate page)*
e. *all known injection wells and their uses (please indicate the usage on a separate page)*
f. *all known drywells and their uses (Label the drywells separately and please indicate the usage on a separate page)*
g. *topography*
h. *the Effluent Pump Station with its latitude and longitude labeled*
i. *all the locations of points of effluent discharge (Reuse, Recharge, NPDES etc), with their latitude and longitude labeled, and all the effluent disposal sites (Golf Courses, Recharge Basins, Washes, Rivers, etc)*

j. *all known borings unless the Department determines that borings are numerous and the requirement may be satisfied by a narrative description of the number and location of the borings*

k. *the existing and proposed points of compliance (POCs) with their latitude and longitude labeled.*

Please see Figure 1 in Attachment F.

22. *Clarification and Justification of Proposed Changes (A.A.C. R18-9-B202.A.3/A211.A)*
Include on the WWTP Site Plan with the existing units in regular lines and proposed units in bold lines; with the design flow capacity and the effluent flow-meter labeled.

Please see Attachment C for mechanical layout of new equipment. Figure 1 in Attachment F shows the existing and new facility layout. The treated effluent from both Phases I and II will be discharged from the existing clear well, which has an existing effluent flow meter. Please see Sheet M10 in Appendix A of the Palm Valley WRF Phase II Expansion APP Application.

23. *Hydraulic Profile (A.A.C. R18-9-B202.A.3)*
Submit the hydraulic profile of the WWTP with the level of the 100-year flood labeled on it.

Please see Figure 5 in Attachment F. The Palm Valley WRF is located outside the 500-year flood zone. Therefore, the flood level is not provided for this area. See FEMA map in Appendix D of the Palm Valley WRF Phase II APP.

24. *Site Grading Plan (A.A.C. R18-9-B202.A.3)*
Include a site grading plan with contours and flow direction arrows.

Please see Attachment C for the proposed site grading plans for the Palm Valley WRF Phase II Expansion. Refer to Figure 1 in Attachment F for the flow direction arrows.

25. *Land Use Map – Figure 1 (A.A.C. R18-9-B202.A.9)*
Please submit the Land Use Map Figure 1, Appendix B of the Application after showing the location of the WWTP on it.

Please see Attachment F, Figure 2 for the revised Land Use Map.

Hydrologic Comments

1. *Groundwater Information (A.A.C. R18-9-A202.A.10)*
Please submit documentation on the depth and direction of groundwater flow.

Please see Attachment F, Figures 3 and 4 for direction and depth of groundwater flow, along with documentation of some local wells.

2. *Site Map (A.A.C. R18-9-A202.A.10)*
Include a site map of the facility's pollutant management area (including all effluent treatment structures, effluent storage ponds, and the discharge into the Roosevelt Irrigation District canal) and the location of the point of compliance (including latitude-longitude coordinate) at the discharge into the RID canal.

Please see the Site Map (Figure 1) in Attachment F.

3. *Liner Information (A.A.C. R18-9-A202.A.10)*
Please provide information (type of material, etc.) on the liner system, if any, for the effluent storage ponds lined and the RID canal.

There is no liner in the effluent storage ponds. The current effluent meets ADEQ Title 18, Class A+, thus no liner is required. Similarly, the effluent from the Palm Valley WRF Phase II Expansion will also meet Title 18 Class A+ Standards. The RID canal is concrete lined.

4. *Flows (A.A.C. R18-9-A202(A)(10))*
What is the proposed treatment design flow of the expanded facility and the total treatment capacity of both phases?

The treatment design capacity for the proposed expansion Phase II is 4.1 MGD. The design capacity of the existing facility is 4.1 MGD. The total treatment capacity will be 8.2 MGD.

We appreciate the opportunity to respond to your comments and look forward to working with ADEQ on this and future projects. If you have any questions, please feel free to call me directly at 714-481-7223.

Sincerely,
PACIFIC ADVANCED CIVIL ENGINEERING, INC.

Duong Do, P.E.
Project Manager

Enclosures

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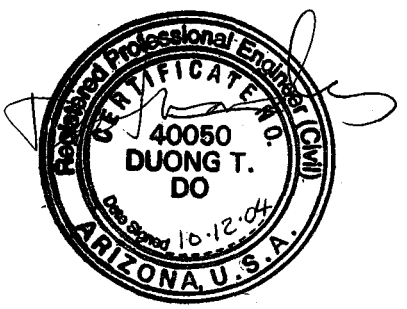

ATTACHMENT C

Palm Valley WRF
Phase II Addition

Additional Treatment Process	Quantity
Anoxic Reactor	1
SBR Tanks	2
ATAD Reactor	1
Aerobic Digester	1

Additional Equipment	Location	Quantity
SBR Fill Pump	SBR	3
Anoxic Mixer	Anoxic Reactor	2
Jet Motive Pump	SBR	6
Jet Aeration Manifold	SBR	6
Effluent Decanter	SBR	6
Mixer Pump	Anoxic Reactor	1
Blower	Blower Room	5
Odor Control System	Blower Room	1
Air Compressor	Blower Room	2
Lift Pump	Lift Station	2
Mechanical Screen	Headworks	2
Vortex Grit Removal	Headworks	1
Grit Classifier	Headworks	1
Jet Motive Pump	Aerobic Digestor / ATAD Reactor	3
Jet Aeration Manifold	Aerobic Digestor / ATAD Reactor	3
Floating Foam Cutter	ATAD Reactor #1 & 2	2
Decanting Centrifuge	Sludge Dewatering & Blower Room	1
Blower	Sludge Dewatering & Blower Room	2
Aquadisk Filter	Filter Gallery	1
UV System	UV Disinfection Room	7
Filter Feed Pumps	Filter Gallery	1
Discharge Pumps	Filter Gallery	2
WAS Sludge Pump	Sludge Dewatering & Blower Room	2

Appendix F

13, 2004

Sobchak
:ona Department of Environmental Quality
0 W Washington St
enix, AZ 85007

Letter in Respect of Financial Capability of Algonquin Water Resources of America ("AWRA") and Palm Valley Water Reclamation Facility ("PVWRF")

ar Mr Sobchak:

is letter is presented in support of the Palm Valley Water Reclamation Facility ("PVWRF") quifer Protection Permit amendment submitted to ADEQ in July 2004

he purpose of this letter is to demonstrate financial capability to construct the facility expansion, perate the PVWRF, and support closure and post-closure activities, if required. The project is cheduled to commence construction in the summer of 2005.

he PVWRF is owned by the Litchfield Park Services Company ("LPSCo"), an Arizona corporation, which is a wholly owned subsidiary of AWRA. AWRA is a Delaware company which owns and perates five other utilities in Arizona and Texas. AWRA is an indirect wholly owned subsidiary of he Algonquin Power Income Fund ("APIF"), a Canadian publicly traded opened ended income trust. APIF is not regulated by the US Securities and Exchange Commission ("SEC"), and thus does not submit 10K or 20F forms, however APIF units are traded on the Toronto Stock Exchange and are regulated by the Ontario Securities Commission ("OSC"). Attached please find a copy of the most recent audited financial statements submitted to the OSC in lieu of a 10K or 20F form.

APIF has assets of over $800 MM CDN and annual free cash flow of in excess of $60 MM CDN. APIF also enjoys the benefit of a credit facility of $115 MM CDN.

The PVWRF upgrade will be financed with equity from APIF.

Should you require more information do not hesitate to call me directly at (905) 465-4513.

LITCHFIELD PARK SERVICES COMPANY

uis Jarratt
EO

LPSCo

Litchfield Park Service Company

Water Reclamation Facility
Goodyear, Arizona

PHASE II - Expansion

Preliminary Cost Estimate Summary

GENERAL CONDITIONS	$479,875
SITEWORK	$333,314
CONCRETE	$2,501,894
BUILDINGS	$324,768
PROCESS EQUIPMENT	$3,075,502
MECHANICAL	$1,376,754
ELECTRICAL	$1,059,141
INSTRUEMENTATION & CONTROLS	$538,966
START-UP	$55,481
ENGINEERING	$833,938
Preliminary Cost Estimate Total:	**$10,579,633**

PERC

Pacific Environmental Resources Corp.

127.

LPSCO
LITCHFIELD PARK SERVICE COMPANY
111 W. WIGWAM BLVD, SUITE B
LITCHFIELD PARK, AZ 85340

FACSIMILE TRANSMITTAL SHEET

TO: Ms. Lisa Richey	FROM: Matthew Garlick
COMPANY: ADEQ	DATE: 11/28/2005
FAX NUMBER: (602) 771 - 4674	TOTAL NO. OF PAGES INCLUDING COVER: 2
PHONE NUMBER: (602) 771 - 4465	SENDER'S REFERENCE NUMBER:
RE: LPSCO APP LETTER of Support	YOUR REFERENCE NUMBER:

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

Ms. Richey,

Here is the letter of support from the City of Goodyear, as I indicated in our meeting last week. Please place this in LPSCO's file.

Thank You,

Matthew Garlick

ARIZONA
Goodyear

RECEIVED
NOV 21 2005

November 18, 2005

Mr. Michael D. Weber, P.E.
Litchfield Park Service Company
111 W. Wigwam Blvd., Suite B
Litchfield Park, AZ 85340

RE: Letter of Support for the Palm Valley Water Reclamation Facility - Phase II Expansion

Dear Mr. Weber,

This letter documents the City of Goodyear's (COG's) awareness and subsequent approval of the recent filing of the Phase II Aquifer Protection Permit (APP) expansion application for the Palm Valley Water Reclamation Facility (PVWRF). The City of Goodyear understands that LPSCO has submitted an amendment application to modify the PVWRF Aquifer Protection Permit (APP) to expand the PVWRF from 4.1 million gallons per day (MGD) to 8.2 MGD. This application proposed using a setback of 150 feet from the nearest process structure of the treatment plant to the nearest property line of the adjacent owners.

Based on the City of Goodyear's extensive research completed by staff and documented in a letter to LPSCO dated July 22, 2005, the City of Goodyear approved a 150-foot setback for the full build-out of the PVWRF to 8.2 MGD. This approval was granted on January 8, 2001 via COAC #01-937 and Ordinance 2001-734. The City of Goodyear hereby reaffirms its allowance and acceptance of a 150-foot setback.

Should you have any questions or need additional information, please feel free to contact me at (623) 882-7062.

Sincerely,

J. Nichols

JIM NICHOLS
Deputy City Manager

Deputy City Manager's Office
190 North Litchfield Road P.O. Box 5100 Goodyear, Arizona 85338
623-882-7061 Fax 623-882-7063 1-800-872-1749 TDD 623-932-6500
www.goodyearaz.gov

Janet Napolitano
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.adeq.state.az.us

Stephen A. Owens
Director

June 15, 2006

Mr. Mike Weber, General Manager
Litchfield Park Service Company
111 West Wigwam Blvd., Suite B
Litchfield, Arizona 85340

RE: APP Significant Amendment for Palm Valley Water Reclamation Facility - Phase II
Inventory #100310 / LTF # 33467

Dear Mr. Weber:

On June 13, 2006, the amended APP with Fact Sheet was signed by ADEQ's Water Quality Division Director, Joan Card, for the above referenced facility. The permit conditions shall apply from June 13, 2006 which is the date of the Water Quality Division Director's signature, and shall be valid for the life of the facility.

Thank you for your cooperation in protecting the water quality of the State of Arizona. If you have any questions about this permit or need further assistance, please contact me at (800) 234-5677 ext. 771-4465 or at (602) 771-4465.

Sincerely,

Lisa A. Richey, Project Manager
APP & Reuse Unit
Groundwater Section, Water Quality Division

cc: Asif Majeed, Manager, Wastewater, Recharge, & Reuse Unit, ADEQ
Henry Darwin, Manager, Water Quality Compliance Section, ADEQ
Robert Casey, Manager, Enforcement Unit, Water Quality Compliance Section, ADEQ
Gary Harmon, Inspector, Field Services Unit, Water Quality Compliance Section, ADEQ
Matthew Hodge, Manager, Data Unit, Water Quality Compliance Section, ADEQ
Lynne Dekarske, Groundwater Section, ADEQ
Kym Kneadler-Holloway, PPS II, ADEQ

WWR0:0381

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Mike Weber, Gen Mgr
Litchfield Park Serv Co
111 W Wigwam Blvd Ste B
Litchfield AZ 85340

PS Form 3800, February 2000 — See Reverse for Instructions

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Arizona Department of Environmental Quality
1110 West Washington Street (5415B-3) L. Richey
Phoenix, AZ 85007

SE2 C015

STATE OF ARIZONA
AQUIFER PROTECTION PERMIT NO. P-100310
PLACE ID 815, LTF NO. 33467
SIGNIFICANT AMENDMENT

1.0 AUTHORIZATION

In compliance with the provisions of Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Articles 1, 2 and 3, Arizona Administrative Code (A.A.C.) Title 18, Chapter 9, Articles 1 and 2, A.A.C. Title 18, Chapter 11, Article 4 and amendments thereto, and the conditions set forth in this permit, Litchfield Park Service Company (LPSCO) is hereby authorized to operate the Palm Valley Water Reclamation Facility (WRF), located at 14222 McDowell Road, in Goodyear, Maricopa County, Arizona, over the groundwater of the West Salt River Valley basin in the Phoenix Active Management Area in Township 2 North, Range 1 West, Section 33 SE¼ SW¼ SW¼- Gila and Salt River Base Line and Meridian.

This permit becomes effective on the date of the Water Quality Division Director's signature and shall be valid for the life of the facility (operational, closure, and post-closure periods) unless suspended or revoked pursuant to A.A.C. R18-9-A213. The permittee shall construct, operate and maintain the permitted facilities:

1. following all the conditions of this permit including the design and operational information documented or referenced below, and
2. such that Aquifer Water Quality Standards (AWQS) are not violated at the applicable point(s) of compliance (POC) set forth below or if an AWQS for a pollutant has been exceeded in an aquifer at the time of permit issuance, that no additional degradation of the aquifer relative to that pollutant and as determined at the applicable POC occurs as a result of the discharge from the facility.

1.1 PERMITTEE INFORMATION

Facility Name:	Palm Valley Water Reclamation Facility (WRF)
Facility Address:	14222 McDowell Road, Goodyear, Arizona
Permittee:	Litchfield Park Service Company
Permittee Address:	12725 West Indian School Rd. Suite D101 Avondale, Arizona 85323
Facility Contact:	Mr. Matthew Garlick
Emergency Phone No.:	(623) 935-3005
Latitude / Longitude:	33° 27' 92" N / 112° 21' 92" W
Legal Description:	Township 2 North, Range 1 West, Section 33, SE ¼, SW ¼ SW ¼ of the Gila and Salt River Base Line and Meridian.

1.2 AUTHORIZING SIGNATURE

Joan Card

Joan Card, Director
Water Quality Division
Arizona Department of Environmental Quality
Signed this 13th day of June, 2006

THIS AMENDMENT SUPERCEDES ALL PREVIOUS AQUIFER PROTECTION PERMITS ISSUED FOR THIS FACILITY

2.0 SPECIFIC CONDITIONS [A.R.S. §§ 49-203(4), 49-241(A)]

2.1 Facility / Site Description [A.R.S. § 49-243(K)(8)]

The permittee is authorized to operate the Palm Valley Water Reclamation Facility (WRF) with a maximum monthly average flow of 8.2 million gallons per day (MGD) of domestic sewage. The WRF is composed of influent lift station, common headworks, Sequencing Batch Reactors (SBRs) with denitrification, tertiary filtration, and ultraviolet disinfection. The WRF shall produce reclaimed water meeting Class A+ Reclaimed Water Quality Standards. Sludge shall be aerobically digested and dewatered onsite by a centrifuge process. The dewatered sludge shall be disposed of at a state approved landfill or land applied pursuant to 40 Code of Federal Regulations (CFR) Part 503 and A.A.C. Title 18, Chapter 9, Article 10.

The reclaimed water may be reused for any allowable use under a valid reclaimed water permit (A.A.C. R18-9, Article 7) or discharged to the Roosevelt Irrigation District (RID) Canal under a valid Arizona Pollutant Discharge Elimination System permit. Discharges to the canal are exempt from APP requirements pursuant to A.R.S. § 49-250(B)(6) and (16).

The site includes the following permitted discharging facilities (see site map attached to Fact Sheet):

Facility	Description	Latitude	Longitude
Influent Lift Station	Receives raw sewage from gravity main and pumps sewage to headworks	33° 27' 93" N	112° 21' 90" W
Wastewater Reclamation Facility	Common headworks; Sequencing Batch Reactors (SBRs) with nitrification/denitrification, tertiary filtration, UV disinfection; sludge thickener; digester; centrifuge.	33° 27' 92" N	112° 21' 90" W

The depth to groundwater is approximately 120 feet below ground surface and the direction of groundwater flow is towards the west-northwest.

2.1.1. Annual Registration Fee [A.R.S. § 49-242(C) and 242(D)]

The Annual Registration Fee for this permit is established by A.R.S. § 49-242(C) and 242(D) and is payable to ADEQ each year. The design flow is 8.2 MGD.

2.1.2 Financial Capability [A.R.S. § 49-243(N) and A.A.C. R18-9-A203]

The permittee has demonstrated financial capability under A.R.S. § 49-243(N) and A.A.C. R18-9-A203. The permittee shall maintain financial capability throughout the life of the facility. The estimated dollar amount demonstrated for financial capability is $14.1 million. The financial capability was demonstrated pursuant to A.A.C. R18-9-A203(C) for a privately owned company.

2.2 Best Available Demonstrated Control Technology [A.R.S. § 49-243(B) and A.A.C. R18-9-A202(A)(5)]

The WRF shall be operated and maintained to meet the treatment performance criteria for new facilities as specified in Arizona Administrative Code R18-9- B204. The facility meets the requirements for pretreatment by conducting monitoring in Section 4.0, TABLE IB as per R18-9-B204(6)(b)(iii).

All industrial hookups and other non-residential hookups to the treatment system shall be authorized according to the applicable federal, state or local regulations.

2.2.1 Engineering Design

The 4.1 MGD WRF was designed as per the design report prepared by Pacific Advanced Civil Engineers, Inc. dated October 2001. The WRF expansion to 8.2 MGD was designed and shall be constructed as per the design report prepared by Pacific Advanced Civil Engineers, Inc. dated August 2004 and subsequent amendments to that report.

2.2.1.1 Influent Lift Station

The 23,845 gallon influent lift station receives raw sewage from a gravity sewer line. The lift station shall serve as initial storage, an equalization sump for the raw wastewater, and shall provide the hydraulic head necessary for the raw influent to flow through the front end of the plant (headworks).

2.2.1.2 Sequencing Batch Reactors (SBRs)

The SBRs shall be an activated sludge process that combines biological oxidation, biological nutrient removal, and clarification in a single tank operation. SBRs use a sequence of five steps: fill, interact, settle, decant, and idle. This achieves an effluent total nitrogen level of less than 10 mg/l through the nitrification/denitrification process.

During the final stage, the treated wastewater is decanted to the surge basin. The surge basin provides storage for the treated wastewater and provides surge capacity of the system during decant. From the surge basin, the effluent is pumped to the tertiary filters to achieve an effluent turbidity level of less than 2 NTU. From the filters, the effluent flows to the clear well. The clear well acts as a contact basin when chlorination is used as a secondary supplement to the disinfection process. From the clear well, the treated effluent is pumped through the UV system to achieve a fecal coliform level of "Non-Detect" and out to final discharge and distribution.

Sludge shall be processed through the sludge thickener, aerobic digester for stabilization, and a centrifuge for final dewatering.

All treatment units shall be constructed below the ground surface and all contact metals are stainless steel.

2.2.1.3 Storage Capacity and Freeboard

Not applicable. There is no storage of wastewater or reclaimed water on site.

2.2.2 Site-specific Characteristics

The depth to groundwater at the site is approximately 120 feet below ground surface and groundwater flow is to the west-northwest. Site-specific characteristics were not considered to determine BADCT for the WRF.

2.2.3 Pre-Operational Requirements

The new SBR system shall be installed according to the Compliance Schedule in Section 3.0. The operator or permittee shall inspect the facility to verify that all components function as designed. According to A.A.C. R18-9-B203(E), the permittee shall provide an Engineer's Certificate of Completion (ECOC) that is signed, dated, and sealed by an Arizona-registered professional engineer. The ECOC must be in a format approved by ADEQ and shall confirm that the new facilities are constructed according to the Department-approved design report or plans and specifications, as applicable. Within 90 days following final completion of the construction, the written certification shall be submitted to ADEQ Water Quality Compliance Section and a copy of the ECOC shall be submitted to ADEQ Groundwater Section.

2.2.4 Operational Requirements

1. The permittee shall maintain a copy of the new O & M manual at the site at all times and shall be available upon request during inspections by ADEQ personnel.

2. The pollution control structures shall be inspected for the items listed in Section 4.0, TABLE III - FACILITY INSPECTIONS. A minimum of 3 feet of freeboard shall be maintained for all impoundments and basins.

3. If any damage of the pollution control structures is identified during inspection, proper repair procedures shall be performed. All repair procedures and material(s) used shall be documented on the Self-Monitoring Report Form submitted quarterly to the ADEQ Water Quality Compliance Section pursuant to Section 2.5.2.

2.2.5 Wastewater Treatment Plant Classification [A.A.C. R18-9-703(C)(2)(a), A.A.C. R18-11-303 through 307]

The WRF shall produce reclaimed water meeting Class A+ Reclaimed Water Quality Standards and can be used for any allowable use under a valid reclaimed water permit (A.A.C. R18-9, Article 7).

2.3 Discharge Limitations [A.R.S. §§ 49-201(14), 49-243 and A.A.C. R18-9-A205(B)]

1. The permittee is authorized to operate the WRF with a maximum average monthly flow of 8.2 MGD.

2. The permittee shall notify all users that the materials authorized to be disposed of through the POTW are typical household sewage and shall not include motor oil, gasoline, paints, varnishes, hazardous wastes, solvents, pesticides, fertilizers or other materials not generally associated with toilet flushing, food preparation, laundry facilities and personal hygiene.

3. Specific discharge limitations are listed in Section 4.0, TABLE IA (Flow Monitoring), TABLE IB (Routine BADCT Discharge Monitoring), and TABLE IC (Class A+ Reclaimed Water Monitoring).

2.4 Points of Compliance (POC) [A.R.S. § 49-244]

The Point of Compliance is established by the following location:

POC #	POC Location	Latitude	Longitude
POC #1	The theoretical hazardous/non-hazardous POC is located at the northwest corner of the WRF - within the site boundary	33° 27' 54" N	112° 21' 54" W

The Director may amend this permit to require installation of a well at the POC and initiation of groundwater monitoring or to designate additional points of compliance if information on groundwater gradients or groundwater usage indicates the need. Groundwater quality monitoring is not required under the terms of this permit as there are no discharges at the plant site and the discharge into the Roosevelt Canal is exempt pursuant to A.R.S. § 49-250.B(6) and (16).

2.5 Monitoring Requirements [A.R.S. § 49-243(K)(1), A.A.C. R18-9-A206(A)]

All monitoring required in this permit shall continue for the duration of the permit, regardless of the status of the facility. All sampling, preservation and holding times shall be in accordance with currently accepted standards of professional practice. Trip blanks, equipment blanks and duplicate samples shall also be obtained, and chain of custody procedures shall be followed, in accordance with currently accepted standards of professional practice. The permittee shall consult the most recent version of the ADEQ Quality Assurance Project Plan (QAPP) and EPA 40 CFR PART 136 for guidance in this regard. Copies of laboratory analyses and chain of custody forms shall be maintained at the permitted facility. Upon request these documents shall be made immediately available for review by ADEQ personnel.

2.5.1 Discharge Monitoring

The permittee shall monitor the wastewater according to Section 4.0, TABLES IA, IB, and IC. A representative sample of the wastewater from the WRF shall be collected at the locations specified in the TABLES IA, IB, and IC.

2.5.2 Facility / Operational Monitoring

Operational monitoring shall be conducted according to Section 4.0, TABLE III - FACILITY INSPECTIONS.

a. If any damage of the pollution control structures is identified during inspection, proper repair procedures shall be performed. Pursuant to Section 2.7.1, all repair procedures and materials used shall be documented on the Self-Monitoring Report Form (SMRF) submitted quarterly to the ADEQ Water Quality Compliance. If none of the conditions occur, the report shall say "no event" for a particular reporting period. If the facility is not in operation, the permittee shall indicate that fact in the SMRF.

b. The permittee shall submit data required in Section 4.0, TABLE III regardless of the operating status of the facility unless otherwise approved by the Department or allowed in this permit.

2.5.3 Groundwater Monitoring and Sampling Protocols

Groundwater monitoring is not required under the terms of this permit.

2.5.4 Surface Water Monitoring and Sampling Protocols

Surface water monitoring is not required under the terms of this permit.

2.5.5 Analytical Methodology

All samples collected for compliance monitoring shall be analyzed using Arizona state approved methods. If no state approved method exists, then any appropriate EPA approved method shall be used. Regardless of the method used, the detection limits must be sufficient to determine compliance with the regulatory limits of the parameters specified in this permit. Analyses shall be performed by a laboratory licensed by the Arizona Department of Health Services, Office of Laboratory Licensure and Certification. For results to be considered valid, all analytical work shall meet quality control standards specified in the approved methods. A list of Arizona state certified laboratories can be obtained at the address below:

Arizona Department of Health Services
Office of Laboratory Licensure and Certification
250 North 17th Ave.
Phoenix, AZ 85007
Phone: (602) 364-0720

2.5.6 Installation and Maintenance of Monitoring Equipment

Monitoring equipment required by this permit shall be installed and maintained so that representative samples required by the permit can be collected. If new groundwater wells are determined to be necessary, the construction details shall be submitted to the ADEQ Groundwater Section for approval prior to installation and the permit shall be amended to include any new points.

2.6 Contingency Plan Requirements

[A.R.S. § 49-243(K)(3), (K)(7) and A.A.C. R18-9-A204 and R18-9-A205]

2.6.1 General Contingency Plan Requirements

At least one copy of the approved contingency and emergency response plan(s) shall be maintained at the location where day-to-day decisions regarding the operation of the facility are made. The permittee shall be aware of and follow the contingency and emergency plans.

Any alert level (AL) that is exceeded or any violation of an aquifer quality limit (AQL), discharge limit (DL), or other permit condition shall be reported to ADEQ following the reporting requirements in Section 2.7.3.

Some contingency actions involve verification sampling. Verification sampling shall consist of the first follow-up sample collected from a location that previously indicated a violation or the exceedance of an AL. Collection and analysis of the verification sample shall use the same protocols and test methods to analyze for the pollutant or pollutants that exceeded an AL or violated an AQL. The permittee is subject to enforcement action for the failure to comply with any contingency actions in this permit. Where verification sampling is specified in this permit, it is the option of the permittee to perform such sampling. If verification sampling is not conducted within the timeframe allotted, ADEQ and the permittee shall presume the initial sampling result to be confirmed as if verification sampling has been conducted. The permittee is responsible for compliance with contingency plans relating to the exceedance of an AL or violation of a DL, AQL or any other permit condition.

2.6.2 Exceeding of Performance Levels/Alert Levels

2.6.2.1 Exceeding of Performance Levels (PL) Set for Operational Conditions

1. If the operational PL set in Section 4.0, TABLE III has been exceeded, the permittee shall:

    a. Notify the ADEQ Water Quality Compliance Section within five (5) days of becoming aware of a violation of any permit condition.

    b. Submit a written report within thirty (30) days after becoming aware of a violation of a permit condition. The report shall document all of the following:

        i. a description of the violation and its cause;

        ii. the period of violation, including exact date(s) and time(s), if known, and the anticipated time period during which the violation is expected to continue;

        iii. any action taken or planned to mitigate the effects or the violation, or the spill, or to eliminate or prevent recurrence of the violation;

        iv. any monitoring activity or other information which indicates that any pollutants would be reasonably expected to cause a violation of an Aquifer

Water Quality Standard; and

v. any malfunction or failure of pollution control devices or other equipment or process.

2. The facility is no longer on alert status once the operational indicator no longer indicates that a PL is being exceeded. The permittee shall, however, complete all tasks necessary to return the facility to its pre-alert operating condition.

2.6.2.2 Exceeding of Alert Levels Set for Discharge Monitoring

1. If an AL set in Section 4.0, TABLES IA and IB has been exceeded, the permittee shall immediately investigate to determine the cause of the AL being exceeded. The investigation shall include the following:

   a. Inspection, testing, and assessment of the current condition of all treatment or pollutant discharge control systems that may have contributed to the AL being exceeded.

   b. Review of recent process logs, reports, and other operational control information to identify any unusual occurrences.

2. The permittee shall initiate specific contingency measures identified in Part 2.6 to resolve any problems identified by the investigation which may have led to an AL being exceeded. To implement any other corrective action the permittee shall obtain prior approval from ADEQ according to Section 2.6.6.

3. Within thirty (30) days after confirmation of an AL being exceeded, the permittee shall submit the laboratory results to the ADEQ Water Quality Compliance Section, Data Unit and a copy to the Groundwater Section, along with a summary of the findings of the investigation, the cause of the AL being exceeded, and actions taken to resolve the problem.

4. Upon review of the submitted report, the Department may require additional monitoring, increased frequency of monitoring, amendments to permit conditions or other actions.

2.6.2.3 Exceeding of Alert Levels in Groundwater Monitoring

2.6.2.3.1 Alert Levels for Indicator Parameters

Not required at time of permit issuance.

2.6.2.3.2 Alert Levels for Pollutants with Numeric Aquifer Water Quality Standards

Not required at time of permit issuance.

2.6.2.3.3 Alert Levels to Protect Downgradient Users from Pollutants Without Numeric Aquifer Water Quality Standards

Not required at time of permit issuance.

2.6.3 Discharge Limitations (DL) Violations

1. If a DL set in Section 4.0, TABLE IA, TABLE IB or TABLE IC has been exceeded, the permittee shall immediately investigate to determine the cause of the violation. The investigation shall include the following:

a. Inspection, testing, and assessment of the current condition of all treatment or pollutant discharge control systems that may have contributed to the violation.

b. Review of recent process logs, reports, and other operational control information to identify any unusual occurrences.

c. Sampling of individual waste streams composing the wastewater for the parameters in violation.

2. The permittee also shall submit a report according to Section 2.7.3, which includes a summary of the findings of the investigation, the cause of the violation, and actions taken to resolve the problem. The permittee shall consider and ADEQ may require corrective action that may include control of the source of discharge, cleanup of affected soil, surface water or groundwater, and mitigation of the impact of pollutants on existing uses of the aquifer. Corrective actions shall either be specifically identified in this permit, included in an ADEQ approved contingency plan, or separately approved according to Section 2.6.6.

3. Upon review of the submitted report, the Department may require the installation of POC groundwater monitoring wells, additional monitoring, increased frequency of monitoring, installation of groundwater monitoring well(s) at the theoretical point(s) of compliance or other applicable location, amendments to permit conditions or other actions.

2.6.4 Aquifer Quality Limit (AQL) Violation

Not required at time of permit issuance.

2.6.5 Emergency Response and Contingency Requirements for Spills and Unauthorized Discharges [A.R.S. § 49-201(12) and pursuant to A.R.S. § 49-241]

2.6.5.1 Duty to Respond

The permittee shall act immediately to correct any condition resulting from a discharge pursuant to A.R.S. § 49-201(12) if that condition could pose an imminent and substantial endangerment to public health or the environment.

2.6.5.2 Discharge of Hazardous Substances or Toxic Pollutants

In the event of any unauthorized discharge pursuant A.R.S. § 49-201(12) of suspected hazardous substances (A.R.S. § 49-201(18)) or toxic pollutants (A.R.S. § 49-243(I)) on the facility site, the permittee shall promptly isolate the area and attempt to identify the discharged material. The permittee shall record information, including name, nature of exposure and follow-up medical treatment, if necessary, on persons who may have been exposed during the incident. The permittee shall notify the ADEQ Water Quality Compliance Field Services Unit at (602) 771-4841 within 24-hours upon discovering the discharge of hazardous material which: a) has the potential to cause an AWQS or AQL to be exceeded; or b) could pose an endangerment to public health or the environment.

2.6.5.3 Discharge of Non-hazardous Materials

In the event of any unauthorized discharge pursuant to A.R.S. § 49-201(12) of non-hazardous materials from the facility, the permittee shall promptly attempt to cease the discharge and isolate the discharged material. Discharged material shall be removed and the site cleaned up as soon as possible. The permittee shall notify the Water Quality Compliance Field Services Unit at (602) 771-4841 within 24-hours upon discovering the discharge of non-hazardous material which: a) has the potential to cause an AQL to be exceeded; or b) could pose an endangerment to public health or the environment.

2.6.5.4 Reporting Requirements

The permittee shall submit a written report for any unauthorized discharges Sections 2.6.5.2 and 2.6.5.3 to ADEQ Water Quality Compliance Field Services Unit at (602) 771-4841 within thirty (30) days of the discharge or as required by subsequent ADEQ action. The report shall summarize the event, including any human exposure, and facility response activities and include all information specified in Section 2.7.3. If a notice is issued by ADEQ subsequent to the discharge notification, any additional information requested in the notice shall also be submitted within the time frame specified in that notice. Upon review of the submitted report, ADEQ may require additional monitoring or corrective actions.

2.6.6 Corrective Actions

Specific contingency measures identified in Part 2.6 have already been approved by ADEQ and do not require written approval to implement.

With the exception of emergency response actions taken under Section 2.6.5, the permittee shall obtain written approval from the Groundwater Section prior to implementing a corrective action to accomplish any of the following goals in response to exceeding an AL or violation of an AQL, DL, or other permit condition:

1. Control of the source of an unauthorized discharge;
2. Soil cleanup;
3. Cleanup of affected surface waters;
4. Cleanup of affected parts of the aquifer;
5. Mitigation to limit the impact of pollutants on existing uses of the aquifer.

Within 30 days of completion of any corrective action, the operator shall submit to the ADEQ Water Quality Compliance Section, a written report describing the causes, impacts, and actions taken to resolve the problem.

2.7 Reporting and Recordkeeping Requirements [A.R.S. § 49-243(K)(2) and A.A.C. R18-9-A206(B) and R18-9-A207]

2.7.1 Self-Monitoring Report Forms (SMRF)

1. The permittee shall complete the SMRFs provided by ADEQ, and submit them to the Water Quality Compliance Section, Data Unit.

2. The permittee shall complete the SMRF to the extent that the information reported may be entered on the form. If no information is required during a quarter, the permittee shall enter "not required" on the SMRF and submit the report to ADEQ. The permittee shall use the format devised by ADEQ.

3. The tables contained in Sections 4.0 list the parameters to be monitored and the frequency for reporting results for discharge and groundwater compliance monitoring. Analytical methods shall be recorded on the SMRFs.

4. In addition to the SMRF, the information contained in A.A.C. R18-9-A206(B)(1) and Section 6.7 shall be included for exceeding an AL or violation of an AQL, DL, or any other permit condition being reported in the current reporting period.

2.7.2 Operation Inspection / Log Book Recordkeeping

A signed copy of this permit shall be maintained at all times at the location where day-to-day decisions regarding the operation of the facility are made. A log book (paper copies, forms or electronic data) of the inspections and measurements required by this permit shall be maintained at the location where day-to-day decisions are made regarding the operation of the facility. The log book shall be retained for ten (10) years from the date of each inspection, and upon request, the permit and the log book shall be made immediately available for review by ADEQ personnel. The information in the log book shall include, but not be limited to, the following information:

1. Name of inspector;
2. Date and shift inspection was conducted;
3. Condition of applicable facility components;
4. Any damage or malfunction, and the date and time any repairs were performed;
5. Documentation of sampling date and time;
6. Any other information required by this permit to be entered in the log book, and
7. Monitoring records for each measurement shall comply with R18-9-A206(B)(2).

2.7.3 Permit Violation and Alert Level Status Reporting

1. The permittee shall notify the Water Quality Compliance Section, Enforcement Unit in writing within five (5) days (except as provided in Section 2.6.5) of becoming aware of a violation of any permit condition, discharge limitation or of an Alert Level being exceeded.

2. The permittee shall submit a written report to the Water Quality Compliance Section, Enforcement Unit within 30 days of becoming aware of the violation of any permit condition or discharge limitation. The report shall document all of the following:

   a. Identification and description of the permit condition for which there has been a violation and a description of its cause.

   b. The period of violation including exact date(s) and time(s), if known, and the anticipated time period during which the violation is expected to continue.

   c. Any corrective action taken or planned to mitigate the effects of the violation, or to eliminate or prevent a recurrence of the violation.

   d. Any monitoring activity or other information which indicates that any pollutants would be reasonably expected to cause a violation of an Aquifer Water Quality Standard.

   e. Proposed changes to the monitoring which include changes in constituents or increased frequency of monitoring.

   f. Description of any malfunction or failure of pollution control devices or other equipment or processes.

2.7.4 Operational, Other or Miscellaneous Reporting

The permittee shall complete the Self-Monitoring Report Form provided by the Department to reflect facility inspection requirements designated in Section 4.0, TABLE VI and submit to the ADEQ, Water Quality Compliance Section quarterly along with other reports required by this permit. Facility inspection reports shall be submitted no less frequently than quarterly, regardless of operational status.

2.7.5 Reporting Location

All SMRFs shall be submitted to:

Arizona Department of Environmental Quality
Water Quality Compliance Section, Data Unit
Mail Code: 5415B-1
1110 W. Washington Street
Phoenix, AZ 85007
Phone (602) 771-4681

All documents required by this permit to be submitted to the Water Quality Compliance Section shall be directed to:

Arizona Department of Environmental Quality
Water Quality Compliance Section, Enforcement Unit
Mail Code: 5415B-1
1110 W. Washington Street
Phoenix, AZ 85007
Phone (602) 771-4614

All documents required by this permit to be submitted to the Groundwater Section shall be directed to:

Arizona Department of Environmental Quality
Groundwater Section
Mail Code: 5415B-3
1110 W. Washington Street
Phoenix, AZ 85007
Phone (602) 771-4428

2.7.6 Reporting Deadline

The following table lists the quarterly report due dates:

Monitoring conducted during quarter:	Quarterly Report due by:
January-March	April 30
April-June	July 30
July-September	October 30
October-December	January 30

2.7.7 Changes to Facility Information in Section 1.0

The Groundwater Section and Water Quality Compliance Section shall be notified as soon as practicable, but no later than 30 days after any change of facility information including Facility Name, Mailing or Street Address, Facility Contact Person or Emergency Telephone Number.

The Groundwater Section and Water Quality Compliance Section shall be notified within 15 days after a change of the Permittee Name. This constitutes a permit transfer under A.A.C. R18-9-A212 and requires the permittee to apply for an "other amendment."

2.8 Temporary Cessation [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A209(A)]

The permittee shall give written notice to the Water Quality Compliance Section before ceasing operation of the facility for a period of 60 days or greater. The permittee shall take the following measures upon temporary cessation:

1. If applicable, direct the wastewater flows from the facility to another State approved wastewater treatment facility.

2. Correct the problem that caused the temporary cessation of the facility.

3. Notify ADEQ with a monthly facility Status Report describing the activities conducted on the POTW to correct the problem.

At the time of notification the permittee shall submit for ADEQ approval a plan for maintenance of discharge control systems and for monitoring during the period of temporary cessation. Immediately following ADEQ's approval, the permittee shall implement the approved plan. If necessary, ADEQ shall amend permit conditions to incorporate conditions to address temporary cessation. During the period of temporary cessation, the permittee shall provide written notice to the Water Quality Compliance Section of the operational status of the facility every three years. If the permittee intends to permanently cease operation of any facility, the permittee shall submit closure notification, as set forth in Section 2.9 below.

2.9 Closure [A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9-A209(B)]

For a facility addressed under this permit, the permittee shall give written notice of closure to the Water Quality Compliance Section of the permittee's intent to cease operation without resuming activity for which the facility was designed or operated.

2.9.1 Closure Plan

Within 90 days following notification of closure, the permittee shall submit for approval to the Groundwater Section, a Closure Plan which meets the requirements of A.R.S. § 49-252 and A.A.C. R18-9-A209(B).

If the closure plan achieves clean closure immediately, ADEQ shall issue a letter of approval to the permittee. If the closure plan contains a schedule for bringing the facility to a clean closure configuration at a future date, ADEQ may incorporate any part of the schedule as an amendment to this permit.

2.9.2 Closure Completion

Upon completion of closure activities, the permittee shall give written notice to the Groundwater Section indicating that the approved Closure Plan has been implemented fully. If clean closure has been achieved, ADEQ shall issue a letter of approval to the permittee at that time. If any of the following conditions apply, the permittee shall follow the terms of Post Closure stated in this permit:

1. Clean closure cannot be achieved at the time of closure notification or within one year thereafter under a diligent schedule of closure actions;

2. Further action is necessary to keep the facility in compliance with aquifer water quality standards at the applicable point of compliance;

3. Continued action is required to verify that the closure design has eliminated discharge to the extent intended;

4. Remedial or mitigative measures are necessary to achieve compliance with Title 49, Ch. 2;

5. Further action is necessary to meet property use restrictions.

2.10 Post-Closure [A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9-A209(C)]

Post-closure requirements shall be established based on a review of facility closure actions and will be subject to review and approval by the Groundwater Section.

In the event clean closure cannot be achieved pursuant to A.R.S. § 49-252, the permittee shall submit for approval to the Groundwater Section a Post-Closure Plan that addresses post-closure maintenance and monitoring actions at the facility. The Post-Closure Plan shall meet all requirements of A.R.S. §§ 49- 201(29) and 49-252 and A.A.C. R18-9-A209(C). Upon approval of the Post-Closure Plan, this permit shall be amended or a new permit shall be issued to incorporate all post-closure controls and monitoring activities of the Post-Closure Plan.

2.10.1 Post-Closure Plan

A specific post closure plan may be required upon the review of the closure plan.

2.10.2 Post-Closure Completion

Not required at the time of permit issuance.

3.0 COMPLIANCE SCHEDULE [A.R.S. § 49-243(K)(5) and A.A.C. R18-9-A208]

For each compliance schedule item listed below, the permittee shall submit the required information, including a cover letter that lists the compliance schedule items, to the Water Quality Compliance Section, Field Services Unit. A copy of the cover letter must also be submitted to the Groundwater Section, Wastewater, Recharge & Reuse Unit and the Water Quality Compliance Section, Data Unit.

Description	Deadline
CONSTRUCTION OF NEW SBR SYSTEM:	
The new SBR treatment system design has been approved. Note that a maximum seepage rate of 550 gallons per day per acre for all containment structures within the treatment works is required pursuant to A.A.C. R18-9-B204(B)(7). Upon completion of the construction of the SBR system, the permittee shall provide an Engineer's Certificate of Completion (ECOC) that is signed, dated, and sealed by an Arizona-registered professional engineer. The ECOC must be in a format approved by ADEQ and shall confirm that the new treatment facility is constructed according to the Department-approved design report or plans and specifications, as applicable. The written certification (plus attachments specified in the ECOC) shall be submitted to ADEQ Water Quality Compliance Section and only a copy of the ECOC shall be submitted to ADEQ Groundwater Section. Attachments (such as the as-builts and any QA/QC testing data) to the ECOC may be submitted separately.	Within 90 days of completion of construction, submit Engineer's Certificate of Completion (ECOC). ECOC must be submitted before discharging from the new SBR system pursuant to A.A.C. R18-9-B203(E). Attachments to the ECOC may be submitted within 90 days from the engineer's signature date on the ECOC.

4.0 TABLES OF MONITORING REQUIREMENTS

TABLE IA
FLOW MONITORING

SAMPLING POINTS	SAMPLING LOCATION	LATITUDE (N)	LONGITUDE (W)
1 - Discharge from WRF	Downstream of disinfection channel	33° 27' 92"	112° 21' 94"

PARAMETER [1]	ALERT LEVEL	DISCHARGE LIMIT	UNITS [2]	SAMPLING FREQUENCY	REPORTING FREQUENCY
Flow (REUSE)	Reserved	Reserved	MGD	Daily	Quarterly
Flow (REUSE)	7.8	8.2	MGD	Monthly (calculated average)	Quarterly
Flow (CANAL)	Reserved	Reserved	MGD	Daily	Quarterly
Flow (CANAL)	7.8	8.2	MGD	Monthly (calculated average)	Quarterly
Flow [3] (TOTAL)	Reserved	Reserved	MGD	Daily	Quarterly
Flow (TOTAL)	7.8	8.2	MGD	Monthly (calculated average)	Quarterly

[1] Flow shall be measured using a recording flow meter.
[2] MGD = million gallons per day.
[3] Total flow = the sum of the flows going to the effluent disposal areas plus the flows delivered to a legitimate B+ classification direct reuse site: Flow (TOTAL) = Flow (CANAL) + Flow (REUSE). If no flows are delivered for reuse or to the canal, then enter "0" for Flow (REUSE) or (CANAL) in the calculation on the SMRF.

4.0 TABLES OF MONITORING REQUIREMENTS (cont'd)

TABLE IB
ROUTINE BADCT DISCHARGE MONITORING

SAMPLING POINTS	SAMPLING LOCATION	LATITUDE (N)	LONGITUDE (W)
1 - Discharge from WRF	Downstream of disinfection channel	33° 27' 92"	112° 21' 94"

PARAMETER	AL	DL	UNITS	SAMPLING FREQUENCY	REPORTING FREQUENCY
Pathogens:					
E. coli[4] - Single sample maximum	No Limit	15	CFU or MPN[5]	Monthly	Quarterly
E. coli - Seven sample median	No Limit	ND[6]	CFU or MPN	Monthly	Quarterly
Nutrients:					
Total Nitrogen[7]: 5-sampling rolling geometric mean	8.0	10.0	mg/l	Monthly[8]	Quarterly
Metals (total):					
Antimony	0.0048	0.006	mg/l	Quarterly	Quarterly
Arsenic	0.04	0.05	mg/l	Quarterly	Quarterly
Barium	1.60	2.00	mg/l	Quarterly	Quarterly
Beryllium	0.0032	0.004	mg/l	Quarterly	Quarterly
Cadmium	0.004	0.005	mg/l	Quarterly	Quarterly
Chromium	0.08	0.10	mg/l	Quarterly	Quarterly
Cyanide (Free Cyanide)	0.16	0.20	mg/l	Quarterly	Quarterly
Fluoride	3.2	4.0	mg/l	Quarterly	Quarterly
Lead	0.04	0.05	mg/l	Quarterly	Quarterly

[4] *E. coli* monitoring results that meet the discharge limits in this table are considered to demonstrate compliance with Class A+ Reclaimed Water Standards (A.A.C. R18-11-303) as reflected in Table IC.
[5] CFU = Colony Forming Units / 100 ml sample. MPN = Most Probable Number / 100 ml sample
[6] ND = Non-Detect. For CFU, a value of <1 shall be considered to be non-detect. For MPN, a value of <2.2 shall be considered to be non-detect. If at least four (4) of the daily samples are non-detect, report "yes" in the appropriate space on the SMRF (indicating that the standard has been met). If at least four (4) of the daily samples have detections of *E. coli*, report "no" in the appropriate space on the SMRF (indicating that the standard has **not** been met).
[7] Total Nitrogen = Nitrate as N + Nitrite as N + Total Kjeldahl Nitrogen.
[8] A 5-Month Geometric Mean of the results of the 5 most recent samples.

PARAMETER	AL	DL	UNITS	SAMPLING FREQUENCY	REPORTING FREQUENCY
Mercury	0.0016	0.002	mg/l	Quarterly	Quarterly
Nickel	0.08	0.1	mg/l	Quarterly	Quarterly
Selenium	0.04	0.05	mg/l	Quarterly	Quarterly
Thallium	0.0016	0.002	mg/l	Quarterly	Quarterly
Volatile Organic Compounds (VOCs) [9]**:**					
Benzene	0.004	0.005	mg/l	Annually	Annually
Carbon tetrachloride	0.004	0.005	mg/l	Annually	Annually
o-Dichlorobenzene	0.48	0.6	mg/l	Annually	Annually
para-Dichlorobenzene	0.06	0.075	mg/l	Annually	Annually
1,2-Dichloroethane	0.004	0.005	mg/l	Annually	Annually
1,1-Dichloroethylene	0.0056	0.007	mg/l	Annually	Annually
cis-1,2-Dichloroethylene	0.056	0.07	mg/l	Annually	Annually
tran-1,2Dichloroethylene	0.08	0.1	mg/l	Annually	Annually
1,2 Dichloropropane	0.004	0.005	mg/l	Annually	Annually
Ethylbenzene	0.56	0.7	mg/l	Annually	Annually
Monochlorobenzene	0.08	0.1	mg/l	Annually	Annually
Styrene	0.08	0.1	mg/l	Annually	Annually
Tetrachloroethylene	0.004	0.005	mg/l	Annually	Annually
Toluene	0.8	1.0	mg/l	Annually	Annually
1,2,4 -Trichlorobenzene	0.056	0.07	mg/l	Annually	Annually
1,1,1-Trichloroethane	0.16	0.2	mg/l	Annually	Annually
1,1,2-Trichloroethane	0.004	0.005	mg/l	Annually	Annually
Trichloroethylene	0.004	0.005	mg/l	Annually	Annually
Vinyl Chloride	0.0016	0.002	mg/l	Annually	Annually
Xylenes (Total)	8.0	10.0	mg/l	Annually	Annually

[9] ADEQ has modified the permit to reduce the monitoring frequency of these constituents from quarterly to annually because the Alert Level for these pollutants has not been exceeded during four (4) consecutive quarters or more.

4.0 TABLES OF MONITORING REQUIREMENTS (cont'd)

TABLE IC
CLASS A+ RECLAIMED WATER MONITORING

SAMPLING POINT	SAMPLING LOCATION	LATITUDE (N)	LONGITUDE (W)
1 - Discharge from WRF	Downstream of disinfection channel	33° 27' 92"	112° 21' 94"

Parameter	DL[10]	Units	Sampling Frequency	Reporting Frequency
E. coli: Single-sample maximum	15	CFU or MPN[11]	Daily[12]	Quarterly
E. coli: Four (4) of last seven (7) samples	Non-detect[13]	CFU or MPN	Daily	Quarterly
Turbidity[14]Single reading	5	NTU[15]	Everyday[16]	Quarterly
Turbidity: 24-hour average	2	NTU	Everyday	Quarterly
Enteric Virus[17]: Four (4) of last seven (7) samples	Non-Detect[18]	PFU[19]	Monthly / Suspended[20]	Quarterly

10 DL = Discharge Limit.

11 CFU = Colony Forming Units per 100 ml; MPN = Most Probable Number per 100 ml. For CFU, a value of <1 shall be considered to be non-detect. For MPN, a value of <2.2 shall be considered to be non-detect.

12 For *E. coli*, "daily" sampling means every day in which a sample can practicably be obtained and delivered in sufficient time for proper analysis, provided that no less than four (4) samples in each calendar week are obtained and analyzed.

13 If at least four (4) out of the last seven (7) samples are non-detect, report "yes" in the appropriate space on the SMRF (indicating that the standard has been met). If at least four (4) out of the last seven (7) samples have detections of *E. coli*, report "no" in the appropriate space on the SMRF (indicating that the standard has **not** been met).

14 Turbidity shall be measured with an instrument with a signal averaging time not exceeding 120 seconds. An occasional spike due to back-flushing or instrument malfunction shall not be considered an exceedance. All exceedances must be explained and submitted to the Department with the corresponding quarterly SMRF.

15 Nephelometric Turbidity Units

16 For the single turbidity reading, "everyday" means the maximum reading during the 24-hour period.

17 Initial monthly enteric virus sampling shall be performed to indicate four (4) out of seven (7) sample results of non-detect.

18 For Enteric Virus, a value of <1.1 PFU shall be considered to be non-detect.

19 PFU = Plaque Forming Units per 40 Liters

20 Enteric virus sampling shall resume only if two (2) consecutive turbidity limits are exceeded. Monthly enteric virus monitoring shall continue until four (4) out of seven (7) consecutive sample results show no detection. During times when enteric virus sampling is suspended, enter "suspended" in the appropriate space on the SMRF.

4.0 TABLES OF MONITORING REQUIREMENTS (cont'd)

TABLE II
GROUNDWATER MONITORING

Groundwater monitoring not required at this time.

TABLE IV
FACILITY INSPECTIONS

POLLUTION CONTROL STRUCTURE or PARAMETER	PERFORMANCE LEVELS	INSPECTION FREQUENCY	REPORTING FREQUENCY
Influent Lift Station:			
Pump Integrity	Good working condition	Weekly	Quarterly
All Treatment Plant Components	Good working condition. No cracks or corrosion.	Weekly	Quarterly
WRF Facility Structures:			
Pump Integrity	Good working condition	Weekly	Quarterly
All Treatment Plant Components	Good working condition. No cracks or corrosion.	Weekly	Quarterly

5.0 REFERENCES AND PERTINENT INFORMATION

The terms and conditions set forth in this permit have been developed based upon the information contained in the following, which are on file with the Department:

5.1 Original Aquifer Protection Permit

1.	APP Application date:	December 29, 2000
2	Public Notice date:	May 30, 2001
3.	Public Hearing date:	Not Applicable
4.	Responsiveness Summary date:	Not Applicable
5.	APP issuance date:	July 23, 2001

5.2 First Significant Amendment to Original APP

1.	APP Application date:	August 18, 2004
2.	Final Engineering Memo date:	August 16, 2005
3.	Final Hydrology Memo date:	October 7, 2005
4	Public Notice date:	February 23, 2006
5.	Public Hearing date:	Not Applicable
6.	Responsiveness Summary date:	Not Applicable
7.	APP issuance date:	April XX, 2006

6.0 NOTIFICATION PROVISIONS

6.1 Annual Registration Fees

The permittee is notified of the obligation to pay an Annual Registration Fee to ADEQ. The Annual Registration Fee is based upon the amount of daily influent or discharge of pollutants in gallons per day as established by A.R.S. § 49-242(D).

6.2 Duty to Comply [A.R.S. §§ 49-221 through 263]

The permittee is notified of the obligation to comply with all conditions of this permit and all applicable provisions of Title 49, Chapter 2, Articles 1, 2 and 3 of the Arizona Revised Statutes, Title 18, Chapter 9, Articles 1 through 4, and Title 18, Chapter 11, Article 4 of the Arizona Administrative Code. Any permit non-compliance constitutes a violation and is grounds for an enforcement action pursuant to Title 49, Chapter 2, Article 4 or permit amendment, suspension, or revocation.

6.3 Duty to Provide Information [A.R.S. §§ 49-243(K)(2) and 49-243(K)(8)]

The permittee shall furnish to the Director, or an authorized representative, within a time specified, any information which the Director may request to determine whether cause exists for amending or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

6.4 Compliance with Aquifer Water Quality Standards [A.R.S. §§ 49-243(B)(2) and 49-243(B)(3)]

The permittee shall not cause or contribute to a violation of an aquifer water quality standard at the applicable point of compliance for the facility. Where, at the time of issuance of the permit, an aquifer already exceeds an aquifer water quality standard for a pollutant, the permittee shall not discharge that pollutant so as to further degrade, at the applicable point of compliance for the facility, the water quality of any aquifer for that pollutant.

6.5 Technical and Financial Capability [A.R.S. §§ 49-243(K)(8) and 49-243(N) and A.A.C. R18-9-A202(B) and R18-9-A203(E) and (F)]

The permittee shall have and maintain the technical and financial capability necessary to fully carry out the terms and conditions of this permit. Any bond, insurance policy, trust fund, or other financial assurance mechanism provided as a demonstration of financial capability in the permit application, pursuant to A.A.C. R18-9-A203(D), shall be in effect prior to any discharge authorized by this permit and shall remain in effect for the duration of the permit.

6.6 Reporting of Bankruptcy or Environmental Enforcement [A.A.C. R18-9-A207(C)]

The permittee shall notify the Director within five days after the occurrence of any one of the following:

1. The filing of bankruptcy by the permittee.

2. The entry of any order or judgment not issued by the Director against the permittee for the enforcement of any environmental protection statute or rule.

6.7 Monitoring and Records [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A206]

The permittee shall conduct any monitoring activity necessary to assure compliance with this permit, with the applicable water quality standards established pursuant to A.R.S. §§ 49-221 and 49-223 and §§ 49-241 through 49-252.

6.8 Inspection and Entry [A.R.S. §§ 49-203(B) and 49-243(K)(8)]

In accordance with A.R.S. §§ 41-1009 and 49-203(B), the permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to enter and inspect the facility as reasonably necessary to ensure compliance with Title 49, Chapter 2, Article 3 of the Arizona Revised Statutes, and Title 18, Chapter 9, Articles 1 through 4 of the Arizona Administrative Code and the terms and conditions of this permit.

6.9 Duty to Modify [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A211]

The permittee shall apply for and receive a written amendment before deviating from any of the designs or operational practices authorized by this permit.

6.10 Permit Action: Amendment, Transfer, Suspension & Revocation [A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]

This permit may be amended, transferred, renewed, or revoked for cause, under the rules of the Department.

The permittee shall notify the Groundwater Section in writing within 15 days after any change in the owner or operator of the facility. The notification shall state the permit number, the name of the facility, the date of property transfer, and the name, address, and phone number where the new owner or operator can be reached. The operator shall advise the new owner or operators of the terms of this permit and the need for permit transfer in accordance with the rules.

7.0 ADDITIONAL PERMIT CONDITIONS

7.1 Other Information [A.R.S. § 49-243(K)(8)]

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, the permittee shall promptly submit the correct facts or information.

7.2 Severability [A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby. The filing of a request by the permittee for a permit action does not stay or suspend the effectiveness of any existing permit condition.

7.3 Permit Transfer

This permit may not be transferred to any other person except after notice to and approval of the transfer by the Department. No transfer shall be approved until the applicant complies with all transfer requirements as specified in A.A.C. R18-9-A212(B) and (C).

ADEQ Arizona Department of Environmental Quality

Fact Sheet

Aquifer Protection Permit
Inventory No. 100310
Place ID 815, LTF 33467
Significant Amendment

The Arizona Department of Environmental Quality (ADEQ) proposes to issue a significant amendment to the aquifer protection permit for the subject facility that covers the life of the facility, including operational, closure, and post closure periods unless suspended or revoked pursuant to Arizona Administrative Code (A.A.C.) R18-9-A213. This document gives pertinent information concerning the issuance of the permit. The requirements contained in this permit will allow the permittee to comply with the two key requirements of the Aquifer Protection Program: 1) meet Aquifer Water Quality Standards at the Point of Compliance; and 2) demonstrate Best Available Demonstrated Control Technology (BADCT). BADCT's purpose is to employ engineering controls, processes, operating methods or other alternatives, including site-specific characteristics (i.e., the local subsurface geology), to reduce discharge of pollutants to the greatest degree achievable before they reach the aquifer or to prevent pollutants from reaching the aquifer.

I. FACILITY INFORMATION

Name and Location

Permittee's Name:	Litchfield Park Services Company (LPSCo)
Mailing Address:	LPSCo 12725 West Indian School Rd. Suite D101 Avondale, Arizona 85323
Facility Name and Location:	Palm Valley Water Reclamation Facility (WRF) 14222 McDowell Road, Goodyear, Arizona 85338

Regulatory Status

The Palm Valley Water Reclamation Facility (WRF) has been issued the following permits or approvals from the Water Permits Section:

- Individual APP (P-100310) issued on July 23, 2001
- Reuse Permit (R-100310) issued on March 5, 1999

On August 18, 2004, the permittee requested a significant amendment to the APP to increase the total design flow from 4.1 to 8.2 million gallons per day (MGD). This

Fact Sheet addresses this request. The original Reuse Permit issued on March 5, 1999 was for a five year period. The reuse monitoring requirements are now covered under this APP amendment due to a change in the APP rules in 2001.

Only one inspection has been conducted for this facility. A physical inspection of the WRF was conducted by ADEQ's Water Quality Field Services Unit on June 1, 2004. No violations were noted in the June 24, 2004 inspection report.

Facility Description

The permittee is authorized to operate the Palm Valley Water Reclamation Facility (WRF) with a maximum monthly average flow of 8.2 MGD. The WRF utilizes a Sequential Batch Reactor (SBR) treatment process. The SBR treatment process combines biological oxidation, biological nutrient removal, and clarification in a single tank operation.

The WRF is composed of an influent lift station, headworks, anoxic reactor, SBR tanks, surge basin for storage of the treated wastewater, tertiary filtration, clear well (which acts as the alternate point of disinfection through the addition of chlorine, if necessary), ultraviolet disinfection, aerobic digester, and centrifuge.

Waste activated sludge is extracted from the process and is delivered to the thickeners. The thickened sludge is discharged to the aerobic digester for sludge stabilization prior to dewatering. Once stabilized, the sludge is pumped to the centrifuge and is ultimately disposed at a State approved landfill in accordance with state and federal waste disposal rules and regulations. The effluent is either reused or may be delivered to the Roosevelt Irrigation District (RID) Canal via pipeline under a valid Arizona Pollutant Discharge Elimination System (AZPDES) permit. Discharges to the canal are exempt from APP requirements pursuant to A.R.S. § 49-250(B)(6) and (16).

This AZPDES discharge is typically considered a categorical discharging facility under the APP program and is typically listed in the facility table below. However, since the discharge to the canal is exempt from the APP program, it is not specifically listed in the facility table because it no longer is considered an APP categorical discharging facility. Note that the discharge from the WRF is still subject to the AZPDES program and an AZPDES permit shall be obtained prior to discharging into the RID Canal.

The WRF is classified for A+ reclaimed water, and may be used for beneficial purposes under a valid reclaimed water permit (A.A.C. R18-9, Article 7).

The site includes the following permitted discharging facilities (see site map attached to Fact Sheet):

Facility	Description	Latitude	Longitude
Influent Lift Station	Receives raw sewage from gravity main and pumps sewage to headworks	33° 27' 93N	112° 21' 90" W
Wastewater Reclamation Facility	Common headworks and Sequencing Batch Reactors (SBRs) with nitrification/denitrification, tertiary filtration, UV disinfection; sludge thickener; digester; centrifuge.	33° 27' 92" N	112° 21' 90" W

Influent Lift Station

The 23,845 gallon influent lift station receives raw sewage from a gravity sewer line. The lift station serves as initial storage, an equalization sump for the raw wastewater, and provides the hydraulic head necessary for the raw influent to flow through the front end of the plant (headworks).

Wastewater Reclamation Facility

Common Headworks

The common headworks shall receive all of the flow from the lift station before being treated in the WRF. The preliminary treatment will remove untreatable material on two mechanical screens and a grit removal unit. The material collected by the screens a grit removal unit shall be disposed of at a State approved landfill. The headworks direct influent flow to the anoxic reactor located beneath the headworks,

SBR Treatment Process

In the anoxic reactor, the influent is mixed with return activated sludge (RAS) from the SBRs. The mixed wastewater is pumped back into one of the two SBRs where the wastewater is treated through biological oxidation using a sequence of five steps: fill, interact, settle, decant, and idle. During the final stage, the treated wastewater is decanted to the surge basin. The surge basin provides storage for the treated wastewater and provides surge capacity of the system during decant. From the surge basin, the effluent is pumped to the tertiary filters. From the filters, the effluent flows to the clear well. The clear well acts as a contact basin when chlorination is used as a secondary supplement to the disinfection process. From the clear well, the treated effluent is pumped through the UV system and out to final discharge and distribution.

Effluent Disposal

Effluent is discharged via on-site process water applications (such as equipment cleaning) or used for beneficial purposes under a valid reclaimed water permit. Another option for effluent disposal is to the RID canal upon obtaining a valid

AZPDES permit. Discharges to the RID canal are exempt from APP requirements pursuant to A.R.S. § 49-250(B)(6) and (16). In accordance with these statutory exemptions, the discharge from the WRF is considered as water used solely for surface transportation and is subject to the AZPDES program.

Sludge Disposal

Sludge is processed through the sludge thickener, aerobic digester for aerobic digestion and stabilization, and a centrifuge for final dewatering. The permittee is required to use the biosolids in accordance with the state and federal biosolids rules or dispose the biosolids at a State approved landfill in accordance with state and federal waste disposal rules and regulations.

Site-specific Hydrology

The depth to groundwater is approximately 120 feet below land surface (bls) and the direction of groundwater flow is generally to the west-northwest.

The facility is located in the West Salt River Valley basin over groundwater basin and is located within the Phoenix Active Management Area. The subsurface geology in the Salt River Valley consists of thick basin fill deposits of unconsolidated to semi-consolidated clastic sediments of the Late Tertiary to Quarternary age, interpreted as alluvial fan, playa, and fluvial deposits. The alluvial deposits generally increase in thickness and decrease in grain size toward the central areas of the basins.

Three geological units have been described in the alluvial material in the area. The Upper Alluvial Unit (approximately 280 feet thick) consists of gravel, sand, and silt, mostly unconsolidated with locally strong cementation near mountain fronts and major stream courses. The Middle Alluvial Unit (approximately 970 feet thick) consists of silt, siltstone, silty sand and gravel, mostly weakly consolidated, but moderately to well-cemented. The Lower Alluvial Unit consists of clay, silts, mudstone, evaporites, sandstone, gravel, conglomerate, and andesitic basalt, weakly to well-cemented and contains interbedded sand, gravel, and conglomerate.

Amendment Description

LPSCo applied for a "significant" amendment on August 18, 2004 to increase the design capacity for treatment from 4.1 MGD to 8.2 MGD. No change in the disposal method was necessary.

In addition to the requested changes, the following is a list of other changes that were initiated by ADEQ:

- Changes to framework language to reflect current rules and regulations and other minor typographic or grammatical errors. In addition, relevant permit

language has been changed to conform to the current APP format for sections pertaining to individual discharging facilities (Section 2.1), discharge limitations, annual registration fee (Section 2.1.1), financial capacity (Section 2.1.2), exceeding of alert levels (Section 2.6.2.2, permit amendment language added), Discharge Limit Violations (added language regarding permit amendment and added standard pond/impoundment overtopping language), Emergency Response and Contingency Requirements (added statutory references and updated language for section 2.6.5.2), Sections 2.8 and 2.9 (updated language to current APP framework), 6.0 Notification Provisions, and the addition of Section 7.0 Additional Permit Conditions.

- Sections 2.2.1.3 and 2.3 – Inclusion of Storage Capacity and Freeboard provision.

- Section 4.0, Table IA (Flow Monitoring) – Inclusion of Table IA - Flow Monitoring for the WRF. Inclusion of individual flow monitoring for Reuse, Recharge, and RID canal disposal options. This table replaced the flow monitoring that was previously in the Discharge Monitoring Tables.

- Section 4.0, Table III (Facility Inspections) - Clarification and changes to the facility inspections checklist.

II. BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY

The permit requires the permittee to operate and maintain the WRF to meet the treatment performance criteria for new facilities as specified in Arizona Administrative Code R18-9-B204. The WRF is required to meet the requirements for the pretreatment by conducting monitoring in Section 4.0, Table IB as per R18-9-B204(6)(b)(iii).

All industrial hookups and other non-residential hookups to the treatment system shall be authorized according to the applicable federal, state or local regulations.

Influent Lift Station

The 23,845 gallon influent lift station serves as initial storage, an equalization sump for the raw wastewater, and provides the hydraulic head necessary for the raw influent to flow through the front end of the plant (headworks). Three submersible pumps are installed in the lift station to lift the wastewater to the headworks. A flow meter, an explosive gas detector, and a pressure transducer are installed in the lift station.

WRF

The WRF has been designed, constructed and located as per the design report prepared by Pacific Advanced Civil Engineering (PACE), Inc. dated August 2004 according to plans approved by ADEQ and on file with this permit.

The common headworks consist of two screening units and a grit unit. The screening units are constructed out of stainless steel, enclosed in a box, and separately scrubbed to reduce odor emissions. The grit unit is also constructed out of stainless steel, enclosed, and separately scrubbed to reduce odor emissions into the screen room.

Based on the design report and plans submitted by the permittee, the SBR treatment process is designed to achieve an effluent total nitrogen level of less than 10 mg/l through the nitrification/denitrification process. The effluent from the SBRs is further treated through filtration to achieve an effluent turbidity level of less than 2 NTU. The effluent is then disinfected through ultraviolet disinfection to achieve an effluent *E. coli* level of 'Non-Detect' and then is delivered to the following locations: 1) approved reuse sites under a valid Reuse permit or 2) RID canal as an APP exempted discharge under a valid AZPDES permit.

All treatment units are constructed below the ground surface and materials are constructed from stainless steel.

Setback Requirements

The WRF was originally permitted in July 2001. According to Ordinance #2001-734 issued by the City of Goodyear, a setback of 150 feet was approved for the full build-out (8.2 MGD) of this plant. Therefore, the Palm Valley WRF is in compliance with the setback requirements pursuant to A.A.C. R18-9-B201(I).

III. COMPLIANCE WITH AQUIFER WATER QUALITY STANDARDS

Monitoring and Reporting Requirements

The facility is located over groundwater of the West Salt River Valley Basin in the Phoenix Active Management Area. The depth to groundwater is approximately 120 feet bls and the direction of groundwater flow is generally to the west-northwest. The nearest point of use in the aquifer is a City of Goodyear fire protection well. Other wells in the area are either monitor wells or abandoned wells.

Flow Monitoring

All flow being treated at the WRF will be measured pursuant to Table IA of the permit. All disposal options will be monitored for flow separately and compared to the total flow leaving the plant. Flows may not exceed the discharge limit of 8.2

MGD. Exceedances trigger compliance actions in accordance with the Contingency Plan in Section 2.6 of the permit.

Discharge Monitoring

The treated effluent will be monitored in accordance with Table IB of the permit. Alert Levels (ALs) and Discharge Limits (DLs) for pathogens (*E. coli*) and nutrients (nitrogen) were based on the BADCT performance standards prescribed in A.A.C. R18-9-B204 for new facilities. ALs were set at 80% of the Aquifer Water Quality Standards (AWQS) and the DLs for metals and VOCs were set at the AWQS. Exceedances trigger compliance actions in accordance with the Contingency Plan in Section 2.6 of the permit.

Table IC requires the permittee to monitor the effluent for Class A+ Reclaimed Water Quality Standards. The DLs were based on the prescribed standards under A.A.C. R18-11- 301 et. seq. This monitoring is in addition to the BADCT monitoring required under Table IB.

The point of compliance discussed below was selected to be protective of all downgradient uses of the aquifer. Groundwater quality monitoring is not recommended at this time as there are no discharges at the plant site and the discharge into the Roosevelt Canal is exempt from APP program requirements pursuant to A.R.S. § 49-250.B.(6) and (16).

Point(s) of Compliance (POC)

The theoretical hazardous point of compliance is located at the northwest corner of the facility at latitude 33° 27' 54", longitude 112° 21' 54". Groundwater quality monitoring is not recommended at this time as there are no discharges at the plant site and the discharge into the Roosevelt Canal is exempt from the APP program requirements.

There is no groundwater monitoring well at this time. Exceedances in the effluent trigger compliance actions in accordance with the Contingency Plan in Section 2.6 of the permit and may require the installation of a monitor well at the POC.

IV. STORM WATER AND SURFACE WATER CONSIDERATIONS

The nearest surface water body is Bullard Wash located approximately one mile west of the facility. The Roosevelt Canal (a potential discharge location upon the applicant obtaining a valid AZPDES permit) is located approximately one mile north of the facility. Bank protection and associated interior embankments have been constructed to protect the facility from the 100-year flood event.

V. COMPLIANCE SCHEDULE

The construction and installation of the second SBR treatment train shall be conducted pursuant to the Compliance Schedule in Section 3.0 of the permit. An Engineer's Certificate of Completion is required to be submitted to the Department prior to discharging in accordance with A.A.C. R18-9-B203.E.

VI. OTHER REQUIREMENTS FOR ISSUING THIS PERMIT

Technical Capability

The Palm Valley WRF has demonstrated the technical competence necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A202(B). A professional civil engineering firm specializing in wastewater treatment systems, PACE, Inc., was hired to design the treatment system and complete the APP application for the significant amendment.

ADEQ requires that appropriate documents be sealed by an Arizona registered geologist or professional engineer. This requirement is a part of an on-going demonstration of technical capability. The permittee is expected to maintain technical capability throughout the life of the facility.

Financial Capability

The Palm Valley WRF has demonstrated the financial responsibility necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A203. The estimated dollar amount demonstrated for financial capability is $14.1 million dollars. The financial capability was demonstrated pursuant to A.A.C. R18-9-A203(C)(1) through self-assurance. The permittee is expected to maintain financial capability throughout the life of the facility.

Zoning Requirements

The Palm Valley POTW has been properly zoned for the permitted use and the permittee has complied with all Maricopa County zoning ordinances in accordance with A.R.S. § 49-243(O) and A.A.C. R18-9-A201(A)(2)(c).

VII. ADMINISTRATIVE INFORMATION

Public Notice (A.A.C. R18-9-108(A))

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft permit or other significant action with

respect to a permit or application. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or permit. This permit will be public noticed in a local newspaper after a pre-notice review by the applicant and other affected agencies.

Public Comment Period (A.A.C. R18-9-109(A))

The aquifer protection program rules require that permits be public noticed in a newspaper of general circulation within the area affected by the facility or activity and provide a minimum of 30 calendar days for interested parties to respond in writing to ADEQ. After the closing of the public comment period, ADEQ is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

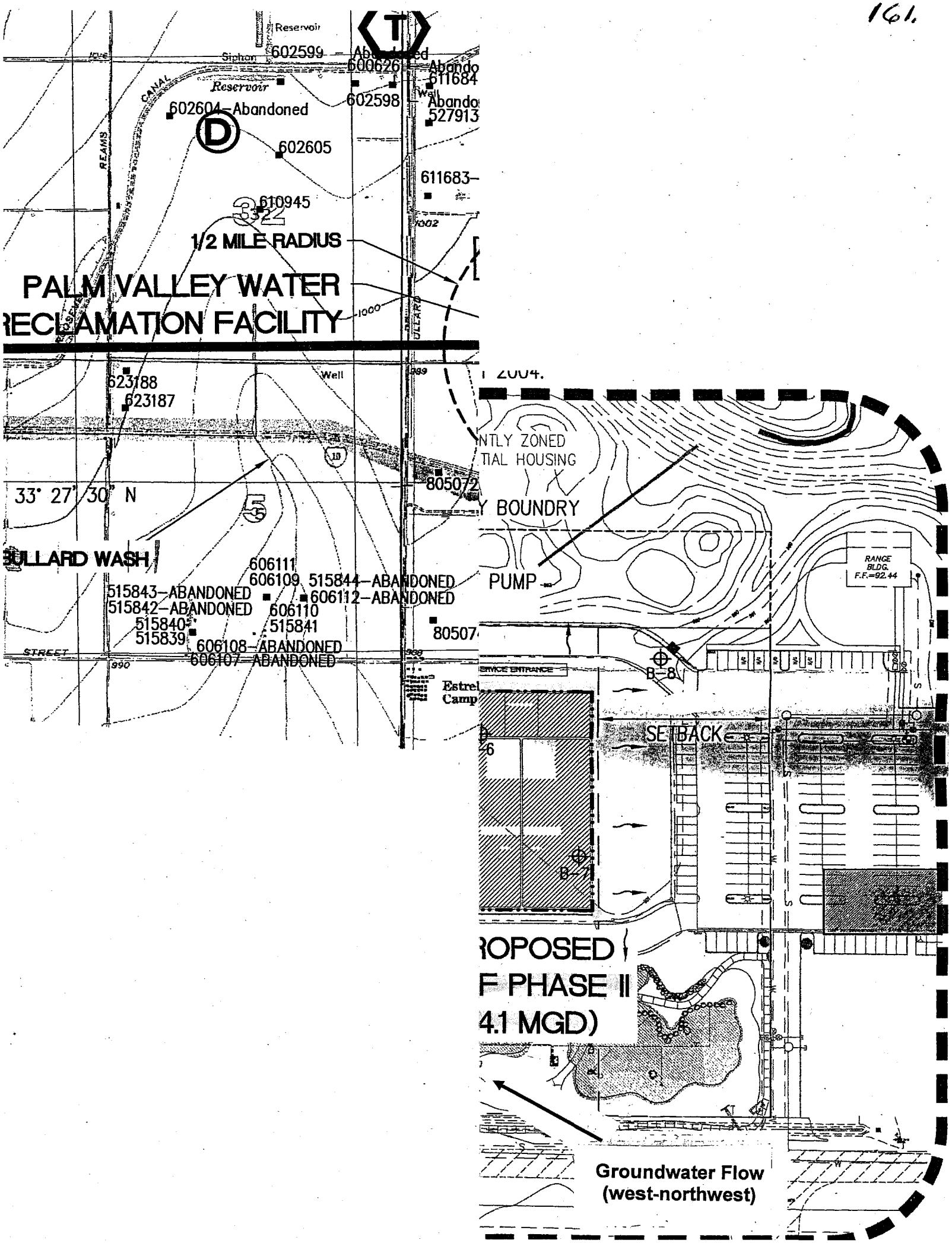
Public Hearing (A.A.C R18-9-109(B))

A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. A public hearing will be held if the Director determines there is a significant amount of interest expressed during the 30-day public comment period, or if significant new issues arise that were not considered during the permitting process.

VIII. ADDITIONAL INFORMATION

Additional information relating to this proposed permit may be obtained from:

Arizona Department of Environmental Quality
Water Quality Division – Wastewater, Reuse, and Recharge Unit
Attn: Lisa Richey
1110 W. Washington St., Mail Code 5415B-3
Phoenix, Arizona 85007
Phone: (602) 771- 4465


Reservoir
Siphon
602599
Abandoned
600626
Abando
611684
Reservoir
CANAL
602598
Well
Abando
527913
602604–Abandoned
D
602605
REAMS
611683–
610945
1/2 MILE RADIUS
PALM VALLEY WATER
RECLAMATION FACILITY
1000
ULLARD
Well
623188
623187
33° 27' 30" N
805072
BULLARD WASH
606111
606109
515844–ABANDONED
515843–ABANDONED
606112–ABANDONED
515842–ABANDONED
606110
515840
515841
515839
606108–ABANDONED
606107–ABANDONED
STREET
990
Estrel
Camp
NTLY ZONED
TIAL HOUSING
Y BOUNDRY
PUMP
RANGE
BLDG.
F.F.=92.44
B–8
SETBACK
B–7
ROPOSED
F PHASE II
4.1 MGD)
Groundwater Flow
(west-northwest)

MCBRIDE ENGINEERING SOLUTIONS, INC.
7305 W. Boston Street
Chandler, AZ 85226

Principal
Brian P. McBride, P.E.

August 1, 2007

William Kenning, P.E.
Maricopa County Environmental Services Department
1001 N. Central Ave, Suite150
Phoenix, Arizona 85004

Re: Palm Valley WRF Upgrades Approval To Construct Application
ATC Application – Phase 10 Surge Tank Recycle

Dear Mr. Kenning:

Attached is the submittal for Phase 10 the surge tank recycle line. This phase has been added since our last submittal on 7/3/2007. Please find below a summary of the entire Palm Valley WRF Upgrades project for your benefit.

1.0 Introduction

Litchfield Park Service Company currently owns and operates the Palm Valley Water Reclamation Facility (WRF) in its Litchfield Park service area. The Palm Valley WRF is a wastewater treatment plant that utilizes sequencing batch reactor (SBR) technology. The plant is designed to produce ARS Title 18 "Class A-plus" quality effluent for various reuse applications. The current rated treatment capacity for the plant is 4.1 million gallons per day (mgd) on a maximum month basis and 8.2 mgd on a peak day basis. This facility is permitted for an ultimate maximum month capacity of 8.2 mgd. The scope of this project includes improvements to plant hydraulics, capacity shortfalls, odor control upgrades, process control difficulties, equipment reliability concerns, trouble-shooting limitations, excessive maintenance requirements, and a lack of operational flexibility. The performance improvements recommended for this project will be installed in a phased approach.

2.0 Proposed Improvements

The capital improvements to be completed for this project will consist of the following major improvement areas:

- Phase 1: Odor Control Upgrades
  - Full Scale Pilot of an Ion Exchange System for Buildings
  - Dedicate Existing Wet Scrubbers to Treat Air from Process Tanks Only
- Phase 2: UV Disinfection System Upgrades
  - New UV Reactors
- Phase 3: Temporary Centrifuge System
  - Lease of a temporary skid mounted centrifuge until a new centrifuge is obtained
- Phase 4: Influent Screening Upgrades

- Replace Existing Screens with Reciprocating Stair Screens
- Temporary Re-screening of Anoxic Basin

- Phase 5: Increase Pumping Capacity for Tertiary Treatment System
  - New Filter Feed Pump
  - New UV / Effluent Disposal Pump
- Phase 6: Solids Handling Upgrades
  - Conversion of ATAD Basins to Aerated Sludge Holding Tanks
  - New Skid Mounted Centrifuge System
  - Dewatered Sludge Conveyor System
- Phase 7: Conversion of Digesters to SBR tanks
  - SBR Equipment
  - Decanters
  - Motive Pumps
  - Jet Aeration Headers
  - Sludge Wasting Pumps
  - Process Blower
- Phase 8: Headworks Building Upgrades
  - Replace Electrical Equipment/Installation
  - New Gas Detection System
- Phase 9: Solids Handling Building Upgrades
  - Replace Electrical Equipment/Installation
  - New Gas Detection System
  - Install Air Conditioning Units
- Phase10
  - Surge Tank Recycle Pipeline

As stated above, this project will be completed in several phases. Separate applications will be submitted for each phase that will include all pertinent drawings, specifications, shop drawings, calculations, manufacturer's documentation/proposals, and/or design reports. The initial phases of this project are expected to begin in July of 2007. The entire project is expected to be completed by January 2008. Attached is a preliminary construction schedule for the above mentioned items.

If you have any questions regarding this project, please feel free to contact me.

Sincerely,

Brian P. McBride, P.E.
Principal
McBride Engineering Solutions, Inc.

MCBRIDE ENGINEERING SOLUTIONS, INC.
7305 W. Boston Street
Chandler, AZ 85226

Principal
Brian P. McBride, P.E.

August 1, 2007

William Kenning, P.E.
Maricopa County Environmental Services Department
1001 N. Central Ave, Suite150
Phoenix, Arizona 85004

Re: Palm Valley WRF Upgrades Approval To Construct Application
ATC Application – Phase 10 Surge Tank Recycle Pipeline

Dear Mr. Kenning:

Please find below a summary of the surge tank recycle pipeline which is part of the Palm Valley WRF Upgrades Project.

1.0 Introduction
Currently, the existing SBR tanks discharge secondary effluent by gravity to the surge tank. The secondary effluent in the surge tank is then pumped to the three disk filters using one of the two vertical turbine pumps in the surge tank. The pumps discharge to a common header that feeds each of the three disk filters. Each of the filter feed lines has a manual butterfly valve to isolate flow into each filter. The end of the pump discharge header is blind flanged to accommodate installation of an additional filter in the future. The surge tank acts as an equalization basin to even out the flow to the tertiary treatment systems. There is presently no means of recycling the secondary effluent contained in the surge tank in case of an insufficient treatment cycle of the SBR. There is also no way of cleaning out the solids that have accumulated over time in the bottom of the surge tank.

2.0 Surge Tank Recycle Pipeline
A surge tank recycle pipeline will be installed to give the plant operators more flexibility in regard to the operation of the surge tank. The recycle pipeline will connect to the end of the filter feed pump discharge header and discharge into the plant influent sewer manhole labeled MH #1 (see attached drawings for the pipeline layout). The surge tank recycle pipeline will not prohibit the addition of a fourth filter in the future as shown on the drawings. The surge tank recycle line will be utilized in the event of an insufficient treatment cycle of the SBR. It will also be utilized as a maintenance tool to help clean out solids that have accumulated at the bottom of the surge tank. The surge tank recycle will be operated by manually opening the butterfly valve on the recycle line and closing the butterfly valves on each of the filter feed inlets.

If you have any questions regarding this project, please feel free to contact me.

Sincerely,

Brian P. McBride, P.E.
Principal
McBride Engineering Solutions, Inc.

cc: Tom Nichols, Algonquin Water Services

Environmental Services Department
1001 N. Central Avenue, Suite 150
Phoenix AZ 85004

Water and Waste Management Division
Water and Wastewater Treatment Program
(602) 506-6666
FAX (602) 506-6925

APPLICATION FOR APPROVAL TO CONSTRUCT WATER AND/OR WASTEWATER TREATMENT/REUSE FACILITIES

1. PROJECT INFORMATION: ☐ Standard review ☒ Expedited review ☒ Phased review ☐ Time extension (approval renewal)

Project Name: Palm Valley WRF Upgrades

Project Description: This project will increase the treatment capacity of the Palm Valley WRF by approximately 0.9 million gallons per day as well as replacing/upgrading some of the existing equipment. See attached project summary for a list of improvements this project will include. This application is for Phase 10 which is the surge tank recycle line, see attached for more detailed information.

Project Components: (check the applicable components)

☒ Treatment Facility/Plant	☐ PRV Station	☐ Recharge/Recovery Facility	☐ Point-of-Use System
☐ Well	☐ Pipeline	☐ Reuse Irrigation System	☐ Other:
☐ Storage Tank/Reservoir	☐ Disinfection System	☐ Reuse Impoundment/Lake	☐ Other:
☐ Pump Station	☐ Odor Control/Facility System	☐ Disposal System/Wetland	

Required Permits: (check each category where a new or modified permit is required)

☐ ADEQ AZPDES Permit	☐ ADWR U/G Storage Facility Permit	☐ POTW Pretreatment Permit
☐ ADEQ Aquifer Protection Permit	☐ ADWR Water Storage Permit	☐ Other:
☐ ADEQ Reclaimed Water Permit	☐ ADWR Recovery Well Permit	☐ Other:

2. SYSTEM INFORMATION:

System Type: ☐ Water ☒ Wastewater ☐ Reclaimed Water

System Name: Palm Valley Water Reclamation Facility (System Name (Type or Print)) **System ID Number:** 100310 (ID (Type or Print))

Owner's Name: Litchfield Park Service Company (Owner's Name (Type or Print)) **Contact Person:** Matthew Garlick (Contact Person (Type or Print))

3. SITE INFORMATION:

Location: Goodyear (Nearest City or Town (Type or Print)) **Township:** 2N **Range:** 1W **Section:** 33

Physical Address: 14222 McDowell Road, Goodyear, AZ, 85338 (Address, City, State, and ZIP Code (Type or Print))

4. DOCUMENTS SUBMITTED WITH THIS APPLICATION: (Check where applicable)

☐ Engineering Design Report	☐ Master Plan/Study/Report	☐ Copies of Permits/Certificates
☒ Design Drawings	☐ Pilot Testing Plan/Study/Report	☐ Recorded Legal Easements/Documents
☐ Technical Specifications	☐ Water Quality Analysis Report	☐ Signed Service or Extension Agreements
☐ Engineering Calculations	☐ Operational Log/Report	☐ Sewer Capacity Letter
☐ Manufacturer's Documentation	☐ MAG 208 Certification Report	☐ Other:

Environmental Services Department
1001 N. Central Avenue, Suite 150
Phoenix AZ 85004

Water and Waste Management Division
Water and Wastewater Treatment Program
(602) 506-6666
FAX (602) 506-6925

APPLICATION FOR APPROVAL TO CONSTRUCT WATER AND/OR WASTEWATER TREATMENT/REUSE FACILITIES

5. ENGINEER OF PROJECT:

Firm Name: McBride Engineering Solutions, Inc. (Firm Name (Type or Print)) **Contact Person:** Brian McBride (Contact Person (Type or Print))

Mailing Address: 7305 W Boston Street, Chandler, AZ, 85226 (Address, City, State, and ZIP Code (Type or Print))

Telephone: 480-759-9608 (Telephone (Type or Print)) **Fax:** 480-706-1106 (Fax (Type or Print)) **E-Mail:** bmcbride@mcbrideengineering.net (E-mail (Type or Print))

6. OWNER OF PROJECT:

Owner's Name: Litchfield Park Service Company (Owner's Name (Type or Print)) **Contact Person:** Matthew Garlick (Contact Person (Type or Print))

Mailing Address: 12725 W Indian School Road, Suite D101, Avondale, AZ, 85323 (Address, City, State, and ZIP Code (Type or Print))

Telephone: 623-935-9367 (Telephone (Type or Print)) **Fax:** 623-935-1020 (Fax (Type or Print)) **E-Mail:** matthew.garlick@algonquinwater.com (E-mail (Type or Print))

7. PERSON AUTHORIZING PROJECT:

Name: Robert Dodds (Name (Type or Print)) **Job Title/Affiliation:** President / Litchfield Park Service Company (Job Title/Affiliation (Type or Print))

Signature: Robert Dodds (Signature) **Date:** Aug. 1/07 (Date (Type or Print))

8. CONSTRUCTION AGREEMENT:

The undersigned hereby agrees to construct the water, wastewater and/or reclaimed water facilities according to the approved plan documents.

Name: Tom Nichols (Name (Type or Print)) **Job Title/Affiliation:** Manager of Engineering and Construction / Algonquin Water Services (Job Title/Affiliation (Type or Print))

Signature: Tom Nichols (Signature) **Date:** August 1, 2007 (Date (Type or Print))

Est. Construction Start Date: July 2007 (Date (Type or Print)) **Est. Construction Completion Date:** January 2008 (Date (Type or Print))

For Internal Use:

Date Submitted:	Project No.:	Amount Paid:	Review Requested: ☐ Standard ☐ Phased ☐ Expedited ☐ Renewal
Site Location Code:	Reviewer:	Fee Codes:	

MCBRIDE ENGINEERING SOLUTIONS, INC.
7305 W. Boston Street
Chandler, AZ 85226

Principal
Brian P. McBride, P.E.

July 3, 2007

William Kenning, P.E.
Maricopa County Environmental Services Department
1001 N. Central Ave, Suite150
Phoenix, Arizona 85004

Re: Palm Valley WRF Upgrades Approval To Construct Application
ATC Application – Phase 1 Odor Control Upgrades

Dear Mr. Kenning:

Please find below a summary of Phase 1 for the Palm Valley WRF Upgrades. Phase 1 consists of installing a full scale pilot of an ion exchange odor control system for all buildings and dedicating the existing odor scrubbers to the process tanks.

1.0 Introduction

The odor control system at the Palm Valley WRF originally consisted of two 3-stage wet chemical scrubbers. There is one 10,000-cfm unit that treats air from the Headworks Building, Influent Wet Well, and Anoxic Reactor. The second unit is a 6,000-cfm unit that treats air from the Solids Dewatering Building and ATAD Basins. Due to numerous public complaints, a 16,000-scfm carbon media scrubber was added to polish the exhaust streams of the two original scrubbers in early 2007. It has been identified that additional odor control capacity is needed to provide proper air exchange rates. In addition, there are no apparent automatic or manual dampers on either the odor control duct lines or the buildings, which means there is no way of balancing the air in the system.

The proposed changes to the odor control system include pilot testing of an ion exchange system that will be installed in all buildings at the facility. The existing wet scrubbers and polisher will then be dedicated to the process basins. Details of the proposed changes are described in the following sections.

2.0 Ion Exchange Pilot System

IONstein Air Technologies is supplying and installing a full scale pilot system that will treat air in all buildings at the facility, see attached proposal. The IONstein system will include all necessary ion exchange units, delivery boxes, scrubbers, stainless steel and perforated plastic duct systems, and control panels. The system will be installed in two steps depending on the remediation results achieved from Step 1. The IONstein system will be tested according to the test protocol included in the attached proposal to determine the effectiveness of the system. If the IONstein equipment works as intended, the system will remain in place as the permanent odor control system for the buildings. If the IONstein system does not work as proposed, the system will be taken out of service and the existing odor control system will be modified back to its original design. Other alternatives are being investigated at this time to improve the existing odor control system that could be implemented if the IONstein system does not work

3.0 Conversion of Existing Odor Control System

After the IONstein system has been installed, modifications to the existing foul air duct will be completed. The foul air intakes for the buildings will be closed using existing slide gates so that the

existing wet scrubbers draw air from the process basins only. If the IONstein system works efficiently and is implemented as a long term solution, dampers will be installed on the ducts from each basin to allow the system to be balanced properly.

If you have any questions regarding this project, please feel free to contact me.

Sincerely,

Brian P. McBride, P.E.
Principal
McBride Engineering Solutions, Inc.

cc: Tom Nichols, Algonquin Water Services

Air Purification System Proposal

001OFF070419

Especially Prepared For:

LPSCO, Litchfield Park Service Co.
14222 W. McDowell Rd Goodyear, AZ 85338
Jason Battern

Through
McBride Engineering Solutions, Inc.
7305 W. Boston Street, Chandler, AZ 85226
Brian McBride

INDEX

Section I	Product Description
Section II	Installation Locations/Scope of Work
Section III	Maintenance Schedule
Section IV	Fee Schedule
Section V	Agreement and Acceptance

170,

MCBRIDE ENGINEERING SOLUTIONS, INC.
7305 W. Boston Street
Chandler, AZ 85226

Principal
Brian P. McBride, P.E.

July 3, 2007

William Kenning, P.E.
Maricopa County Environmental Services Department
1001 N. Central Ave, Suite150
Phoenix, Arizona 85004

Re: Palm Valley WRF Upgrades Approval To Construct Application
ATC Application – Phase 2 UV Disinfection System Upgrades

Dear Mr. Kenning:

Please find below a summary of Phase 2 for the Palm Valley WRF Upgrades. Phase 2 consists of the demolition of three existing UV units and replacing them with one larger UV system.

1.0 Introduction

The UV disinfection system at the Palm Valley WRF originally consisted of seven 1.4 million gallons per day (MGD) in-line UV reactor units. The existing UV units are obsolete The proposed changes to the UV disinfection system include replacing the three UV units that are out of service with one new system that has a treatment capacity of 5.0 MGD. An additional 5.0 MGD UV disinfection system will be installed as part of this project at a later time to ensure proper treatment capacity with redundancy.

2.0 UV Disinfection System Design Criteria

The UV disinfection system is designed to meet Class A+ effluent requirements as defined in Arizona Administrative Code (A.A.C.) R18-11-303. The fecal coliform testing requirements include a non-detect result in 4 of the last 7 samples and a single sample maximum concentration of less than 23 CFU per 100 milliliters. The capacity of the UV system is being designed so that it can treat the peak day flow with the largest unit of service. Currently, the plant is rated for 4.1 MGD average flow with a peak day flow of 8.2 MGD. This project will increase the capacity of the plant to 5.0 MGD average day flow and 10.0 MGD peak day flow. Three of the existing UV units will be demolished as part of this project. In their place, one new UV system will be installed immediately that will provide 5.0 MGD of disinfection capacity. The plant will then have a total disinfection capacity of 10.6 MGD. Another 5.0 MGD UV system will be provided later on in this project to ensure proper disinfection capacity with the largest unit out of service.

3.0 New UV System Information

The new UV disinfection equipment will be supplied by Aquionics, see attached submittal for equipment cut sheets, specifications, installation instructions, and operation and maintenance procedures. The new system will provide an additional 5.0 MGD of disinfection capacity. Also attached are mechanical drawings showing the demolition of the existing UV units and the modification required for the new system. Aquionics only had one system available for immediate delivery, but a second 5.0 MGD system will be provided later on in this project that will provide the required redundancy to ensure proper disinfection capacity.

7/3/2007

If you have any questions regarding this project, please feel free to contact me.

Sincerely,

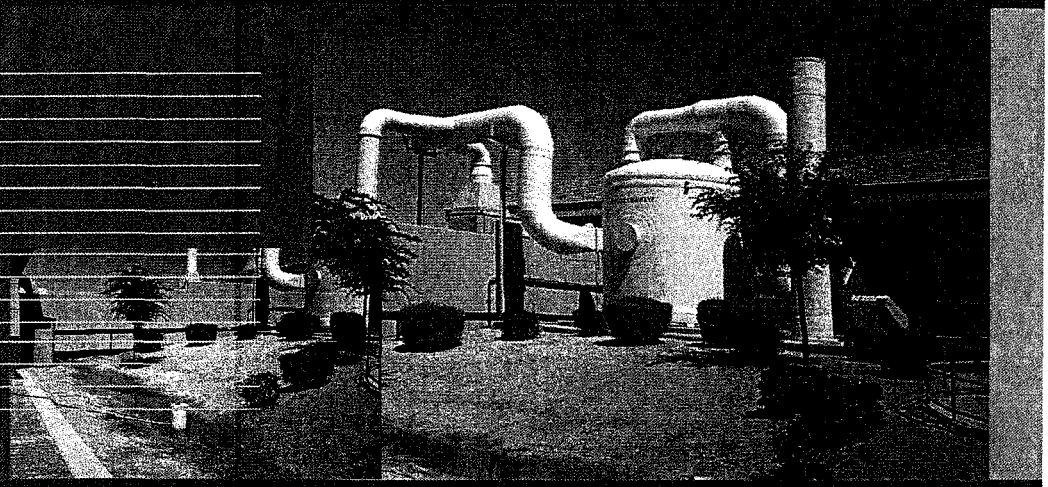
Brian P. McBride, P.E.
Principal
McBride Engineering Solutions, Inc.

cc: Tom Nichols, Algonquin Water Services

172.

September 2007

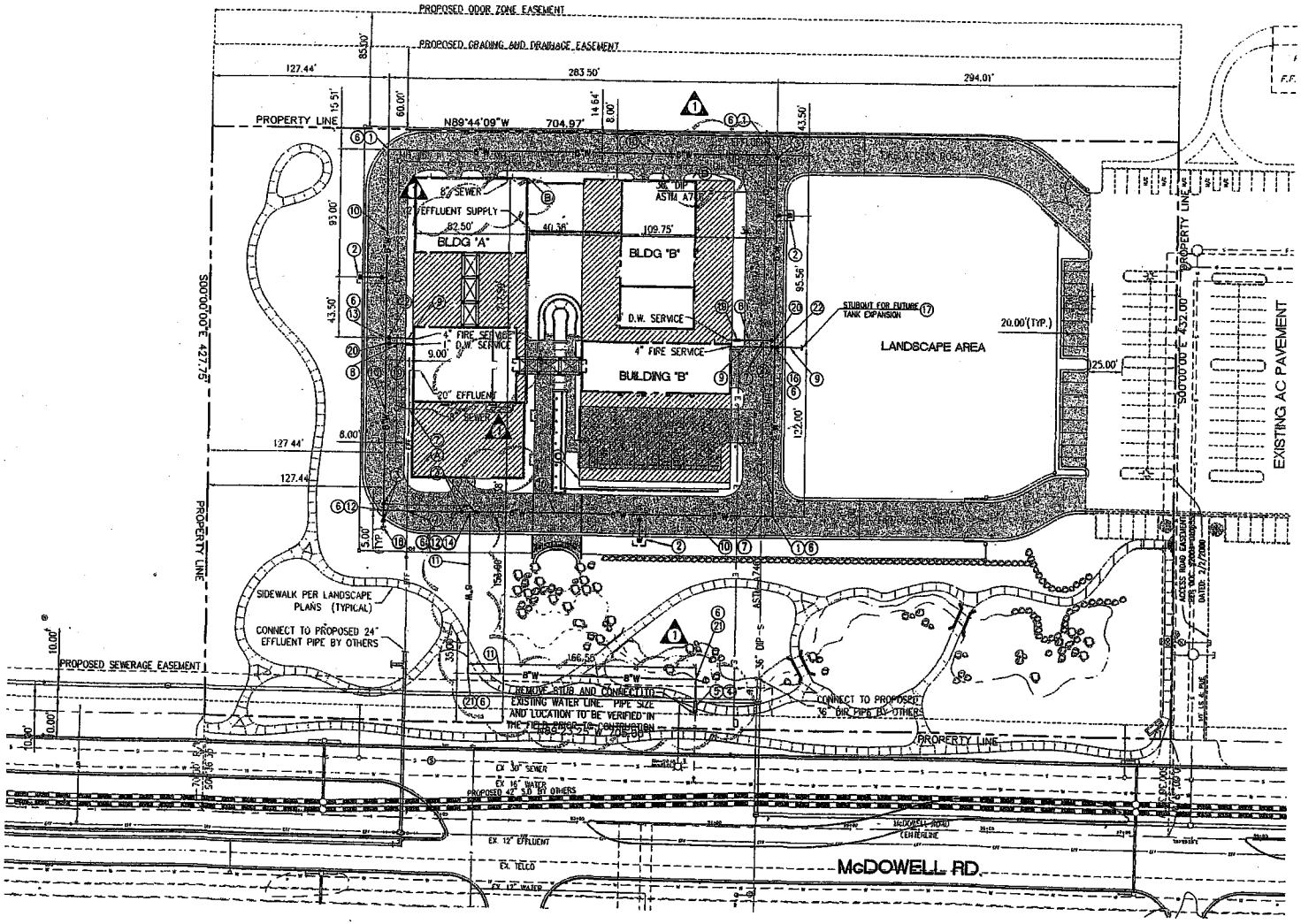
AZPDES Permit Application
Palm Valley Reclamation Plant



LPSCO
Litchfield Park Service Co.

NCS

NARASIMHAM CONSULTING SERVICES, INC.



CONSTRUCTION NOTES AND QUANTITIES

1. INSTALL 6" D.I. 90° ELBOW ..... 3 EA.
2. INSTALL 6" FIRE HYDRANT ASSEMBLY PER COG STD. DETAIL G-3330 ..... 3 EA.
3. INSTALL 6" VALVE PER MAG STD. DETAIL 301 WITH BOX COVER & DEBRIS CAP PER COG STANDARD DETAILS G-3320-2 & G-3321 TYPE "A" ..... 5 E.A.
4. INSTALL 8" REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY PER COG STD. DETAIL G-3351 ..... 1 EA.
5. INSTALL 6" COMPOUND WATER METER PER COG STD. DETAIL G-3313 ..... 1 EA.
6. CONSTRUCT THRUST BLOCK PER MAG STD. DETAIL 380 ..... 10 EA.
7. CONSTRUCT WATER AND SANITARY SEWER SEPARATION / PROTECTION PER MAG STD. DETAIL 404 ..... 4 EA.
8. INSTALL 1" COPPER WATER LINE ..... 10 L.F.
9. INSTALL 4" D.I.P. WATER LINE ..... 86 L.F.
10. INSTALL 6" PVC (C900) WATER LINE ..... 1,120 L.F.
11. INSTALL 8" PVC (C900) WATER LINE ..... 144 L.F.
12. INSTALL 6" X 6" X 6" TEE ..... 2 EA.
13. INSTALL 6" X 6" X 4" FLG. OUTLET TEE ..... 1 EA.
14. INSTALL 8" X 6" D.I. REDUCER ..... 1 EA.
15. NOT USED
16. INSTALL 6" X 4" D.I. FLG OUTLET CROSS ..... 1 EA.
17. INSTALL 4" D.I. CAP ..... 1 EA.
18. INSTALL 6" D.I. CAP ..... 1 EA.
19. INSTALL 1" REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY PER COG STD. DETAIL G-3354 ..... 1 EA.
20. INSTALL 1" WATER SERVICE CONNECTION PER COG STD. DETAIL G-3310 ..... 2 EA.
21. INSTALL 8" D.I. 90° ELBOW ..... 2 EA.
22. INSTALL 4" VALVE PER MAG STD. DETAIL 301 WITH BOX COVER & DEBRIS CAP PER COG STANDARD DETAILS G-3320-2 & G-3321 TYPE "A" ..... 2 E.A.

NOTE TO CONTRACTOR

1. ALL CONSTRUCTION WORK SHALL BE PERFORMED IN ACCORDANCE WITH CITY OF GOODYEAR AND M.A.G. STANDARDS.
2. UTILITY APPROXIMATE LOCATION PROVIDED BY OTHERS. CONTRACTOR TO FIELD VERIFY ALL UTILITIES PRIOR TO START OF CONSTRUCTION.
3. THE ABOVE LISTED QUANTITIES ARE FOR BONDING AND ESTIMATING PURPOSES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR COMPUTING HIS OWN QUANTITIES FOR CONTRACT PURPOSES.

LEGEND

- PROP. A.C. PAVEMENT
- PROP. CONCRETE PAVEMENT
- PROP. DECORATIVE CONCRETE PER LANDSCAPE PLANS
- PROP. UNDERGROUND TANK

Two working days before you dig CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT

BUILDING COORDINATES			
##	NORTHING	EASTING	DESCRIPTION
A	50215.24	52915.45	POINT OF COMPLIANCE
B	50433.04	52997.95	NE CORNER OF DIGESTER
C	50215.42	53038.33	SW CORNER OF SBRS
D	50433.17	53148.08	NE CORNER OF SBRS

NORTH
40 20 0 40 80

1 DD 05/22/01 REVISE PER COUNTY COMMENTS DATED 05/17/01

JOB

PALM VALLEY WRF
SBR WASTEWATER RECLAMATION FACILITY

GOODYEAR

A2

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17902 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-5734 FAX 848-4099

PREPARED BY
JAMES A. MATTHEWS
PROJECT ENGINEER
R.C.E. NO. AZ #34090
EXP. 09/30/02

DRAWN DAD/JDM/NK
DESIGNED SOS/JDM
CHECKED
SCALE 1" = 40'
DATE

34090 JAMES A. MATTHEWS REGISTERED PROFESSIONAL ENGINEER ARIZONA, U.S.A.

TREATMENT PLANT WATER & FIRE LINE LAYOUT

SHEET C2 OF 4 SH

FIGURE 1

176

MANNER NOR BE USED FOR CONSTRUCTION UNLESS STAMPED "ISSUED FOR CONSTRUCTION".

September 2007

LITCHFIELD PARK SERVICE COMPANY

AZPDES PERMIT APPLICATION NARRATIVE
PALM VALLEY WATER RECLAMATION PLANT

1.0 INTRODUCTION

The Litchfield Park Service Company (LPSCO) owns and operates the Palm Valley Water Reclamation Plant (PVWRP), located at 14222 W. McDowell Rd., Goodyear, AZ. The PVWRP currently has an approximate treatment capacity of 4.1 million gallons per day (mgd) and will be expanding to 8.2 mgd in the future. The PVWRP utilizes an activated sludge treatment process that includes primary sedimentation, aeration, filtration, secondary clarification, UV disinfection, and nitrification/denitrification. The effluent is delivered to three potential discharge locations: 1) Roosevelt Irrigation District (RID) Main Canal, 2) the Palm Valley / Pebblecreek golf courses, and 3) the LPSCO Reuse Irrigation site. Direct uses for the reclaimed water are limited to non-drinking water purposes such as golf course irrigation, and not for edible crop irrigation. The residual solids from the PVWRP are treated on site and disposal is to a sanitary landfill.

Although LPSCO routinely discharges PVWRP effluent to the golf courses for irrigation, during times of low golf course water demand the effluent may be diverted to the RID Canal.

1.1 Background

The LPSCO sewer system master plan emphasizes local wastewater reclamation and beneficial reuse. The PVWRP is an integral part of the wastewater infrastructure. A site plan of the facility is shown in Figure 1. The plant is currently operated to serve the irrigation demands of the Palm Valley and Pebblecreek Golf Courses.

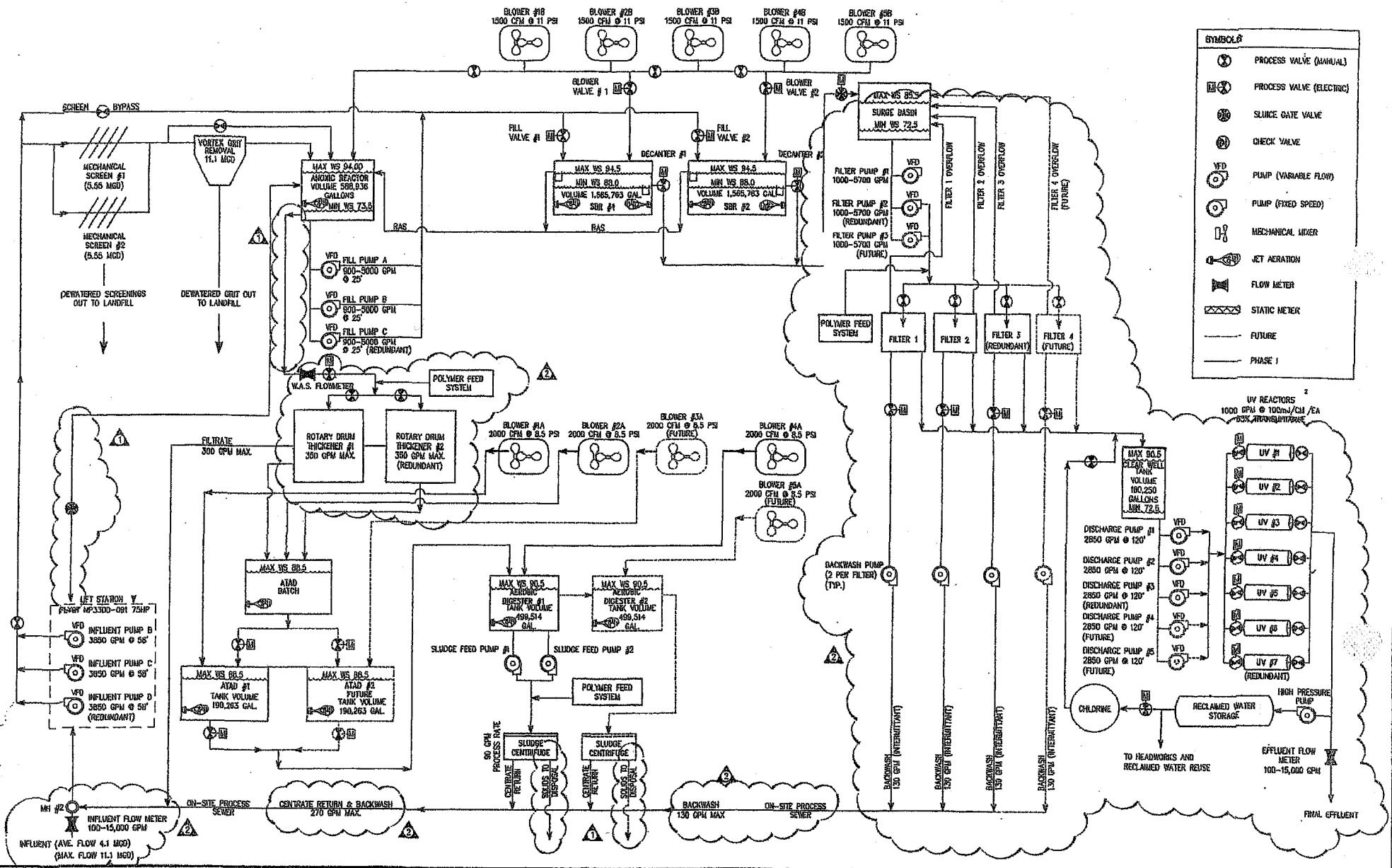
The PVWRP is authorized to operate with an average design flow of 4.1mgd. The permit requested in this application will allow the periodic discharge of treated effluent to the Roosevelt Irrigation District Canal (at a new outfall located at the intersection of Thomas Rd. and Bullard Rd.).

2.0 EXISTING PERMITS AND CONDITIONS

The PVWRP operates under a General Aquifer Protection Permit (#P100310) and a General Reuse Permit (#R105221). The effluent is monitored for selected constituents in accordance with Aquifer Water Quality Standards, including all nitrogen forms, at the point of discharge.

3.0 EXISTING FACILITIES

The treatment process includes an influent pump station, mechanical screens, vortex grit removal, two sequencing batch reactors, two filters, an ultraviolet (UV) disinfection system, an anoxic reactor, rotary drum thickeners, an ATAD batch system, aerobic digesters, and sludge centrifuges. A process flow diagram of the facility is shown in Figure 2.



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DD		10/03/01	REVISED TO REFLECT THE RECONFIGURATION OF EQUIPMENT		
DD		05/24/01	REVISED PER COUNTY COMMENTS DATED 05/17/01		

JOB

PALM VALLEY WRF
SBR WASTEWATER RECLAMATION FACILITY

GOODYEAR AZ

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17992 GEORGETOWN LANE, H.B. CA. 92647
(714) 842-5734 FAX. 842-1822

PREPARED BY JAMES A. MATTHEWS PROJECT ENGINEER REG. NO. AZ #34090 EXP. 09/30/02

DRAWN DAD/JDM SCALE NONE
DESIGNED JAM
CHECKED DATE 12/27/00

PROCESS FLOW SCHEMATIC

SHEET G3 OF 5 SHEETS
JOB NO. 724-

175

FIGURE 2

The average daily flow from the plant 4.1 mgd. The future maximum daily flow is 8.2 mgd. Influent biochemical oxygen demand (BOD) averages 283 mg/L. Effluent total suspended solids (TSS) average 5 mg/L, with a maximum single value of 15 mg/L. The pH of the plant effluent varies between 6.8 and 8.3. Effluent ammonia levels average 1.5 mg/L, with a maximum of 12.3 mg/L. Maximum fecal coliforms in the effluent was measured at 400 cfu/mL. Effluent total organic nitrogen and nitrate+nitrite concentrations are 7.1 mg/l and 0.73 mg/L, respectively.

Compliance with technology based limitations for conventional pollutants is anticipated with the existing facilities.

4.0 RECEIVING STREAM AND APPLICABLE STANDARDS

The designated uses for the RID Canal downstream of the PVWRP are AgI and AgL. During periods of maintenance or dry-up of the RID Main Canal, PVWRP effluent is discharged to the golf courses. In addition to stream water quality limits, standards for TSS, BOD, pH, ammonia, dissolved oxygen and nitrate would apply, along with toxicity and narrative standards.

5.0 MONITORING RESULTS

Several rounds of monitoring were conducted in 2006 to obtain sufficient information to prepare the permit application. These monitoring results are presented in Table 1, along with the most stringent receiving stream standards. As shown in Table 1, very few constituents were detected and none were detected in excess of surface water quality standards. Therefore, compliance with all surface water quality standards is anticipated.

Table 1: Summary of Detected Trace Constituents

Constituent	Maximum Level Detected (mg/L)	Most Stringent Standard (mg/L)	# of Samples
Fluoride	1.1	NNS	4
Barium	0.04	NNS	4
Antimony	0.003	NNS	4
Arsenic	0.045	0.2	3

6.0 PRETREATMENT PROGRAM

The Code of Federal Regulations Part 403 requires treatment plants receiving industrial waste which pass through or interfere with operations to provide pretreatment. No industrial users are anticipated to discharge to PVWRP. A pretreatment program will be developed within the next two years as the system size increases.

7.0 CWA 208 PLAN

Section 208 of the Clean Water Act requires Designated Planning Authorities (DPA) to develop and manage drinking water, wastewater, and water quality management issues (208 Plan). In 2005, a draft plan has been prepared for the Maricopa Association of Governments (MAG), and was revised in February 2006. This amendment is attached with this application for reference.

8.0 CONSIDERATIONS FOR PERMIT LIMITS AND MONITORING

Effluent discharges from the Palm Valley WRP meet the technology based treatment requirements identified in the Clean Water Act. The PVWRP has proven that can meet the requirements for both the protection of the receiving stream, underlying aquifer and the requirements for the protection of the public through the reuse of the treated effluent for irrigation in populated and agricultural areas. Permit limits are appropriate for conventional pollutants, while monitoring requirements would apply for the one detected trace constituent with a stream standard (arsenic).

AZPDES FORM 2A APPLICATION
For Discharge from Wastewater Treatment Plants (WWTPs) Treating Domestic Sewage

NOTE: Complete all blanks; put 'N/A' where applicable. All applicants must also complete and submit AZPDES FORM 2S along with Form 2A. Please submit 3 copies of your completed application.

FACILITY NAME Palm Valley Water Reclamation Facility (WRF)

AZPDES (NPDES) PERMIT NO. New Application AZ0025712

PART A. BASIC APPLICATION INFORMATION

Complete each section below.

A.1 Facility Information.

Facility (plant) name Palm Valley WRF County where located Maricopa

Facility mailing address 12725 West Indian School Road
Avondale, AZ 85392

Facility physical address 14222 W. McDowell Rd, Goodyear, AZ 85395

A.2. Facility Owner/Operator Information.

Facility owner Litchfield Park Service Co.

Owner's address 12725 West Indian School Rd, Avondale, AZ 85392

Contact person Matthew Garlick

Title Operations Manager Phone number 623-935-9367

Facility operator Litchfield Park Service Co.

Operator's address 14222 West McDowell Road, Goodyear, AZ 85395

Contact person Matthew Garlick

Title Operations Manager Phone number 623-935-9367

A.3 Landowner(s).

Name and address of owner of land where the WWTP is located (such as National Forest, State Land, Bureau of Land Management, private land):

Land owner Litchfield Park Service Company

Owner's address 12725 West Indian School Rd, Avondale, AZ 85395

Name and address of owner(s) of land where the WWTP pipes flow to the outfall and the outfall discharges:

Land owner Roosevelt Irrigation District

Owner's address 103 W. Baseline Road
Buckeye, AZ 85326

A.4. Person/Entity Preparing Application. If the person/entity preparing the application is different from the above, provide the following:

Name Narasimhan Consulting Services, Inc.

Mailing address 3660 North 3rd Street, Phoenix, AZ 85012

Contact person Ramesh Narasimhan

Title President Phone number 602-629-0206

*** Indicate **(circle below)** to whom correspondence regarding this application should be directed.

Owner (contact person) Operator (contact person) (Person/entity preparing application)

A.5. Existing Environmental Permits. Provide the permit number of any existing environmental permits that have been issued to the treatment works *(include state issued permits)*.

AZPDES _____ (NPDES- include Stormwater permits)

UIC _____ (Underground injection control)

RCRA _____ (Hazardous waste)

PSD _____ (Air emission from proposed sources)

APP 100310 (Aquifer Protection Permit)

Reuse _____

Other (Specify) _____

Other (Specify) _____

A.6. 208 Consistency. For new facilities, facilities with new AZPDES outfalls, or applications for expansion, is the proposal to discharge under an AZPDES permit consistent with the current 208 Regional Water Quality Plan?

_____ Yes _____ No. ***NOTE: An AZPDES application can not be considered administratively complete until a finding of consistency is documented and confirmed by ADEQ.***

_____ Pending. Permittee has contacted and is working with Regional Planning Board.

A.7. Collection System Information. *Provide information on municipalities and areas served by the facility.* Provide the name and population of each entity and, if known, provide information on the type of collection system (combined vs. separate) and its ownership (municipal, private, etc.).

Name	Population Served	Type of Collection System	Ownership
Litchfield Park	4,000	Separate	LPSCO
Goodyear	13,000	Separate	LPSCO
Avondale	13,000	Separate	LPSCO

Total population served 30,000

A.8. Indian Country.

a. Is the treatment works located in Indian Country? X No ____ Yes (Give name) _____

b. Does the treatment works discharge to a receiving water in Indian Country or that is upstream from (and/or eventually flows through) Indian Country? X No ____ Yes

If 'yes," give name of Tribe _____

If 'yes," give approximate distance from discharge to Indian Country boundary _____

A.9. Is the facility located within 100 km (62 miles) of the Arizona-Mexico border? _____ Yes __X__ No

If yes, provide the following information:

1. A description of the area into which the effluent discharges from the facility may flow _____

2. Is the discharge expected to cross the Arizona-Mexico border? ____ Yes ____ No

A.10. Flow. Indicate the design flow rate of the treatment plant *(i.e., the wastewater flow rate that the plant was built to treat on a daily basis – not including peak flows)*. Also provide the average daily flow rate and the maximum daily flow rate for each of the last three years. Each year's data must be based on a 12 month time period with the 12th month of "this year" occurring no more than three months prior to this application submittal.

a. Design flow rate 4.1 mgd

	05 Two Years Ago	06 Last Year	Jan of 07 This Year
b. Annual average daily influent flow rate	2.5 mgd	2.8 mgd	3.4 mgd
c. Maximum daily influent flow rate	3.5 mgd	3.2 mgd	3.8 mgd

d. Describe how you measure (or estimate) flow:
Meter

A.11. Discharges and Other Disposal Methods.

a. List how many of each of the following types of discharge points the treatment works uses:

i. Discharges of treated effluent 2

ii. Discharges of untreated or partially treated effluent 0

iii. Combined sewer overflow points 0

iv. Constructed emergency overflows (prior to the headworks) 0

v. Other Reuse Applications (Golf Course and Irrigation)

b. Does the treatment works discharge effluent to basins, ponds or other surface impoundments that do not have outlets for discharge to waters of the U.S.? _____ Yes __X__ No

If yes, provide the following for each surface impoundment:

Location _____

How far is the impoundment from the closest water of the U.S? _____

Annual average daily volume discharged to surface impoundment(s) _____ mgd

Is discharge _____ continuous or _____ intermittent or _____ periodic (seasonal)?

If intermittent or periodic, provide the following information:

Number of times per year discharge occurs _____ Average duration of each discharge _____

Average flow per discharge _____ mgd Months in which discharge occurs _____

c. Does the treatment works land apply (excluding direct reuse) treated wastewater? ___ Yes __X__ No

If 'yes," provide the following for each land application site:

Location _____

Number of acres _____ Annual average daily volume applied to site _____ mgd

Frequency of application _____

d. Does the treatment works discharge or transport treated or untreated wastewater to another treatment works?

__X__ Yes _____ No

If 'yes,' describe the means by which the wastewater from the treatment works is discharged or transported to the other treatment works (e.g., tank truck, pipe).
We have a Interconnect W/City of Goodyear with the future potential to sell effluent to COG.

If transport is by a party other than the applicant, provide the following:

Transporter name _____

Mailing address _____

_____

Contact person _____

Title _____ Phone number _____

For each treatment works that receives this discharge, provide the following:

Name _____

Mailing address _____

_____

Contact person _____

Title _____ Phone number _____

If known, provide the NPDES/AZPDES permit number of the treatment works that receives this discharge

_____

Provide the average daily flow rate from the treatment works into the receiving facility. _____ mgd

e. Does the treatment works discharge or dispose of its wastewater in a manner not included in A.8.a through A.8.d above. (e.g., underground recharge, well injection)? _____ Yes __X__ No

If 'yes," provide the following for each disposal method:

Description of method (including location and size of site(s) if applicable): _____

_____

_____

Annual average daily volume disposed by this method _____ mgd Frequency of disposal _____

WASTEWATER OUTFALLS.

Copy this page and complete Items A.12, and A.13 ***once for every outfall through which effluent is discharged, or is proposed to be, discharged*** *to a wash or other water of the U.S.*

A.12. Description of Outfall.

a. Outfall number 1

b. Location RID Canal

City or town Goodyear County Maricopa

State AZ Zip code 85338

Latitude 33 ° 28 ' 44 " N Longitude 112 ° 22 ' 30 " W

Township 2N Range 1W Section 29

c. Distance from shore, if applicable N/A ft.

d. Depth below surface, if applicable N/A ft.

e. Average daily discharge flow through outfall 2.0 mgd. (Determine this by dividing the annual discharge through the outfall by the number of days in a year that discharge occurs.)

f. Is/will discharge from this outfall be _____ continuous or X Intermittent/periodic?

If discharge is or is expected to be intermittent or periodic, describe the discharge pattern below. Include 1) the number of times per year the facility is expected to discharge under the terms of the AZPDES permit, 2) the frequency of discharge, 3) the average duration of each discharge, 4) the flow per period of discharge in MGD and 5) include the months over which discharge is typically expected. Estimations are acceptable for this information.

One time per year - Dec, Jan, Feb, Mar, continuous duration, flow of 2 MGD or 50% of plant effluent (amount estimated as not needed by Golf Courses).

g. Is the outfall equipped designed to, or equipped with a device, to mix and/or disperse the effluent in the receiving water? _____ Yes X No

A.13. Description of Receiving Waters. (Fill in all blanks. Put 'not known' if applicable.)

a. Name of receiving waters RID Canal

b. Name of watershed, if known Middle Gila

U.S. Natural Resources Conservation Service 14 digit watershed code, if known Unknown

c. Name of River Basin, if known Gila River

d. United States Geological Survey 8 digit hydrologic cataloging unit code, if known Unknown

e. Critical low flow of receiving stream, if applicable. acute N/A cfs chronic N/A cfs

f. Total hardness of receiving stream at critical low flow, if applicable. N/A mg/l of $CaCO_3$

A.14. Description of WWTP Treatment.

a. What levels of treatment are provided? Check all that apply.

_____ Primary _____ Secondary X Advanced (with filtration)

Other (Describe) _____

b. Indicate the following removal rates, as applicable:

Design BOD_5 removal or design $CBOD_5$ removal	95	%
Design SS removal	95	%
Design P removal	95	%
Design N removal	95	%
Other _____		%
Other _____		%

c. What type of disinfection is used for the effluent? If disinfection varies by season, please describe.

Ultra Violet

If disinfection is by chlorination, is dechlorination used for this outfall? _____ Yes _____ No

d. Does the treatment plant have post aeration? _____ Yes __X__ No

e. Provide a topographic map extending at least one mile beyond property boundaries of the treatment plant that shows the location of the plant and the outfall(s). {Note Part B of this application requires additional detail on the map for facilities with a design flow >100,000 gpd.] (see attached map)

f. Provide a process flow diagram or schematic of the treatment plant and include a brief description. Depict any areas where the sewage sludge produced by the treatment works is stored, treated or disposed of, if applicable. {Note Part B of this application requires additional process detail for facilities with a design flow >100,000 gpd.] (see attached diagram and narrative)

A.15. Effluent Testing. All applicants are to provide effluent testing data for the following parameters if the WWTP is operational. Provide the effluent testing results for discharges from the facility or data from representative samples of the effluent if the facility is not yet discharging. For plants not yet constructed, provide an estimate based on the design or on similar plants and indicate 'estimated' in the Number of Samples column.

All information reported must be based on data analyzed using 40 CFR 136 methods for wastewater samples by a laboratory certified in Arizona to use those methods. If no 136 methods exist, any other method approved for analyses of the parameters in 9 A.A.C. 14, Article 6 may be used. In addition, all data must comply with QA/QC requirements per 40 CFR 136 and/or 9 A.A.C. 14, Article 6. ***Note: Effluent data collected under the facility's aquifer protection or reuse permit is also required to be reported if it is representative of the effluent and meets these requirements.***

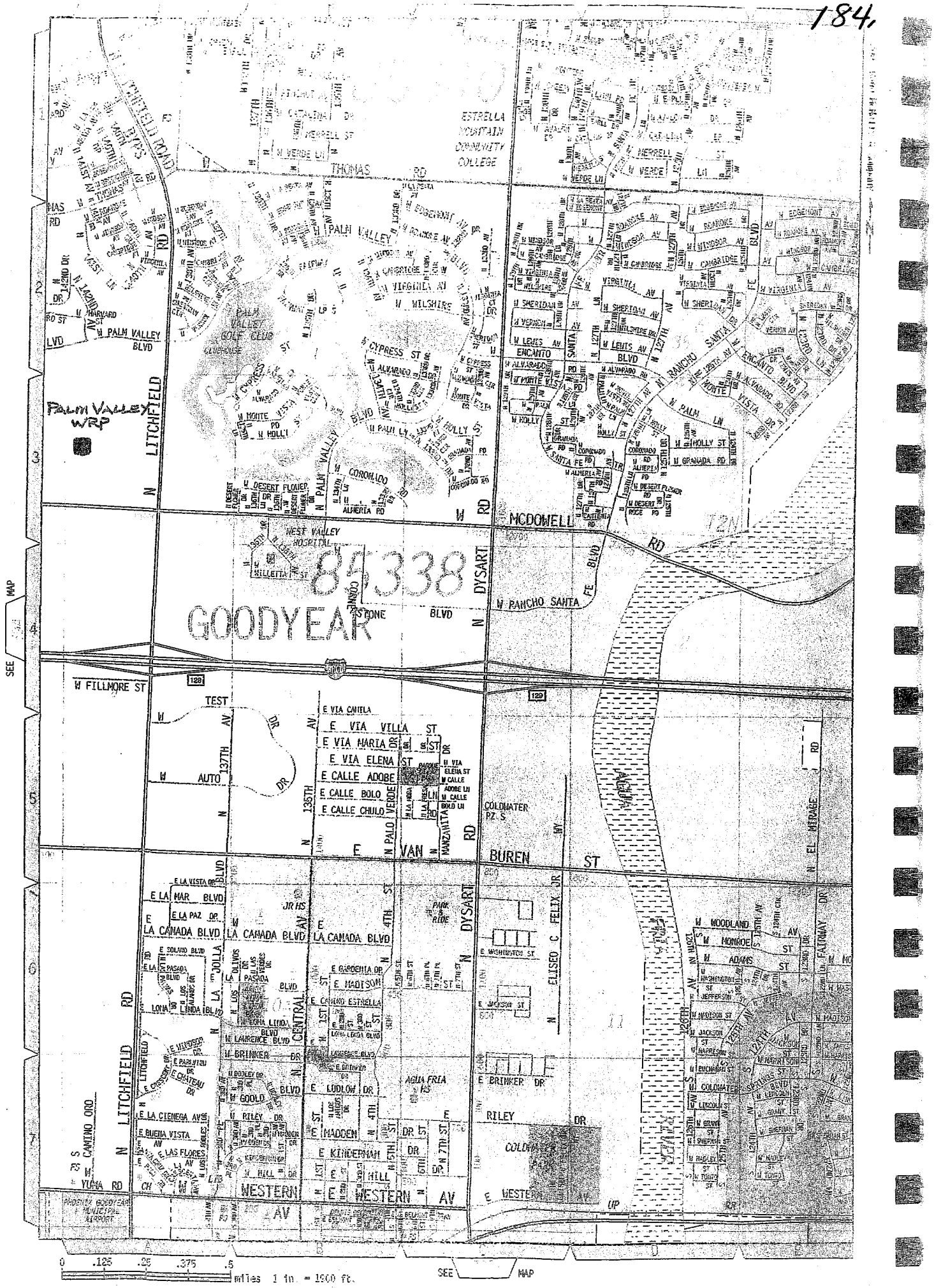
All effluent testing data collected over the last 4.5 years is to be included in the response. (If data was collected at a frequency of monthly or greater for any parameter, you are only required to summarize at least the last year.) If data can be tabulated and made available electronically, ADEQ requests submission in this format. **Laboratory sheets supporting any Table 3 and Table 4 data are also to be submitted.** If you are collecting data solely to support this application, a minimum of 3 sampling events must be submitted. You are to provide seasonally representative samples when possible.

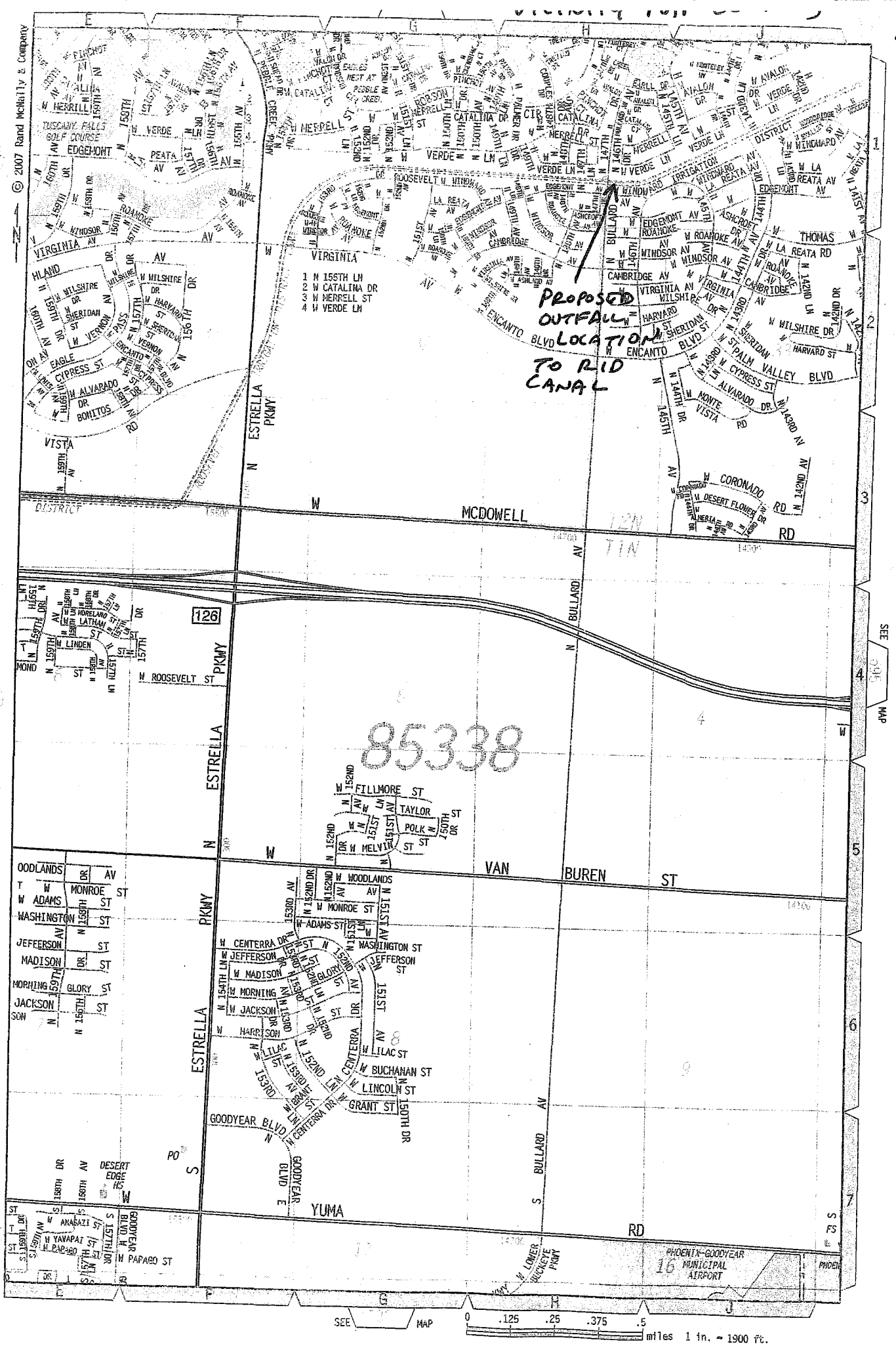
If the facility may discharge through several outfalls and there are different treatment trains, different wastewater sources, or other sources of variation in the effluent from one outfall to another, you must provide data for each outfall.

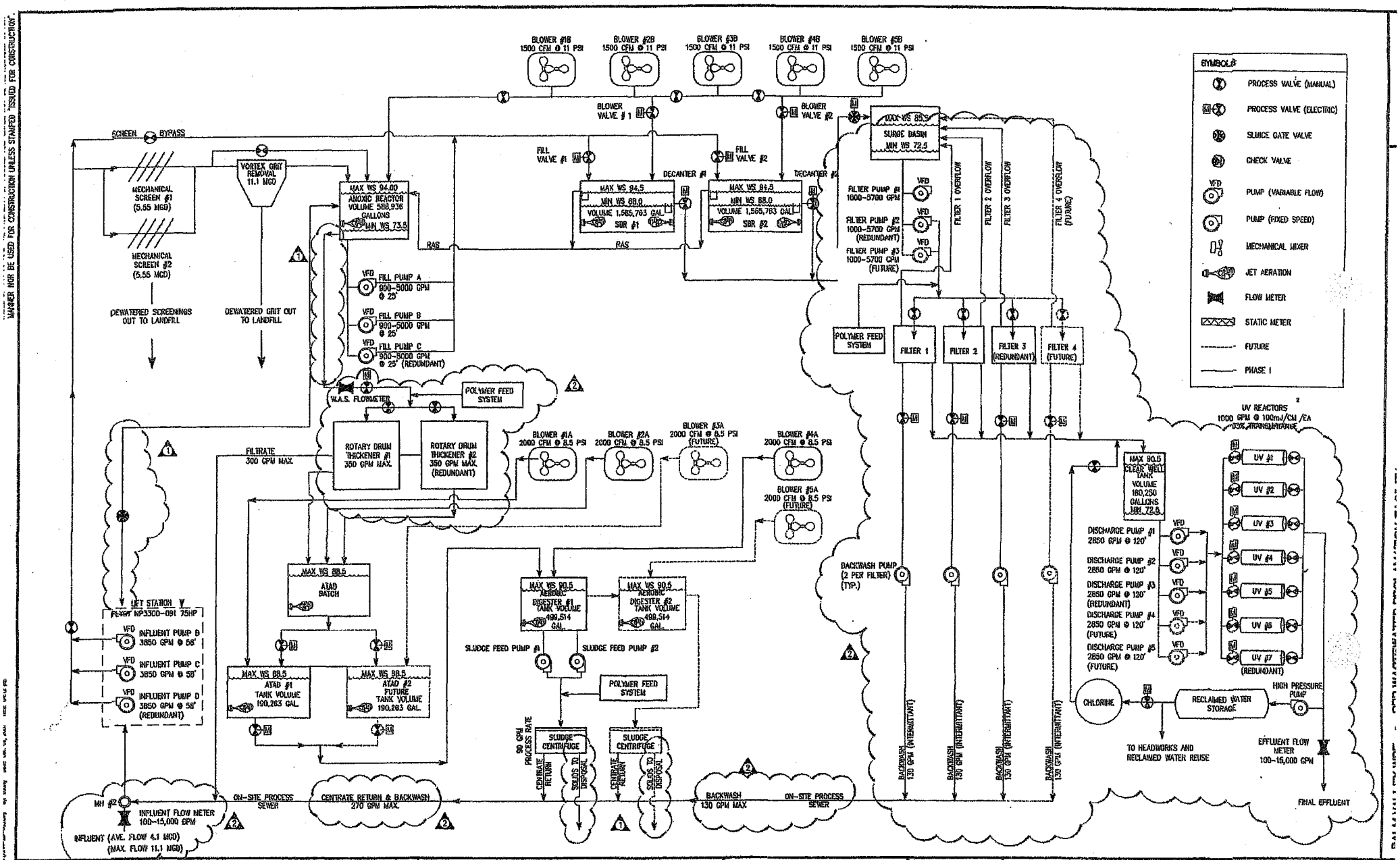
⇒ ***IT IS IMPORTANT THAT YOU REPORT THE DATA USING THE CORRECT UNITS! PLEASE RE-CHECK THE UNITS THE LABORATORY REPORTED.***

Indicate the timeframe covered by the following data 1/01/05 to 1/31/07

TABLE 1 PARAMETERS	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE		Number of Samples
	Value	Units	Value	Units	
pH (minimum) *	6.8	s.u.			700
pH (maximum)*	8.3	s.u.			700
Flow Rate	8	MGD	4	MGD	365
Temperature (Oct.-Mar.)	30	Deg. C	29	Deg. C	700
Temperature (Apr.-Sep.)	31	Deg. C	28	Deg. C	700
* For pH please report a minimum and a maximum daily value.					


PALM VALLEY WRP
GOODYEAR
84338
ESTRELLA MOUNTAIN COMMUNITY COLLEGE
PALM VALLEY GOLF CLUB CLUBHOUSE
WEST VALLEY HOSPITAL
PHOENIX GOODYEAR MUNICIPAL AIRPORT
AGUA FRIA HS
JR HS
PARK & RIDE
COLDWATER PZ S
COLDWATER
THOMAS RD
PALM VALLEY BLVD
MCDOWELL RD
W PANCHO SANTA FE BLVD
N LITCHFIELD RD
N DYSART RD
W FILLMORE ST
W AUTO DR
E VIA VILLA ST
E VIA MARIA DR
E VIA ELENA ST
E CALLE ADOBE
E CALLE BOLO
E CALLE CHULO VERDE
N PALO VERDE
MANZANITA RD
E VAN BUREN ST
E LA MAR BLVD
E LA PAZ DR
E LA CANADA BLVD
N LA JOLLA RD
N CENTRAL AV
E MADISON
E CAMINO ESTRELLA
E LUDLOW DR
E GOOLD BLVD
E RILEY DR
E MADDEN DR
E KINDERMAN DR
E HILL DR
E WESTERN AV
N 4TH ST
N 7TH ST
N 127TH AV
N 135TH AV
N 136TH DR
N 137TH AV
N ELISEO C FELIX DR
E BRINKER DR
E WASHINGTON ST
E JACKSON ST
W WOODLAND AV
W MONROE ST
W ADAMS ST
W JACKSON ST
W MADISON ST
W COLDWATER SPRINGS BLVD
W LINCOLN ST
W GRANT ST
W SHERMAN ST
W TONTO ST
N EL MIRAGE RD
N FAIRWAY DR
S CAMINO ORO
YUMA RD
W PALM VALLEY BLVD
W CYPRESS ST
W MONTE VISTA BLVD
W PALM LN
W HOLLY ST
W GRANADA RD
W CORONADO RD
W ALVARADO RD
W ALMERIA RD
W DESERT FLOWER RD
W CAMELBACK RD
W ENCANTO BLVD
W LEWIS AV
W SHERIDAN AV
W VERNON AV
W VIRGINIA AV
W WILSHIRE DR
W CAMBRIDGE AV
W WINDSOR AV
W ROANOKE AV
W EDGEMONT AV
W HARVARD ST
W MERRELL ST
W VERDE LN
W CATALINA DR
SEE MAP
SEE MAP
0 .125 .25 .375 .5
miles 1 in. = 1900 ft.


© 2007 Rand McNally & Company
1 N 155TH LN
2 W CATALINA DR
3 W MERRELL ST
4 W VERDE LN
PROPOSED OUTFALL LOCATION TO RID CANAL
85338
N ESTRELLA PKWY
W MCDOWELL RD
BULLARD AV
W VAN BUREN ST
S ESTRELLA PKWY
GOODYEAR BLVD
S BULLARD AV
W YUMA RD
PHOENIX-GOODYEAR 16 MUNICIPAL AIRPORT
SEE MAP
0 .125 .25 .375 .5 miles 1 in. = 1900 ft.



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2	DD	10/02/01	REVISED TO REFLECT THE RECONFIGURATION OF EQUIPMENT		
1	DD	05/24/01	REVISED PER COUNTY COMMENTS DATED 05/17/01		

JOB

PALM VALLEY WRF
SBR WASTEWATER RECLAMATION FACILITY

GOODYEAR AZ

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17802 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-5734 FAX 843-4922

PREPARED BY JAMES A. MATTHEWS PROJECT ENGINEER AZ #34020
REG. NO. ---
EXP. 06/30/02
DRAWN DAD/RM
SCALE NONE
DESIGNER JAM
CHECKED
DATE 12/27/00

FIGURE 3
PROCESS FLOW SCHEMATIC

SHEET G3 OF 5 SHE
JOB NO. 724

1 of 2

Indicate the timeframe covered by the following data _____

TABLE 2 PARAMETERS	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					LAB METHOD	Indicate highest detection levels
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	# of Samples		
CONVENTIONAL & NONCONVENTIONAL COMPOUNDS.											
AMMONIA (as N)	12.3	mg/L	821	lbs	1.5	mg/L	50	lbs	700		
BIOCHEMICAL OXYGEN DEMAND **or** CBOD, 5-Day											
CHLORINE, TOTAL RESIDUAL (TRC)											
DISSOLVED OXYGEN											
E-coli (Fecal coliform if not available)	400	CFU/mL							89		
TOTAL SUSPENDED SOLIDS (TSS)	15	mg/L	1001	lbs	5	mg/L	167		700		
TOTAL KJELDAHL NITROGEN (TKN)											
NITRATE PLUS NITRITE NITROGEN	0.73	mg/L	48.7	lbs					6		
OIL and GREASE											
PHOSPHORUS (Total)											
TOTAL DISSOLVED SOLIDS (TDS)											

Indicate the timeframe covered by the following data _____

TABLE 3 POLLUTANTS	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					LAB METHOD	Indicate highest detection levels
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	# of Samples		
METALS (TOTAL RECOVERABLE), CYANIDE, PHENOLS AND HARDNESS											
ANTIMONY	0.003	mg/L	0.20	lbs					4		
ARSENIC	0.045	mg/L	2.7	lbs					3		
BERYLLIUM	<0.002	mg/L	<0.13	lbs					4		
CADMIUM	<0.002	mg/L	<0.13	lbs					4		
CHROMIUM	<0.01	mg/L	<0.67	lbs					4		
CHROMIUM VI											
COPPER											
LEAD	<0.002	mg/L	<0.13	lbs.					4		
MERCURY	<0.0002	mg/L	<0.02	lbs					4		
NICKEL	<0.02	mg/L	<0.13	lbs					4		
SELENIUM	<0.002	mg/L	<0.13	lbs					4		

SILVER											
THALLIUM	<0.001	mg/L	<0.067	lbs					4		
ZINC											
CYANIDE	<0.0097	mg/L	<6.5						2		
TOTAL PHENOLIC COMPOUNDS											
HARDNESS (AS $CaCO_3$)											

Describe the sampling point(s) where effluent was collected at the facility to obtain the data in Tables 1-3:
Final plant clear well.

Detail HOW the samples were collected (i.e., manual, automatic sampler) and composited (when applicable. i.e., 8 samples taken hourly over 8 hours, 4 samples taken over 24 hours, etc.):
Manual grab samples.

⇒ ***REMEMBER TO ATTACH TABULATED DATA AND LABORATORY SHEETS!***

PART B. ADDITIONAL INFORMATION FOR WWTPs WITH A DESIGN FLOW GREATER THAN OR EQUAL TO 0.1 MGD (100,000 gallons per day)

⇒ ***All applicants with a design flow rate greater than or equal to 0.1 mgd must complete Items B.1 through B.6. All others go to Part C).***

B.1. Inflow and Infiltration (I &I). Estimate the average number of gallons per day that flow into the treatment works from inflow and/or infiltration. <50,000 gpd

Infiltration *is the water entering a sewer system, including sewer service connections, from the ground, through such means as, but not limited to defective pipes, pipe joints, connections, or manhole walls. Infiltration does not include, and is distinguished from, inflow.*

Inflow *is the water discharged into a sewer system, including service connections, from such sources as, but not limited to, roof leaders, cellar, yard, and area drains, foundation drains, cooling-water discharges, drains from springs and swampy areas, manhole covers, cross connections from storm sewers and combined sewers, catch basins, storm waters, surface runoff, street wash waters, or drainage. Inflow does not include, and is distinguished from, infiltration.*

I & I *means the total quantity of water from both infiltration and inflow without distinguishing the source.*

Briefly explain any steps underway or planned to minimize inflow and infiltration.

Construction of Equalization Basin, Sewer Maintenance,

B.2. Detailed Topographic Map. Show the following on the topographic map submitted pursuant to Item A.14.e (You may submit more than one map if one map does not show the entire area.)

a. The outline of the facility and the area surrounding the treatment plant, including all unit processes. (see attached drawings)

b. The major pipes or other structures through which wastewater enters the treatment works and the pipes or other structures through which treated wastewater is discharged from the treatment plant. Include outfalls from bypass piping, if applicable. (see attached drawings)

c. Each well where wastewater from the treatment plant is injected underground, if applicable. (N/A)

d. Wells, including drinking water wells, springs and other surface water bodies listed in public records or otherwise known to the applicant that are located within 1/4 mile of the discharge points or outfalls. (N/A)

e. If the treatment works receives waste that is classified as hazardous under the Resource Conservation and Recovery Act (RCRA) by truck, rail or dedicated pipe, show on the map where that hazardous waste enters the treatment works and where it is treated, stored and/or disposed.

B.3. Detailed Process Flow Diagram or Schematic. Show the following on the process flow diagram or schematic of the treatment works submitted pursuant to Item A.14.f.

a. All bypass piping

b. All backup power sources or redundancy in the system.

c. A water balance showing all treatment units, including disinfection (e.g., chlorination and dechlorination), daily average flow rates at influent and discharge points and approximate daily flow rates between treatment units.

d. A brief narrative description of the diagram.

B.4. Operation/Maintenance Performed by Contractor(s). Are any operational or maintenance aspects (other than those performed by the operator listed under Item A.2) of the treatment works the responsibility of a contractor?

_____ Yes __X__ No

If yes, list the name, address and telephone number of each contractor and describe the contractor's responsibilities. Attach additional pages if necessary.

Name _____

Mailing address _____

_____

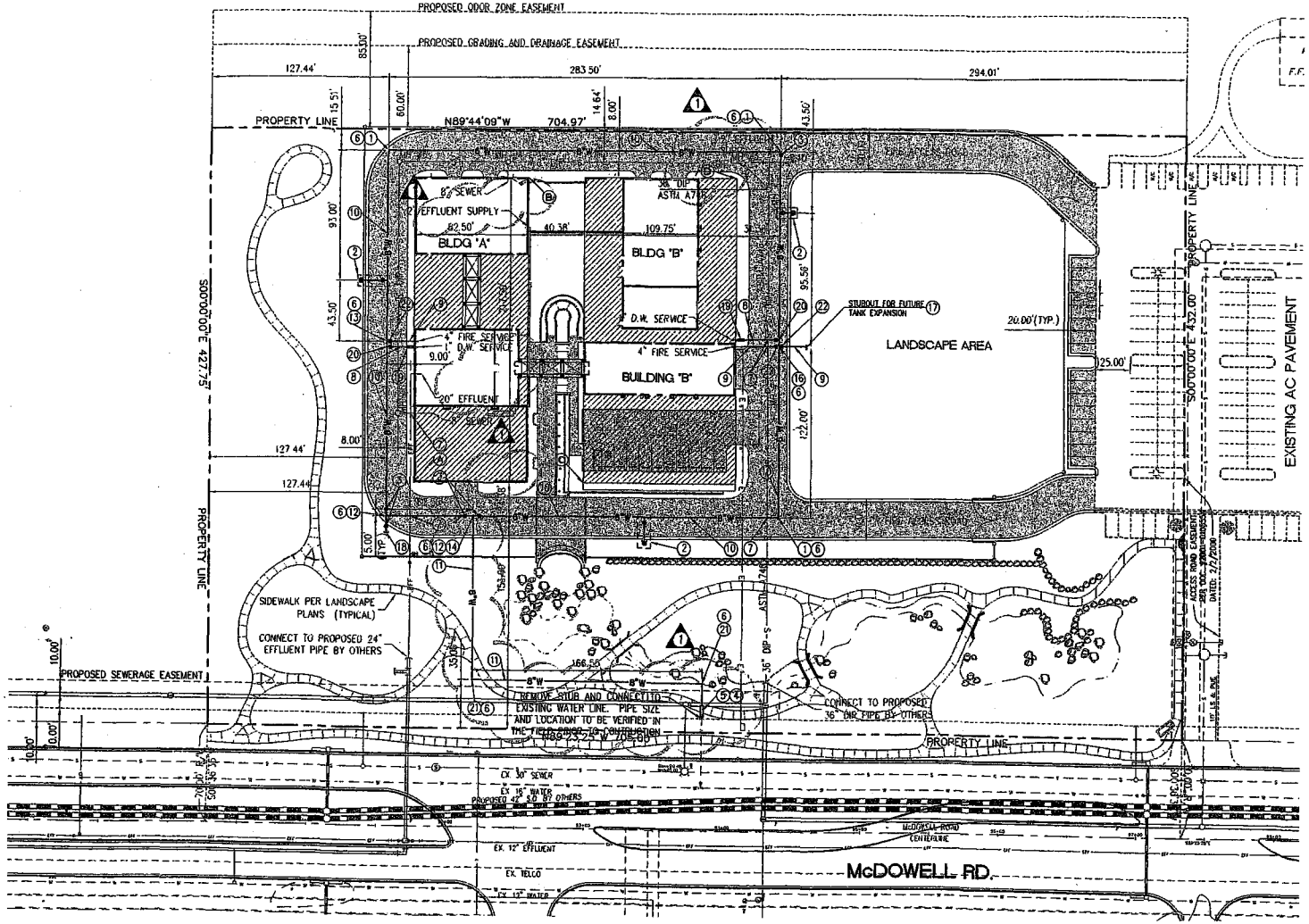
Telephone number _____

Responsibilities of contractor _____

B.5. Scheduled Improvements and Schedules of Implementation. Provide a schedule on plans for implementing improvements that will affect the wastewater treatment, effluent quality or design capacity of the treatment works. If the treatment works has several different implementation schedules or is planning several improvements, submit separate responses to Item B.5 for each. Expansion of plant capacity from 4 MGD to 8 MGD.

a. List the outfall number (assigned in Item A.12) for each outfall that is covered by this implementation schedule. None

b. Indicate whether the planned improvements or their implementation schedule are required by local, state or federal agencies. _____ Yes ___X___ No



CONSTRUCTION NOTES AND QUANTITIES

①	INSTALL 6" D.I. 90° ELBOW	3 EA.
②	INSTALL 6" FIRE HYDRANT ASSEMBLY PER COG STD. DETAIL G-3330	3 EA.
③	INSTALL 6" VALVE PER MAG STD. DETAIL 301 WITH BOX COVER & DEBRIS CAP PER COG STANDARD DETAILS G-3320-2 & G-3321 TYPE "A"	5 EA.
④	INSTALL 8" REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY PER COG STD. DETAIL G-3351	1 EA.
⑤	INSTALL 6" COMPOUND WATER METER PER COG STD. DETAIL G-3313	1 EA.
⑥	CONSTRUCT THRUST BLOCK PER MAG STD. DETAIL 380	10 EA.
⑦	CONSTRUCT WATER AND SANITARY SEWER SEPARATION / PROTECTION PER MAG STD. DETAIL 404	4 EA.
⑧	INSTALL 1" COPPER WATER LINE	10 L.F.
⑨	INSTALL 4" D.I.P. WATER LINE	86 L.F.
⑩	INSTALL 6" PVC (C900) WATER LINE	1,120 L.F.
⑪	INSTALL 8" PVC (C900) WATER LINE	144 L.F.
⑫	INSTALL 6" X 6" X 6" TEE	2 EA.
⑬	INSTALL 6" X 6" X 4" FLG. OUTLET TEE	1 EA.
⑭	INSTALL 8" X 6" D.I. REDUCER	1 EA.
⑮	NOT USED	
⑯	INSTALL 6" X 4" D.I. FLG OUTLET CROSS	1 EA.
⑰	INSTALL 4" D.I. CAP	1 EA.
⑱	INSTALL 6" D.I. CAP	1 EA.
⑲	INSTALL 1" REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY PER COG STD. DETAIL G-3354	1 EA.
⑳	INSTALL 1" WATER SERVICE CONNECTION PER COG STD. DETAIL G-3310	2 EA.
㉑	INSTALL 8" D.I. 90° ELBOW	2 EA.
㉒	INSTALL 4" VALVE PER MAG STD. DETAIL 301 WITH BOX COVER & DEBRIS CAP PER COG STANDARD DETAILS G-3320-2 & G-3321 TYPE "A"	2 EA.

NOTE TO CONTRACTOR

1. ALL CONSTRUCTION WORK SHALL BE PERFORMED IN ACCORDANCE WITH CITY OF GOODYEAR AND M.A.G. STANDARDS.
2. UTILITY APPROXIMATE LOCATION PROVIDED BY OTHERS. CONTRACTOR TO FIELD VERIFY ALL UTILITIES PRIOR TO START OF CONSTRUCTION.
3. THE ABOVE LISTED QUANTITIES ARE FOR BONDING AND ESTIMATING PURPOSES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR COMPUTING HIS OWN QUANTITIES FOR CONTRACT PURPOSES.

LEGEND

- PROP. A.C. PAVEMENT
- PROP. CONCRETE PAVEMENT
- PROP. DECORATIVE CONCRETE PER LANDSCAPE PLANS
- PROP. UNDERGROUND TANK

The working days before you dig CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT

BUILDING COORDINATES			
##	NORTHING	EASTING	DESCRIPTION
(A)	50215.24	52915.45	POINT OF COMPLIANCE
(B)	50433.04	52997.95	NE CORNER OF DIGESTER
(C)	50215.42	53038.33	SW CORNER OF SBRS
(D)	50433.17	53148.08	NE CORNER OF SBRS

NORTH
40 20 0 40 80

00 05/22/01 REVISE PER COUNTY COMMENTS DATED 05/17/01

JOB
PALM VALLEY WRF
SBR WASTEWATER
RECLAMATION FACILITY
GOODYEAR AZ

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17902 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-5734 FAX 842-4893

PREPARED BY
JAMES A. MATTHEWS
PROJECT ENGINEER
R.C.E. NO. — AZ #34090
EXP. 09/30/02
DRAWN DAO/JDM/NK
DESIGNED SOS/JDM
CHECKED
SCALE 1" = 40'
DATE

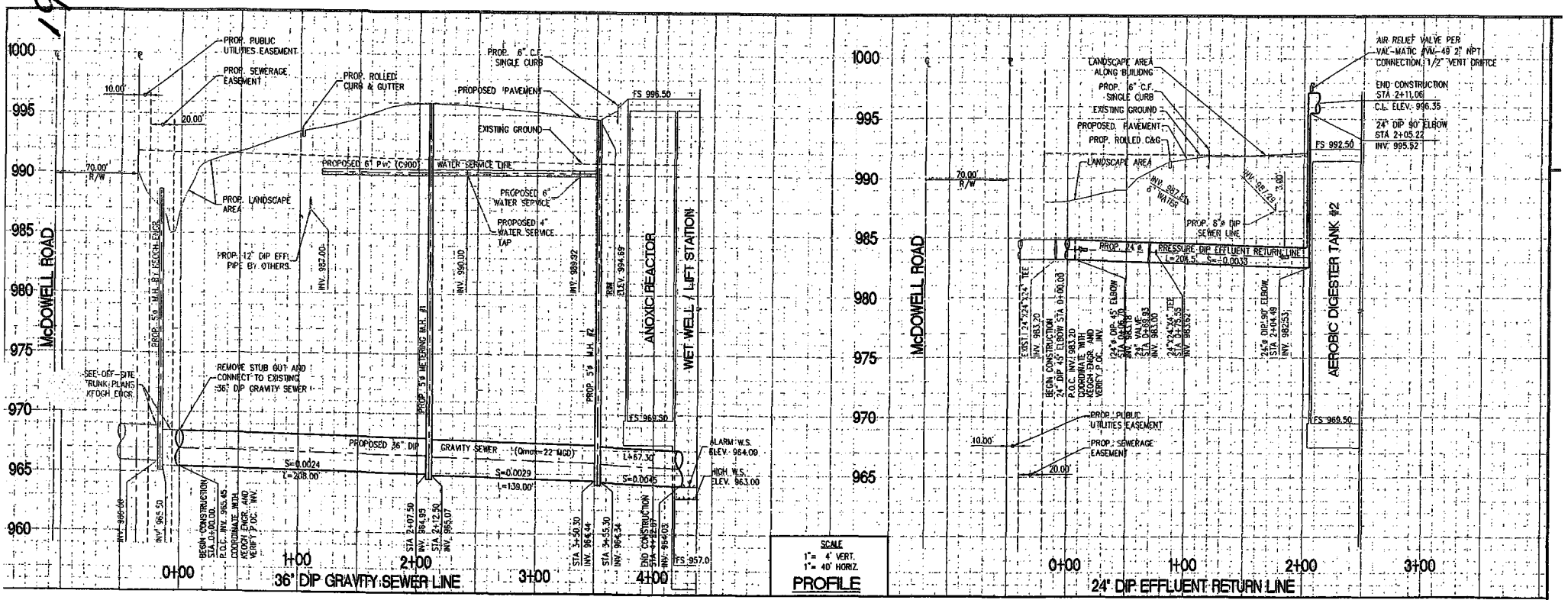
REGISTERED PROFESSIONAL ENGINEER 34090 JAMES A. MATTHEWS 10-31-01 ARIZONA, U.S.A.

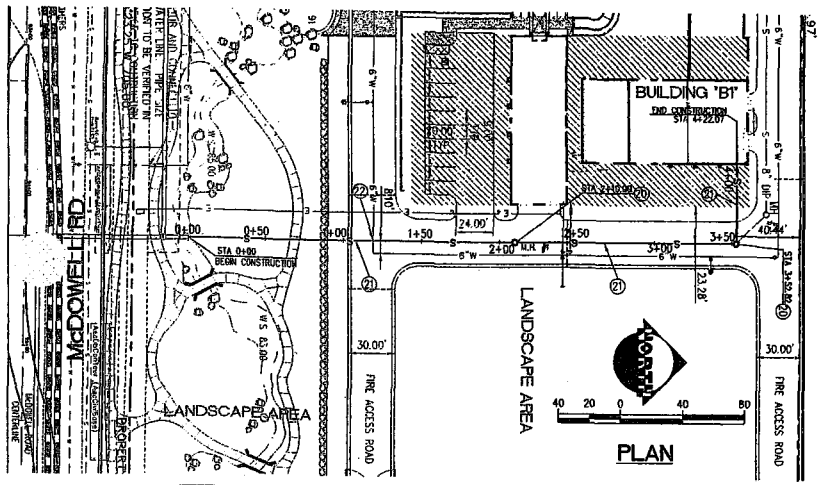
TREATMENT PLANT
WATER & FIRE LINE
LAYOUT

SHEET C2 OF 4 SH

MANNER NOR BE USED FOR CONSTRUCTION UNLESS STAMPED "ISSUED FOR CONSTRUCTION".

V:\PROJECTS\7244-GOODYEAR\7244-GRADING\7244-GRADING.DWG 05/22/01 10:10:09 am





CONSTRUCTION NOTES AND QUANTITIES

24" EFFLUENT RETURN

(9)	INSTALL 4" FLG. X M.J. VALVE PER MAG STD. DETAIL 340	2 E.A.
(10)	INSTALL 24" FLG. X M.J. VALVE PER MAG STD. DETAIL 340	2 E.A.
(11)	INSTALL 24" DIP EFFLUENT LINE	236 L.F.
(12)	INSTALL 24" X 24" X 4" FLG. OUTLET TEE	1 E.A.
(13)	INSTALL 24" D.I. 90° ELBOW	2 E.A.
(14)	CONSTRUCT WATER AND SANITARY SEWER SEPARATION / PROTECTION PER MAG STD. DETAIL 404	2 E.A.
(15)	CONSTRUCT THRUST BLOCK PER MAG STD. DETAIL 380	1 E.A.
(16)	INSTALL 4" STUBOUT AND CAP PER MAG STD. DETAIL 427	1 E.A.

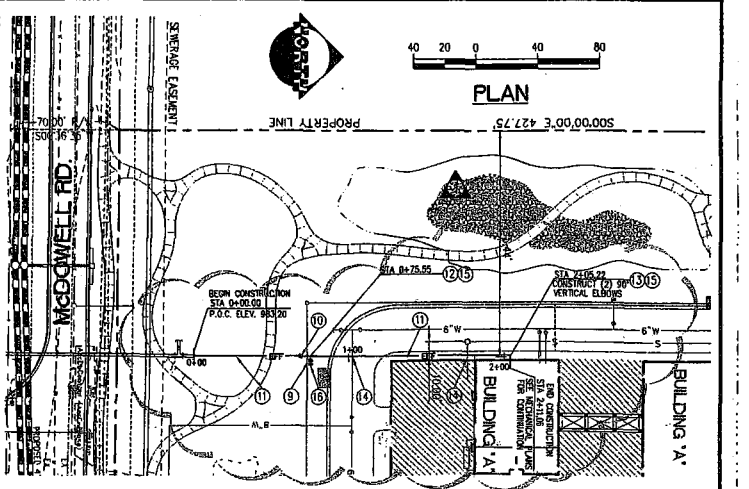
36" GRAVITY SEWER

(20)	CONSTRUCT 5' DIAMETER MANHOLE PER MAG STD. DETAIL 422	2 E.A.
(21)	INSTALL 36" D.I.P. SEWER LINE	414 L.F.
(22)	CONSTRUCT WATER AND SANITARY SEWER SEPARATION / PROTECTION PER MAG STD. DETAIL 404	2 E.A.

LEGEND

- PROPOSED A.C. PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- PROPOSED UNDERGROUND TANK

Two working days before you dig CALL FOR THE RIGHT SERVICE 263-1100 Arizona Blue Stake Center CALL COLLECT



NO	BY	DATE	
1	JDM	5/22/01	PROP. 12"ø EFFLUENT LINE PLAN & PROFILE REMOVED. PROP. 30"ø EFFLUENT LINE PLAN & PROFILE ADDED. REVISED PER COUNTY COMMENTS DATED 3/17/01. RELOCATE EFFLUENT POINT OF CONNECTION.

JOB

PALM VALLEY WRF
SBR WASTEWATER RECLAMATION FACILITY

GOODYEAR AZ

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17802 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-9734 FAX. 843-4922

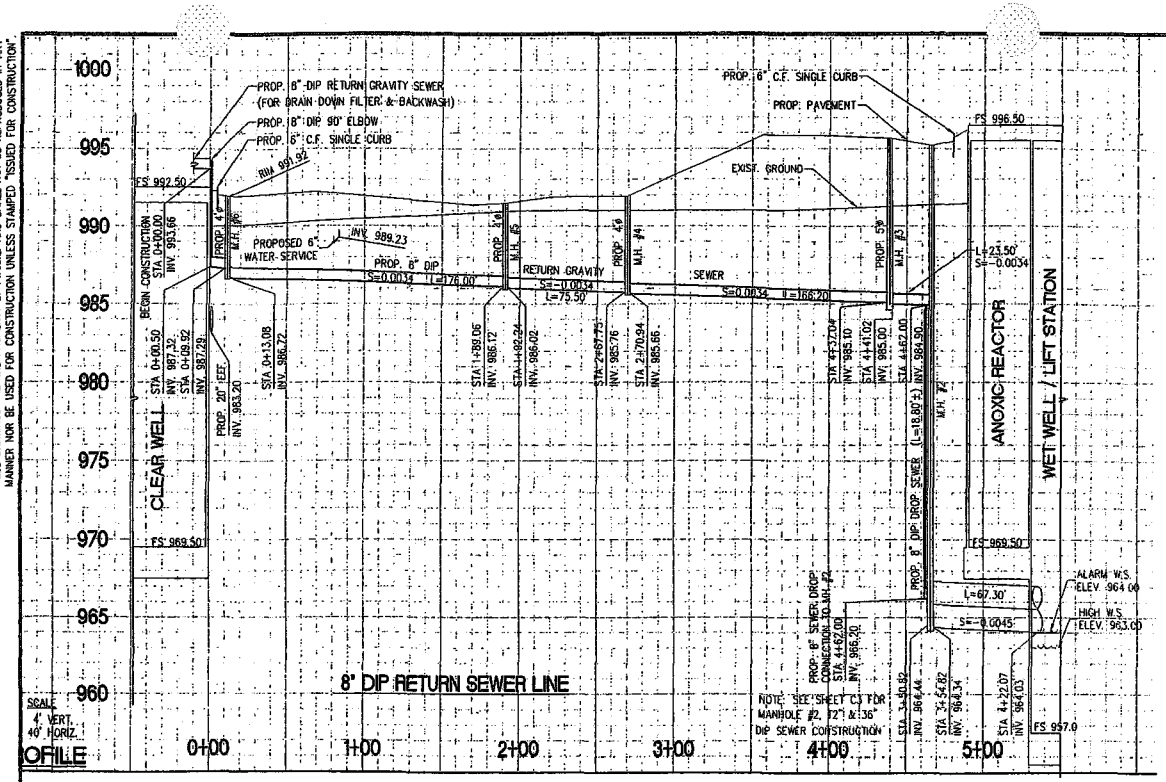
PREPARED BY
JAMES A. MATTHEWS
PROJECT ENGINEER
R.C.E. NO. --- AZ #34090
EXP. 09/30/02

DRAWN	SCALE
DAD/JDM/NK	AS SHOWN
DESIGNED	
SOS/JDM	
CHECKED	DATE

34090 JAMES A. MATTHEWS REGISTERED PROFESSIONAL ENGINEER ARIZONA, U.S.A.

TREATMENT PLANT 36" GRAVITY SEWER & 24" EFFLUENT RETURN PLAN AND PROFILE

SHEET G3 OF 4 SHEETS



8" DIP RETURN SEWER LINE

SCALE
4' VERT.
40' HORIZ.

OFILE

NOTE: SEE SHEET C3 FOR MANHOLE #2, 72" & 136" DIP SEWER CONSTRUCTION

CONSTRUCTION NOTES AND QUANTITIES

(20) CONSTRUCT 4' ø MANHOLE PER MAG STD. DETAIL 422 ..... 2 E.A.
(20) CONSTRUCT 5' ø MANHOLE PER MAG STD. DETAIL 422 ..... 1E.A.
(21) INSTALL 8" DIP SEWER PIPE ..... 478 L.F.
(22) CONSTRUCT DROP SEWER CONNECTION PER MAG STD. DETAIL 426 TYPE "B" ..... 1 E.A.
(23) INSTALL 8" D.I. 90° ELBOW (VERTICAL) ..... 2 E.A.
(25) CONSTRUCT WATER AND SANITARY SEWER SEPARATION / PROTECTION PER MAG STD. DETAIL 404 (RESTRAINED JOINT ON 8" D.I.P. SS FITTINGS) ..... 2 E.A.

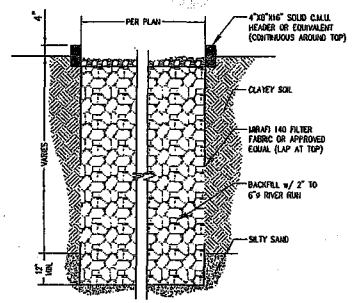
NOTE TO CONTRACTOR

ALL CONSTRUCTION WORK SHALL BE PERFORMED IN ACCORDANCE WITH CITY OF GOODYEAR AND M.A.G. STANDARDS.

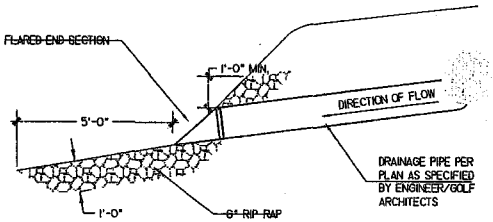
Two working days before you dig CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center DIAL COLLECT

LEGEND

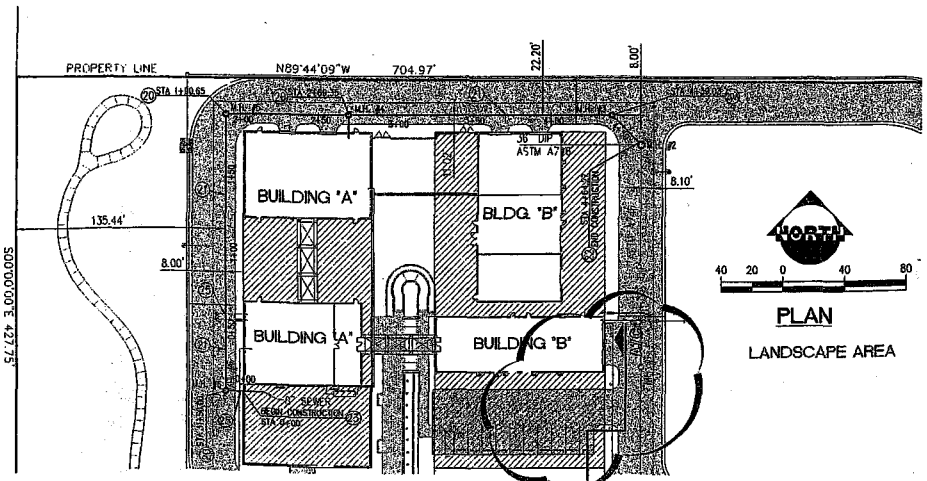
- PROPOSED A.C. PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- PROPOSED UNDERGROUND TANK



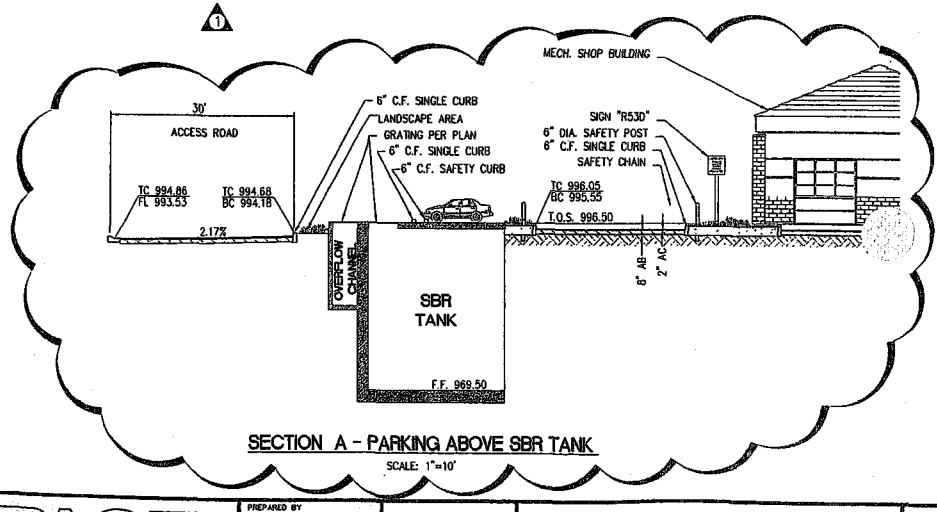
SEEPAGE PIE DETAIL
SCALE: 1/12"=1'



PIPE OUTLET DETAIL
SCALE: 1/12"=1'



PLAN
LANDSCAPE AREA



SECTION A - PARKING ABOVE SBR TANK
SCALE: 1"=10'

4	
3	
2	
1	05/22/01 REVISE PER COUNTY COMMENTS DATED 05/17/01

JOB

PALM VALLEY WRF
SBR WASTEWATER RECLAMATION FACILITY

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17902 GEORGETOWN LANE

PREPARED BY
JAMES A. MATTHEWS
PROJECT ENGINEER
R.E.P. NO. --- AZ #34090
EXP. 09/30/02
DRAWN DAD/JDM/NK
SCALE AS SHOWN
DESIGNED SOS/JDM

34090 JAMES A. MATTHEWS Registered Professional Engineer ARIZONA U.S.A.

TREATMENT PLANT 8" DIP RETURN GRAVITY SEWER PLAN AND PROFILE

SHEE
C4
OF 4 SH

193

THESE DRAWINGS AND THE PROJECT IT IS PREPARED FOR ARE COPYRIGHTED AND SHALL NOT BE REPRODUCED IN ANY MANNER NOR BE USED FOR CONSTRUCTION UNLESS STAMPED "ISSUED FOR CONSTRUCTION".

J:\7244-25-dsk-208.dwg 7244-addmap.dwg 7244-plan&prof.dwg 7244-plan&prof-blank.dwg 7244-sbr-details.dwg 7244-STRUCT.dwg 7244-MECH-PLAN.dwg
By: sonny Date: Oct. 10, 2001 Time: 08:12 pm

c. Briefly describe the improvements to be made for the outfall (s) listed in Item B.5.a and include new maximum daily flow rate, if applicable.

_____

d. Provide dates imposed by any compliance schedule or planned independently of local, state or federal agencies. Also provide any actual dates of completion for the implementation steps listed below, as applicable. Indicate dates as accurately as possible. Place an (*) in front of the improvements required by a governmental agency. N/A

Schedule

Implementation Stage	Planned or Imposed MM/DD/YYYY	Actual Completion MM/DD/YYYY
- Begin construction	_____	_____
- End construction	_____	_____
- Begin discharge	_____	_____
- Attain operational level	_____	_____

e. Have appropriate permits/clearances concerning other federal/state requirements been obtained?
_____ Yes _____ No

Describe briefly _____

PART C. EFFLUENT CHARACTERIZATION TESTING for Organics

Effluent Characterization Testing: All applicants for a treatment works listed below (except those not yet constructed), must provide effluent testing data for the following parameters:

1. A design flow greater than or equal to 1.0 mgd
2. The treatment works has or is required to have, a pretreatment program
3. The treatment works is or was required to collect such data under a prior NPDES or AZPDES permit, or
4. The treatment works have the results of such testing due to requirements under an Aquifer Protection Permit,

Provide the effluent testing results for discharges from the facility or representative samples of the effluent if the facility is not yet discharging. If data can be tabulated and made available electronically, ADEQ requests submission in this format.

All information reported must be based on data analyzed using 40 CFR 136 methods for wastewater samples by a laboratory certified in Arizona to use those methods. In addition, this data must comply with QA/QC requirements per 9 A.A.C. 14, Article 6 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 9 A.A.C. 14, Article 6. Effluent testing data collected over the last 4.5 years is to be included in the response. If data can be tabulated and made available electronically, ADEQ requests submission in this format. If you are collecting data solely to support this application, **a minimum of 3 sampling events** must be submitted. You are to provide seasonally representative samples when possible.

If the facility may discharge through several outfalls and there is a different treatment train, different wastewater sources, or other reason for potential variation in the effluent from one outfall to another, you must provide data for each outfall.

TABLE 4 POLLUTANTS	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					LAB METHOD	Indicate highest detection levels
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	# of Samples		
VOLATILE ORGANIC COMPOUNDS											
ACROLEIN											
ACRYLONTRILE											
BENZENE	<0.002	mg/L	<0.13	lbs					1		
BROMOFORM											
CARBON TETRACHLORIDE	<0.002	mg/L	<0.13	lbs					1		
CHLOROBENZENE											
CHLORODIBROMO-METHANE	<0.002	mg/L	<0.13	lbs					1		
CHLOROETHANE	<0.002	mg/L	<0.13	lbs					1		
2-CHLORO-ETHYLVINYL ETHER											
CHLOROFORM											
DICHLOROBROMO-METHANE											
1,1-DICHLOROETHANE											
1,2-DICHLRORETHANE											
TRANS-1,2-DICHLOROETHYLENE											
1,1-DICHLOROETHYLENE	<0.002	mg/L	<0.13	lbs					1		
1,2-DICHLOROPROPANE											
1,3-DICHLOROPROPYLENE											
ETHYLBENZENE											
METHYL BROMIDE											
METHYL CHLORIDE											
METHYLENE CHLORIDE											
1,1,2,2-TETRACHLOROETHANE											
TETRACHLORO-ETHYLENE											
TOLUENE											
1,1,1-TRICHLOROETHANE	<0.002	mg/L	<0.13	lbs					1		
1,1,2-TRICHLOROETHANE	<0.002	mg/L	<0.13	lbs					1		
TRICHLOROETHYLENE	<0.002	mg/L	<0.13	lbs					1		
VINYL CHLORIDE	<0.002	mg/L	<0.13	lbs					1		

TABLE 4 POLLUTANTS	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					LAB METHOD	Indicate highest detection levels
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	# of Samples		
P-CHLORO-M-CRESOL											
2-CHLOROPHENOL											
2,4-DICHLOROPHENOL											
2,4-DIMETHYLPHENOL											
4,6-DINITRO-O-CRESOL											
2,4-DINITROPHENOL											
2-NITROPHENOL											
4-NITROPHENOL											
PENTACHLOROPHENOL											
PHENOL											
2,4,6-TRICHLOROPHENOL											
ACENAPHTHENE											
ACENAPHTHYLENE											
ANTHRACENE											
BENZIDINE											
BENZO(A)ANTHRACENE											
BENZO(A)PYRENE											
3,4-BENZOFLUORANTHENE											
BENZO(GHI)PERYLENE											
BENZO(K)FLUORANTHENE											
BIS(2-CHLOROETHOXY) METHANE											
BIS(2-CHLOROETHYL) ETHER											
BIS (2-CHLOROISO-PROPYL) ETHER											
BIS(2-ETHYLHEXYL) PHTHALATE											
4-BROMOPHENYL PHENYL ETHER											
BUTYL BENZYL PHTHALATE											
2-CHLORONAPHTHALENE											
4-CHLOROPHENYL PHENYL ETHER											
CHRYSENE											

TABLE 4 POLLUTANTS	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					LAB METHOD	Indicate highest detection levels
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	# of Samples		
DI-N-BUTYL PHTHALATE											
DI-N-OCTYL PHTHALATE											
DIBENZO(A,H) ANTHRACENE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
3,3-DICHLOROBENZIDINE											
DIETHYL PHTHALATE											
DIMETHYL PHTHALATE											
2,4 –DINITROTOLUENE											
2,6-DINITROTOLUENE											
1,2-DIPHENYLHYDRAZINE											
FLUORANTHENE											
FLUORENE											
HEXACHLOROBENZENE											
HEXACHLOROBUTADIENE											
HEXACHLOROCYCLO-PENTADIENE											
HEXACHLOROETHANE											
INDENO(1,2,3-CD) PYRENE											
ISOPHORONE											
NAPHTHALENE											
NITROBENZENE											
N-NITROSODI-N-PROPYLAMINE											
N-NITROSODI-METHYLAMINE											
N-NITROSODI-PHENYLAMINE											
PHENANTHRENE											
PYRENE											
1,2,4-TRICHLOROBENZENE											

Part D. Expanded Effluent Testing Data

⇒ ***PER R18-9-A905 and 40 CFR 122.21(j) (4)(iv), YOU ARE ALSO TO TEST YOUR EFFLUENT FOR ANY OTHER SURFACE WATER QUALITY STANDARD APPLICABLE TO YOUR RECEIVING WATER AS INDICATED IN AAC 18-11, ARTICLE 1. PLEASE ATTACH THIS DATA TO YOUR APPLICATION.***

PART E. TOXICITY TESTING DATA

NONE

E. Toxicity Testing. All applicants for a treatment works (except those not yet constructed), must provide the results of whole effluent toxicity (WET) tests for acute and/or chronic toxicity for each of the facility's discharge points.

1. A design flow greater than or equal to 1.0 mgd,
2. The treatment works has or is required to have, a pretreatment program, or
3. The treatment works is or was required to collect such data under a current AZPDES or AZPDES permit.

⇒ Applicants completing Part E must submit **ALL** WET data acquired during the past 4.5 years. For facilities with a design flow greater than or equal to 1.0 MGD or that have been designated as a "Major" by the permitting authority, these results must include at least four (4) quarterly tests for a 12-month period within the past 1 year, or the results from four (4) tests performed at least annually in the four and one-half years prior to the application. All WET tests conducted must use multiple species (2 species for acute and 3 species for chronic) unless otherwise specified in an active AZPDES permit. All information reported must be based on data collected through analyses conducted by a laboratory licensed by ADHS to conduct WET testing using 40 CFR 136 methods for wastewater samples. In addition, this data must comply with QA/QC requirements of 9 A.A.C. 14, Article 6 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 9 A.A.C. 14, Article 6.

⇒ If a WET test conducted during the past four and one-half years revealed toxicity, provide any information on the cause of the toxicity or any results of a toxicity reduction evaluation, if one was conducted.

E.1. Number of Tests.
Indicate the number of whole effluent toxicity tests conducted in the past four and one-half years.
_____ chronic _____ acute

E.2. Individual Test Data. Complete the following chart for each whole effluent toxicity test conducted in the last four and one-half years for which the applicant has not previously submitted a full WET report to ADEQ. Complete one column for each species that was used in the test. (A single WET 'test' consists of 2-3 species). Copy and complete the following table for each WET test performed. In lieu of completing this chart for WET reports previously not submitted, the applicant may opt to submit full WET reports with this application.

WET TEST NUMBER _____

Test species and Test Method Number			
a. Test information.			
Outfall number (or indicate other representative location where sample was collected)			
Date and time sample collected			
Date and time test started			
Date and time test ended			
Manual title			
Edition number and year of publication			
b. Give the sample collection method(s) used. For multiple grab samples, indicate the number of grab samples used. For composite samples, indicate the length of the compositing period.			
x-hour composite / Grab			
c. Indicate where the sample was taken in relation to disinfection. Check all that apply for each.			
Before disinfection			
After disinfection			
After dechlorination			
Was the effluent sample dechlorinated at the lab?			
d. Describe the point in the treatment process at which the sample was collected.			

e. Indicate whether the test was intended to assess chronic toxicity, acute toxicity or both.			
Chronic / Acute / or Both			
f. Indicate the type of test performed.			
Static / Static-renewal / Flow-through			
g. Source of dilution water. If laboratory water, specify type; if receiving water, specify source.			
Laboratory water /Receiving water			
h. Give the dilution series used.			
i. Parameters measured during the test. State whether parameter meets test method specifications.			
Ph			
Salinity			
Temperature			
Ammonia			
Dissolved oxygen			
j. Test results.			
Acute:			
Percent test species survival in 100% effluent			
LC_{50}			
95% Confidence Interval.			
Control percent survival			
Significant difference from control?			
Chronic:			
Survival NOEC			
Growth/ reproduction NOEC			
Survival IC_{25}			
Growth/ reproduction IC_{25}			
Control percent survival			

% biostimulatory effect (algae)			
k. Quality Control/Quality Assurance.			
Was reference toxicant test within acceptable bounds?			
What date was reference toxicant test run (WW/DD/YYYY)?			
Did effluent samples arrive at the lab between 0 - 6°C?			
Were all test acceptability criteria met?			
List the effluent test PMSD			
l. Additional Controls / Test Alterations			
Describe any deviations from normal testing conditions such as pH control, ammonia removal, dechlorination.			

E.3 Toxicity Reduction Evaluation. Is the treatment works involved in a Toxicity Reduction Evaluation?

_____ Yes __X__ No If yes, describe. _____

_____

E.4 Summary of Submitted WET Test Information. If you have previously submitted WET test information or information regarding the cause of toxicity to ADEQ within the past four and one-half years, provide a summary of the results for each WET report previously submitted. Each WET test summary should include the outfall #, sample collection dates, test dates, test methods used, species tested, and the test results. All endpoints given in the WET reports should be listed in these summaries.

Date(s) submitted _____ (MM/DD/YYYY)

Summary of results (see instructions). You may wish to attach a separate table summarizing your test results:

None

PART F. INDUSTRIAL USER DISCHARGES & Wastes from Remedial Activities

F.1. Industrial User Discharges and RCRA/CERCLA Wastes. Does the treatment works accept process wastewater from any significant industrial user (SIU) or receive RCRA, CERCLA, or other remediation wastes (including WQARF or UST remediations)?

___ Yes __X__ No. If 'yes,' complete the rest of Part E. If 'no,' skip to Part F.

An SIU is defined as:

1. *An industrial user subject to Categorical Pretreatment Standards under 40 Code of Federal Regulations (CFR) Part 403.6 and 40 CFR Chapter I, Subchapter N (see instructions); and*
2. *Any other industrial user that:*
   a. *Discharges an average of 25,000 gallons per day or more of process wastewater to the treatment works (excluding sanitary, non-contact cooling and boiler blowdown wastewater); or*
   b. *Contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the treatment works; or*
   c. *Is designated as an SIU by the control authority as defined in 40 CFR Part 403.12(a).*

F.2. Pretreatment Program. Does the treatment works have or is it subject to, an approved pretreatment program?

____ Yes __X__ No

F.3. Number of Significant Industrial Users (SIUs). Provide the number of each of the following types of SIUs that discharge to the treatment works.

a. Number of non-categorical SIUs 0

b. Number of categorical SIUs 0

c. Total number of SIUs 0

Supply the following information for each SIU. If more than one SIU discharges to the treatment works, copy question E.3 through E.9 and provide the information required for each SIU.

F.4. Significant Industrial User Information. Provide the name and address of each SIU discharging to the treatment works. Submit additional pages as necessary.

Name N/A

Mailing address _____

_____

F.5. Industrial Processes. Describe all of the industrial processes that affect or contribute to the SIU's discharge.

_____

_____

F.6. Principal Product(s) and Raw Material(s). List principal products that the SIU generates and the raw materials used to manufacture them.

Principal product(s) _____

Raw material(s) _____

F.7. Flow Rate.

a. Process wastewater flow rate. Indicate the average daily volume of process wastewater discharged into the collection system in gallons per day (gpd) and whether the discharge is continuous or intermittent.

_____ gpd (_____ continuous or _____ intermittent)

b. Non-process wastewater flow rate. Indicate the average daily volume of non-process wastewater flow discharged into the collection system in gallons per day (gpd) and whether the discharge is continuous or intermittent. _____ gpd (_____ continuous or _____ intermittent)

F.8. Pretreatment Standards. Indicate whether the SIU is subject to the following:

a. Local limits _____ Yes _____ No

b. Categorical pretreatment standards _____ Yes _____ No

If subject to categorical pretreatment standards, which category and subcategory?
N/A

F.9. Problems at the Treatment Works Attributed to Waste Discharged by the SIU. Has the SIU caused or contributed to any problems (e.g., upsets, interference) at the treatment works in the past three years?

_____ Yes __X__ No If 'yes," describe each episode: _____

F.10. RCRA Waste. Does the treatment works receive or has it in the past three years, received **RCRA Hazardous Waste by truck, rail or dedicated pipe**?

_____ Yes __X__ No (if 'no,' go to F.12)

F.11. Waste Transport. Method by which RCRA waste is received. *Check all that apply.*

_____ Truck _____ Rail _____ Dedicated Pipe

F.12. Waste Description. Give EPA hazardous waste number and amount (volume or mass, specify units).

EPA Hazardous Waste Number	Amount	Units

F.13. Remediation Waste. Does the treatment works (or has it been notified that in the next five years it will) receive waste from **CERCLA (SUPERFUND) wastewater, RCRA OR WQARF REMEDIATION/CORRECTIVE ACTION wastewater or OTHER REMEDIAL activities?**

_____ Yes (complete E.13 through F.15) __X__ No

Provide a list of sites and the required information (E.14 - E.16) for each current and future site.

F.14. Waste Origin. Describe the site and type of facility at which the CERCLA/RCRA/or other remedial waste originates (or is expected to originate in the next five years). Also, provide the EPA identification number if one exists.
N/A

F.15. Pollutants. List the hazardous constituents that are received (or are expect to be received). Include data on volume and concentration, if known. Attach additional sheets as necessary.
N/A

F.16. Waste Treatment.

a. Is this waste treated (or will it be treated) prior to entering the treatment works?

_____ Yes _____ No

If 'yes,' describe the treatment (provide information about the removal efficiency):

N/A

b. Is the discharge (or will the discharge be) continuous or intermittent?

_____ Continuous _____ Intermittent If intermittent, describe discharge schedule

N/A

PART G. COMBINED SEWER SYSTEMS

G. Does the treatment works have a combined sewer system? _____ Yes ___X_ No If 'no' skip to Part G.

G.1. System Map. Provide a map indicating the following (may be included with Basic Application Information).

a. All CSO discharge points.

b. Sensitive use areas potentially affected by CSOs (e.g., beaches, drinking water supplies, shellfish beds, sensitive aquatic ecosystems and outstanding natural resource waters).

c. Waters that support threatened and endangered species potentially affected by CSOs.

G.2. System Diagram. Provide a diagram, either in the map provided in F.1 or on a separate drawing, of the combined sewer collection system that includes the following information:

a. Locations of major sewer trunk lines, both combined and separate sanitary.

b. Locations of points where separate sanitary sewers feed into the combined sewer system.

c. Locations of in-line and off-line storage structures.

d. Locations of flow-regulating devices, and pump stations.

CSO OUTFALLS- *Complete questions F.3 through F.6 once for each CSO discharge point.*

G.3. Description of Outfall.

a. Outfall number _____

b. Location _____

City/County _____

State/Zip Code _____

Latitude _____ ° _____ ' _____ " N Longitude _____ ° _____ ' _____ " W

c. Distance from shore, if applicable _____ ft.

d. Depth below surface, if applicable _____ ft.

e. Which of the following were monitored during the last year for this CSO?

_____ Rainfall _____ CSO pollutant concentrations _____ CSO frequency

_____ CSO flow volume _____ Receiving water quality

f. How many storm events were monitored during the last year? _____

G.4. CSO Events

a. Give the number of CSO events in the last year. _____ events (____actual or _____ approximate)

b. Give the average duration per CSO event. _____ hours (_____actual or _____ approximate)

c. Give the average volume per CSO event. _____ million gallons (___actual or ___ approximate)

d. Give the minimum rainfall that caused a CSO event in the last year. _____ inches of rainfall.

G.5. Description of Receiving Waters.

a. Name of receiving waters _____

b. Name of watershed _____

U.S. NRCS 14-digit watershed code, if known: _____

c. Name of River Basin _____

G.6. CSO Operations. Describe any known water quality impacts on the receiving water caused by this CSO (e.g., permanent or intermittent beach closings, permanent or intermittent shellfish bed closings, fish kills, fish advisories, other recreational loss or violation of any applicable State water quality standards).

_____

_____

_____

PART H. CERTIFICATION

All applicants must complete the Certification. Federal Regulations are specific concerning application signatories. The application may not be signed by a consultant. **Refer to instructions to determine who is authorized to sign this certification.** By signing this certification statement, applicants confirm that they have reviewed this Form 2A and attachments for accuracy, and have completed all parts that apply to the facility.

ALL APPLICANTS MUST COMPLETE THE FOLLOWING CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and Official Title Matthew Garlick, Operations Manager

Signature Matthew E. Garlick Date Signed 8/14/07

Telephone Number (623) 935-9361

⇒ ***Upon request of the ADEQ, you must submit any other information necessary to assess wastewater treatment practices at the treatment works to identify appropriate permitting requirements.***

⇒ ***REMEMBER TO ALSO SUBMIT AS APPLICABLE:***

- ☑ Form 2S (all facilities)
- ☐ Anti-degradation information
- ☐ Mixing Zone information
- ☐ Information supporting requests for variances under R11-18-122
- ☐ Photodocumentation, reports, ambient monitoring, or other information required by special conditions in your existing AZPDES/NPDES permit.

205.

MCBRIDE ENGINEERING SOLUTIONS, INC.
7305 W. Boston Street
Chandler, AZ 85226

Principal
Brian P. McBride, P.E.

December 12, 2007

William Kenning, P.E.
Maricopa County Environmental Services Department
1001 N. Central Ave, Suite150
Phoenix, Arizona 85004

Re: Palm Valley WRF Upgrades Approval To Construct Application
ATC Application – Phase 5 Tertiary Pumping Capacity Increase

Dear Mr. Kenning:

Please find below a summary of Phase 5 for the Palm Valley WRF Upgrades. Phase 5 consists of increasing the pumping capacity of the tertiary treatment systems.

1.0 Introduction

The existing tertiary treatment systems at the Palm Valley WRF consists of a surge tank, filter feed pumps, filters, clear well, effluent pumps, and UV disinfection. The surge tank receives the effluent from the two existing SBR tanks. The surge tank allows the SBR effluent to be equalized before continuing to the tertiary treatment systems. Vertical turbine pumps then pump the effluent from the surge tank to one of three disk filters. The effluent from the filters then drops down into the clear well. Vertical turbine pumps then pump the effluent through the UV disinfection system and then to the effluent disposal system. The UV disinfection system was upgraded as part of the project. The UV system now consists of two new treatment trains (each train with a capacity of 5 MGD) and 4 existing UV units (each with a capacity of 1.44 MGD).

The Palm Valley WRF currently has a treatment capacity of 4.1 MGD with a peak day factor of 2.0. The existing tertiary treatment system is sized to handle the peak day flow of 8.2 MGD. As a part of this project, the treatment capacity of the WRF will be increased to a total of 5.0 MGD with a peak day flow of 10.0 MGD. The UV disinfection system has already been upgraded as part of this project. This phase of the project will upgrade the filter feed and effluent pumping capacity to a total capacity of 10.0 MGD with the largest pump out of service.

2.0 New Filter Feed and Effluent Pump

There are two existing vertical turbine filter feed pumps that draw secondary effluent from the surge tank and discharge to the three filters. Each pump has a capacity of 8.2 million gallons per day (MGD). Only one pump is in operation while the other pump serves as a standby unit. One new vertical turbine pump will be added as part of this phase of the project. The new pump will have a capacity of 2 MGD to give a firm pumping capacity of 10.2 MGD with the largest pump out of service.

There are three existing vertical turbine effluent pumps that draw effluent from the clear well and pump it through the UV disinfection system and to the effluent disposal system. Each pump has a capacity of 4.1 million gallons per day (MGD). Only one pump is in operation while the other pump serves as a standby unit. One new vertical turbine pump will be added as part of this phase of the project. The new pump will have a capacity of 2 MGD to give a firm pumping capacity of 10.2 MGD with the largest pump out of service.

206.

12/12/2007

The layout of the new vertical turbine pumps are shown in the attached drawing. The manufacturer's shop drawing submittal is also attached to this permit application.

If you have any questions regarding this project, please feel free to contact me.

Sincerely,

Brian P. McBride, P.E.
Principal
McBride Engineering Solutions, Inc.

cc: Tom Nichols, Algonquin Water Services

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MCBRIDE ENGINEERING SOLUTIONS, INC.
7305 W. Boston Street
Chandler, AZ 85226

Principal
Brian P. McBride, P.E.

December 14, 2007

William Kenning, P.E.
Maricopa County Environmental Services Department
1001 N. Central Ave, Suite150
Phoenix, Arizona 85004

Re: Palm Valley WRF Upgrades Approval To Construct Application
ATC Application – Phase 7 Conversion of Digesters to a SBR

Dear Mr. Kenning:

Please find below a summary of Phase 7 for the Palm Valley WRF Upgrades. Phase 7 consists of converting the two digester tanks to one new sequencing batch reactor (SBR), and upgrading the controls for the existing SBR system.

1.0 Introduction

The current treatment capacity of the Palm Valley WRF is 4.1 million gallons per day (MGD). Raw influent comes into the influent pump station where it is pumped through screens and grit removal and discharged into an anoxic tank. The biological and nutrient removal portion of the process consists of an anoxic tank and two SBR tanks. The plant has two digester tanks, of which only one is currently in use.

This phase of the project will convert the two digesters tanks into one SBR tank to provide an additional 0.95 MGD of treatment capacity. Also as part of this phase, the controls and control strategy of the existing SBR process will be upgraded to give the operators increased flexibility. The anoxic tank will be converted into a flow equalization tank.

The attached design drawings show the proposed modifications to convert the two existing digesters into a SBR tank. The manufacturer's (Jet Tech) shop drawing is also attached which has details on the equipment being supplied, design calculations, and a control strategy description. Details of the proposed changes are provided in the following sections

2.0 Digester to SBR Conversion

The two existing digester tanks will be converted into one SBR tank. The existing jet aeration system and motive pump will be removed out of the digester currently in use. Holes will be core drilled in the wall separating the two tanks to hydraulically connect the two tanks to convert them into one SBR tank. As part of this process, the existing anoxic tank will be converted to an equalization tank. The conversion is just a change in how it will be utilized, as the equipment in the anoxic tank will remain in place. The anoxic tank has three transfer pumps and one motive pump attached to a jet aeration header. The jet aeration header is used to mix and aerate the tank but is completely plugged and has not been utilized for some time. The anoxic tank currently receives flow from the preliminary treatment system as well as recycle flow from the SBR tanks. The recycle flow occurs when an SBR tank is in a react phase and helps in the nitrification/denitrification process.

The anoxic tank will only receive flow from the preliminary treatment system once the new SBR tank is put in operation and the new control strategy is implemented. The existing SBR tanks will not be allowed to overflow back into the anoxic tank as the nitrification/denitrification process will be completed

in the SBR tank. The transfer pumps will be utilized to fill the three SBR tanks. Only one SBR tank will be in a fill phase at any given time, and there will always be one SBR tank in a fill phase. Switching between the SBR tanks for the fill phase will be accomplished automatically by use of automated valves on each SBR tank fill line. A new pipeline will be provided to the new SBR tank from the existing anoxic zone transfer pump discharge header. The new pipeline will drop down into the new SBR in each of the hydraulically connected tanks. Both locations will be connected to an influent distribution header which will distribute the influent wastewater along the entire length of the header. This allows for a better distribution of the influent wastewater instead of concentrating the entire load in one area of the tank, which is what occurs with the existing SBR fill lines.

The new SBR will have two sets of jet aeration headers and motive pumps in each of the hydraulically connected tanks. This system is similar to the existing SBR tanks but has a back flush system that the existing SBR system does not have. The back flush system will allow the plant operators to reverse the flow through the jet aeration header. This will help keep the jet aeration headers from getting clogged which has been an issue with the existing system. The new SBR will have a submersible waste activated sludge (WAS) pump located in each of the hydraulically connect tanks. The pumps are used to waste excess solids to the solid handling facility which is being converted and upgraded as part of this project, see the Phase 6 application for details. The new SBR will have a DO probe, ORP probe, pH probe, stilling well with level transducer, and a float switch installed in each of the two tanks. The DO and level transducer will be utilized as part of the control set points. The ORP and pH probes will be utilized by the plant operators for information on how the SBR is operating. The float switch will be utilized as a high level emergency back-up if something happens to the level transducer.

A complete description of the control system is included in the attached manufacturer's shop drawing. The control system is a propriety system developed by Jet Tech that gives operators great flexibility in how the SBR system is run. The SBR system can be controlled by any combination of level, time, and DO set points. The control system has a flow proportional system that can automatically adjust set points based on how much flow entered that SBR during that cycle.

The new SBR system has five phases for each batch cycle. The five phases are fill, react, settle, decant, and idle/sludge wasting. A complete cycle will take 6 hours to complete. The fill phase has operator adjustable time set points for anoxic fill, anoxic mixed fill, and aerated fill. For the react phase, operators can adjust the time blowers are cycled on and off, as well as terminate the react cycle based on a maximum DO set point. The operators can set the total time for the settle phase and also the settle preparation time. The settle preparation occurs right after the react phase ends and has the motive pumps continue to run which enhances the settling in the SBR. Decant is not a time phase, it is allowed to continue until the bottom water level is reached or when the maximum decant time set point is reached. The idle is also not a timed phase but is the time from the end of decant until the next cycle begins with the fill phase. Sludge wasting is completed during the idle phase and can be set to occur after each cycle or once per day. The sludge wasting is done during the idle phase to help get a higher solids concentration as the sludge has had a chance to settle and begin to compact. Typical operation will be to waste sludge after every cycle as this will promote wasting at a higher solids concentration. The higher the solids concentration of the sludge that is wasted will result in a decrease in the volume of sludge that has to be processed by the solids handling systems.

The control system also has adjustable set points for the levels that are used to operate the SBR. The top water level (TWL) set point is used to represent a full batch. If the TWL is reached then the fill phase is terminated and the react phase is initiated. The TWL is adjustable for each tank. The emergency top water level (ETWL) is utilized during high flow conditions. If the TWL is reached and there is not another SBR in a decant or idle phase then the tank will remain in the fill cycle until the ETWL is reached to attempt to allow another SBR to get to a decant or idle phase. The ETWL is adjustable for each tank. The bottom water level (BWL) set point is utilized during the decant phase. The SBR will remain in the decant phase until the BWL is reached. The BWL is adjustable for each

tank. The bottom water level lower limit is utilized as an emergency backup to the BWL and is adjustable for each tank.

3.0 Existing SBR Upgrades

The existing SBR system provides minimal flexibility to the plant operators. Both SBR basins have to have the same set points and they do not automatically adjust based on flow changes coming into the plant. The anoxic tank is currently utilized for both flow equalization and also nutrient removal. The existing SBR process control strategy uses a five step sequence consisting of fill, react, settle, decant, and idle. One SBR will be in a fill or react phase while the other tank will be in a settle, decant or idle phase. A cycle begins by pumping wastewater from the anoxic zone to one SBR until that SBR reaches the top water level, the fill phase. The top water level is at the height of the overflow weir back to the anoxic zone. That SBR then begins the interact phase where wastewater from the anoxic zone continues to be pumped into the SBR and is constantly overflowing from the SBR back to the anoxic zone. The motive pumps and blowers are cycled on and off for certain set period of times during the entire fill and interact phases. The anoxic tank continues to fill during this process until it reaches a cycle level set point. Once that set point or the maximum react time set point is reached, the SBR begins the settle phase. The other SBR begins the fill phase at this point. The SBR is in the settle phase for a set amount of time. The SBR then begins the decant phase until the bottom water level set point is reached. After decant, the SBR goes into an idle phase until the anoxic tank has reached the cycle level set point and begins the fill phase again. The existing waste activate sludge (WAS) pump only has a capacity of 250 gallons per minute, which forces the pump to operate during almost the entire settle period. The sludge has not had a chance to settle at this point so the solids concentration of the WAS is only around 0.3 to 0.4 percent. This cause a larger volume of flow to be sent to the solids handling system and also increases the amount of return flow back to the head of the plant. This issue will be dealt with as part of Phase 6 of this project.

The amount of time for the fill and interact phase is dependent on the amount of flow coming into the plant. The time for these phases can vary greatly depending on if the plant is seeing low or high flows. The control strategy for the new SBR, described above, will be utilized for the existing SBR tanks once the upgrades are completed. The amount of time for the fill, react, and settle phase as well as the time for a complete cycle will have set points and the amount of aeration and mixing will be determined based on the amount of flow that enters that particular SBR during the fill phase. The overflow or recycle from the existing SBR tanks during the react phase will not occur anymore when the new control strategy is implemented. The anoxic zone will then be utilized as a true equalization basin to help dampen the peak diurnal flows that are seen everyday at the plant.

If you have any questions regarding this project, please feel free to contact me.

Sincerely,

Brian P. McBride, P.E.
Principal
McBride Engineering Solutions, Inc.

cc: Tom Nichols, Algonquin Water Services

210.

7305 W. Boston Street
CHANDLER, AZ 85226

Transmittal Letter

To: John Matta, P.E.
Waterworks Engineers, Inc
(480)-661-1742

Address: 7949 E. Acoma Drive
Suite 206
Scottsdale, AZ 85260

From: Matt Andros **Date:** 5/2/2008

Re: Palm Valley WRF

☑ For Your Use ☐ For Review ☐ Please Comment ☐ Urgent ☑ File Copy

ITEM	QUANTITY	DESCRIPTION
10	1	*ATC Palm Valley WRF*

Notes:

MCBRIDE ENGINEERING SOLUTIONS, INC.
7305 W. Boston Street
Chandler, AZ 85226

Principal
Brian P. McBride, P.E.

May 2, 2008

William Kenning, P.E.
Maricopa County Environmental Services Department
1001 N. Central Ave, Suite150
Phoenix, Arizona 85004

Re: Palm Valley WRF Upgrades Approval To Construct Application
ATC Application – Phase 4 Influent Screening Upgrades
Phase 8 Headworks Electrical Upgrades

Dear Mr. Kenning:

Please find below a summary of Phase 4 and Phase 8 for the Palm Valley WRF Upgrades. Phase 4 consists of replacing the existing influent screens with new reciprocating stair screens. Phase 8 consists of upgrading the electrical work located in the Headworks building.

1.0 Introduction

The two existing screens have been prone to clogging which has lead to raw influent bypassing the screens completely. This has caused problems in down stream treatment processes and equipment. The existing screens will be removed and replaced with two new reciprocating stair screens.

The Headworks Building is located above the Influent Wet Well and portions of the Anoxic Reactor and SBR tanks. The Headworks Building contains two influent screens, a grit removal system, as well as piping, valves and instrumentation. Some of the existing electrical equipment is in need of repair or replacement. This portion of the project will repair, replace, or relocate selected electrical equipment that was deemed necessary for improvements by the project team. The project team consists of plant staff, Algonquin in-house engineers, consultant engineers (McBride Engineering Solutions and Jensen Engineering), and the construction contractor (D.L. Norton General Contracting).

2.0 Influent Screens Upgrade

There are two existing influent screens located in the Headworks Building. Each screen is a completely packaged system that includes a self cleaning screen surface, spiral solids conveyor, high pressure solids washer, and solids de-watering compactor. Each screen has a weir built into the package that provides for unattended, automatic overflow bypass of the screen. The existing screens have been prone to clogging which has resulted in un-screened influent wastewater to enter the downstream treatment processes. The un-screened wastewater has caused numerous problems in the downstream processes including clogging of the aeration systems and pumps wearing out sooner than expected.

Two new reciprocating stair screen systems will be utilized to replace the existing screens, see attached mechanical drawings and shop drawing submittal from Vulcan Industries. The screens remove debris form the incoming wastewater by means of fixed and movable lamellas. The moveable lamellas direct the debris to a washing press that washes, dewaters, and compacts the screenings. The new screens have an overflow connection that directs the overflow back to the influent pump station. One main control panel will be provided that will be installed in the adjacent blower room. The local controls, motors, and other electrical equipment associated with the screens that will be installed in the Headworks Building will be NEMA 7 rated.

5/2/2008

3.0 Headworks Building Electrical Upgrades

The attached electrical drawings show the work that will be completed as part of the Headworks Building electrical upgrades. The work includes demolition of existing disconnect switches, conduit, wiring, junction boxes, light switches, receptacles, and lighting. The new wiring will be installed with PVC coated RGS sealoffs and conduit. The new junction boxes will be PVC coated RGS boxes or stainless steel NEMA 4X boxes if they do not contain switching or arcing/sparking deices. The new disconnect switches will be NEMA 7 rated. All new lighting fixtures will be internally sealed. All light switches will be installed in PVC coated RGS boxes. The control panel for the grit removal system will be relocated to the adjacent blower room. The existing motor operated valves and toggle type switches will be replaced with new NEMA 7 rated equipment. A gas monitoring system will be provided in the Headworks Building to monitor hydrogen sulfide (H_2S), oxygen (O_2), and combustible gas lower explosive limit (LEL). A strobe light and horn will be provided near the outside of each access door to the Headworks Building. An alarm and horn will also be provided inside the Headworks Building.

If you have any questions regarding this project, please feel free to contact me.

Sincerely,

Brian P. McBride, P.E.
Principal
McBride Engineering Solutions, Inc.

cc: Tom Nichols, Algonquin Water Services

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MCBRIDE ENGINEERING SOLUTIONS, INC.
6100 W Gila Springs Place, Suite 7
Chandler, AZ 85226

Principal
Brian P. McBride, P.E.

May 2, 2008

William Kenning, P.E.
Maricopa County Environmental Services Department
1001 N. Central Ave, Suite150
Phoenix, Arizona 85004

Re: Palm Valley WRF Upgrades Approval To Construct Application
ATC Application – Phase 9 Solids Handling Building Electrical Upgrades

Dear Mr. Kenning:

Please find below a summary of Phase 9 for the Palm Valley WRF Upgrades. Phase 9 consists of upgrading the electrical work located in the Solids Handling Building.

1.0 Introduction

The Solids Handling Building is located above the existing ATAD basins. The Solids Handling Building contains two rotary drum thickeners, a waste activated sludge pump, two sludge suction pumps, one existing centrifuge, one temporary centrifuge, three blowers, as well as piping, valves and instrumentation. Some of the existing electrical equipment is in need of repair or replacement. This portion of the project will repair, replace, or relocate selected electrical equipment that was deemed necessary for improvements by the project team. The project team consists of plant staff, Algonquin in-house engineers, consultant engineers (Jensen Engineering and McBride Engineering Solutions), and the construction contractor (D.L. Norton General Contracting).

2.0 Solids Handling Building Electrical Upgrades

The attached electrical drawings show the work that will be completed as part of the Solids Handling Building electrical upgrades. The work includes demolition of existing disconnect switches, conduit, wiring, junction boxes, centrifuge VFD cabinet, transformer, and lighting. The new wiring will be installed in PVC coated RGS conduit. Conduits entering the tanks below will be installed with a PVC coated sealoff. The new junction boxes will be PVC coated RGS boxes or stainless steel NEMA 4X boxes. The new disconnect switches will be NEMA 4X rated stainless steel. A new NEMA 4X rated cabinet will be supplied to replace the existing centrifuge VFD cabinet. All new lighting fixtures will be suitable for a corrosive rated non-hazardous area.

If you have any questions regarding this project, please feel free to contact me.

Sincerely,

Brian P. McBride, P.E.
Principal
McBride Engineering Solutions, Inc.

cc: Tom Nichols, Algonquin Water Services

214.

Mr. Asif Majeed
Unit Manager, APP and Reuse Unit
1110 W. Washington Street
Phoenix, AZ 85007

Re: APP Amendment Application Permit No. P-100310

Dear Mr. Majeed,

Please find enclosed an APP amendment application for the Palm Valley Water Reclamation Facility located in Goodyear, AZ, operating under APP Permit P-100310.

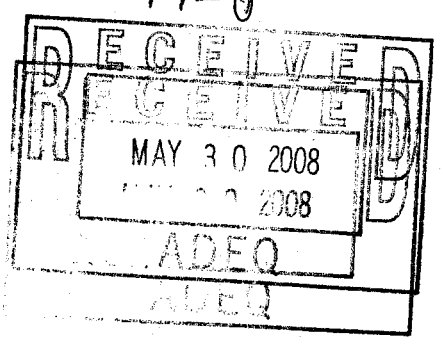
We are seeking an "Other" amendment to cover a maintenance and minor improvements project being presently undertaken at the facility. Problematic equipment or equipment at the end of its useful life is being replaced. In addition, we are installing new equipment units that will provide a higher level redundancy and improve the efficiency of our secondary treatment, tertiary treatment, solids dewatering and odor control processes. A detailed description of each of these improvements is provided in the application and the supporting documentation attached.

Please feel free to contact me at (623) 935. 9367 or via e-mail at Matthew.Garlick@algonquinwater.com with any questions you may have regarding this APP amendment application.

Yours Sincerely,

Matthew Garlick
Business Manager,
Litchfield Park Service Company (LPSCo)

4428



215.

ADEQ Arizona Department of Environmental Quality

AQUIFER PROTECTION PROGRAM PERMIT AMENDMENT FORM

GOOD FAITH ITEMS

1 Applicant [A.A.C. R18-1-503(1)]

(Check One)

☐ Owner ☐ Operator ☒ Owner and Operator

Name: Matthew Garlick | Phone: (623) 935. 9367

Title: Business Manager | Business: Litchfield Park Service Company

Mailing Address: 12725 West Indian School Rd. Ste D 101 | City: Avondale | State: AZ | Zip: 85392

2 Permittee

(Check One) ☐ Owner ☐ Operator ☒ Owner and Operator

Name: Litchfield Park Service Company | Phone: (623) 935. 9367

Title: | Business: Water and Sewer Service Provider

Mailing Address: 12725 West Indian School Road, Ste D 101 | City: Avondale | State: AZ | Zip: 85392

3 Facility Name [A.A.C. R18-1-503(2)]

Facility Name: **Palm Valley Water Reclaimation Facility (WRF)**

4 Authorized Agent [A.A.C. R18-1-503(3)]

☒ Check this box if the person listed below is authorized to act as an "Agent" on behalf of the applicant

Name: Sheba Hafiz, P.E. | Phone: 480.313.8635

Title: Project Manager | Firm Name: WaterWorks Engineers

Mailing Address: 8800 E Chaparral Road, Ste 105 B | City: Scottsdale | State: AZ | Zip: 85250

5 Completed Form [A.A.C. R18-1-503(5)]

☒ I have completed and signed the APP amendment form.

6 Initial Fee [A.A.C. R18-1-503(6) and R18-14-103]

☒ Check this box if an initial fee of $1,000 is attached.

☐ Check this box if no initial fee is required (see instructions)

ADEQ WATER PERMITS
RECEIVED
JUN 03 2008
LTF Application Clerk

GENERAL INFORMATION

7 Permit Number and Issue Date [A.A.C. R18-9-A202(A)(11)]

Aquifer Protection Permit Number: **P-100310**

Issue date of original permit: **July 23, 2001**

Issue date of most recent amendment: **June 13, 2006**

8 Facility Address and Location Information [A.A.C. R18-9-A201(B)(1)]

Address: 14222 McDowell Road

City: Goodyear | State: AZ | Zip: 85338

County: Maricopa

Township: 2N | Range: 1W | Section: 33 ,

Latitude: 33 ° 27 ' 92 " N | Longitude: 112 ° 21 ' 92 " W

1110 WEST WASHINGTON, PHOENIX, AZ 85007
WWW.AZDEQ.GOV

PERMIT AMENDMENT FORM

9 Emergency Contact [A.A.C. R18-9-A202(A)(11)]

Name: Matthew Garlick Phone 623. 935.9367

Certificate of Disclosure [A.A.C. R18-9-A201(B)(2) and A.R.S. § 49-109]

Are you required to file a Certificate of Disclosure? ☐ Yes ☒ No (If yes, please attach)

SPECIFIC AMENDMENT INFORMATION

11 Amendment Description [A.A.C. R18-9-A211(A)(1)]

☒ I have attached an itemized list of all amendment requests with a justification for each request.

12 Design Flow [A.A.C. R18-9-101(13)] ☐ **Not Applicable**

Please provide the design flow in gallons per day for all the discharging facilities located at the Site. Calculations for determining design flow must be attached as part of this application. "Design flow" means the daily flow rate a facility is designed to accommodate on a sustained basis while satisfying all Aquifer Protection Permit discharge limitations and treatment and operational requirements. The design flow either incorporates or is used with appropriate peaking and safety factors to ensure sustained, reliable operation. The design flow will be used to calculate the Annual Registration Fee in accordance with Arizona Revised Statutes § 49-242.

Design Flow **4,100,000** gallons per day

13 Cost Estimates [A.A.C. R18-9-A201(B)(5)] ☐ **Not Applicable**

Description	Cost Estimate
Construction	$ 5,200,000
Operation	$ 300,000
Maintenance	$1,000,000
Closure	N.A
Post-closure	N.A.

I have attached documentation supporting the cost estimates listed above? ☐ Yes (include as attachment)

14 Financial Demonstration [A.A.C. R18-9-A203] ☒ **Not Applicable**

A) I have attached a letter by the Chief Financial Officer stating that the applicant is financially capable of meeting the costs listed in the above item. ☐ Yes (Check if letter attached)

B) For government entities, submit a statement that indicates how the entity is capable of meeting the costs in item 12 above. ☐ Yes (Check if statement attached)

C) For non-government entities, submit the information required for at least one of the financial assurance mechanisms listed below that covers the closure and post-closure costs submitted in item 12, including:

1. The selected financial mechanism or mechanisms;
2. The amount covered by each financial mechanism;
3. The institution or company that is responsible for each financial mechanism used in the demonstration; and
4. Any other details that demonstrate how the applicant is financially capable of meeting the costs described in item 12.

Select Financial Mechanism (Check all that apply)	
☐ Financial Test for Self-Assurance	☐ Letter of Credit
☐ Performance Surety Bond	☐ Insurance Policy
☐ Certificate of Deposit	☐ Cash Deposit
☐ Trust Fund	☐ Guarantees

Note: Please reference A.A.C. R18-9-A203 for specific financial mechanism requirements.

15 Technical Capability [A.A.C. R18-9-A202(B)] ☐ **Not Applicable**

I have attached evidence that the applicant has the ability to carry out the terms of the permit (design, construction, operation, closure). The attached evidence includes:

A) Pertinent licenses or certifications held by the person.

B) Professional training relevant to the design, construction, or operation of the facility.

C) Work experience relevant to the design, construction, or operation of the facility.

☒ Yes (include as attachment)

16 Facility Compliance History (List all Notices of Violation, Consent Orders or Compliance Orders) ☒ **None Issued**

17 Process Flow Diagram ☐ Not Applicable

Describe the activity producing the discharge. (Example – wastewater treatment, dewatering, cooling, manufacturing, etc.). Include pertinent elements of water processing or treatment that could affect the quality of the water discharged in a process flow diagram.

☒ Check if a process flow diagram is attached.

18 Discharge History ☒ Not Applicable

I have submitted graphs of the monitored parameters in the discharge and in any groundwater wells over the time period of the existing permit (e.g., plot BOD5 vs. month). The time scale should not be less frequent than the permitted sampling frequency. Attach a tabulated compilation of all compliance data for all monitoring parameters analyzed or measured during the preceding five (5) years or the lifetime of the permit, whichever is shorter. Provide the tabulated data in hard copy, and if available, an electronic file compatible with Microsoft Office software (version 97 or later).

☐ Check if graphs and tabulated data attached.

19 Technical Requirements (Check all that have been attached or indicate "Not Applicable" or "NA". See Rule Citation for Specific Requirements)

Description	Page #	NA or Attached?
A) Maps [A.A.C. R18-9-A202(A)(1)]		☒ NA ☐ Attached
B) Site Plan [A.A.C. R18-9-A202(A)(2)]		☒ NA ☐ Attached
C) Design Documents [A.A.C. R18-9-A202(A)(3)]		☐ NA ☒ Attached
D) Characterization of Discharge [A.A.C. R18-9-A202(A)(4)]		☒ NA ☐ Attached
E) Description of Best Available Demonstrated Control Technology [A.A.C. R18-9-A202(A)(5)]		☐ NA ☒ Attached
F) Compliance with Aquifer Water Quality Standards at the Point of Compliance [A.A.C. R18-9-A202(A)(6)]		☒ NA ☐ Attached
G) Contingency Plan [A.A.C. R18-9-A202(A)(7) and R18-9-A204]		☒ NA ☐ Attached
H) Hydrogeologic Study or ☒ Justification that a limited study or no hydrogeologic study is required [A.A.C. R18-9- A202(A)(8)]		☒ NA ☐ Attached
I) Detailed proposal indicating alert levels, discharge limitations, aquifer quality limits, monitoring requirements (discharge, groundwater and operational monitoring), and compliance schedule items. [A.A.C. R18-9-A202(A)(9)]		☒ NA ☐ Attached
J) Closure and post-closure plans [A.A.C. R18-9-A202(A)(10)]		☒ NA ☐ Attached
SEWAGE TREATMENT FACILITIES (STF) ONLY		
K) For a STF provide a map demonstrating that setbacks have been met [A.A.C. R18-9-B201(I)]		☒ NA ☐ Attached
L) Design Report [A.A.C. R18-9-B202 and B203]		☐ NA ☒ Attached
M) Engineering Plans [A.A.C. R18-9-B203]		☐ NA ☒ Attached

20 Other Information

List any additional information that is attached as part of this permit amendment.

(Insert additional rows if needed)

21 Certification Statement (To be completed by the applicant in item 1 above)

I certify under penalty of law that this Aquifer Protection Permit application and all attachments were prepared under my direction or authorization and all information is, to the best of my knowledge, true, accurate and complete. I also certify that the APP discharging facilities described in this form is or will be designed, constructed, operated, and/or closed in accordance with the terms and conditions the Aquifer Protection Permit and applicable requirements of Arizona Revised Statutes Title 49, Chapter 2, and Arizona Administrative Code Title 18, Chapter 9 regarding aquifer protection permits. I am aware that there are significant penalties for submitting false information, including permit revocation as well as the possibility of fine and imprisonment for knowing violations.

Name (Print or Type) Matthew E. Garlick

Matthew Garlick
Signature

May 27th, 2008
Date

ITEM 11: AMENDMENT DESCRIPTION

An improvements project is being carried out the Palm Valley WRF primarily for providing greater redundancy and improved efficiency in various unit processes. The improvements will not result in a change of capacity at the plant, which remains at 4.1 MGD. The improvements made at the facility include the following:

1. Replacement of existing influent screens with two new stair screen units
2. Installation of a new odor control system to treat the Headwork Building and Solids Handling Building for improved odor mitigation
3. Conversion of two existing Aerobic Digester tanks to a Sequencing Batch Reactor (SBR) to provide redundancy and allow the existing SBR units to be taken offline for replacing the decanters on each of the units
4. Installation of the new Filter Feed Pump and Effluent Pump
5. Conversion of existing ATAD tanks to sludge holding tanks and WAS pump replacement.
6. Replacement of the existing inline ultraviolet (UV) disinfection units with newer technology medium pressure units for improved process performance.
7. Installation of a new centrifuge unit to provide greater reliability in the dewatering process

Influent Screening/Headworks

The existing influent screens are self contained units that are prone to frequent clogging and bypass large solids to the SBR units through an overflow. Two new stair screens have been installed to replace the existing screens and provide a total screening capacity of 15.8 mgd.

Odor Control Unit

The WRF has experienced problems with odor mitigation in the past. The existing system consists of a 10,000 cfm unit for the Headworks building and a 6,000 cfm unit for the Solids Handling Building plus 16,000 cfm carbon polishing unit is connected to the two units. The existing ductwork has been re-routed to allow the existing odor control units to treat the air from the process tanks including the anoxic tank, SBR and aerobic digester tanks. The 10,000 cfm scrubber will serve the Headworks and process tanks while the 6,000 cfm unit will serve the aerated sludge storage.
A new ion-exchange odor control unit has been installed which treats the headspace in process buildings including the Headworks, Administration Building, UV Room and Solids Building. The ion-exchange units are designed to provide a 99-percent removal of H2S and Total Volatile Organic Carbon. (TVOC).

Sequencing Batch Reactor

The WRF currently has two SBR units that provide a total treatment capacity of 4.1 mgd. There are two existing aerobic digester tanks that have a combined volume of 1.0 million gallons. These tanks will be hydraulically connected and the tanks will be retrofitted with SBR equipment that will provide an additional 0.95 mgd treatment capacity. This will allow one of the two SBR

tanks to be taken offline during low flow season to replace the existing fixed decanters with floating decanters. In addition, any jet mixing system nozzles that are clogged or damaged will be replaced.

Filter Feed Pumps

gpm for pump

One new filter feed pump will be added under this maintenance project. There are two existing pumps with an 8.2 mgd maximum capacity each. The new 2.0 mgd pump will expand the peak capacity to 10.2 mgd.

Sludge Holding Tanks and WAS Pumping

The three existing ATAD tanks each have a capacity of 0.19 MG. These tanks will be utilized for sludge holding after the improvements project is completed. The tanks provide a combined capacity of 0.57 MG or 2 days of storage of waste-activated sludge. In addition, one of the existing 250 gpm WAS pumps will be replaced by a 1,000 gpm rotary lobe pump.

UV Disinfection

The existing UV disinfection units have become obsolete and have several operational problems. Two new inline UV trains will be installed to provide a firm capacity of 10.0 MGD. Each train will have two units to provide a 4.5 log removal of coliform and produce effluent with non-detect fecal coliform.

Effluent Pumping

One new effluent pump will be added under this project to improve redundancy. The new pump will be 2.0 mgd pump will expand the peak effluent pumping capacity to 10.0 mgd.

Centrifuge Unit

The WRF has two centrifuge dewatering units with a capacity of 250 gpm and 90 gpm. The 250 gpm centrifuge is a leased skid mounted unit. A new centrifuge unit with a 250 gpm capacity will be added under this project.

ITEM 15: TECHNICAL CAPABILITY

See attached resumes for the Operators -Matthew Garlick and Raymond Scott. The improvements were designed by McBride Engineering Solutions. The designer's resume is attached.

ITEM 16: FACILITY COMPLIANCE HISTORY

The Palm Valley WRF is in compliance with the current APP permit and has not received any notices of violation or consent orders. Compliance reports are submitted to ADEQ on a quarterly basis.

ITEM 19 C: DESIGN DOCUMENTS

See attached design information.

ITEM 19 D: CHARACTERIZATION OF DISCHARGE

Discharge characterization will remain unchanged and will be same as the existing permit. The WRF will produce Class A+ reclaimed water. Sludge will be aerobically digested and dewatered for landfill disposal.

ITEM 19 E: DEMONSTRATION OF BADCT

The improvements made at the WRF will not change the treatment processes which include secondary treatment for nutrient removal followed by tertiary filtration and UV disinfection.

ITEM 19 F: COMPLIANCE WITH AWQ STANDARDS AT POC

The facility is monitoring the POCs per the existing APP and submitting monthly reports to ADEQ, as required.

ITEM 19 H HYDRO-GEOLOGICAL STUDY

The discharge points remain unchanged from the current APP, hence an updated hydro-geological study is not submitted.

ITEM 19 I: AL, DL, AND MONITORING

These shall remain the same as the current APP.

ITEM 19 L: DESIGN REPORT:

See attached design information

ITEM 19 M: DRAWINGS

See attached Drawings

Resume of Qualifications

Matthew E. Garlick
12725 West Indian School Road, Suite D101
Avondale, Arizona 85338

EMPLOYMENT

Algonquin Water Services, Inc. 06/06 - Current
12725 West Indian School Road, D101, Avondale, Arizona 85323
Supervisor: President of Infrastructure Division, Bob Dodds, P.E.
Position: Regional Operations Manager / LPSCO General Manager/ LPSCO Business Manager
Facilities of Responsibility: **Litchfield Park Service Company**
Rio Rico Utilities
Bella Vista Water Company
Northern and Southern Sunrise Utilities

- MANAGEMENT OF WATER AND WASTEWATER SYSTEM UTILITIES. MANAGE PERSONNEL IN THE OPERATION AND MAINTENANCE OF EACH FACILITY. OVERSEE THE OPERATION OF THE WATER DISTRIBUTION SYSTEMS, REUSE, COLLECTION AND WASTEWATER TREATMENT FACILITIES. OVERSEE AND MANAGE THE DAY TO DAY OPERATIONS, PLANNING OF LONG AND SHORT TERM BUDGETING, LONG RANGE WATER AND TREATMENT PLANNING, AND REGULATORY REPORTING. WORK WITH FACILITY PERSONNEL IN THE IMPLEMENTATION OF THE COMPANY HEALTH AND SAFETY PROGRAMS, AS WELL AS OTHER OPERATIONAL PROGRAMS SUCH AS, BACKFLOW PREVENTION, FATS, OILS, AND GREASE PROGRAM, VALVE AND FIRE HYDRANT MAINTENANCE PROGRAMS THROUGHOUT THE DISTRIBUTION SYSTEM. IN ADDITION, OVERSIGHT OF THE REGULATORY ISSUES AND PROBLEM SOLVING FOR DIFFICULT OPERATIONS. OVERSEE, MANAGE, AND AID IN THE PERMITTING OF FACILITIES FOR AQUIFER PROTECTION PERMITS (APP), REUSE PERMITTING, WATER RIGHT MANAGEMENT, GROUNDWATER SAVINGS FACILITIES, RECHARGE WELLS, AND AZPDES PERMITTING.

Algonquin Water Services, Inc. 1/00 – 6/06
111 West Wigwam Blvd., Suite B, Litchfield Park, Arizona 85323
Supervisor: Vice President of the Infrastructure Division, Mike Weber, P.E.
Position: LPSCO Operations Manager
Facility of Responsibility: **Litchfield Park Service Company**

- OPERATIONS MANAGER OF WATER AND WASTEWATER SYSTEM. MANAGE PERSONNEL IN THE OPERATION AND MAINTENANCE AND REPAIR OF THE WATER DISTRIBUTION SYSTEM, REUSE, COLLECTION AND 4.2 MGD SBR WASTEWATER TREATMENT FACILITY. RESPONSIBILITIES INCLUDE: MANAGE PERSONNEL TO PERFORM DAY TO DAY OPERATIONS, PLANNING OF LONG AND SHORT TERM BUDGETS, LONG RANGE WATER AND TREATMENT PLANNING, ADEQ, ADWR AND MCESD REPORTING, CCR REPORTING, RESPOND AND REMEDIATE WATER QUALITY ISSUES, REVIEW OF WATER AND WASTEWATER PLANS FOR FUTURE PROJECTS, REGULATORY OVERSIGHT AND SITE CONTACT FOR REGULATORY AGENCIES SUCH AS ADWR, ADEQ, EPA, AND MCESD. IMPLEMENT AND MAINTAIN COMPANY SAFETY PROGRAMS (CURRENTLY SERVE AS THE CO-CHAIR FOR THE JOINT HEALTH AND SAFETY COMMITTEE). MANAGE, OVERSEE AND AID IN THE PERMITTING OF FACILITIES FOR AQUIFER PROTECTION PERMITS (APP), REUSE, GROUNDWATER SAVINGS FACILITIES, RECHARGE WELLS, AND AZPDES. MANAGE, CONSTRUCT AND

DESIGN FUTURE WELL SITES. AID IN THE INTERRUPTION OF GEOLOGIC DATA AS IT PERTAINS TO WATER QUALITY FOR DRILLING PROJECTS.

MacTech Environmental, Inc. 4/95 - 12/99

8901 North Industrial Road
Peoria, Illinois 61615
Supervisor: Steven Willis, R.G.
Position: Project Geologist

- MANAGED AND REMEDIATED VARIOUS FACILITIES THROUGHOUT THE STATE OF ARIZONA. PERFORMED PHASE I, II AND III SITE INVESTIGATIONS ALONG WITH VARIOUS REMEDIAL PROJECTS INCLUDING SEVERAL ARIZONA WATER QUALITY ASSURANCE REVOLVING FUND (WQARF) PROJECTS. PREFORMED VARIOUS ENVIRONMENTAL CLEAN-UP EFFORTS IN ORDER TO CLEAR LAND FOR DEVELOPERS. WORKED EXCLUSIVELY FOR SEVERAL LARGE DEVELOPERS ON CLEARING ENVIRONMENTAL ISSUES SUCH AS ARSENIC, PESTICIDE, HERBICIDE, BROWN FIELD WORK, HYDRO-CARBON, LEAD AND ASBESTOS TYPE CONTAMINATION.

Speedie and Associates, Inc. 04/93 - 04/95
11029 North 24th Street, Suite 805
Phoenix, Arizona 85029
Supervisor: Greg Creaser, P.E.
Position: Staff Geologist

- STAFF GEOLOGIST FOR THE GEOTECHNICAL AND ENVIRONMENTAL DEPARTMENTS. RESPONSIBILITIES INCLUDED ENVIRONMENTAL SITE ASSESSMENTS PHASES I, II AND III, PRELIMINARY ASSESSMENTS, CONTAMINANT CHARACTERISTICS, SUBSURFACE EXPLORATION, REMEDIATION DESIGN, WELL CLOSURES, SEISMIC SURVEYING AND GEOLOGIC FIELD MAPPING.

Geological Consultants, Inc. 09/92 - 01/93
2333 West Northern Avenue, Suite 1A
Supervisor: Ken Eugue, R.G.
Position: Staff Geologist

- GEOLOGIC AID. RESPONSIBILITIES INCLUDED AERIAL PHOTOGRAPHIC MAPPING, CROSS-SECTIONAL MAPPING, SLOPE ANALYSIS, ROCK IDENTIFICATION AND CHARACTERIZATION.

EDUCATION

Northern Arizona University, *08/90 - 05/92*
Flagstaff, AZ

- 160 CREDIT HOURS MAJOR GEOLOGY.
- 16 CREDIT HOURS IN WATER AND WASTEWATER FIELD.
- ADEQ WATER TREATMENT PLANT OPERATOR IV
- ADEQ WATER DISTRIBUTION OPERATOR III
- ADEQ WASTEWATER COLLECTIONS SYSTEM OPERATOR IV
- ADEQ WASTEWATER TREATMENT PLANT OPERATOR IV
- 40 HOUR HAZARDOUS WHOPPER COURSE
- ARIZONA DEPARTMENT OF HEALTH SERVICES (ADHS) SAMPLING COURSE

- ACTIVE MEMBER OF THE AMERICA WATER WORKS ASSOCIATION

SKILLS

COMPUTER: MICROSOFT WORD, EXCEL, POWER POINT, AND GINT.

REFERENCES

Available Upon Request

Clint Arndt

RESUME OF QUALIFICATIONS

8355 TNT Lane Florence, Arizona 85232 Home 520-868-4468 Cell 623-293-3056

OBJECTIVE: A challenging **WATER WASTEWATER OPERATOR** position, where my experience and skill set have valuable application.

EXPERIENCE:

Algonquin Water **Avondale, Arizona**
Operations Manager LPSCO **2006-Present**

- Ensure the safe and legal operation of a 4.1 M.G.D Water Reclamation Facility
- Ensure the safe and legal operations of nine wells and distribution sites.
- Ensure the safe and legal operations of Arsenic Treatment Facilities.
- Implement and Support safety programs.
- Responsible for all Federal and State Reporting.
- Establish and implement Fiscal Budgets.

Global Water Management **Phoenix, Arizona**
Operations Supervisor Southern AZ 2005-2006

- Ensure the safe and legal operation of a 3 M.G.D Water Reclamation Facility
- Ensure the safe and legal operations of nine wells and three distribution site.
- Implement safety programs
- Supervise and train employees

Town of Florence **Florence, Arizona**
WATER/WASTEWATER SUPERINTENDENT 1991 - 2005

- Ensure the safe and legal operation of two wastewater treatment facilities
- Ensure the safe and legal operation of five wells and two water systems
- Responsible for all Federal and State Reporting
- Establish and implement Fiscal Budgets
- Implement Safety Programs
- Supervise and train a staff of twelve employees

Park Water Company **Florence, Arizona**
COMPANY MANAGER/WATER OPERATOR 2003 – 2006

- Ensure the safe and legal operation of two wells and PWS systems
- Establish and implement Fiscal Budgets
- Responsible for monthly utility billing and collections
- Handle all Customer Service Issues

Pinal County Housing Division **Florence, Arizona**
WASTEWATER CONSULTANT 2000-2003

- Ensure the safe and legal operation of three wastewater treatment plants
- Worked with ADEQ to correct and prevent any violations
- Trained Pinal County employees on the continual operation of the plants

Town of Florence **Florence, Arizona**
ASSISTANT FIRE CHIEF 1989-1999

- Supervised and trained 35 firefighters
- Executed Fire Prevention Education and Public Safety Programs
- Provided Emergency Medical Services
- Responsible for entire operation of Firehouse

EDUCATION: **Central Arizona College** **Coolidge, Arizona**
A.A.S. Degree :Manufacturing Engineering Technology 1989

ADEQ CERTIFICATIONS:
- **Wastewater Operator Grade 4**
- **Water Operator Grade 2**
- **Collections Grade 2**
- **Distribution Grade 2**

ACHIEVEMENTS:
* **2001 Wastewater ASUA Wastewater Operator of the Year**
* **Previous Board Member, CAAG Environmental Planning Committee**
* **Previous Board Member, DWR, Pinal AMA Water Augmentation Authority**

REFERENCES: **Professional references available upon request**

Clint Arndt
8355 TNT Lane Florence, Arizona 85232
Home 520-868-3571 Cell 520-251-3658

PROFESSIONAL REFERENCES

Ms. Becki Guilin **520-868-6629**
Finance Director – Town of Florence

Mr. Don Lowry **520-868-7607**

Ms. Nina Condose **602-771-4608**
ADEQ

Mr. William Hare **602-771-4838**
ADEQ

Janet Napolitano
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Stephen A. Owens
Director

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

Decision to Grant AZPDES Permit #AZ0025712

July 7, 2008

LTF ID: 45829
Place ID: 815

Ramesh Narasimhan
Narasimhan Consulting Services, Inc.
3660 N. 3rd Street
Phoenix, AZ 85012

RE: AZPDES Permit Application No. AZ0025712
Palm Valley WRP
Goodyear, AZ 85395

Dear Mr. Narasimhan:

The Arizona Department of Environmental Quality (ADEQ) has completed the public participation and comment period for the above-referenced facility. No comments were received during the 30-day comment period. ADEQ has made a final decision to issue the AZPDES permit for discharge from the Palm Valley WRP in Goodyear, Arizona.[1] A copy of the Fact Sheet and signed permit is enclosed. Please note the effective date and expiration date for your permit. If you wish to renew this permit, a complete and accurate application must be submitted no later than 180 days prior to the permit expiration date.

The review of your AZPDES application was subject to the licensing timeframes statute under Arizona Revised Statutes A.R.S. §§ 41-1072 through 41-1079. Therefore, this letter is the written notification of ADEQ's licensing decision required under A.R.S. § 41-1076 and Arizona Administrative Code (A.A.C.) R18-1-507(A).

This decision was made prior to expiration of the licensing time frames governing your application. Please contact me at (602) 771- 4515 if you have any questions regarding this notice or your permit.

Sincerely,

Ramona Chomor

Ramona Chomor
Permits Unit
Surface Water Section
Water Quality Division

Enclosures: Signed AZPDES Permit No. AZ0025712
Fact Sheet

SWSPU08:0115

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[1]This determination is an appealable agency action under A.R.S. § 41-1092. You have the right to request a hearing and file an appeal under A.R.S. § 41-1092.03. To do this you must file a Request for Hearing or Notice of Appeal **within thirty (30) days of receipt of this notice.** A request for Hearing or Notice of Appeal is filed when it is received by ADEQ's Hearing Administrator as follow:

Judith Fought, Hearing Administrator
Office of Administrative Counsel
ADEQ
1110 W. Washington Street
Phoenix, AZ 85007

The Request or Notice must contain the following:

1. The name of the party that is filing the appeal;
2. The address of the party that is filing the appeal;
3. The action being appealed; and
4. A concise statement of the reasons for the appeal.

Upon proper filing of a Request for Hearing or Notice of Appeal, ADEQ will serve a Notice of Hearing on all parties to the appeal. If you file a timely Request for Hearing or Notice of Appeal, you have the right to request an informal settlement conference with ADEQ under A.R.S § 41-1092.06. This request must be made in writing no later than 20 days before a scheduled hearing and must be filed with the Hearing Administrator at the above address.

229.

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City, S PHOENIX, AZ 85012

PS Form 3800, August 2006 See Reverse for Instructions

230.

ARIZONA POLLUTANT DISCHARGE ELIMINATION SYSTEM (AZPDES)

FACT SHEET

This document gives pertinent information concerning the issuance of the AZPDES permit listed below. This facility is a wastewater treatment plant with a design capacity of 4.1 MGD, and thus is considered to be a major facility under the NPDES program. The effluent limitations contained in this permit will maintain the Water Quality Standards listed in Arizona Administrative Code (AAC.) R18-11-101 et. seq. This permit is proposed to be issued for a period of 5 years.

Permittee's Name:	Litchfield Park Service Company (LPSCO) Palm Valley Water Reclamation Plant (PVWRP)
Mailing Address:	12725 W. Indian School Road, Suite D101 Avondale, AZ 85392
Plant Location:	14222 W. McDowell Road Goodyear, AZ 85395
Contact Person(s):	Matthew Garlick 623-935-9367
AZPDES Permit No.	AZ0025712
Inventory No.	100310

I. STATUS OF PERMIT(s)

Litchfield Park Service Company has applied for a new Arizona Pollutant Discharge Elimination System (AZPDES) permit to allow the discharge of treated effluent from the Palm Valley Water Reclamation Plant (WRP) in Goodyear, Arizona to the Roosevelt Irrigation District Canal. This application was received by the Arizona Department of Environmental Quality (ADEQ) on October 1, 2007 and was determined to be administratively complete on June 20, 2008 when the 208 plan information was received. The Palm Valley Water Reclamation Plant currently has an Aquifer Protection Permit (APP) No. P100310 and a Reuse Permit No. R105221, both issued by ADEQ for discharges from this plant. The APP permit regulates discharges to the local aquifer and the Reuse permit regulates the practice of reusing the treated wastewater for irrigation at the Palm Valley and Pebblecreek Golf Courses and the LPSCO Reuse Irrigation site.

II. GENERAL FACILITY INFORMATION

The Palm Valley WRP is located at 14222 W. McDowell Road in Goodyear, Arizona.

The applicant is a privately-owned and operated wastewater treatment plant providing service for all of the City of Litchfield Park, and portions of Avondale, Glendale, Goodyear, and unincorporated Maricopa County. Palm Valley WRP was designed to serve residential and commercial development from McDowell Road on the south to Camelback Road on the north and from Bullard Avenue on the west to Dysart Road on the east. The wastewater treatment plant is part of a sanitary sewer system that receives domestic wastewater from residential and commercial sources in the areas listed above. There are no

significant industrial dischargers connected to the treatment works. No industrial users are anticipated to discharge to the Palm Valley WRP.

Palm Valley WRP was constructed and placed into service in February 2001. It has a design capacity of 4.1 MGD. The AZPDES permit is being written for the current design capacity of 4.1 MGD, however, the facility plans on expanding to 8.2 MGD in the future. This expansion is not covered in the draft permit.

The treatment process includes an influent pump station, mechanical screens, vortex grit removal, two sequencing batch reactors, two filters, an ultraviolet (UV) disinfection system, an anoxic reactor, rotary drum thickeners, an autothermal thermophilic aerobic digestion (ATAD) batch system, aerobic digesters, and sludge centrifuges.

Direct uses for the reclaimed water are limited to non-drinking water purposes such as golf course irrigation, and not for crop irrigation. The residual solids from the PVWRP are treated on site and disposal is to a sanitary landfill.

The treated effluent from the Palm Valley WRP may be delivered to three locations: 1) Roosevelt Irrigation District (RID) Main Canal, 2) the Palm Valley and Pebble Creek Golf Courses, 3) the LPSCO Reuse Irrigation site. The proposed AZPDES permit will authorize discharge of treated effluent to the Roosevelt Irrigation District Canal (at a new outfall located at the intersection of Thomas Rd. and Bullard Rd.).

III. RECEIVING WATER

The State of Arizona has adopted water quality standards to protect the designated uses of its surface waters. Streams have been divided into segments and designated uses assigned to these segments. The water quality standards vary by designated use depending on the level of protection required to maintain that use.

The receiving water for Palm Valley WRP Outfall 001 is the Roosevelt Irrigation District (RID) Canal tributary to the Gila River.

Outfall 001 is located at: Township 2N, Range 1W, Section 29

Latitude 33° 28' 44" N, Longitude 112° 22' 30" W

This receiving water is not on the 303(d) list and there are no TMDL issues associated. The outfall discharges to, or the discharge may reach, a surface water listed in Appendix B of A.A.C. Title 18, Chapter 11, Article 1.

The RID Canal is a Phoenix Area Canal below drinking water intakes and has the following designated uses:

Agricultural Irrigation (AgI)
Agricultural Livestock watering (AgL)

The following designated uses are being applied to the receiving water:

Agricultural Irrigation (AgI)
Agricultural Livestock Watering (AgL)

Given the uses stated above, the applicable narrative water quality standards are described in A.A.C. R18-11-108 and the applicable numeric water quality standards are listed in A.A.C. R18-11-109, and in Appendix A thereof.

IV. DESCRIPTION OF DISCHARGE

Parameters	Maximum Daily Value	Average Daily Value	Number of Samples
pH (minimum)	6.8 s.u.	N/A	700
pH (maximum)	8.3 s.u.	N/A	700
Flow Rate	4.1 MGD	4 MGD	365
Temp (Oct – Mar)	30°C	29°C	700
Temp (Apr – Sept)	31°C	28°C	700

The application indicates that the design removal rate for: BOD5, SS, P and N are all 95%.

Since Palm Valley WRP does not have an existing AZPDES permit no DMR data was available. However, this facility does have an APP permit and results of data collected for that permit was available for analysis to help determine reasonable potential (RP). The APP Self Monitoring Report Form (SMRF) data from 10/5/2004 to 10/17/2006 was reviewed. Potential pollutants monitored and recorded under the APP permit include: Antimony, Arsenic, Barium, Beryllium, Cadmium, total Chromium, Cyanide, Lead, Mercury, Nickel, Selenium, and Thallium. Further details regarding this data are presented in the sections that follow.

V. DETERMINATION OF EFFLUENT LIMITATIONS and ASSESSMENT LEVELS (Part I in Permit)

When determining what parameters need monitoring and/or limits included in the draft Palm Valley WRP permit, both technology-based and water quality-based criteria were compared and the more stringent criteria applied.

Technology-based Limitations: As outlined in 40 CFR Part 133:
The regulations found at 40 CFR §133 require that publicly owned treatment works achieve specified treatment standards for BOD, TSS, and pH based on the type of treatment technology available.
The Palm Valley WRP is a privately owned plant using the same technology for treatment of domestic sewage as a POTW. These provisions have been applied based on Best Professional Judgment (BPJ).

Numeric Water Quality Standards: As outlined in A.A.C. R18-11-109 and Appendix A:
Per 40 CFR 122.44(d)(1)(ii), (iii) and (iv), discharge limits must be included in the permit for parameters with "reasonable potential", that is, those known to be or expected to be present in the effluent at a level that could potentially cause any applicable numeric water quality standard to be exceeded. "Reasonable

potential" refers to the possibility, based on the statistical calculations using the data submitted, or consideration of other factors to determine whether the discharge may exceed the Water Quality Standards. The procedures used to determine reasonable potential are outlined in the *Technical Support Document for Water Quality-based Toxics Control (TSD)* (EPA/505/2-90-001). In most cases, the highest reported value for a parameter is multiplied by a factor (determined from the variability of the data and number of samples) to determine a "highest estimated value". This value is then compared to the lowest applicable Water Quality Standard for the receiving water. If the value is greater than the standard, RP exists and a limit is required in the permit. RP may also be determined from best professional judgment (BPJ) based on knowledge of the treatment facilities and other factors. The basis for the RP determination for each parameter with a limit is shown in the table below.

It is assumed that RP exists for exceedance of water quality criteria for the pollutants *E. coli* and total residual chlorine (TRC). These parameters have been shown through extensive monitoring of POTWs to fluctuate greatly and thus are not conducive to exclusion from limitation due to a lack of RP. Therefore the permit contains numeric limits for *E. coli* and TRC.

The proposed permit limits and/or ALs were established using a methodology developed by EPA. Long Term Averages (LTA) were calculated for each designated use and the lowest LTA was used to calculate the average monthly limit (AML) and maximum daily limit (MDL) necessary to protect all uses. This methodology takes into account criteria, effluent variability, and the number of observations taken to determine compliance with the limit and is described in Chapter 5 of the TSD. Limits/ALs based on A&W criteria were developed using the "two-value steady state waste load allocation" described on page 99 of the TSD. When the limit/AL is based on human health criteria, the monthly average was set at the level of the applicable standard and a daily maximum limit was determined as specified in Section 5.4.4 of the TSD.

Arizona water quality rules require that water quality standards be achieved without mixing zones unless the permittee applies and is approved for a mixing zone. Since the receiving stream for this discharge is ephemeral prior to the discharge, no water is available for a mixing zone and all water quality criteria are applied at end-of pipe. This means that the effluent concentration must meet stream standards.

Permit Limitations and Monitoring Requirements: The tables that follow summarize parameters that are limited in the permit and the rationale for that decision. Also included are some parameters that require monitoring without any limitations or that have not been included in the permit at all and the basis for that decision. The corresponding monitoring requirements are shown for each parameter. In general, the regulatory basis for monitoring requirements is per 40 CFR §122.44(i) *Monitoring requirements*; and 40 CFR §122.48(b), *Required monitoring*; all of which have been adopted by reference in R18-9-A905, AZPDES Program Standards.

Parameter	Lowest Standard/ Designated Use	Maximum Reported Daily Value	No. of Samples	Estimated Maximum Value	RP determination	Proposed Monitoring Requirement/ Rationale
Flow	NA	3.8 mgd	- - -	- - -	- - -	It is proposed that discharge flow be monitored on a continual basis using a flow meter and reported monthly.
BOD & Suspended Solids (TSS)	30 mg/L 30 day average 45 mg/L 7 day average/ Technology based limits 40 CFR 133.102	No Data	N/A	N/A	Limit for BOD and TSS is always included.	Monitoring for influent and effluent BOD and TSS to be conducted 2 times/month using 24 hour composite samples of the influent and the effluent. The sample type required was chosen to be representative of the discharge. The requirement to monitor influent BOD and suspended solids is included to assess compliance with the 85% removal requirement in this permit. At least one sample must coincide with WET testing to aid in the determination of the cause of toxicity if toxicity is detected.
pH	Minimum: 6.5 Maximum: 9.0 AgL A.A.C.R 18-11-109(B)	No Data	N/A	N/A	Limit is always included. Technology based limit exists in addition to the limit in A.A.C.R 18-11-109(B)	pH is to be monitored once a week using a discrete sample of the effluent. 40 CFR Part 136 specifies that grab samples must be collected for pH. At least one sample must coincide with WET testing to aid in the determination of the cause of toxicity if toxicity is detected. pH sampling must also coincide with ammonia sampling when required.
Temperature	No applicable standard	No Data	N/A	N/A	NA	Effluent temperature is to be monitored 1 time per quarter for effluent characterization by discrete sample. 40 CFR Part 136 specifies that discrete samples must be collected for temperature. Additionally, one sample must coincide with WET sampling to aid in the determination of the cause of toxicity, if toxicity is detected.
Ammonia	No applicable standard	No data	N/A	N/A	NA	Ammonia is to be monitored 1 time per quarter for effluent characterization by discrete sample. One sample must coincide with WET sampling to aid in the determination of the cause of toxicity, if toxicity is detected.
Antimony	No applicable standard	3 ug/L	8	9.9 ug/L	NA	Monitoring required 1 time per 6 months for effluent characterization.
Arsenic	200 ug/L / AgL	25 ug/L	8	82.5 ug/L	No RP	Monitoring required 1 time per 6 months for effluent characterization
Barium	No applicable standard	40 ug/L	8	132 ug/L	NA	Monitoring required 1 time per 6 months for effluent characterization
Beryllium	No applicable standard	1 ug/L	8	3.3 ug/L	NA	Monitoring required 1 time per 6 months for effluent characterization
Boron	1000 ug/L AgI	No Data	N/A	N/A	Indeterminate	Assessment level set with monitoring required 1 time per month.
Cadmium	50 ug/L / AgI & AgL	1 ug/L	8	3.3 ug/L	No RP	Monitoring required 1 time per 6 months for effluent characterization

Parameter	Lowest Standard/ Designated Use	Maximum Reported Daily Value	No. of Samples	Estimated Maximum Value	RP determination	Proposed Monitoring Requirement/ Rationale
Chromium (total)	1000 ug/L / AgI & AgL	5 ug/L	8	16.5 ug/L	No RP	*Monitoring required 1 time per 6 months* for effluent characterization
Chromium VI	No applicable standard	No Data	N/A	N/A	N/A	Monitoring required 1 time per 6 months for effluent characterization
Copper	500 ug/L/ AgL	No Data	N/A	N/A	Indeterminate	Assessment level set with monitoring required 1 time per month.
Cyanide	200 ug/L / AgL	4.85 ug/L	1	64.02 ug/L	No RP	Monitoring required 1 time per 6 months for effluent characterization
E. Coli	*No Applicable Standard* PBC standard is applied as a Technology based Limit based on Best Professional Judgement (BPJ) . Well operated Secondary Treatment WWTPs are capable of meeting the PBC standard.	No Data	N/A	N/A	NA	*E. coli* is to be monitored four times per month using a grab sample of the effluent. The specified monitoring frequency is the minimum required to ensure compliance with the 30-day geometric mean water quality standards. 40 CFR Part 136 specifies that grab samples must be collected for coliform bacteria. At least one sample per month must coincide with WET testing to aid in the determination of cause of toxicity if toxicity is detected.
Fecal Coliform	No Applicable Standard	No Data	N/A	N/A	NA	No monitoring required.
Hardness	No Applicable Standard	No Data	N/A	N/A	NA	Monitoring required quarterly for effluent characterization
Lead	100 ug/L / AgL	2.5 ug/L	8	8.25	No RP	Monitoring required 1 time per 6 months for effluent characterization
Mercury	10 ug/L / AgL	1 ug/L	8	3.3 ug/L	No RP	Monitoring required 1 time per 6 months for effluent characterization
Nickel	No applicable standard	10 ug/L	8	33 ug/L	NA	Monitoring required 1 time per 6 months for effluent characterization
Nutrients	No applicable standard	No Data	N/A	N/A	NA	Monitoring required 1x/quarter for effluent characterization.
Oil and grease	BPJ Technology based level. The monthly assessment/level of 10mg/L is a commonly accepted value that can be achieved by properly operated and maintained WWTPs. This level is also considered protective of the narrative standard A.A.C. R1811-108.B.	No Data	N/A	N/A	NA	Assessment level set with monitoring required 1 time per month.
Selenium	20 ug/L / AgL	6 ug/L	8	19.8 ug/L	Indeterminate	Assessment level set with monitoring required 1 time per month.

Parameter	Lowest Standard/ Designated Use		Maximum Reported Daily Value	No. of Samples	Estimated Maximum Value	RP determination	Proposed Monitoring Requirement/ Rationale
Silver	No applicable standard		No Data	N/A	N/A	NA	Monitoring required 1 time per 6 months for effluent characterization
Sulfides	No applicable standard		No Data	N/A	N/A	NA	Monitoring required 1 time per 6 months for effluent characterization
Thallium	No applicable standard		1 ug/L	8	3.3 ug/L	NA	Monitoring required 1 time per 6 months for effluent characterization
Total Residual Chlorine	A&Wedw standard applied as technology based limit based on BPJ. WWTPs are capable of meeting this level.		No Data	N/A	N/A	RP always exists when chlorine is used.	TRC is to be monitored 1 time per week using a discrete sample. 40 CFR Part 136 specifies that discrete samples must be collected for chlorine. At least one sample per month must coincide with WET testing to aid in the determination of the cause of toxicity if toxicity is detected.
Whole Effluent Toxicity (WET)	No toxicity (A.A.C. R18-11-108.A.6)	*Raphidocelis subcapitata*	No Data	N/A	N/A	Indeterminate	Action level set with monitoring required 1 time per quarter.
		Pimephales promelas	No Data	NA	N/A	Indeterminate	Action level set with monitoring required 1 time per quarter.
		Ceriodaphnia dubia	No Data	NA	N/A	Indeterminate	Action level set with monitoring required 1 time per quarter.
Zinc	1000 ug/L Agl		No Data	N/A	N/A	Indeterminate	Assessment level set with monitoring required 1 time per month.

Footnotes:

(1) The monitoring frequencies above are required when the facility is discharging through Outfall 001. If there is no discharge, monitoring shall be conducted at least once per calendar quarter for these parameters, as shown in Part 1.G. of the permit. (Exception: Discharge Flow metering should remain operational during periods of no discharge). The resulting data will be needed to characterize the effluent and plant performance, and upon application for permit renewal, if this permit is to be renewed.

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Assessment Levels:

Assessment levels (ALs) are established in the draft permit for: Boron, Copper, Selenium, and Zinc. The basis for establishing ALs for each of these parameters is discussed in the table in Section V above. ALs are listed in Part I.B of the permit. An AL differs from a discharge limit in that an exceedance of an AL is not a permit violation. Instead, ALs serve as triggers, alerting the permitting authority when there is cause for re-evaluation of RP for exceeding a water quality standard, which may result in new permit limitations. The AL numeric values also serve to advise the permittee of the analytical sensitivity needed for meaningful data collection. Trace substance monitoring is required when there is uncertain RP (based on non-detect values, or limited datasets) or a need to collect additional data or monitor treatment efficacy on some minimal basis. A reopener clause is included in the draft permit should future monitoring data indicate water quality standards are being exceeded. This permit also contains a provision for potential reduction in monitoring after 10 routine data sets are collected. Upon request by the permittee ADEQ will review the tabulated data and determine if the data support such a reduction.

The requirement to monitor for these parameters is included in the permit according to A.A.C. R18-11-104(C) and Appendix A. ALs listed for each parameter were calculated in the same manner that a limit would have been calculated (See Numeric Water Quality Standards Section above.)

The following trace substances were not included in the draft permit due to a lack of RP based on best professional judgment (BPJ): barium, nitrates and manganese. The numeric standards for these pollutants are well above what would be expected from a domestic effluent discharge.

Effluent Characterization Testing

In addition to monitoring for parameters assigned either a permit limit or an AL, sampling is required to assess the presence of pollutants in the discharge at certain minimum frequencies for additional suites of parameters, whether the facility is discharging or not. This monitoring is specified in permit Tables 3.a through 3.f., *Effluent Characterization Testing,* as follows:

- Table 3.a. – ammonia, BOD-5, total residual chlorine, dissolved oxygen, total Kjeldahl nitrogen, nitrate/nitrite, oil and grease, pH, phosphorus, temperature, and total dissolved solids and total suspended solids.
- Table 3.b. - Selected Metals (Total Recoverable), Hardness, and Cyanide. Data from monitoring done per Table 2 may be used.
- Table 3.c. – Selected Volatile Organic Compounds
- Table 3.d. – Selected Acid-extractible Compounds
- Table 3.e. – Selected Base-Neutral Compounds
- Table 3.f. – Additional Parameters Based on Designated Uses (from Arizona Surface Water Quality Standards, Appendix A, tables 1 and 2.)

NOTE: Some parameters listed in Tables 3.a. and 3.b. are also listed in Tables 1 or 2. In this case, the data from monitoring under Tables 1 or 2 may be used to satisfy the requirements of Tables 3.a. and/or 3.b., provided the specified sample types are the same. In the event the facility does not discharge to a water of the U.S. during the life of the permit, Effluent Characterization Testing, of representative samples of the effluent, is still required.

The purpose of Effluent Characterization (EC) Testing is to characterize the effluent and determine if the parameters of concern are present in the discharge and at what levels. This monitoring will be used to assess RP per 40 CFR 122.44(d) (1) (iii)). EC monitoring is required in accordance with 40 CFR 122.43(a), 40 CFR 122.44(i), and 40 CFR 122.48(b) as well as ARS49-203(A)(7). If pollutants are noted at levels of concern during the permit term, this permit may also be reopened to add related limits or conditions.

Whole Effluent Toxicity:

Whole Effluent Toxicity (WET) testing is required in the permit (Parts I.E. and IV) to evaluate the discharge according to the narrative toxic standard in AAC R18-11-108(A)(5), as well as whether the discharge has RP for WET per 40 CFR 122.44(d)(iv). At a minimum, the results reported on an AZPDES application must include quarterly testing for a 12-month period within the past year using multiple species, or the results from four tests performed at least annually in the 4.5 years prior to the application. However, since the Palm Valley WRP is a new discharger, the permittee can be allowed to report these required WET test results up to two years after making the initial application for an AZPDES permit.

ADEQ does not have a numeric standard for Whole Effluent Toxicity. However, ADEQ adopted the EPA recommended chronic toxicity benchmark of 1.0 TUc for a four day exposure period. Using this benchmark, the limitations and action levels for WET included in the permit were calculated in accordance with the methods specified in the *TSD*. The species chosen for WET testing are as recommended in the *TSD* and in *Regions 9 & 10 Guidance for Implementing Whole Effluent Toxicity Testing Programs*.

The permit requires quarterly monitoring for three surrogate species [*Ceriodaphnia dubia* (water flea) representing the invertebrate phyla; *Pimephales promelas* (fathead minnow), a vertebrate species; and *Selenastrum capricornutum* (green alga) for evaluating toxicity to plant life]. An exceedance of a limit or action level will trigger follow-up testing to determine if effluent toxicity is persistent. If toxicity above a limit or action level is found in a follow-up test, the permittee will be required to conduct a TRE and possibly a TIE to identify the source of toxicity and reduce toxicity. These conditions are required to ensure that toxicants are not discharged in amounts that are toxic to organisms [A.A.C. R18-11-108(A)(5)]. A reopener clause is included in accordance with 40 CFR Parts 122 and 124 and AAC R18-9-B906.

The required WET monitoring frequency for this facility is consistent with the WET testing frequency required for facilities with a similar design flow. The draft permit requires WET test results to be reported on discharge monitoring reports and submittal of the full WET lab report to ADEQ.

Parameter	Proposed Monitoring Requirement
Whole Effluent Toxicity (WET)	WET testing for chronic and/or acute toxicity shall be conducted quarterly. The permittee may request a reduction in the required WET monitoring frequency after 10 or more chronic toxicity tests have been completed with no finding of toxicity. A more frequent sampling requirement is triggered if any of the WET action levels listed in the permit are exceeded. The permit also contains provisions for investigating the sources of toxicity, if detected. Three composite samples are required to complete one WET test. A 24-hour composite sample type is required. WET sampling must coincide with testing for all the parameters in Tables 1 and 2 of the draft permit to aid in the determination of the cause of toxicity if toxicity is detected. Additional procedural requirements for the WET test are included in the proposed permit.

VI. NARRATIVE WATER QUALITY STANDARDS

All narrative limitations in A.A.C. R18-11-108 that are applicable to the receiving water are included in Part I, Section H of the permit.

VII. MONITORING AND REPORTING REQUIREMENTS (Part II of Permit)

Section 308 of the Clean Water Act and 40 CFR Part 122.44(i) require that monitoring be included in permits to determine compliance with effluent limitations. Additionally, monitoring may be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality. The permittee has the responsibility to determine that all data collected for purposes of this permit meets the requirements specified in this permit and is collected, analyzed, and properly reported to ADEQ.

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. The permittee is responsible for conducting and reporting results to ADEQ on DMRs or as otherwise specified in the permit.

Monitoring locations are specified in the permit Part I.A in order to ensure that representative samples of the influent and effluent are consistently obtained.

The permit, (Part II A.1 and 2) requires the permittee to keep a Quality Assurance (QA) manual at the facility, describing sample collection and analysis processes; the required elements of the QA manual are outlined.

For the purposes of this permit, a "24-hour composite" sample has been defined as a flow-proportioned mixture of not less than three discrete samples (aliquots) obtained at equal time intervals. The volume of each aliquot shall be directly proportional to the discharge flow rate at the time of sampling.

These criteria for composite sampling are included in order to obtain samples that are representative of the discharge given the potential variability in the duration, frequency and magnitude of discharges from this facility. Information in the application states that discharge will occur continuously from December to March. The applicant indicates that discharge flow of 2 MGD or 50% of plant effluent (amount estimated as not needed by golf courses) will occur during this time.

Discrete (i.e., grab) samples are specified in the permit for parameters that for varying reasons are not amenable to compositing.

The requirements in the permit pertaining to Part II Monitoring and Reporting are included to ensure that the monitoring data submitted under this permit is accurate in accordance with 40CFR122.41(e).

Reporting requirements for monitoring results are detailed in Part II.B.1 of the permit, including completion and submittal of Discharge Monitoring Reports (DMRs) and AZPDES Flow Record forms.

Requirements for retention of monitoring records are detailed in Part II. D of the permit.

VIII. BIOSOLIDS REQUIREMENTS (Part III in Permit)

Standard requirements for the monitoring, reporting, record keeping, and handling of biosolids, as well as minimum treatment requirements for biosolids according to 40 CFR Part 503 are incorporated in the draft permit.

IX. SPECIAL CONDITIONS (Part V in Permit)

Operation

This permit condition requires the permittee to ensure that the WWTP has an operator who is certified at the appropriate level for the facility, in accordance with R18-5-104 through -114. The required certification level for the WWTP operator is based on the class (Wastewater Treatment Plant) and grade of the facility, which is determined by population served, level of treatment, and other factors.

Permit Reopener

This permit may be modified based on newly available information; to add conditions or limits to address demonstrated effluent toxicity; to implement any EPA-approved new Arizona water quality standard; or to re-evaluate reasonable potential (RP), if Assessment Levels in this permit are exceeded (AAC R18-9-B906, and 40 CFR Part 122.62 (a) and (b)).

X. ANTIDEGRADATION

Antidegradation rules have been established under A.A.C. R18-11-107 to ensure that existing surface water quality is maintained and protected. The discharge is to a canal which is filled with water from various sources. Therefore, there is no consistent background quality. Effluent quality limitations and monitoring requirements have been established under the proposed permit to ensure that the discharge will meet the applicable water quality standards. As long as the permittee maintains consistent compliance with these provisions, the designated uses of the receiving water will be presumed protected, and the facility will be deemed to meet currently applicable antidegradation requirements under R18-11-107.C.

XI. STANDARD CONDITIONS

Conditions applicable to all NPDES permits in accordance with 40 CFR, Part 122 are attached as an appendix to this permit.

XII. ADMINISTRATIVE INFORMATION

Public Notice (A.A.C. R18-9-A907)

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft AZPDES permit or other significant action with respect to an AZPDES permit or application. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or permit. This permit will be public noticed in a local newspaper after a pre-notice review by the applicant and other affected agencies.

Public Comment Period (A.A.C. R18-9-A908)
Rules require that permits be public noticed in a newspaper of general circulation within the area affected by the facility or activity and provide a minimum of 30 calendar days for interested parties to respond in writing to ADEQ. After the closing of the public comment period, ADEQ is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

Public Hearing (A.A.C R18-9-A908(B))
A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. A public hearing will be held if the Director determines there is a significant amount of interest expressed during the 30-day public comment period, or if significant new issues arise that were not considered during the permitting process.

EPA Review (A.A.C. R18-9-A908(C))
A copy of this draft permit and any revisions made to this draft as a result of public comments received will be sent to EPA Region 9 for review. If EPA objects to a provision of the draft, ADEQ will not issue the permit until the objection is resolved.

XIII. ADDITIONAL INFORMATION

Additional information relating to this proposed permit may be obtained from:

ADEQ
Water Quality Division- Surface Water Permits Unit
Attn: Ramona Chomor
1110 W. Washington St. – Mail Code 5415A-1
Phoenix, Arizona 85007
By contacting Ramona Chomor at (602) 771-4515
Or email rc7@azdeq.gov

XIV. INFORMATION SOURCES

While developing effluent limitations, monitoring requirements and special conditions for the draft permit, the following information sources were used:

1. AZPDES Permit Application Form 2A and 2S, received October 1, 2007 and along with supporting data, facility diagram and maps submitted by the applicant with the application forms.

    i. Supplemental information to the application received by ADEQ on January 22, 2008.

2. ADEQ files containing SMRF data for Palm Valley WRP.

3. Arizona Administrative Code (AAC) Title 18, Chapter 11, Article 1, *Water Quality Standards for Surface Waters,* adopted March 31, 2003.

4. AAC Title 18, Chapter 9, Article 9. *Arizona Pollutant Discharge Elimination System Rules.*

5. Code of Federal Regulations (CFR) Title 40:
    Part 122, *EPA administered permit programs: The National Pollutant Discharge Elimination System.*
    Part 124: *Procedures for decision making.*
    Part 133: *Secondary Treatment Regulation.*
    Part 503: *Standards for the Use or Disposal of Sewage Sludge.*

6. EPA Technical Support Document for Water Quality-based Toxics Control dated March, 1991.

7. *Regions 9 & 10 Guidance for Implementing Whole Effluent Toxicity Testing Programs*, US EPA, May 31, 1996.

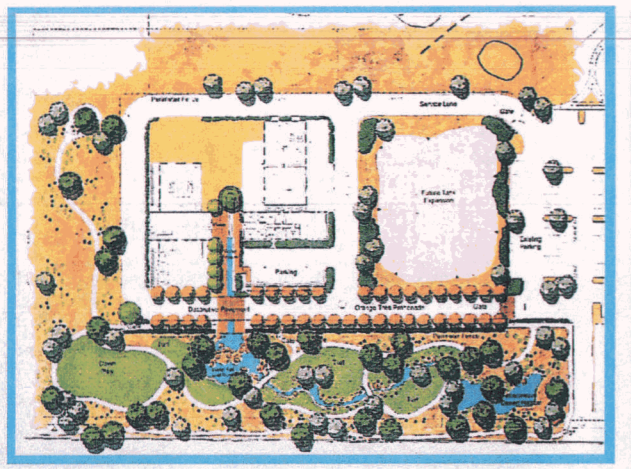
8. *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (EPA /821-R-02-013).

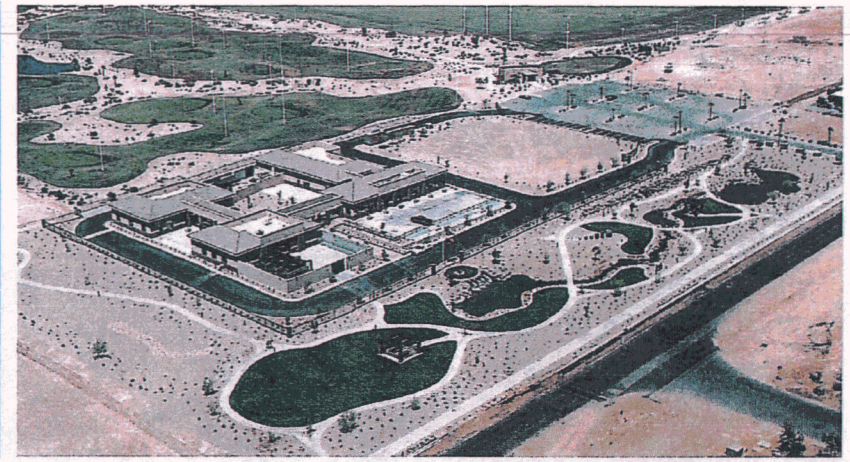
9. U.S. EPA NPDES Permit Writers Manual, December 1996.

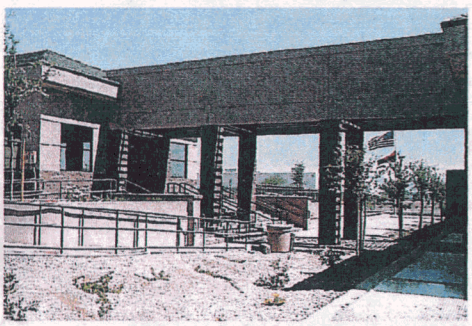
Extras - Duplicates, maps
will probably

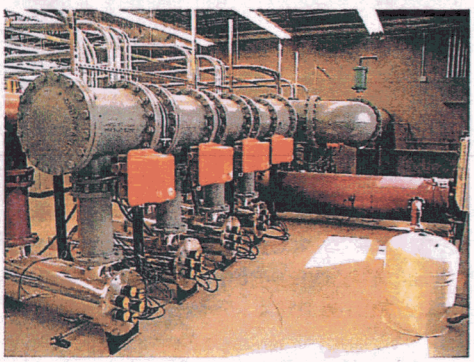
ATTACHMENT I

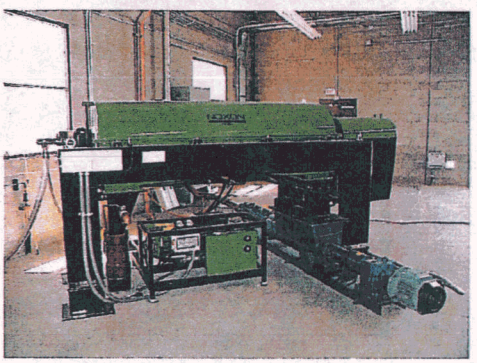
Palm Valley WRF











PACE
PACIFIC ADVANCED CIVIL ENGINEERING, INC.

Palm Valley WRF

244 Goodyear, Arizona

CLIENT	JOB TYPE	PERSONNEL INVOLVED	START-COMPLETE
LPSCo 111 W. Wigwam Blvd., Ste. B Litchfield Park, AZ 85340 Dave Ellis (623) 935-9367	Design: Advanced Activated Sludge Water Reclamation Facility	Principal - Johan Perslow, P.E. Project Manager - James Matthews, P.E. Project Engineer - Duong Do, P.E.	November 2000 to April 2001 #7244

PROJECT DESCRIPTION • • • • • • • SCOPE OF PACE SERVICES

Design of a 4.1 MGD (expandable to 8.2 MGD) water reclamation facility.

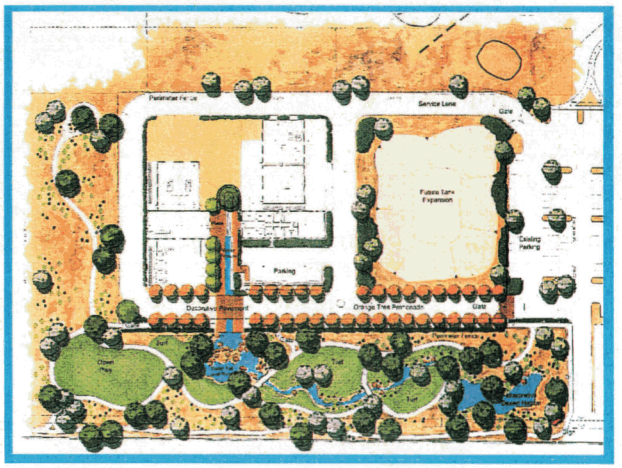
PACE provided the residential community in the City of Goodyear with the design for a two-phase, 8.2 MGD water reclamation facility. The project had an extremely tight schedule to implement ADEQ Class A+ treatment, and PACE successfully led design and start-up services to complete the project in less than 18 months from start to finish. The facility features advanced biological nutrient removal disc filtration, UV disinfection and an Auto Thermophilic Aerobic Digestion (ATAD) process for EPA Class A biosolids. In addition to design, PACE addressed all permitting issues and provided construction documents and services during construction.

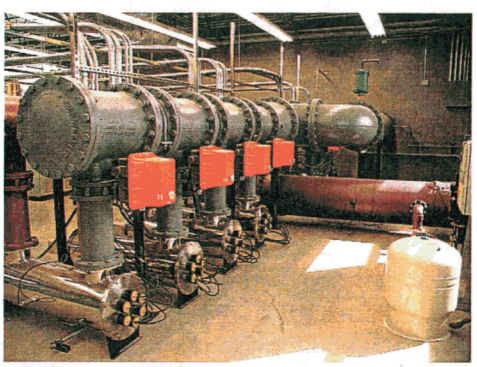
By utilizing a small footprint and eliminating offsite odors, LPSCo was able to incorporate a park highlighted by an elaborate water feature designed by PACE utilizing 100% effluent from the treatment facility. Construction of the water feature including 3 ponds, manmade rock, water cascade and stream was completed by PACE's strategic alliance partner, Pacific Aquascape, Inc. The West Valley Fine Arts Center designed the art piece residing in the park, entitled "Recyclamation!". This art piece represents the contribution man makes to preserving or harming Earth. The Palm Valley WRF represents one of the many steps man has made to preserve Earth's most precious resource.

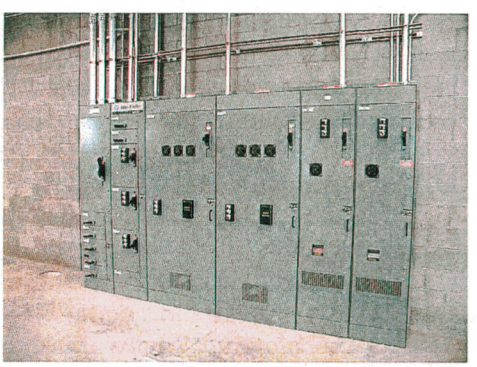
(see reverse)

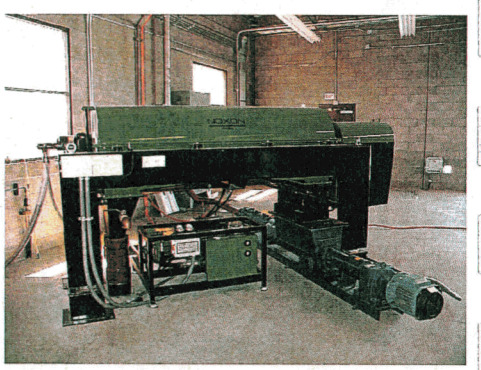
PACE
PACIFIC ADVANCED CIVIL ENGINEERING, INC.

Palm Valley WRF









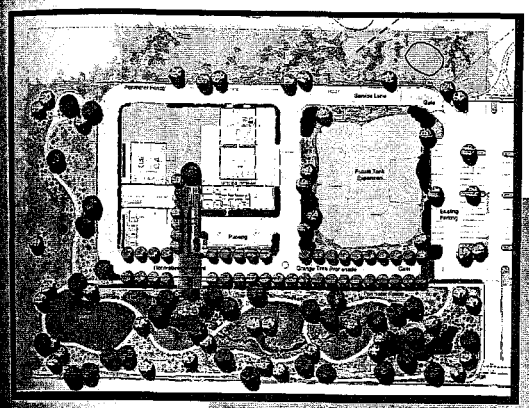
PACE
PACIFIC ADVANCED CIVIL ENGINEERING, INC.

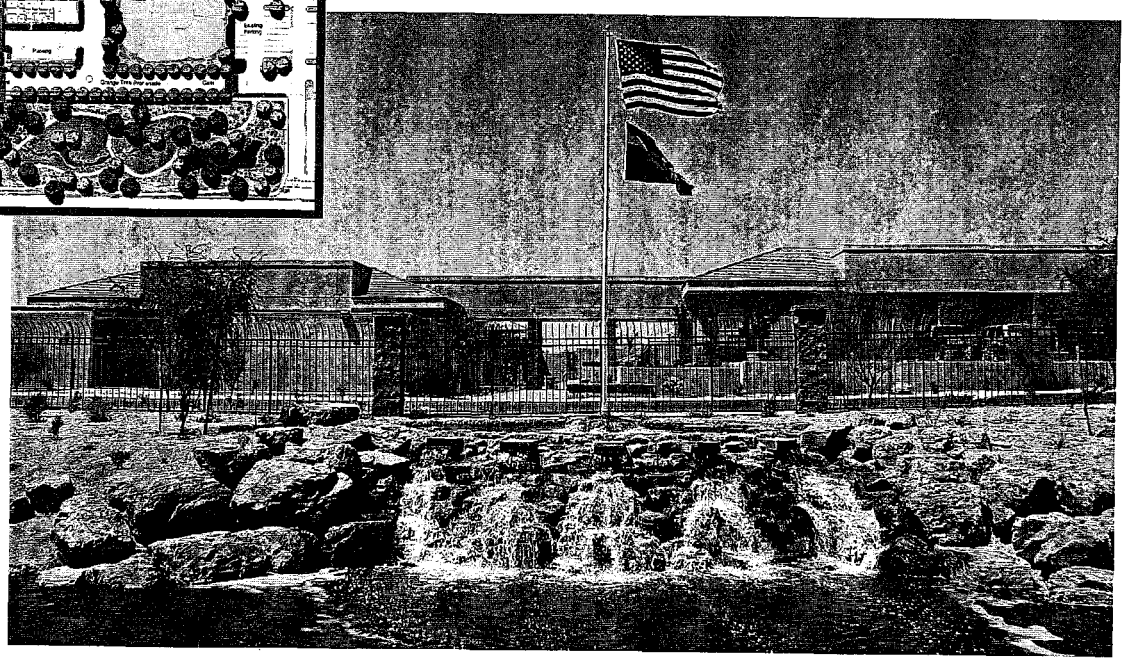
Pacific Environmental Resources Corp.

PALM VALLEY WRF

Goodyear, Arizona

CLIENT	JOB TYPE	START-COMPLETE
LPSCo. / City of Goodyear 111 W. Wigwam Blvd., Ste. B Litchfield Park, AZ 85340 Dave Ellis (623) 935-9367	Design / Build/Operate: Water Reclamation Facility	November 2000 to April 2002





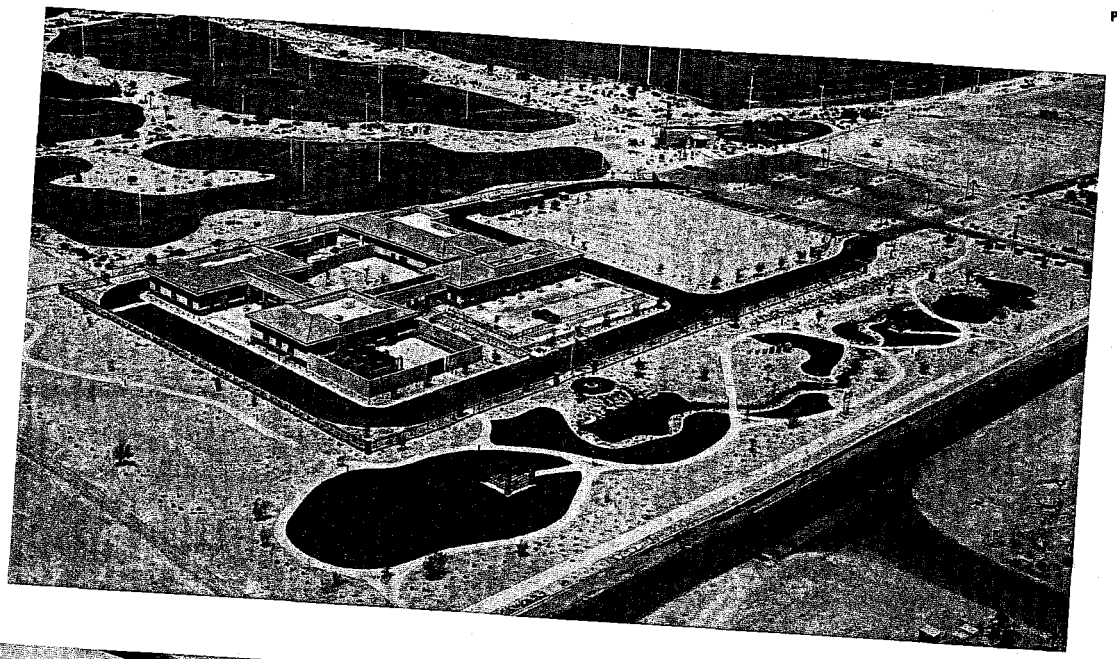
SCOPE OF PERC SERVICES

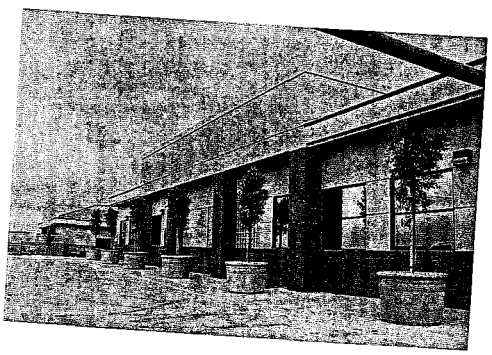
Construction and operation of a 4.1 MGD (expandable to 8.2 MGD) water reclamation facility.

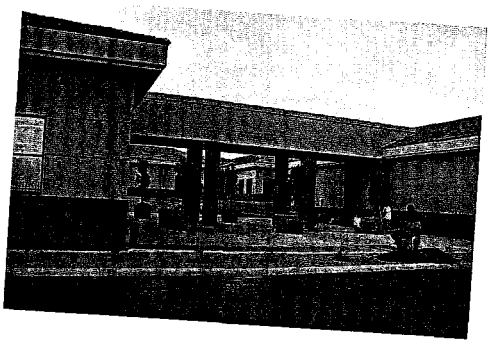
was contracted to provide the residential community in the City of Goodyear with a two-phase, 8.2 MGD clamation facility. The design/build/operate approach provided by PERC allowed SunCor Development nfield Park Service Company (LPSCo) to implement ADEQ Class A+ treatment in less than 18 months rt to finish. The facility features advanced biological nutrient removal disc filtration, UV disinfection uto Thermophilic Aerobic Digestion (ATAD) process for EPA Class A biosolids. In addition to design, business alliance partner PACE addressed all permitting issues and provided construction documents ces during construction. PERC is providing construction for all phases, and will also be operating the aminimum of two years.

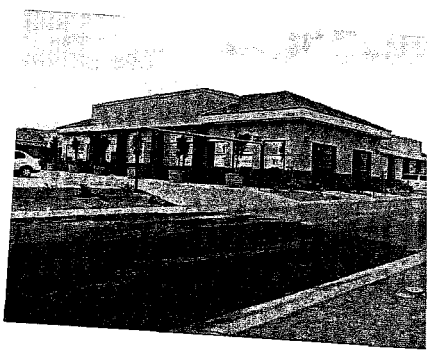
nga small footprint and eliminating offsite odors, LPSCo was able to incorporate a park highlighted by ate water feature designed by PACE utilizing 100% effluent from the treatment facility. Construction of feature including 3 ponds, manmade rock, water cascade and stream was completed by strategic rtner, Pacific Aquascape, Inc. The West Valley Fine Arts Center designed the art piece residing in the ted "Recyclamation!". This art piece represents the contribution man makes to preserving and arth. The Palm Valley WRF represents one of the many steps man has made to preserve Earth's most source.

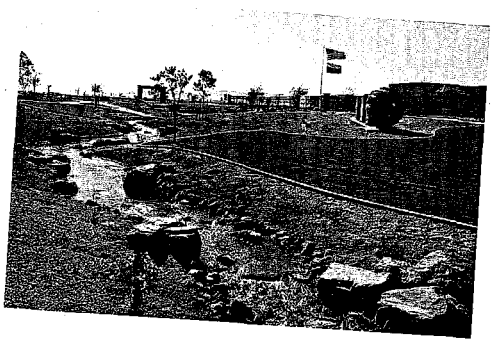
PALM VALLEY WRF

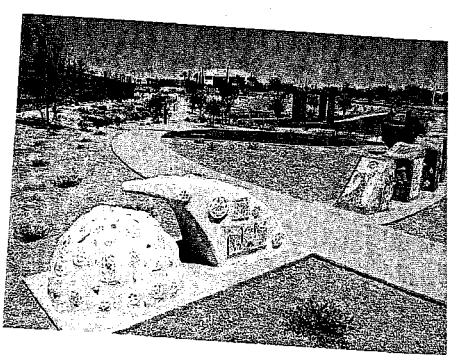


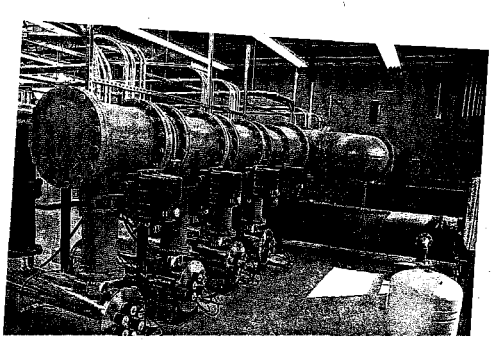


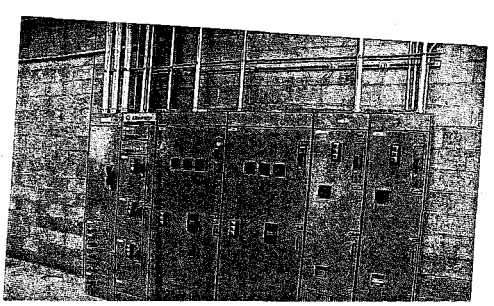












247

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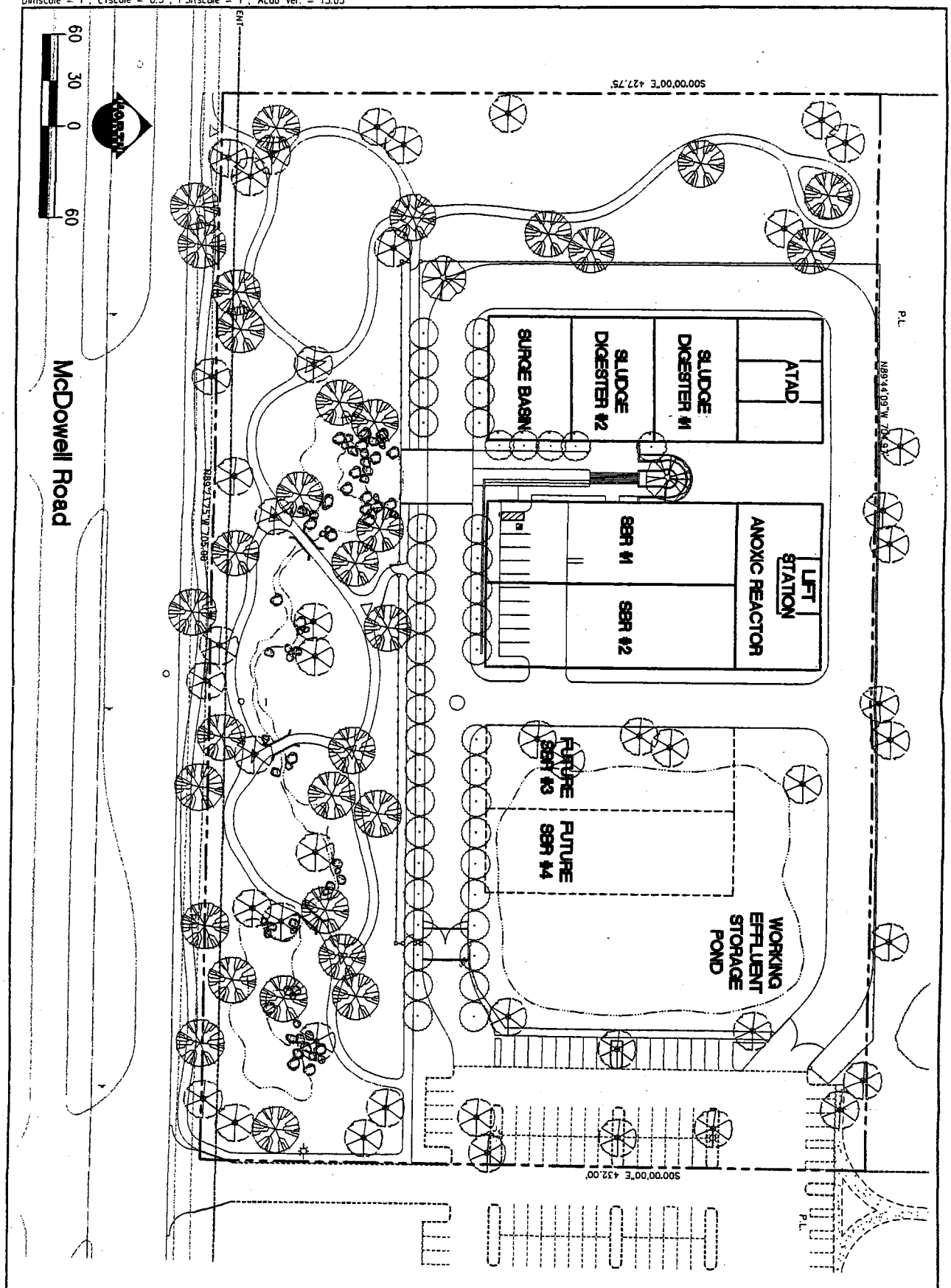

FIGURE 05

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17992 GEORGETOWN LANE, H.B. CA. 92647
(714) 843-5734 FAX. 848-4822

SCALE	1"= 60'
DESIGNED	JAM
DRAWN	DAD
CHECKED	DDT
DATE	12/27/00
JOB NO.	7244E

JOB
PALM VALLEY
WRF-PHASE I
RECLAMATION FACILITY
GOODYEAR AZ

TITLE
TREATMENT PLANT SITE LAYOUT

P:\7244\EXHIBITS\7244 Site (11x17).dwg By: DAVIDD Date: Dec. 27, 2000 Time: 04:36 pm

Xrefs: 7244-20-CIVIL-TBLK.dwg
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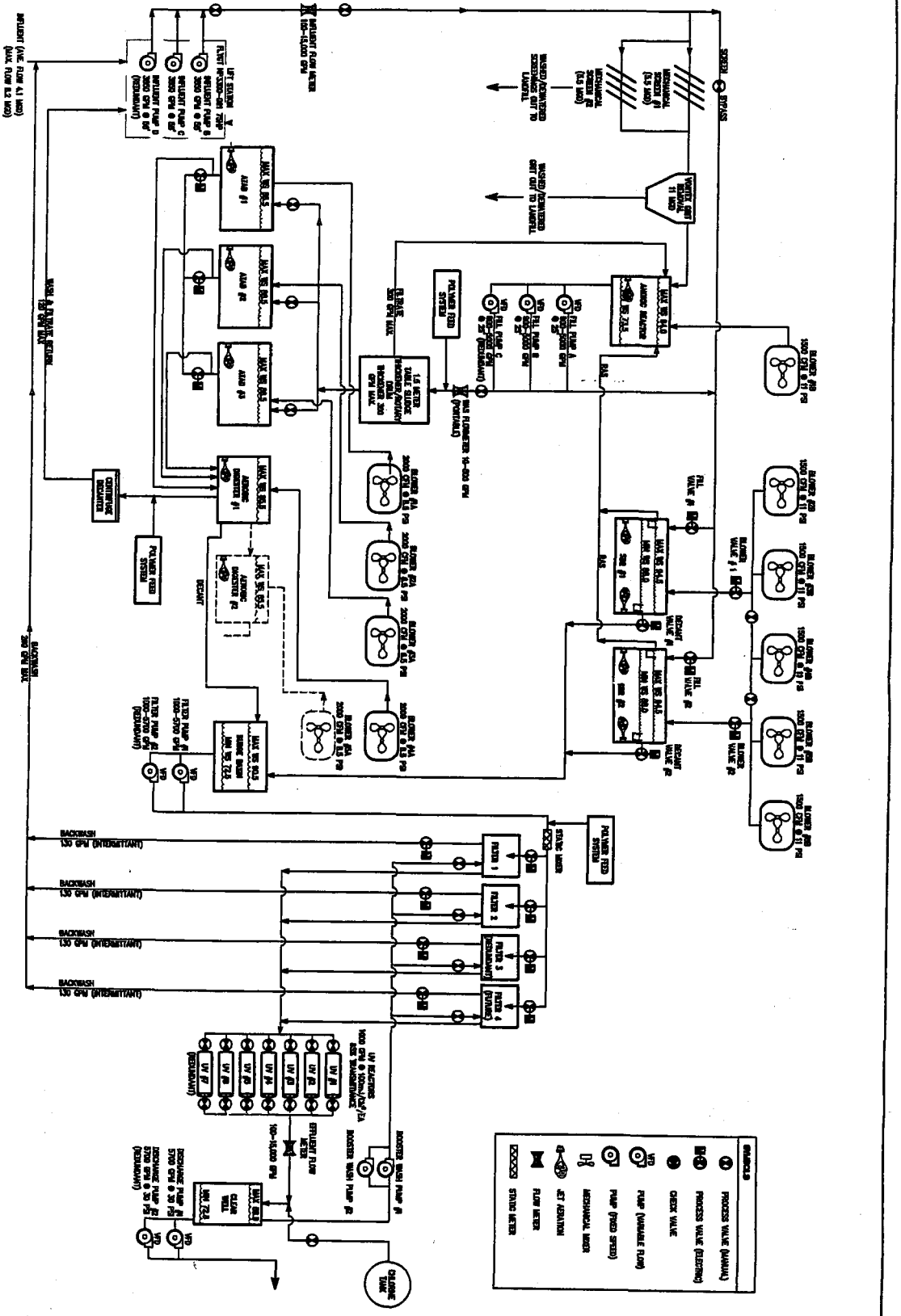
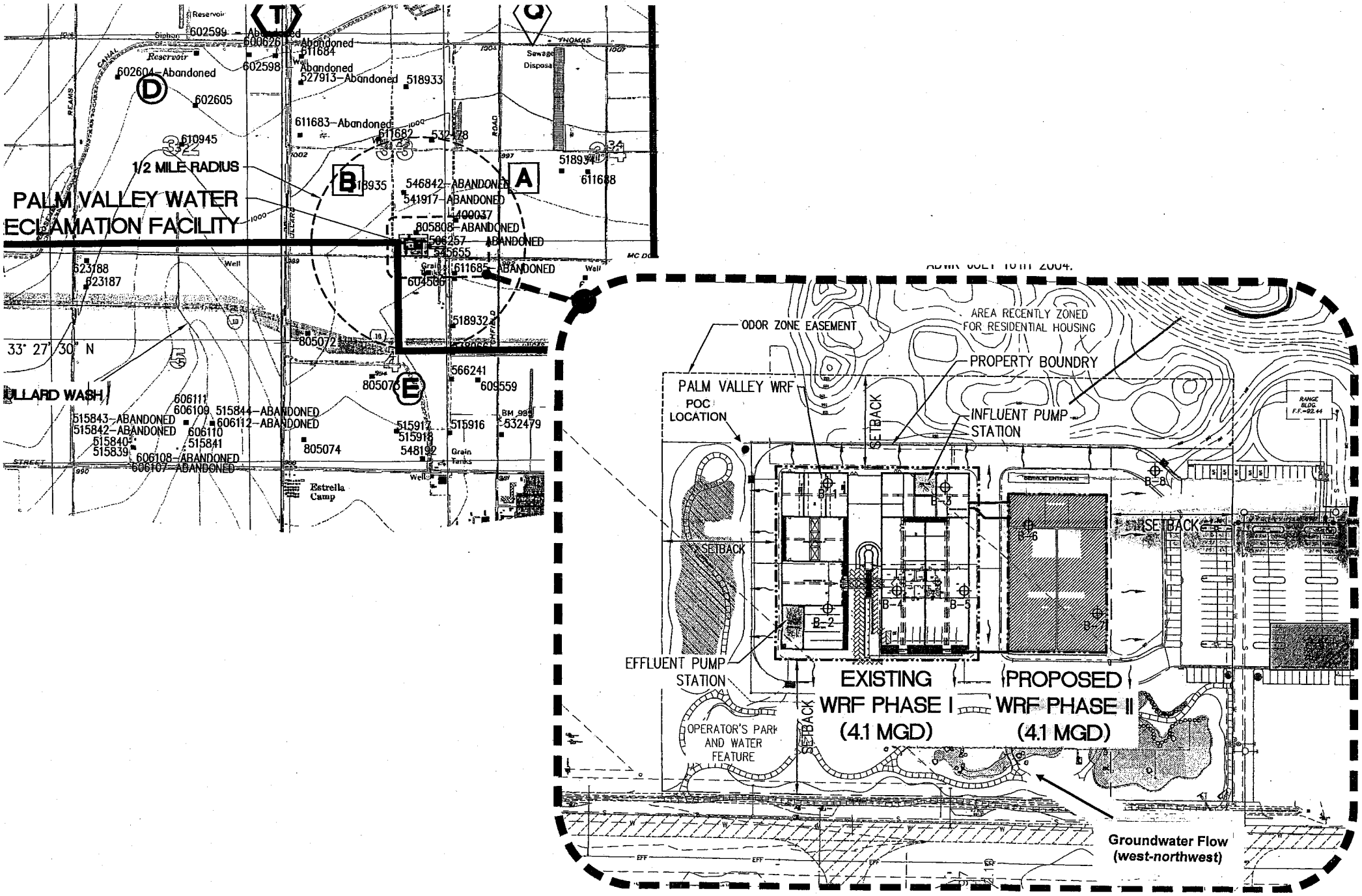




PALM VALLEY WATER
RECLAMATION FACILITY
1/2 MILE RADIUS
33° 27' 30" N
ULLARD WASH
Estrella Camp
ODOR ZONE EASEMENT
AREA RECENTLY ZONED FOR RESIDENTIAL HOUSING
PROPERTY BOUNDRY
PALM VALLEY WRF
POC LOCATION
INFLUENT PUMP STATION
SETBACK
EFFLUENT PUMP STATION
OPERATOR'S PARK AND WATER FEATURE
EXISTING WRF PHASE I (4.1 MGD)
PROPOSED WRF PHASE II (4.1 MGD)
Groundwater Flow (west-northwest)

249.

II. GENERAL REQUIREMENTS

Design and Construction Standards

The design and construction of the Palm Valley WRF Phase II will be in conformance with the following codes:

- MAG – Uniform Details and Standard Specifications for Public Works Construction – 1998
- City of Goodyear Engineering Standards and Policies Manual
- ADEQ Engineering Bulletin 11 – 1978
- Uniform Building Code (UBC) – Latest Edition
- Uniform Plumbing Code (UPC) – Latest Edition
- Uniform Fire Code – Latest Edition

Permits

Table 1 list the permits required for Palm Valley WRF Phase II.

Table 1. Required Permits

Requirement	Regulatory Agency
Permit to Construct (ATC)	Maricopa County Environmental Services Department
Approval of Construction (AOC)	Maricopa County Environmental Service Department
Aquifer Protection Permit (APP) – Amend	Arizona Department of Environmental Quality
Groundwater Savings Facility Permit	Arizona Department of Water Resources
Reclaimed Wastewater Reuse Permit	Arizona Department of Environmental Quality
Air Quality Permit – Amended	Maricopa County Environmental Services Department
Grading Permit	City of Goodyear
Architectural and Zoning Approval – Amended	City of Goodyear
Building Permit	City of Goodyear
Flood Control	Maricopa County/Flood Control

Electrical Power Supply and Controls

The Palm Valley WRF has a 3000 amp service entrance and meter section installed at the north end of the facility. From the service pedestal, power is routed to a 3000 amp Automatic Transfer Switch (ATS). The transfer switch is fed by both the prime APS power source and a 1500 KW diesel powered generator. In the event that prime power is lost due to service provider failure or construction damage, the ATS will automatically start the generator and transfer power to generator service. Once prime power is restored, the ATS will automatically transfer back to prime power. The generator is equipped with a 12-hour fuel tank and automatic exerciser clock, which runs the generator once a week to ensure proper operation when needed. The 1500 KW generator is sufficient for both phases of facility.

From the ATS, power is routed to two independent sub-distribution panels, which currently supply power to all existing processes, and will supply power to the proposed Phase II facility. The power from each sub-distribution panel will be run in parallel. In the event that one sub-distribution panel is out of service, the unit processor will still remain operational.

Each of the buildings has two independent Motor Control Centers (MCC), powered by the sub-distribution panels. The MCCs are controlled by a local programmable logic control (PLC), which communicates via network to other PLC units in the plant. By having the command instruction local to each system, a PLC problem with one controller or network connection will not affect other controllers in the system.

All PLC units are currently, and will be Allen Bradley modular controllers. By providing commonality between PLCs, spare parts and service requirements will be reduced. The following completed Phase II processes will use PLC control:

- SBR Mechanical and Process Controls
- Influent Screening Process
- Effluent Filtration
- UV Disinfection
- Solids Processing and Dewatering

Potable and Non-Potable Water Systems

Potable water is currently available from the city's water mains. However, the new Phase II expansion building will not need a new potable water connection. Only reclaimed water will be plumbed to provide equipment wash down. Water for fire protection is already available from Phase I. Based on the Uniform Fire Code, the required fire flow for the entire facility will be approximately 2000 GPM for a duration of 2 hours.

Reclaimed water will be used to irrigate landscape around the Phase II Expansion, similar to the existing irrigation layout. Purple pipe will be used above and below ground to identify the reclaimed water lines from other potable and non-potable piping systems. Separation between potable and non-potable water lines will be maintain to MAG – Uniform Details and Standard Specifications for Public Works Construction, Detail 404-1.

Plumbing Color Coding and Marking Requirements

All exposed plumbing in the Phase II Expansion will be properly color coded and marked. The following color-coding will be used to identify and distinguish between plumbing and piping systems:

Palm Valley Water Reclamation Facility
Phase II
Design Calculations
Duong Do, P.E.
March 30, 2004

Calculation Methods Adapted from:
H. David Stensel, Ph.D., P.E.
University of Washington

DESIGN CONDITION

Flow:

Average	4.1 Mgal/d
Peak Day	8.2 Mgal/d
Peak Hour	11.07 Mgal/d

Wastewater Parameters:

BOD5	300 mg/L
TSS	300 mg/L
TKN	40 mg/L

Plant Design Load:

BODs	10,258 lb/d
TKN	1,368 lb/d
Water Temp.	25° C
Ambient Air Temp.	38° C

Effluent Parameters:

BOD5	< 5.0 mg/L
TSS	< 5.0 mg/L
TN	< 10.0 mg/L
Turbidity	< 2 NTU
Coliform (FCU/100 ml.)	non-detect

PROCESS OPERATION (TWO AEROBIC SBR TANKS)

Operation description:

influent feed rate. Thus, the anoxic volume is drawn down during fill. Following the fill cycle, the SBR water level is at the top of the tank and interact phase is initiated. In the interact phase, mixed liquor and influent from the anoxic reactor continue to be transferred to the SBR. With the SBR full, activated sludge flows back to the anoxic tank via the RAS weir. The overflow from the aerobic SBR tank feeds NO_3-N to the anoxic tank, which was produced by aerobic nitrification of NH_4-N. During interact the anoxic reactor again begins to fill with in coming raw wastewater. Once the anoxic reactor level reaches a pre-determined set-point, the SBR stops interact and initiates settle, followed by decant and idle to complete its cycle. At the point when the first SBR goes to settle, the other SBR starts a new cycle by initiating fill.

The following tables show the time sequence and volume changes during a complete cycle for each aerobic SBR tank.

1. Cycle Times Per Aerobic Tank – From Table 6.0:

Fill	37 min (mix during fill)
Interact	107 min
Settle	50 min
Decant	36 min
Idle	58 min
Total Time	288 min/cycle

Number of cycles/day/tank	=	1440 min/day / 288 min/cycle
	=	5 cycles/day
@ 2 tanks	=	10 fills/day

2. Fill volume at average design load:

Average volume/fill	=	4.1 MGD / 10 fills
	=	410,000 gal/fill

Fill Volume = Aerobic Tank Decant Volume
Decant volume = 410,000 gallons

Aerobic Tank Area = 148.25 ft x 58.25 ft
= 8,635 ft^2

3. Determine Decant depth:

Decant Depth (ft) = (Decant Volume, ft^3) / (Aerobic tank area ft^2)

Assume:
Total surface area of Anoxic Tank = (38.25' x 118.25') = 4,523 ft^2
Average day flow of 4.1 MGD = 2917 gpm into Anoxic Tank

Average Flow out of Anoxic Tanks = 11,000 gpm[a] (using one pump)
[a] – fill pumping rate conservatively calculated @ 20' TDH

Actual flow out of Anoxic Tanks = 11,000 gpm – 2,917 gpm
= 8083 gpm

SBR fill time = 410,000 gallons / 11,000 gpm = 37 min.

Therefore: Volume change in anoxic tanks = 8,083 gpm x 37 min = 299,071 gallons
Calculated depth change at the end of Fill for 4.1 MGD = (299,071 gal / 7.48) / (4523 ft^2) = 8.8 ft

5. The following shows the changes in anoxic volume and the cycle operation:

CYCLE DESCRIPTION

Δ t min	Total Time (min)	Anoxic Volume	Aerobic 1 Volume/Condition	Aerobic 2 Volume/Condition
	0	Top Water Start Fill #1	Bottom Water Stop Idle/Start Fill	Top Water Start Settle
+37	37	Bottom Water Draining	Top Water Start Interact	Top Water Settling
+13	50	Filling	Top Water Interact	Stop Settle Start Decant
+36	86	Filling	Top Water Interact	Bottom Water Stop Decant/Start Idle
+58	144	Top Water Start Fill #2	Top Water Start Settle	Bottom Water Stop Idle/Start Fill
+37	181	Bottom Water Draining	Top Water Settling	Top Water Start Interact
+13	194	Filling	Stop Settle Start Decant	Top Water Interact
+36	230	Filling	Bottom Water Stop Decant/Start Idle	Top Water Interact
+58	288	Top Water Start Fill #1	Bottom Water Stop Idle/Start Fill	Top Water Start Settle

Average Daily Load To Each Aerobic SBR Tank:

BOD	=	10,258 lb/d	÷ 2	=	5,129 lb/d/t
TKN	=	1368 lb/d	÷ 2	=	684 lb/d/t

SBR Tank Volume at Full

= (25 ft Depth) 8636 ft^2
= 215,900 ft^3
= 1,614,932 gallons

1. Determine equivalent hydraulic retention times

Equivalent Hydraulic Retention Time (HRT):

HRT = 1,614,932 gal / (4.1 MGD / 2 tanks) x 24 hrs = **18.9 hrs**

Equivalent Anoxic HRT
Maximum Depth = 25 ft
Normal Max. Depth : 25 – 9.0 = 16.0 ft (volume of full batch avail.)
Anoxic tank depth (Average): = 16.0 ft – (8.8 / 2) = 11.6 ft

Anoxic Volume = (11.6 ft) (4,523 ft^2)
= 52,467 ft^3
= 392,452 gallons

HRT = (392,452 gal / 4.1 MGD) x 24 hrs = 2.3 **hrs**

2. Determine Aerobic Tank SRT
Assume that MLSS = 3500 mg/L – typical of SBR operations

Check for sufficient depth in aerobic reactor during settling to handle a MLSS of 3500 mg/L, based on typical SVI achieved:

Assume SVI = 120 mg/L

Thickened MLSS during settling = $\frac{10^6}{SVI}$ = 8333 mg/L

MLSS mass full = MLSS mass in settled volume

So sufficient depth in settle and decant period to handle MLSS of 3500 mg/L

To determine system SRT, a solids balance is needed accounting for solids yield and BOD removal. The following is a standard equation for solids yield that accounts for biomass production and inert solids that enter with wastewater and are not degraded and accumulate in the system:

Net Solids Yield: $\left(\frac{Y}{1+bSRT}+Y_I\right)=Y_N$

Y	=	g VSS/g BOD removal ≈ 0.60 g/g
B	=	0.08 g/g-d
SRT	=	Solids retention time, days
Y_I		g non-biodegradable solids / g BOD ≈ 0.50 g/g

V(MLSS)	=	Y_N (ΔBOD)Q (SRT)
Q	=	2.05 Mgal/d/tank
ΔBOD	=	300 mg/L
V	=	1.61 Mgal
Y_N	=	$\left(\frac{0.6}{1+.08\,SRT}+0.50\right)$
MLSS	=	3500 mg/L

Solve for SRT
Use spreadsheet:

$$(3500)(1.61) = \left(\frac{0.6}{1+.08\,SRT}+0.50\right)(300)(2.05)\,SRT$$

SRT = 14.4 days

3. What is the net solids yield?

$Y_N = (0.60 / (1 + 0.08 \times 14.4) + 0.50 =$ **0.8 gTSS/g BOD**

4. Determine the aerobic SRT, which accounts for the time that the mixed liquor is under aeration (accounts for fraction of aeration time per cycle):

Design for 12 hrs/day/tank,

Aeration Fraction = 12 hours aeration / 24 per day = 0.5 hours aeration/day/tank

Aerobic SRT @ 3500 mg/L MLSS = 0.5 (14.4 d)
= 7.2 days

5. Determine if this aerobic SRT is sufficient to result in satisfactory nitrification and maintain concentrations of nitrifiers in the system (i.e. the minimum nitrifier growth rate must exceed the wasting rate) – the design goal is to achieve is NH4-N concentration less than 0.5 mg/L.

Because of recirculation through the anoxic tank with continuous feeding, the aerobic SBR tank can be considered equivalent to a continuously stirred tank reactor (CSTR). Thus, we can consider that the minimum nitrifying bacteria growth rate (i.e. growth rate is minimized at the lowest substrate concentration) is related to the aerobic SRT as follows. From this we can determine the NH4-N concentration expected in the SBR related to the nitrifier growth rate and sludge wasting rate (i.e. SRT).

$$\frac{1}{SRT} = \mu = \frac{\mu_m N}{K_N + N}$$ Nitrification Monod Kinetics

where:
μ = specific growth rate of nitrifiers, g/g-d
N = NH_4-N Conc., mg/L
μm = Maximum specific growth rate, 0.72 g/g-d @ 25° C
K_N = 0.75 mg/L
(EPA Nitrogen Control Manual, 1993)

From above the aerobic SRT = 7.2 days

$\mu = 1 / SRT = 1/ 7.2 = 0.139$
$0.139 = 0.72 \times N / (0.75 + N)$
$N = NH_4\text{-}N = 0.18$ mg/L

Sufficient capacity for complete nitrification

Check safety factor for NH4-N = 0.50 mg/L treatment goal

PERFORM NITROGEN BALANCE TO GET AMOUNT OF N OXIDIZED

Nitrogen N = nitrogen for synthesis + effluent N + N oxidized to nitrate

Nitrogen for synthesis: SRT = 14.4 days @ 3500 mg MLSS

Biomass Yield = Y / (1 + b x SRT) = 0.8 / (1 + 0.08 x 14.4) = 0.37 g VSS / g BOD

Biomass Produced = (0.37 g VSS/g BOD) * (300 mg/L – 5 mg/L BOD) = 109 mg/L

@ 10% nitrogen, N synthesis = 0.10 (109) = 10.9 mg/L

Assume 30% N for synthesis is returned/recycled during digestion/dewatering of sludge:

10.9 mg/L – (0.3 * 10.9 mg/L) = **7.6 mg/L**

Nitrate Produced:

TKN – Nsyn – NH_4-N = NO_3-N

40 – 7.6 – 0.5 = NO_3-N

NO_3-N = **31.9 mg/L**

NO_3-N Produced Per Feed Cycle:

= 31.9 mg/L (0.41 Mgal / cycle) * 8.34 = **109 lb/cycle**

EVALUATE NITROGEN REMOVAL CAPACITY

1. Determine NO3-N balance:

Since the reactor approaches a complete mix operation with the internal recycle, we can assume a relatively constant NO3-N concentration in the aerobic reactor. The nitrate produced has to be accounted for as follows:

NO3-N produced = **(109 lb/cycle)**

A. - Aerobic reactor nitrate loss (denitrification) will occur in the mixed liquor during the decant, settle, and idle periods when oxygen is depleted.

Use SDNR for endogenous respiration per the following reference:

Biological Nutrient Removal, Randall, Barnard, and Stensel, Technomics, 1992

$$SDNR=\left(\frac{0.50}{2.86}\right)\left(\frac{An}{Yn}\right)\left(\frac{1}{SRT}\right)$$

$$An = 1.5 - 1.42Y + \frac{1.42bYSRT}{1+bSRT}$$

$$Yn = \frac{Y}{1+bSRT} + Y_I$$

An = 1.5 – (1.42 * 0.6) + ((1.42)(0.08)(0.6)(7.2) / (1 + (0.08)*(7.2))) = 0.96

Yn = (0.6 / (1 + (0.08)*(7.2))) + 0.50 = 0.88

SDNR = (0.5/2.86) * (0.90/0.92) * (1/14.4) = **0.013 g/g-d**

Removed = SDNR(V)(MLSS)(8.34)(time),

Time = 50 min (Settle)
+ 36 min (Decant)
+ 25 min (half of idle)
= 111 min (Total)

= (0.013)(1.61)(3500)(8.34)(111)/60/24

= **47.1 lb/cycle**

B. - Denitrification occurs in the SBR during anoxic mix throughout the cycle of interact when air is periodically turned off. For conservative purposes, the denitrification value from this process is not used.

C. - NO3-N allowed to be in the effluent is < 9.5 mg/l;

Assume 5 mg/L of NO3-N is discharge:

Removed = (5 mg/l) * (0.410) * (8.34)

= 17.1 lbs/cycle

D. - Determine how much NO3-N must be removed in anoxic zone:

NO3-N to be removed on anoxic zone = 109 lb/cycle – 47.1 – 17.1

= 44.8 lb/cycle

D. (continued) Determine amount of nitrate fed to anoxic reactor:
To evaluate the nitrate removal capacity we have to determine the amount of nitrate that flows from the aerobic reactor to the anoxic tank and use the SDNR to determine if it can be sufficiently reduced.

Nitrate return feed rate to anoxic zone (using only one fill pump):
Flow to anoxic = 11000 gpm (107 min) = 1,177,000 gallons/cycle
Average initial nitrate concentration in the recycle flow:

NO3-N (mg/L) = ((109 lbs N / 1.61 Mgal) / 8.34) = 8.1 mg/L

Assume 60% of this concentration = 5 mg/l

At 5 mg/L NO3-N = 5 * (1.177) * (8.34) = 49.1 lb/cycle

As 49.1 lb/cycle > 44.8 lb/cycle, the system is not limited by recycle rate

Determine NO3-N removal capacity of anoxic reactor:

Specific Denitrification Rate in the Anoxic Reactor can be related to BOD F/M Ratio. (EPA Nitrogen Control Manual)

SDNR = 0.03 F/M + 0.029
SDNR = Specific NO_3-N reduction rate, g NO_3-N / g MLSS-d
F/M = g BOD / g MLSS-d

$$F/M = \frac{4.1 \text{ Mgal/d} \times 300 \text{ mg/L BOD}}{3500 \text{ mg/L} \times 0.392 \text{ Mgal (average depth)}}$$

F/M = 0.89 g/g-d
SDNR = 0.056 g/g-d

The SDNR $\cong$ 0.056 g NO_3-N/g MLSS-d

$$NO_3\text{-N removal} = (\text{Volume})(\text{MLSS})(\text{SDNR})\frac{\Delta t}{\text{cycle}}(8.34)$$

Average Anoxic Volume = 0.392 Mgal

Δt = 107 min = 1.78 hours = 0.074 days/cycle

DETERMINE OXYGEN REQUIRED

Flow/Tank	= 2.05 MGD
BOD	= 300 mg/L
NO_3-N Produced	= 31.9 mg/L
Effluent TN	= < 5 mg/L

Oxygen for BOD Removal:

$$O_2 = [1.5]\frac{gO_2}{gBOD}(BOD)Q - 1.42P_{XBio}$$

P_{XBio} = Biomass sludge wasted/day

Biomass yield = 0.37 gVSS/gBOD

P_{XBio}/Tank = 0.37 g/g x 300 mg/L x 2.05 MGD x 8.34
= 1,897.8 lb/d

Lbs O_2/day = 1.5 g O_2 / g BOD x (300 mg/L – 5 mg/L) x 2.05 MGD x 8.34 – 1.42 x 1,897.8 lb/d

= 4,871 lb O_2/day

Max Aeration Time Available

= 37 min (fill) + (107 min) (interact) + 29 min (idle) / 288 (cycle) = 0.6

0.6 (24 hr/d) = 14.4 hrs/day available aeration

Design Aeration Time = **12.0 hrs/day**

Lbs O_2 / hr aeration = 4,871 lb/d / 12.0 hrs/d = **406 lb O_2/hr (AOR)**

Nitrification O_2:

NO_3-N produced = 31.9 mg/L

Denitrification O_2 Credit:

NO_3-N reduced = 34.1 mg/L (accounts for 5 mg/L in effluent)

O_2 credit = 2.86 (34.1) (2.02) 8.34

Lbs O_2 / hr aeration = 1,643 / 12.0 = **137 lbs/hr (AOR)**

Net O_2 Require:

Net O_2 req'd/Tank = 406 (BOD) + 165 (Nitro) – 137 (De-nitro)

= 434 $lbsO_2/hr$

AOR = **434 $lbsO_2/hr$**

Determine Clean Water Transfer Rate

$$SOR = \frac{AOR(C_{Sat20a})}{\alpha\,(BC_{Sat,TH} - DO)(1.024^{T-20})}$$

$$C_{Sat,TH} = (C_{Sat})(0.5)\left[\frac{P_d}{P_{Atm,H}} + \frac{O_t}{21}\right]$$

$$C_{Sat20a} = (C_{Sat20})(0.5)\left[\frac{P_d}{P_{Atm20}} + \frac{O_t}{21}\right]$$

SOR = standard oxygen transfer rate

$\alpha = 0.6$ $\beta = 0.95$
$T = 25°C$ $C_{Sat} = 7.96$ mg/L (at 1000 ft Elevation)
$DO = 2.0$ mg/L $C_{Sat20} = 9.08$ mg/L
$P_d = 25$ psi $P_{Atm,H} = 14.17$ psi Please note: P_d = depth + atmospheric pressure
$O_t = 18\%$

$$SOR = \frac{AOR(C_{Sat20a})}{\propto (BC_{Sat,TH} - DO)(1.024^{T-20})}$$

$$SOR = \frac{43.4(11.6)}{0.6[(0.95)(10.43) - 2)](1.024^{25-20})}$$

SOR = 942 lbs/hr

Determine air rate @ 30% O_2 transfer efficiency

Blower CFM = SOR / (60 min/hr x Transfer Eff. x 0.0172 $lbO_2/ft3$)

Blower CFM = 942 / (60 * 0.3 * 0.0172)

Blower CFM = **3,042 SCFM @ 12.0 hours**

Each SBR requires one blower per tank with rated capacity of 3,042 scfm @ 11 psi using 12.0 hours aeration to provide design capacity. Provide (5) five blowers at capacity of **1,500 SCFM at 11** psi – two per tank with one redundant.

SURGE TANK AND FILTER DESIGN REQUIREMENTS

Decant Time = 36 min

Decant Volume = 0.410 Mgal
= 410,000 gal

Decant Rate = 410,000 gal / 36 min
= 11389 gpm

Using Decanters @ 110 gpm/ft – requires (6) 19 ft of weir length

---

Filter area: 53.8 ft^2/disc
8 Disc x 53.8 = 430.4 ft^2

Four filters in service

Flux rate (peak) = 11388 gpm / (430.4 ft^2 x 4 filter)
= 6.6 gpm/ ft^2 (< 8.0 gpm/ ft^2 - okay)

SLUDGE PRODUCTION

1. Waste to Aerobic Storage for Thickening (to 1.5%)
2. Aerobic Digestion for Solids reduction (assume 30%)
3. Dewater with centrifuge (polymer addition)
4. Haul to disposal

1. Pre-Thickened Sludge Volume

2. After Solids Reduction
   Assume 80% VSS = 16,413 lb TS x 0.8 = 13,130 lbs VSS
   Assume 40% VSS reduction in storage.
   TS after reduction = (16,413 lb TS – 13,130 lb VSS) + (13,130 lb VSS x (1 – 0.40))
   = 11,161 lb TS @ 4% = 33,456 gallons/day wet sludge

   Calculate Solids Storage in Aerobic Storage:

   ATAD storage = 52.5' x 25.5' x 19' = 25,436 ft^3 = 190,263 gallons
   3 ATAD = 570,789 gallons
   Aerobic Digester Area = 79.5ft x 52.5 ft = 4174ft^2 = 31,219 gallons/ft

   Total water depth in reactor = 21 feet
   21 ft x 31,219 gal/ft = 655,612 gal
   Therefore the available storage volume = 655,612gal x 2 ft = 1,311,224 gallons

   Total storage = 570,789 + 1,311,224 = 1,882,013 gallons
   1,882,013 gal / 33,456gal/day = 56 days

3. Final sludge for dewatering

   Volume = 33,456 gal/d @ 4%

   Provide 1 additional Centrifuge Unit @ 90 gpm loading rate

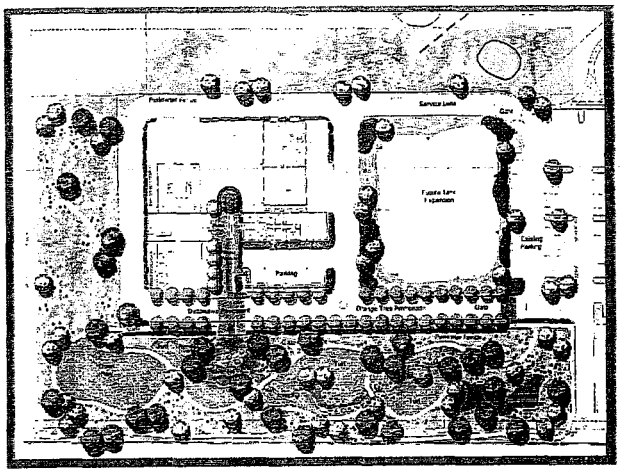
   Hours of operation per day @ design flow = 33,456 gal/d / 180 gpm x 60 min/hr
   = 3.0 hours per day @ 4%

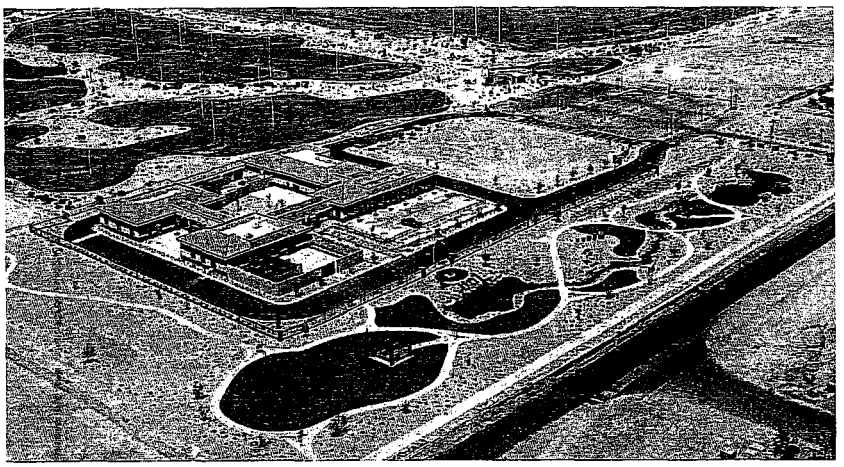
4. Final sludge for disposal

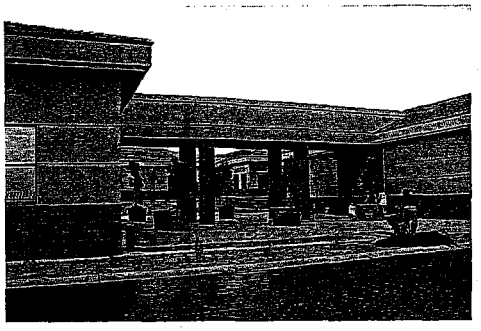
   Assume:
   Solids concentration from centrifuge = 25%
   Solids feed concentration = 4%

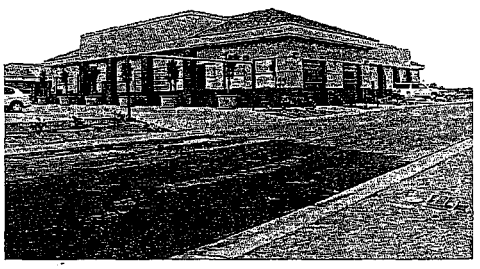
   Total volume of dewater sludge = 33,456 gallons x 4% / 25% / 7.48 gal/ft^3 / 27 ft^3/yd
   = 26.5 yd/day

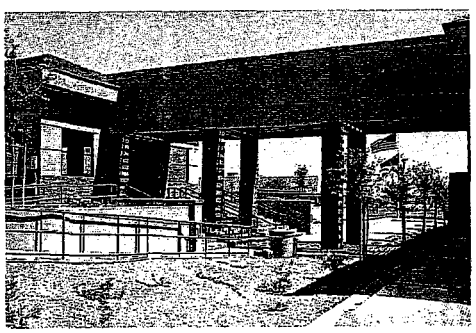
Palm Valley WRF

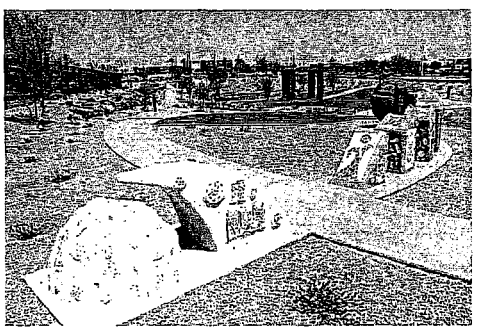


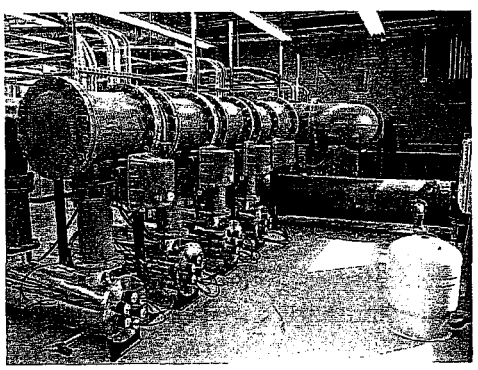


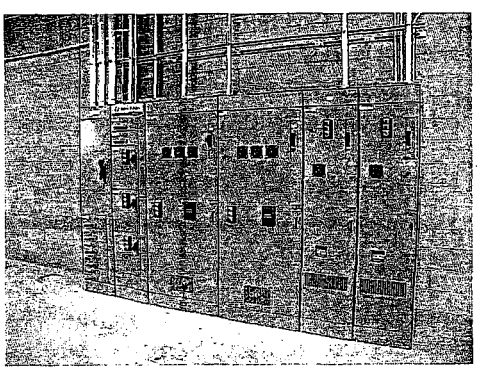


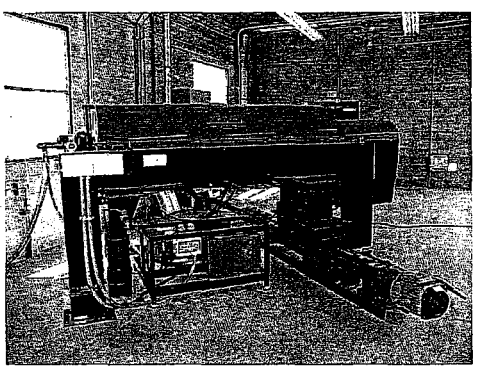






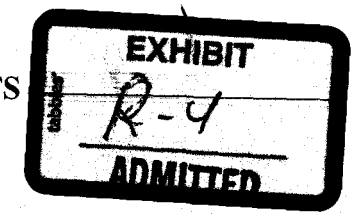






PACE
PACIFIC ADVANCED
CIVIL ENGINEERING, INC.

LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103, W-01427A-09-0104,
W-01427A-09-0116, and W-01427A-09-0120
RESPONSE TO RUCO'S EIGHTH SET OF DATA REQUESTS



December 14, 2009

Response provided by: Brian McBride

Company Name: McBride Engineering Solutions

Address: W. Gila Springs Place, Ste 7
Chandler, Arizona 85226

Company Response Number: MJR 8.1

Q. At page 5 line 21 of his Rebuttal testimony, Mr. McBride states "This type of situation is not unusual." Please provide examples of "this sort of situation" that Mr. McBride relies on to conclude that they are not unusual.

RESPONSE: The reference in that sentence of Mr. McBride's testimony refers to situations in which a wastewater facility is designed and engineered in accordance with applicable engineering and regulatory requirements and then subsequent additions and upgrades are constructed to increase the plant's reliability and redundancy and thereby decrease operations, maintenance, and crisis management costs. The sentence "this type of situation is not unusual" refers to the fact that the benefits for such plant additions and upgrades often will not be apparent until after a plant has been in operation for several years.

R-5

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

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

Janet Napolitano
Governor

Stephen A. Owens
Director

September 30, 2008

EXHIBIT
R-5
ADMITTED

Matthew Garlick
Litchfield Park Service Company
12725 W Indian School Rd, Suite D101
Avondale, AZ 85392

Re: Litchfield Park Service Company – Palm Valley Water Reclamation Facility (WRF)
Aquifer Protection Permit (APP) Other Amendment
Inventory No. 100310, LTF No. 47746

Dear Mr. Garlick:

Enclosed is a signed copy of an APP Other Amendment with Fact Sheet for the above referenced facility. The permit conditions shall apply from September 30, 2008, which is the date of the Water Quality Division Director's signature, and shall be valid for the life of the facility. Thank you for your cooperation in protecting the water quality of the State of Arizona.

If you have any questions please feel free to call me at (800) 234-5677 ext. 771-4498, or at (602) 771-4498. You can also contact me by email at rm4@azdeq.gov.

Sincerely,

Bob Manley

Bob Manley, Project Manager
APP and Reuse Unit I
Groundwater Section, Water Quality Division

cc: Asif Majeed, Supervisor, Groundwater Section, APP and Reuse Unit I
Farhana Jesmin, Groundwater Section, APP and Reuse Unit I – Letter Only
Marcy Mullins, Groundwater Section, Reuse Program Coordinator – Letter Only
Lynne Dekarske, Groundwater Section, Administrative Unit
Cynthia Campbell, Manager, Water Quality Compliance Section
Matthew Hodge, Supervisor, Water Quality Compliance Section, Data Unit
Marcia Colquitt, Supervisor, Water Quality Compliance Section, Compliance Assurance Unit
John Gibbons, Supervisor, Water Quality Compliance Section, Field Services Unit
Gary Harmon, Inspector, Water Quality Compliance Section, Field Services Unit
John Matta, P.E., WaterWorks Engineers
Sheba Hafiz, WaterWorks Engineers
Maricopa County Department of Planning and Development
Maricopa County Environmental Services Department

WRR08:0512

STATE OF ARIZONA
AQUIFER PROTECTION PERMIT NO. P-100310
PLACE ID 815, LTF 47746

1.0 AUTHORIZATION

In compliance with the provisions of Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Articles 1, 2 and 3, Arizona Administrative Code (A.A.C.) Title 18, Chapter 9, Articles 1 and 2, A.A.C. Title 18, Chapter 11, Article 4 and amendments thereto, and the conditions set forth in this permit, Litchfield Park Service Company (LPSCO) is hereby authorized to operate the Palm Valley Water Reclamation Facility, located at 14222 West McDowell Road in Goodyear, Arizona, in Maricopa County, over groundwater of the West Salt River Valley basin in the Phoenix Active Management Area, in Township 2 N, Range 1 W, Section 33, SE¼, SW¼, SW¼ of the Gila and Salt River Baseline and Meridian.

This permit becomes effective on the date of the Water Quality Division Director's signature and shall be valid for the life of the facility (operational, closure, and post-closure periods) unless suspended or revoked pursuant to A.A.C. R18-9-A213. The permittee shall construct, operate and maintain the permitted facilities:

1. Following all the conditions of this permit including the design and operational information documented or referenced below, and
2. Such that Aquifer Water Quality Standards (AWQS) are not violated at the applicable point(s) of compliance (POC) set forth below or if an AWQS for a pollutant has been exceeded in an aquifer at the time of permit issuance, that no additional degradation of the aquifer relative to that pollutant and as determined at the applicable POC occurs as a result of the discharge from the facility.

1.1 PERMITTEE INFORMATION

Facility Name:	Palm Valley Water Reclamation Facility
Facility Address:	14222 West McDowell Road Goodyear, Arizona 85338 Maricopa County
Permittee:	Litchfield Park Service Company
Permittee Address:	12725 West Indian School Road, Suite D101 Avondale, Arizona 85392
Facility Contact:	Mr. Matthew Garlick
Emergency Phone No.:	(623) 935-3005
Latitude/Longitude:	33° 27' 55" N/112° 21' 55" W
Legal Description:	Township 02N, Range 01W, Section 33, SE¼, SW¼, SW¼ of the Gila and Salt River Baseline and Meridian

1.2 AUTHORIZING SIGNATURE

Joan Card, Director
Water Quality Division
Arizona Department of Environmental Quality

Signed this 30th day of September, 2008

2.0 SPECIFIC CONDITIONS [A.R.S. §§ 49-203(4), 49-241(A)]

2.1 Facility / Site Description [A.R.S. § 49-243(K)(8)]

Litchfield Park Service Company (LPSCO) is authorized to operate the Palm Valley Water Reclamation Facility (WRF), a 4.1 million gallons per day (mgd) facility. The maximum average monthly flow at full build-out, to be completed as per Section 3.0, Compliance Schedule, is 8.2 mgd. The WRF process consists of an influent lift station, headworks with fine screens and grit removal, anoxic reactor/equalization tank and sequencing batch reactors (SBRs) for nitrification-denitrification, disc filters, an ultraviolet (UV) disinfection system, aerobic sludge digesters, and sludge dewatering centrifuges. The WRF is designed and constructed according to plans approved by ADEQ.

Effluent shall be used for on-site process water applications (such as equipment cleaning), reused for any allowable use under a valid reclaimed water permit (A.A.C. R18-9, Article 7), or discharged to the Roosevelt Irrigation District (RID) canal under a valid AZPDES permit. Discharges to the canal are exempt from APP requirements pursuant to A.R.S. § 49-250(B)(6) and (16). Sludge shall be aerobically digested and dewatered onsite by a centrifuge process. The dewatered sludge, including screenings, grit, and scum, shall be hauled off-site for management and disposal in accordance with State and Federal regulations.

The depth to groundwater is approximately 120 feet below ground surface and the direction of groundwater flow is towards the west-northwest.

The site includes the following permitted discharging facilities:

Wastewater Reclamation Facility	33° 27' 55" N	112° 21' 55" W

Amendment Description

This amendment reflects changes to the design of the facility. Palm Valley WRF has been modified by replacing the influent screens, installing a new odor control system, converting two aerobic digester tanks into Sequencing Batch Reactors (SBRs), converting existing Autothermal Thermophilic Aerobic Digestion (ATAD) tanks into sludge holding tanks, replacing a waste activated sludge (WAS) pump, installing a new centrifuge, installing new filter feed and effluent pumps, and replacing the UV disinfection system. The existing centrifuge and UV disinfection system will remain in place for standby use. These changes will allow the two existing SBR units to be taken out of service (one at a time) to maintain and/or replace aeration headers, pumps, decanters and other support equipment located in the SBR tanks. In addition, relevant permit language has been updated to conform to the current framework language.

Annual Registration Fee [A.R.S. § 49-242]

The Annual Registration Fee for this permit is established by A.R.S. § 49-242(E) and is payable to the Arizona Department of Environmental Quality (ADEQ) each year. The design flow is 8.2 million gallons per day (mgd).

Financial Capability [A.R.S. § 49-243(N) and A.A.C. R18-9-A203]

The permittee has demonstrated financial capability under A.R.S. § 49-243(N) and A.A.C. R18-9-A203. The permittee shall maintain financial capability throughout the life of the facility. The estimated dollar amount demonstrated for financial capability is $14.1 million. The financial capability was demonstrated through A.A.C. R18-9-A203(C)(1).

2.2 Best Available Demonstrated Control Technology [A.R.S. § 49-243(B) and A.A.C. R18-9-A202(A)(5)]

The Water Reclamation Facility shall be designed, constructed, operated, and maintained to meet the treatment performance criteria for new facilities as specified in Arizona Administrative Code R18-9-B204.

The facility shall meet the requirements for pretreatment by conducting monitoring as per R18-9-B204(B)(6)(b)(iii).

All industrial hookups and other non-residential hookups to the treatment system shall be authorized according to the applicable federal, state or local regulations.

2.2.1 Engineering Design

The 4.1 mgd WRF was designed as per the design report prepared by Pacific Advanced Civil Engineers, Inc. dated October 2001. A WRF expansion to 8.2 mgd was designed and shall be constructed as per the design report prepared by Pacific Advanced Civil Engineers, Inc. dated August 2004. The WRF modifications outlined in this amendment were designed by Brian P McBride, P.E. (Civil), McBride Environmental Solutions, Inc., dated July 2, 2007.

2.2.2 Site-specific Characteristics

Site-specific characteristics were not considered to determine BADCT for the WRF.

2.2.3 Pre-operational Requirements

The permittee shall submit a signed, dated, and sealed Engineer's Certificate of Completion in a format approved by the Department per the Compliance Schedule in Section 3.0.

2.2.4 Operational Requirements

1. Permittee shall maintain a copy of the up-to-date Operations and Maintenance Manual at the WRF site at all times and shall be available upon request during inspections by ADEQ personnel.
2. The pollution control structures shall be inspected for the items listed in Section 4.2, Table III.
3. If any damage of the pollution control structures is identified during inspection, proper repair procedures shall be performed. All repair procedures and material(s) used shall be documented on the Self-Monitoring Report Form submitted quarterly to the ADEQ Water Quality Compliance Section.

2.2.5 Reclaimed Water Classification
[A.A.C. R18-9-703(C)(2)(a), A.A.C. R18-11-303 through 307]

The treatment facility is classified as producing Class A+ reclaimed water and may be used for any allowable Class A, B, or C use under a valid reclaimed water permit.

2.2.6 Certified Areawide Water Quality Management Plan Conformance
[A.A.C. R18-9-A201(B)(6)(a)]

~~Facility operations must conform to the approved Certified Areawide Water Quality Management Plan~~ according to the 208 consistency determination in place at the time of permit issuance.

2.3 Discharge Limitations [A.R.S. §§ 49-201(14), 49-243 and A.A.C. R18-9-A205(B)]

1. The permittee is authorized to operate the WRF with a maximum average monthly flow of 4.1 mgd. The maximum average monthly flow at full build-out, to be completed as per Section 3.0, Compliance Schedule, is 8.2 mgd.

2. The permittee shall notify all users that the materials authorized to be disposed of through the WRF are typical household sewage and pre-treated commercial wastewater, and shall not include motor oil, gasoline, paints, varnishes, hazardous wastes, solvents, pesticides, fertilizers or other materials not generally associated with toilet flushing, food preparation, laundry facilities and personal hygiene.
3. The permittee shall operate and maintain all permitted facilities to prevent unauthorized discharges pursuant to A.R.S. § 49-201(12) resulting from failure or bypassing of applicable BADCT pollutant control technologies including liner failure[1], uncontrollable leakage, overtopping (e.g., exceeding the maximum storage capacity, defined as a fluid level exceeding the crest elevation of a permitted impoundment), of basins, lagoons, impoundments or sludge drying beds, berm breaches, accidental spills, or other unauthorized discharges.
4. Specific discharge limitations are listed in Section 4.2, Tables IA, IB and IC.

2.4 Point of Compliance (POC) [A.R.S. § 49-244]

The hazardous/non-hazardous POC is established by the following designated location:

POC	POC location	Latitude	Longitude
1	Theoretical POC located at the northwest corner of the WRF	33° 27' 56" N	112° 21' 54" W

Groundwater monitoring is not required at the point of compliance, except as a contingency action.

The Director may amend this permit to require installation of a well and initiation of groundwater monitoring at the POC, or to designate additional points of compliance, if information on groundwater gradients or groundwater usage indicates the need.

2.5 Monitoring Requirements [A.R.S. § 49-243(K)(1), A.A.C. R18-9-A206(A)]

All monitoring required in this permit shall continue for the duration of the permit, regardless of the status of the facility. All sampling, preservation and holding times shall be in accordance with currently accepted standards of professional practice. Trip blanks, equipment blanks and duplicate samples shall also be obtained, and Chain-of-Custody procedures shall be followed, in accordance with currently accepted standards of professional practice. The permittee shall consult the most recent version of the ADEQ Quality Assurance Project Plan (QAPP) and Environmental Protection Agency (EPA) 40 Code of Federal Regulations (CFR) PART 136 for guidance in this regard. Copies of laboratory analyses and Chain-of-Custody forms shall be maintained at the permitted facility. Upon request these documents shall be made immediately available for review by ADEQ personnel.

2.5.1 Pre-Operational Monitoring

Not applicable at the time of permit issuance.

2.5.2 Routine Discharge Monitoring

The permittee shall monitor the wastewater according to Section 4.2, Table IA or IB, as applicable. Representative samples of the wastewater shall be collected downstream of the UV disinfection channel.

[1]Liner failure in a single-lined impoundment is any condition that would result in leakage exceeding 550 gallons per day per acre.

2.5.3. Reclaimed Water Monitoring

The permittee shall monitor the reclaimed water parameters listed under Section 4.2, Table IC in addition to the routine discharge monitoring parameters listed in Section 4.2, Table IA or IB, as applicable. Representative samples of the reclaimed water shall be collected downstream of the UV disinfection channel.

2.5.4 Facility / Operational Monitoring

Operational monitoring inspections shall be conducted according to Section 4.2, Table III.

1. If any damage of the pollution control structures is identified during inspection, proper repair procedures shall be performed. All repair procedures and materials used shall be documented on the SMRF submitted quarterly to the ADEQ Water Quality Compliance Section, Data Unit. If none of the conditions occur, the report shall say "no event" for a particular reporting period. If the facility is not in operation, the permittee shall indicate this on the SMRF.
2. The permittee shall submit data required in Section 4.2, Table III regardless of the operating status of the facility unless otherwise approved by the Department or allowed in this permit.

2.5.5 Groundwater Monitoring and Sampling Protocols

Routine groundwater monitoring is not required under the terms of this permit.

2.5.6 Surface Water Monitoring and Sampling Protocols

Routine surface water monitoring is not required under the terms of this permit.

2.5.7 Analytical Methodology

All samples collected for compliance monitoring shall be analyzed using Arizona state approved methods. If no state approved method exists, then any appropriate EPA-approved method shall be used. Regardless of the method used, the detection limits must be sufficient to determine compliance with the regulatory limits of the parameters specified in this permit. Analyses shall be performed by a laboratory licensed by the Arizona Department of Health Services, Office of Laboratory Licensure and Certification. For results to be considered valid, all analytical work shall meet quality control standards specified in the approved methods. A list of Arizona state certified laboratories can be obtained at the address below:

Arizona Department of Health Services
Office of Laboratory Licensure and Certification
250 North 17th Ave.
Phoenix, AZ 85007
Phone: (602) 364-0720

2.5.8 Installation and Maintenance of Monitoring Equipment

Monitoring equipment required by this permit shall be installed and maintained so that representative samples required by the permit can be collected. If new groundwater wells are determined to be necessary, the construction details shall be submitted to the ADEQ Groundwater Section for approval prior to installation and the permit shall be amended to include any new monitoring points.

2.6 Contingency Plan Requirements
[A.R.S. § 49-243(K)(3), (K)(7) and A.A.C. R18-9-A204 and R18-9-A205]

2.6.1 General Contingency Plan Requirements

At least one copy of the approved contingency and emergency response plan(s) submitted in the application shall be maintained at the location where day-to-day decisions regarding the operation of the facility are made. The permittee shall be aware of and follow the contingency and emergency plans.

Any AL exceedance, violation of a discharge limit (DL), AQL, or other permit condition shall be reported to ADEQ following the reporting requirements in Section 2.7.3.

Some contingency actions involve verification sampling. Verification sampling shall consist of the first follow-up sample collected from a location that previously indicated a violation or the exceedance of an AL. Collection and analysis of the verification sample shall use the same protocols and test methods to analyze for the pollutant or pollutants that exceeded an AL or violated an AQL. The permittee is subject to enforcement action for the failure to comply with any contingency actions in this permit. Where verification sampling is specified in this permit, it is the option of the permittee to perform such sampling. If verification sampling is not conducted within the timeframe allotted, ADEQ and the permittee shall presume the initial sampling result to be confirmed as if verification sampling has been conducted. The permittee is responsible for compliance with contingency plans relating to the exceedance of an AL or violation of a DL, AQL, or any other permit condition.

2.6.2 Exceeding of Alert Levels/Performance Levels

2.6.2.1 Exceeding of Performance Levels Set for Operational Conditions

1. If an operational performance level (PL) set in Section 4.2, Table III has been exceeded the permittee shall:

   a. Notify the ADEQ Water Quality Compliance Section within five days of becoming aware of the exceedance.

   b. Submit a written report within thirty days after becoming aware of the exceedance. The report shall document all of the following:

      (1) A description of the exceedance and its cause;
      (2) the period of the exceedance, including exact date(s) and time(s), if known, and the anticipated time period during which the exceedance is expected to continue;
      (3) any action taken or planned to mitigate the effects of the exceedance or spill, or to eliminate or prevent recurrence of the exceedance or spill;
      (4) any monitoring activity or other information which indicates that any pollutants would be reasonably expected to cause a violation of an AWQS; and
      (5) any malfunction or failure of pollution control devices or other equipment or process.

2. The facility is no longer on alert status once the operational indicator no longer indicates that a PL is being exceeded. The permittee shall, however, complete all tasks necessary to return the facility to its pre-alert operating condition.

2.6.2.2 Exceeding of Alert Levels (ALs) Set for Discharge Monitoring

1. If an AL set in Section 4.2, Tables IA and IB has been exceeded, the permittee shall immediately investigate to determine the cause. The investigation shall include the following:

a. Inspection, testing, and assessment of the current condition of all treatment or pollutant discharge control systems that may have contributed to the exceedance;
b. Review of recent process logs, reports, and other operational control information to identify any unusual occurrences; and
c. If the investigation procedures indicated in (a) and (b) above fail to reveal the cause of the exceedance, the permittee shall sample individual waste streams composing the wastewater for the parameters in question, if necessary to identify the cause of the exceedance.

2. The permittee shall initiate actions identified in the approved contingency plan referenced in Section 5.0 and specific contingency measures identified in Section 2.6 to resolve any problems identified by the investigation which may have led to an AL exceedance. To implement any other corrective action the permittee shall obtain prior approval from ADEQ according to Section 2.6.6.

3. Within 30 days of an AL exceedance, the permittee shall submit the laboratory results to the ADEQ Water Quality Compliance Section, Data Unit, along with a summary of the findings of the investigation, the cause of the exceedance, and actions taken to resolve the problem.

4. Upon review of the submitted report, the Department may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions or other actions.

2.6.2.2.1 Exceeding Permit Flow Limit

1. If the AL for average monthly flow in Section 4.2, Table IA or IB has been exceeded, the permittee shall submit an application for an APP amendment to expand the WRF or submit a report detailing the reasons that expansion is not necessary.
2. Acceptance of the report instead of an application for expansion requires ADEQ approval.

2.6.2.3 Exceeding of Alert Levels in Groundwater Monitoring

2.6.2.3.1 Alert Levels for Indicator Parameters

No ALs were established for indicator parameters. Monitoring is for informational purposes only.

2.6.2.3.2 Alert Levels for Pollutants with Numeric Aquifer Water Quality Standards

Not required at time of permit issuance.

2.6.2.3.3 Alert Levels to Protect Downgradient Users from Pollutants Without Numeric Aquifer Water Quality Standards

Not required at time of permit issuance.

2.6.3 Discharge Limit Violation

1. If a DL set in Section 4.2, Tables IA, IB or IC has been violated, the permittee shall immediately investigate to determine the cause of the violation. The investigation shall include the following:

a. Inspection, testing, and assessment of the current condition of all treatment or pollutant discharge control systems that may have contributed to the violation;

b. Review of recent process logs, reports, and other operational control information to identify any unusual occurrences; and
c. If the investigation procedures indicated in (a) and (b) above fail to reveal the cause of the violation, the permittee shall sample individual waste streams composing the wastewater for the parameters in violation, if necessary to identify the cause of the violation.

The permittee also shall submit a report according to Section 2.7.3, which includes a summary of the findings of the investigation, the cause of the violation, and actions taken to resolve the problem. The permittee shall consider and ADEQ may require corrective action that may include control of the source of discharge, cleanup of affected soil, surface water or groundwater, and mitigation of the impact of pollutants on existing uses of the aquifer. Corrective actions shall either be specifically identified in this permit, included in an ADEQ approved contingency plan, or separately approved according to Section 2.6.6.

2. The permittee shall comply with the freeboard requirements as specified in Section 4.2, Table III (Facility Inspections) to prevent the overtopping of an impoundment or sludge drying bed. If an impoundment or sludge drying bed is overtopped, the permittee shall follow the requirements in Section 2.6.5.3 and the reporting requirements of Section 2.7.3.

3. Upon review of the submitted report, the Department may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions, or other actions.

2.6.4 Aquifer Quality Limit Violation

Not applicable.

2.6.5 Emergency Response and Contingency Requirements for Unauthorized Discharges pursuant to A.R.S. § 49-201(12) and pursuant to A.R.S. § 49-241

2.6.5.1 Duty to Respond

The permittee shall act immediately to correct any condition resulting from a discharge pursuant to A.R.S. § 49-201(12) if that condition could pose an imminent and substantial endangerment to public health or the environment.

2.6.5.2 Discharge of Hazardous Substances or Toxic Pollutants

In the event of any unauthorized discharge pursuant to A.R.S. § 49-201(12) of suspected hazardous substances (A.R.S. § 49-201(19)) or toxic pollutants (A.R.S. § 49-243(I)) on the facility site, the permittee shall promptly isolate the area and attempt to identify the discharged material. The permittee shall record information, including name, nature of exposure and follow-up medical treatment, if necessary, on persons who may have been exposed during the incident. The permittee shall notify the ADEQ Water Quality Compliance Section at (602) 771-4497 within 24 hours of discovering the discharge of hazardous material which: a) has the potential to cause an AWQS or AQL exceedance, or; b) could pose an endangerment to public health or the environment.

2.6.5.3 Discharge of Non-hazardous Materials

In the event of any unauthorized discharge pursuant to A.R.S. § 49-201(12) of non-hazardous materials from the facility, the permittee shall promptly attempt to cease the discharge and isolate the discharged material. Discharged material shall be removed and the site cleaned up as soon as possible. The permittee shall notify the ADEQ Water Quality Compliance Section at (602) 771-4497 within 24 hours of discovering the discharge of non-hazardous material which: a) has the potential to cause an AQL exceedance, or; b) could pose an endangerment to public health or the environment.

to-day decisions are made regarding the operation of the facility. The log book shall be retained for ten years from the date of each inspection, and upon request, the permit and the log book shall be made immediately available for review by ADEQ personnel. The information in the log book shall include, but not be limited to, the following information as applicable:

1. Name of inspector;
2. Date and shift inspection was conducted;
3. Condition of applicable facility components;
4. Any damage or malfunction, and the date and time any repairs were performed;
5. Documentation of sampling date and time; and
6. Any other information required by this permit to be entered in the log book.

Monitoring records for each measurement shall comply with R18-9-A206(B)(2).

2.7.3 Permit Violation and Alert Level Status Reporting

1. The permittee shall notify the Water Quality Compliance Section in writing (by mail or by fax - see Section 2.7.5) within five (5) days (except as provided in Section 2.6.5) of becoming aware of a violation of any permit condition, discharge limitation, or of an AL exceedance.

2. The permittee shall submit a written report to the Water Quality Compliance Section within 30 days of becoming aware of the violation of any permit condition or discharge limitation. The report shall document all of the following:

   a. Identification and description of the permit condition for which there has been a violation and a description of the cause;
   b. The period of violation including exact date(s) and time(s), if known, and the anticipated time period during which the violation is expected to continue;
   c. Any corrective action taken or planned to mitigate the effects of the violation, or to eliminate or prevent a recurrence of the violation;
   d. Any monitoring activity or other information which indicates that any pollutants would be reasonably expected to cause a violation of an AWQS;
   e. Proposed changes to the monitoring which include changes in constituents or increased frequency of monitoring; and
   f. Description of any malfunction or failure of pollution control devices or other equipment or processes.

2.7.4 Operational, Other or Miscellaneous Reporting

The permittee shall complete the SMRF provided by the Department to reflect facility inspection requirements designated in Section 4.2, Table III and submit to the ADEQ Water Quality Compliance Section, Data Unit quarterly along with other reports required by this permit. Facility inspection reports shall be submitted no less frequently than quarterly, regardless of operational status.

The permittee shall submit the reclaimed water monitoring results as required in Section 4.2, Table IC and flow volumes to any of the following in accordance with A.A.C. R18-9-703(C)(2)(c):

1. Any reclaimed water agent who has contracted for delivery of reclaimed water from the permittee; and
2. Any end user who has not waived interest in receiving this information.

2.7.5 Reporting Location

All SMRFs shall be submitted to:

Arizona Department of Environmental Quality
Water Quality Compliance Section, Data Unit
Mail Code 5415B-1
1110 West Washington Street
Phoenix, Arizona 85007
Phone (602) 771-4681

All documents required by this permit to be submitted to the Water Quality Compliance Section shall be directed to the following address:

Arizona Department of Environmental Quality
Water Quality Compliance Section
Mail Code 5415B-1
1110 West Washington Street
Phoenix, Arizona 85007
Phone (602) 771-4497
Fax (602) 771-4505

All documents required by this permit to be submitted to the Groundwater Section shall be directed to:

Arizona Department of Environmental Quality
Groundwater Section
Mail Code 5415B-3
1110 West Washington Street
Phoenix, Arizona 85007
Phone (602) 771-4428

2.7.6 Reporting Deadline

The following table lists the quarterly report due dates:

Monitoring conducted during quarter:	Quarterly Report due by:
January-March	April 30
April-June	July 30
July-September	October 30
October-December	January 30

The following table lists the semi-annual and annual report due dates:

Monitoring conducted:	Report due by:
~~Semi-annual: January-June~~	~~July 30~~
Semi-annual: July-December	January 30
Annual: January-December	January 30

2.7.7 Changes to Facility Information in Section 1.0

The Groundwater Section and Water Quality Compliance Section shall be notified within 10 days of any change of facility information including Facility Name, Permittee Name, Mailing or Street Address, Facility Contact Person, or Emergency Telephone Number.

2.8 Temporary Cessation [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A209(A)]

The permittee shall give written notice to the Water Quality Compliance Section before ceasing operation of the facility for a period of 60 days or greater. The permittee shall take the following measures upon temporary cessation:

1. If applicable, direct the wastewater flows from the facility to another state-approved wastewater treatment facility;
2. Correct the problem that caused the temporary cessation of the facility; and
3. Notify the ADEQ (Water Quality Compliance Section with a monthly facility status report describing the activities conducted on the treatment facility to correct the problem.

At the time of notification the permittee shall submit for ADEQ approval a plan for maintenance of discharge control systems and for monitoring during the period of temporary cessation. Immediately following ADEQ approval, the permittee shall implement the approved plan. If necessary, ADEQ shall amend permit conditions to incorporate conditions to address temporary cessation. During the period of temporary cessation, the permittee shall provide written notice to the Water Quality Compliance Section of the operational status of the facility every three (3) years. If the permittee intends to permanently cease operation of any facility, the permittee shall submit closure notification, as set forth in Section 2.9 below.

2.9 Closure [A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9-A209(B)]

For a facility addressed under this permit, the permittee shall give written notice of closure to the Water Quality Compliance Section of the intent to cease operation without resuming activity for which the facility was designed or operated.

2.9.1 Closure Plan

Within 90 days following notification of closure, the permittee shall submit for approval to the Groundwater Section, a closure plan which meets the requirements of A.R.S. § 49-252 and A.A.C. R18-9-A209(B)(3).

If the closure plan achieves clean closure immediately, ADEQ shall issue a letter of approval to the permittee. If the closure plan contains a schedule for bringing the facility to a clean closure configuration at a future date, ADEQ may incorporate any part of the schedule as an amendment to this permit.

2.9.2 Closure Completion

Upon completion of closure activities, the permittee shall give written notice to the Groundwater Section indicating that the approved closure plan has been implemented fully and providing supporting documentation to demonstrate that clean closure has been achieved (soil sample results, verification sampling results, groundwater data, as applicable). If clean closure has been achieved, ADEQ shall issue a letter of approval to the permittee at that time. If any of the following conditions apply, the permittee shall follow the terms of post-closure stated in this permit:

1. Clean closure cannot be achieved at the time of closure notification or within one year thereafter under a diligent schedule of closure actions;
2. Further action is necessary to keep the facility in compliance with AWQS at the applicable POC;
3. Continued action is required to verify that the closure design has eliminated discharge to the extent intended;

4. Remedial or mitigative measures are necessary to achieve compliance with Title 49, Ch. 2; and
5. Further action is necessary to meet property use restrictions.

2.10 Post-closure [A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9 A209(C)]

Post-closure requirements shall be established based on a review of facility closure actions and will be subject to review and approval by the Groundwater Section.

In the event clean-closure cannot be achieved pursuant to A.R.S. § 49-252, the permittee shall submit for approval to the Groundwater Section a post-closure plan that addresses post-closure maintenance and monitoring actions at the facility. The post-closure plan shall meet all requirements of A.R.S. §§ 49-201(30) and 49-252 and A.A.C. R18-9-A209(C). Upon approval of the post-closure plan, this permit shall be amended or a new permit shall be issued to incorporate all post-closure controls and monitoring activities of the post-closure plan.

2.10.1 Post-closure Plan

A specific post-closure plan may be required upon the review of the closure plan.

2.10.2 Post-closure Completion

Not required at the time of permit issuance.

3.0 COMPLIANCE SCHEDULE [A.R.S. § 49-243(K)(5) and A.A.C. R18-9-A208]

For each compliance schedule item listed below, the permittee shall submit the required information, including a cover letter that lists the compliance schedule items, to the Groundwater Section. A copy of the cover letter must also be submitted to the ADEQ Water Quality Compliance Section.

Requirement	Due
8.2 mgd Expansion	
The permittee shall submit a signed, dated, and sealed Engineer's Certificate of Completion in a format approved by the Department that confirms that the facility is constructed according to the Department-approved design report or plans and specifications, as applicable.	Prior to discharging under this permit and within 90 days after completion of construction.
8.2 mgd Expansion	
Begin construction of the 8.2 mgd expansion.	Notify ADEQ within 15 days after the commencement date of construction of the 8.2 mgd expansion.
Submit an Engineer's Certificate of Completion for the 8.2 mgd expansion.	Within 30 days after completion of construction, prior to commencing discharge from the expanded WRF, and prior to beginning monitoring under Table IB.
Cease monitoring under Table IA and commence monitoring under Table IB.	Within 30 days after submitting the Engineer's Certificate of Completion for the 8.2 mgd expansion.
Notify ADEQ of commencement of discharge from the expanded WRF.	Within 15 days after commencement of monitoring under Table IB.

4.0 TABLES OF MONITORING REQUIREMENTS

4.1 PRE-OPERATIONAL MONITORING (OR CONSTRUCTION REQUIREMENTS)

Not applicable at permit issuance.

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

TABLE IA
ROUTINE DISCHARGE MONITORING – 4.1 MGD[2]

Sampling Point Number	Sampling Point Identification			Latitude	Longitude
1	Downstream of the UV Channel			33° 27' 55" N	112° 21' 56" W
Parameter	**AL[3]**	**DL[4]**	**Units**	**Sampling Frequency**	**Reporting Frequency**
Total Flow[5]: Daily[6]	Not Established[7]	Not Established	mgd[8]	Daily	Quarterly
Total Flow: Monthly Average[9]	3.9	4.1	mgd	Monthly Calculation	Quarterly
Total Flow - Reuse Daily	Not Established	4.1	mgd	Daily	Quarterly
Total Flow - Reuse Monthly Average[10]	Not established	4.1	mgd	Monthly Calculation	Quarterly
E. coli: Single sample maximum	Not established	15.0	CFU or MPN[11]	Daily	Quarterly
E. coli: four (4) of seven (7) samples in a week[12]	Not established	Non-detect[13]	CFU or MPN	Daily	Quarterly
Total Nitrogen[14]: Five-sample rolling geometric mean	8.0	10.0	mg/l	Monthly[15]	Quarterly

[2]Monitoring under Table IA is no longer required upon commencement of monitoring under Table IB.
[3]AL = Alert Level
[4]DL = Discharge Limit
[5]Total flow is the total of flows to on-site process use, reclaimed water, and discharge to the RID canal.
[6]Flow shall be measured using a continuous recording flow meter which totals the flow daily.
[7]Not established = Monitoring required but no limits have been specified at time of permit issuance.
[8]mgd = million gallons per day
[9]Monthly average of daily flow values.
[10]Monthly average of daily flow values.
[11]CFU = Colony Forming Units / 100 ml sample. MPN = Most Probable Number / 100 ml sample. For CFU, a value of <1.0 shall be considered to be non-detect. For MPN, a value of <2.2 shall be considered to be non-detect.
[12]Week means a seven-day period starting on Sunday and ending on the following Saturday.
[13]If at least four (4) of seven (7) samples in a week are non-detect, report "yes" in the appropriate space on the SMRF (indicating that the standard has been met). If at least four (4) of seven (7) samples in a week have detections of fecal coliform, report "no" in the appropriate space on the SMRF (indicating that the standard has not been met).
[14]Total Nitrogen = Nitrate as N + Nitrite as N + Total Kjeldahl Nitrogen
[15]A five-month geometric mean of the results of the five (5) most recent samples

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

TABLE IA
ROUTINE DISCHARGE MONITORING – 4.1 MGD (continued)

Parameters	AL	DL	Units	Sampling Frequency	Reporting Frequency
Metals (total):					
Antimony	0.0048	0.006	mg/l	Quarterly	Quarterly
Arsenic	0.04	0.05	mg/l	Quarterly	Quarterly
Barium	1.60	2.00	mg/l	Quarterly	Quarterly
Beryllium	0.0032	0.004	mg/l	Quarterly	Quarterly
Cadmium	0.004	0.005	mg/l	Quarterly	Quarterly
Chromium	0.08	0.1	mg/l	Quarterly	Quarterly
Cyanide (as free cyanide)	0.16	0.2	mg/l	Quarterly	Quarterly
Fluoride	3.2	4.0	mg/l	Quarterly	Quarterly
Lead	0.04	0.05	mg/l	Quarterly	Quarterly
Mercury	0.0016	0.002	mg/l	Quarterly	Quarterly
Nickel	0.08	0.1	mg/l	Quarterly	Quarterly
Selenium	0.04	0.05	mg/l	Quarterly	Quarterly
Thallium	0.0016	0.002	mg/l	Quarterly	Quarterly

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

TABLE IA
ROUTINE DISCHARGE MONITORING – 4.1 MGD (continued)

Parameter	AL	DL	Units	Sampling Frequency	Reporting Frequency
Volatile Organic Compounds (VOCs):					
Benzene	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
Carbon tetrachloride	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
o-Dichlorobenzene	0.48	0.6	mg/l	Semi-Annually	Semi-Annually
para-Dichlorobenzene	0.06	0.075	mg/l	Semi-Annually	Semi-Annually
1,2-Dichloroethane	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
1,1-Dichloroethylene	0.0056	0.007	mg/l	Semi-Annually	Semi-Annually
cis-1,2-Dichloroethylene	0.056	0.07	mg/l	Semi-Annually	Semi-Annually
trans-1,2-Dichloroethylene	0.08	0.1	mg/l	Semi-Annually	Semi-Annually
Dichloromethane	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
1,2-Dichloropropane	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
Ethylbenzene	0.56	0.7	mg/l	Semi-Annually	Semi-Annually
Hexachlorobenzene	0.0008	0.001	mg/l	Semi-Annually	Semi-Annually
Hexachlorocyclopentadiene	0.04	0.05	mg/l	Semi-Annually	Semi-Annually
Monochlorobenzene	0.08	0.1	mg/l	Semi-Annually	Semi-Annually
Styrene	0.08	0.1	mg/l	Semi-Annually	Semi-Annually
Tetrachloroethylene	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
Toluene	0.8	1.0	mg/l	Semi-Annually	Semi-Annually
1,1,1-Trichloroethane	0.16	0.2	mg/l	Semi-Annually	Semi-Annually
1,2,4 - Trichlorobenzene	0.056	0.07	mg/l	Semi-Annually	Semi-Annually
1,1,2 - Trichloroethane	0,004	0.005	mg/l	Semi-Annually	Semi-Annually
Trichloroethylene	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
Vinyl Chloride	0.0016	0.002	mg/l	Semi-Annually	Semi-Annually
Xylenes (Total)	8.0	10.0	mg/l	Semi-Annually	Semi-Annually

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

TABLE IB
ROUTINE DISCHARGE MONITORING – 8.2 MGD

Sampling Point Number	Sampling Point Identification			Latitude	Longitude
1	Downstream of the UV Channel			33° 27' 55" N	112° 21' 56" W
Parameter	**AL[16]**	**DL[17]**	**Units**	**Sampling Frequency**	**Reporting Frequency**
Total Flow[18]: Daily[19]	Not Established[20]	Not Established	mgd[21]	Daily	Quarterly
Total Flow: Monthly Average[22]	7.8	8.2	mgd	Monthly Calculation	Quarterly
Total Flow - Reuse Daily	Not Established	8.2	mgd	Daily	Quarterly
Total Flow - Reuse Monthly Average[23]	Not established	8.2	mgd	Monthly Calculation	Quarterly
E. coli: Single sample maximum	Not established	15.0	CFU or MPN[24]	Daily	Quarterly
E. coli: four (4) of seven (7) samples in a week[25]	Not established	Non-detect[26]	CFU or MPN	Daily	Quarterly
Total Nitrogen[27]: Five-sample rolling geometric mean	8.0	10.0	mg/l	Monthly[28]	Quarterly

[16] AL = Alert Level
[17] DL = Discharge Limit
[18] Total flow is the total of flows to on-site process use, reclaimed water, and discharge to the RID canal.
[19] Flow shall be measured using a continuous recording flow meter which totals the flow daily.
[20] Not established = Monitoring required but no limits have been specified at time of permit issuance.
[21] mgd = million gallons per day
[22] Monthly average of daily flow values.
[23] Monthly average of daily flow values.
[24] CFU = Colony Forming Units / 100 ml sample. MPN = Most Probable Number / 100 ml sample. For CFU, a value of <1.0 shall be considered to be non-detect. For MPN, a value of <2.2 shall be considered to be non-detect.
[25] **Week** means a seven-day period starting on Sunday and ending on the following Saturday.
[26] If at least four (4) of seven (7) samples in a week are non-detect, report "yes" in the appropriate space on the SMRF (indicating that the standard has been met). If at least four (4) of seven (7) samples in a week have detections of fecal coliform, report "no" in the appropriate space on the SMRF (indicating that the standard has **not** been met).
[27] Total Nitrogen = Nitrate as N + Nitrite as N + Total Kjeldahl Nitrogen
[28] A five-month geometric mean of the results of the five (5) most recent samples

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

TABLE IB
ROUTINE DISCHARGE MONITORING – 8.2 MGD (continued)

Parameter	AL	DL	Units	Sampling Frequency	Reporting Frequency
Metals (total):					
Antimony	0.0048	0.006	mg/l	Quarterly	Quarterly
Arsenic	0.04	0.05	mg/l	Quarterly	Quarterly
Barium	1.60	2.00	mg/l	Quarterly	Quarterly
Beryllium	0.0032	0.004	mg/l	Quarterly	Quarterly
Cadmium	0.004	0.005	mg/l	Quarterly	Quarterly
Chromium	0.08	0.1	mg/l	Quarterly	Quarterly
Cyanide (as free cyanide)	0.16	0.2	mg/l	Quarterly	Quarterly
Fluoride	3.2	4.0	mg/l	Quarterly	Quarterly
Lead	0.04	0.05	mg/l	Quarterly	Quarterly
Mercury	0.0016	0.002	mg/l	Quarterly	Quarterly
Nickel	0.08	0.1	mg/l	Quarterly	Quarterly
Selenium	0.04	0.05	mg/l	Quarterly	Quarterly
Thallium	0.0016	0.002	mg/l	Quarterly	Quarterly

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

TABLE IB
ROUTINE DISCHARGE MONITORING – 8.2 MGD (continued)

Parameter	AL	DL	Units	Sampling Frequency	Reporting Frequency
Volatile Organic Compounds (VOCs):					
Benzene	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
Carbon tetrachloride	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
o-Dichlorobenzene	0.48	0.6	mg/l	Semi-Annually	Semi-Annually
para-Dichlorobenzene	0.06	0.075	mg/l	Semi-Annually	Semi-Annually
1,2-Dichloroethane	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
1,1-Dichloroethylene	0.0056	0.007	mg/l	Semi-Annually	Semi-Annually
cis-1,2-Dichloroethylene	0.056	0.07	mg/l	Semi-Annually	Semi-Annually
trans-1,2-Dichloroethylene	0.08	0.1	mg/l	Semi-Annually	Semi-Annually
Dichloromethane	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
1,2-Dichloropropane	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
Ethylbenzene	0.56	0.7	mg/l	Semi-Annually	Semi-Annually
Hexachlorobenzene	0.0008	0.001	mg/l	Semi-Annually	Semi-Annually
Hexachlorocyclopentadiene	0.04	0.05	mg/l	Semi-Annually	Semi-Annually
Monochlorobenzene	0.08	0.1	mg/l	Semi-Annually	Semi-Annually
Styrene	0.08	0.1	mg/l	Semi-Annually	Semi-Annually
Tetrachloroethylene	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
Toluene	0.8	1.0	mg/l	Semi-Annually	Semi-Annually
1,1,1-Trichloroethane	0.16	0.2	mg/l	Semi-Annually	Semi-Annually
1,2,4 - Trichlorobenzene	0.056	0.07	mg/l	Semi-Annually	Semi-Annually
1,1,2 - Trichloroethane	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
Trichloroethylene	0.004	0.005	mg/l	Semi-Annually	Semi-Annually
Vinyl Chloride	0.0016	0.002	mg/l	Semi-Annually	Semi-Annually
Xylenes (Total)	8.0	10.0	mg/l	Semi-Annually	Semi-Annually

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

TABLE IC
RECLAIMED WATER MONITORING TABLE - CLASS A+[29]

Sampling Point Number	Sampling Point Identification		Latitude	Longitude
1	Downstream of the UV Channel		33° 27' 55" N	112° 21' 56" W
Parameter	**DL**	**Units**	**Sampling Frequency**	**Reporting Frequency**
Total Nitrogen[30]: Five-sample rolling geometric mean	10.0	mg/l	Monthly	Quarterly
E. coli: Single-sample maximum	15.0	CFU or MPN[31]	Daily[32]	Quarterly
E. coli: Four (4) of last seven (7) samples	Non-detect[33]	CFU or MPN	Daily	Quarterly
Turbidity[34]: Single reading	5.0	NTU[35]	Everyday[36]	Quarterly
Turbidity: 24-hour average	2.0	NTU	Everyday	Quarterly
Enteric Virus[37]: Four (4) of last seven (7) samples	Non-detect	PFU[38]	Monthly / Suspended[39]	Quarterly

[29]Reclaimed water monitoring under Table IC shall be performed in addition to routine discharge monitoring required under Section 4.2, Tables IA and IB.

[30]Nitrate N, plus Nitrite N, plus Total Kjeldahl Nitrogen (TKN)

[31]CFU = Colony Forming Units per 100 ml: MPN = Most Probable Number per 100 ml. For CFU, a value of <1.0 shall be considered to be non-detect. For MPN, a value of <2.2 shall be considered to be non-detect.

[32]For fecal coliform, "daily" sampling means every day in which a sample can practicably be obtained and delivered in sufficient time for proper analysis, provided that no less than four (4) samples in each seven-day period are obtained and analyzed.

[33]If at least four (4) of the last seven (7) samples are non-detect, report "yes" in the appropriate space on the SMRF (indicating that the standard has been met). If at least four (4) of the last seven (7) samples have detections of fecal coliform, report "no" in the appropriate space on the SMRF (indicating that the standard has not been met).

[34]Turbidimeter shall have a signal averaging time not exceeding 120 seconds. Occasional spikes due to back-flushing or instrument malfunction shall not be considered an exceedance. All exceedances must be explained and submitted to the Department with the corresponding quarterly SMRF.

[35]NTU = Nephelometric Turbidity Units

[36]For the single turbidity reading, "everyday" means the maximum reading during the 24-hour period.

[37]Initial monthly enteric virus sampling shall be performed to indicate four (4) out of seven (7) sample results of non-detect.

[38]Plaque Forming Units per 40 Liters. A value of <1.1 PFU/40 L shall be considered to be non-detect.

[39]Enteric virus sampling shall resume only when the discharge limit for the 24-hour average for turbidity is exceeded for two (2) consecutive 24-hour monitoring periods. Monthly enteric virus monitoring shall continue until four (4) out of seven (7) consecutive sample results show no detection. During times when enteric virus sampling is suspended, enter "suspended" in the appropriate space on the SMRF.

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

TABLE II
GROUNDWATER MONITORING

Not applicable.

TABLE III
FACILITY INSPECTION (Operational Monitoring)

Pollution Control Structures/Facilities	Performance Levels	Inspection Frequency	Reporting Frequency
Pump Integrity	Good working condition	Weekly	Quarterly
Treatment Plant Components	Good working condition	Weekly	Quarterly

5.0 REFERENCES AND PERTINENT INFORMATION

The terms and conditions set forth in this permit have been developed based upon the information contained in the following, which are on file with the Department:

1.	APP Application, dated:	December 29, 2000 (original APP, signed on July 23, 2001) August 18, 2004 (Significant Amendment, signed on June 13, 2006) June 30, 2008 (Other Amendment)
3.	Final Hydrologist Report, dated:	October 7, 2005 (Significant Amendment)
4.	Final Engineering Report, dated:	August 16, 2005 (Significant Amendment) August 27, 2008 (Other Amendment)
5.	Public Notice, dated:	May 30, 2001 (original APP) February 23, 2006 (Significant Amendment)
6.	Public Hearing, dated:	Not applicable.
7.	Responsiveness Summary, dated:	Not applicable.

6.0 NOTIFICATION PROVISIONS

6.1 Annual Registration Fees

The permittee is notified of the obligation to pay an Annual Registration Fee to ADEQ. The Annual Registration Fee is based upon the amount of daily influent or discharge of pollutants in gallons per day as established by A.R.S. § 49-242(D).

6.2 Duty to Comply [A.R.S. §§ 49-221 through 263]

The permittee is notified of the obligation to comply with all conditions of this permit and all applicable provisions of Title 49, Chapter 2, Articles 1, 2 and 3 of the Arizona Revised Statutes, Title 18, Chapter 9, Articles 1 through 4, and Title 18, Chapter 11, Article 4 of the Arizona Administrative Code. Any permit non-compliance constitutes a violation and is grounds for an enforcement action pursuant to Title 49, Chapter 2, Article 4 or permit amendment, suspension, or revocation.

6.3 Duty to Provide Information [A.R.S. §§ 49-243(K)(2) and 49-243(K)(8)]

The permittee shall furnish to the Director, or an authorized representative, within a time specified, any information which the Director may request to determine whether cause exists for amending or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

6.4 Compliance with Aquifer Water Quality Standards [A.R.S. §§ 49-243(B)(2) and 49-243(B)(3)]

The permittee shall not cause or contribute to a violation of an Aquifer Water Quality Standard at the applicable point of compliance for the facility. Where, at the time of issuance of the permit, an aquifer already exceeds an Aquifer Water Quality Standard for a pollutant, the permittee shall not discharge that pollutant so as to further degrade, at the applicable point of compliance for the facility, the water quality of any aquifer for that pollutant.

6.5 Technical and Financial Capability [A.R.S. §§ 49-243(K)(8) and 49-243(N) and A.A.C. R18-9-A202(B) and R18-9-A203(E) and (F)]

The permittee shall have and maintain the technical and financial capability necessary to fully carry out the terms and conditions of this permit. Any bond, insurance policy, trust fund, or other financial assurance mechanism provided as a demonstration of financial capability in the permit application, pursuant to A.A.C. R18-9-A203(D), shall be in effect prior to any discharge authorized by this permit and shall remain in effect for the duration of the permit.

6.6 Reporting of Bankruptcy or Environmental Enforcement [A.A.C. R18-9-A207(C)]

The permittee shall notify the Director within five days after the occurrence of any one of the following:

1. the filing of bankruptcy by the permittee;
2. the entry of any order or judgment not issued by the Director against the permittee for the enforcement of any environmental protection statute or rule.

~~6.7 Monitoring and Records [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A206]~~

The permittee shall conduct any monitoring activity necessary to assure compliance with this permit, with the applicable water quality standards established pursuant to A.R.S. §§ 49-221 and 49-223 and §§ 49-241 through 49-252.

6.8 Inspection and Entry [A.R.S. §§ 41-1009, 49-203(B), and 49-243(K)(8)]

In accordance with A.R.S. §§ 41-1009 and 49-203(B), the permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to enter and inspect the facility as reasonably necessary to ensure compliance with Title 49, Chapter 2, Article 3 of the Arizona Revised Statutes, and Title 18, Chapter 9, Articles 1 through 4 of the Arizona Administrative Code and the terms and conditions of this permit.

6.9 Duty to Modify [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A211]

The permittee shall apply for and receive a written amendment before deviating from any of the designs or operational practices authorized by this permit.

6.10 Permit Action: Amendment, Transfer, Suspension, and Revocation [A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]

This permit may be amended, transferred, suspended, or revoked for cause, under the rules of the Department. The permittee shall notify the Groundwater Section in writing within 15 days after any change in the owner or operator of the facility. The notification shall state the permit number, the name of the facility, the date of property transfer, and the name, address, and phone number where the new owner or operator can be reached. The operator shall advise the new owner or operators of the terms of this permit and the need for permit transfer in accordance with the rules.

7.0 ADDITIONAL PERMIT CONDITIONS

7.1 Other Information [A.R.S. § 49-243(K)(8)]

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, the permittee shall promptly submit the correct facts or information.

7.2 Severability [A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby. The filing of a request by the permittee for a permit action does not stay or suspend the effectiveness of any existing permit condition.

7.3 Permit Transfer

This permit may not be transferred to any other person except after notice to and approval of the transfer by the Department. No transfer shall be approved until the applicant complies with all transfer requirements as specified in A.A.C. R18-9-A212(B) and (C).

R-6

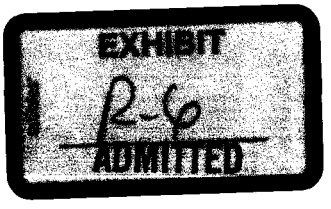
LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103, W-01427A-09-0104,
W-01427A-09-0116, and W-01427A-09-0120
RESPONSE TO RUCO'S NINTH SET OF DATA REQUESTS

December 15, 2009

Response provided by: Brian McBride

Company Name: McBride Engineering Solutions

Address: W. Gila Springs Place, Ste 7
Chandler, Arizona 85226



Company Response Number: WAR 9.1

Q. Please have Mr. McBride provide any and all engineering reports reviewed by Brian P. McBride, and/or McBride Environmental Solutions ("MES") or any employee thereof relating to the Palm Valley Water Reclamation Facility, ("PVWRF").

RESPONSE: The August 2001 Phase I Design Report prepared by Pacific Advanced Civil Engineers, and the Draft Litchfield Park Sewer Company Water Reclamation Facilities Strategic Planning Evaluation Report already have been provided to RUCO.

LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103, W-01427A-09-0104,
W-01427A-09-0116, and W-01427A-09-0120
RESPONSE TO RUCO'S NINTH SET OF DATA REQUESTS

December 15, 2009

Response provided by:	Brian McBride
Company Name:	McBride Engineering Solutions
Address:	W. Gila Springs Place, Ste 7 Chandler, Arizona 85226
Company Response Number:	WAR 9.2

Q. Please have Mr. McBride provide any and all engineering reports prepared by Brian P. McBride, and/or McBride Environmental Solutions ("MES") or any employee thereof relating to the Palm Valley Water Reclamation Facility, ("PVWRF") including, but not limited to the August 16, 2005 and August 27, 2008 Final Engineering Reports cited on page 23 of the September 30, 2008 Aquifer Protection Permit ("APP").

RESPONSE: The Draft Litchfield Park Sewer Company Water Reclamation Facilities Strategic Planning Evaluation Report already has been provided to RUCO. LPSCO also is informed and believes that § 5 of the September 30, 2008 Aquifer Protection Permit refers to internal engineering reviews prepared by ADEQ.

LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103, W-01427A-09-0104,
W-01427A-09-0116, and W-01427A-09-0120
RESPONSE TO RUCO'S NINTH SET OF DATA REQUESTS

December 15, 2009

Response provided by:	Brian McBride
Company Name:	McBride Engineering Solutions
Address:	W. Gila Springs Place, Ste 7 Chandler, Arizona 85226
Company Response Number:	WAR 9.3

Q. Please have Mr. McBride provide any and all engineering reports reviewed or prepared by Brian P. McBride and/or MES or any employee thereof relating to the Sarival WRF or Sarival lift station.

RESPONSE: The Draft Litchfield Park Sewer Company Water Reclamation Facilities Strategic Planning Evaluation Report already has been provided to RUCO.

LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103, W-01427A-09-0104,
W-01427A-09-0116, and W-01427A-09-0120
RESPONSE TO RUCO'S NINTH SET OF DATA REQUESTS

December 15, 2009

Response provided by:	Brian McBride
Company Name:	McBride Engineering Solutions
Address:	W. Gila Springs Place, Ste 7 Chandler, Arizona 85226
Company Response Number:	WAR 9.18

Q. Mr. McBride identify any and all sums paid or agreed to be paid to you or your affiliates by the Company, its affiliates or parent companies for consultation, design or construction of a WRF expansion to 8.2 mgd.

RESPONSE: None.

LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103, W-01427A-09-0104,
W-01427A-09-0116, and W-01427A-09-0120
RESPONSE TO RUCO'S NINTH SET OF DATA REQUESTS

December 15, 2009

Response provided by:	Brian McBride
Company Name:	McBride Engineering Solutions
Address:	W. Gila Springs Place, Ste 7 Chandler, Arizona 85226
Company Response Number:	WAR 9.17

Q. Mr. McBride identify any and all sums paid or agreed to be paid to you or your affiliates by the Company, its affiliates or parent companies for consultation, design or construction of the 4.1 mgd plant.

RESPONSE: MES was not involved in the design or construction of Phase I of PVWRF as originally built in 2003. MES has received payments totaling $1,070,860.00 for consulting, engineering and construction administration services relating to the existing PVWRF and the 2007/2008 upgrades.

LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103, W-01427A-09-0104,
W-01427A-09-0116, and W-01427A-09-0120
RESPONSE TO RUCO'S NINTH SET OF DATA REQUESTS

December 9, 2009

Response provided by:

Title:

Company Name:

Address:

Company Response Number: WAR 9.19

Q. Admit the Company has taken no action to recover the cost of replacement of non-operational plant from prior owner, contractor or engineer.

OBJECTION: LPSCO objects on the grounds that WAR 9.19 is confusing, ambiguous and unclear. Further, LPSCO objects because WAR 9.19 assumes facts not in evidence. LPSCO does not agree that PVWRF has or had any non-operational plant. Rather, LPSCO believes that PVWRF is and has been fully used and useful in the provision of utility service.

ARIZONA CORPORATION COMMISSION
UTILITIES DIVISION

R-7

ANNUAL REPORT MAILING LABEL – MAKE CHANGES AS NECESSARY

L

SW-01428A
Litchfield Park Service Company - Sewer
12725 W. Indian School Rd. Suite D101
Avondale, AZ 85392

RECEIVED
APR 2 2009
AZ CORP COMMISSION
DOCKET CONTROL

EXHIBIT
R-7
ADMITTED

ANNUAL REPORT

FOR YEAR ENDING

12	31	2008

FOR COMMISSION USE

ANN06	07

4-1709

COMPANY INFORMATION

Company Name (Business Name) Litchfield Park Service Company

Mailing Address 12725 W. Indian School Rd. Suite D101
(Street)

Avondale	Arizona	85392
(City)	(State)	(Zip)

(623) 935-9367	(623) 935-1020	
Telephone No. (Include Area Code)	Fax No. (Include Area Code)	Pager/Cell No. (Include Area Code)

Email Address

Local Office Mailing Address 12725 W. Indian School Rd. Suite D101
(Street)

Avondale	Arizona	85392
(City)	(State)	(Zip)

(623) 935-9367	(623) 935-1020	
Local Office Telephone No. (Include Area Code)	Fax No. (Include Area Code)	Pager/Cell No. (Include Area Code)

Email Address

MANAGEMENT INFORMATION

Management Contact: Greg Sorensen (Name) V.P. (Title)

12725 W. Indian School Rd.. Suite D101	Avondale	AZ	85392
(Street)	(City)	(State)	(Zip)

(623) 298-3753	(623) 935-1020	
Telephone No. (Include Area Code)	Fax No. (Include Area Code)	Pager/Cell No. (Include Area Code)

Email Address

On Site Manager: Bob Dodds General Manger
(Name)

12725 W. Indian School Rd. Suite D101	Avondale	Arizona	85392
(Street)	(City)	(State)	(Zip)

(623) 935-9367	(623) 935-1020	
Telephone No. (Include Area Code)	Fax No. (Include Area Code)	Pager/Cell No. (Include Area Code)

Email Address

☒ **Please mark this box if the above address(es) have changed or are updated since the last filing.**

Statutory Agent: C T Corporation System
(Name)

3225 N Central Ave	Phoenix	AZ	85012
(Street)	(City)	(State)	(Zip)

(602) 277-4792		
Telephone No. (Include Area Code)	Fax No. (Include Area Code	Pager/Cell No. (Include Area Code)

Attorney: Richard Sallquist @ Sallquist & Drummond, P.C.
(Name)

4500 South Lake Shore Drive, Suite 339	Tempe,	AZ	85282
(Street)	(City)	(State)	(Zip)

(602) 224-9222	(480) 345-0412	
Telephone No. (Include Area Code)	Fax No. (Include Area Code)	Pager/Cell No. (Include Area Code)

☐ **Please mark this box if the above address(es) have changed or are updated since the last filing.**

OWNERSHIP INFORMATION

Check the following box that applies to your company:

- ☐ **Sole Proprietor (S)**
- ☐ **Partnership (P)**
- ☐ **Bankruptcy (B)**
- ☐ **Receivership (R)**
- ☐ **Other (Describe)**_____
- ☒ **C Corporation (C) (Other than Association/Co-op)**
- ☐ **Subchapter S Corporation (Z)**
- ☐ **Association/Co-op (A)**
- ☐ **Limited Liability Company**

COUNTIES SERVED

Check the box below for the county/ies in which you are certificated to provide service:

☐ APACHE	☐ COCHISE	☐ COCONINO
☐ GILA	☐ GRAHAM	☐ GREENLEE
☐ LA PAZ	☒ MARICOPA	☐ MOHAVE
☐ NAVAJO	☐ PIMA	☐ PINAL
☐ SANTA CRUZ	☐ YAVAPAI	☐ YUMA
☐ STATEWIDE		

COMPANY NAME
Litchfield Park Service Company (Sewer)

UTILITY PLANT IN SERVICE

Acct. No.	DECRIPTION	Original Cost (OC)	Accumulated Depreciation (AD)	O.C.L.D. (OC less AD)
351	Organization			
352	Franchises			
353	Land and Land Rights	1,783,426		1,783,426
354	Structures and Improvements	19,249,060	2,086,248	17,162,811
355	Power Generation Equipment	543,475	111,857	431,618
360	Collection Sewers - Force	1,180,729	79,025	1,101,704
361	Collection Sewers - Gravity	24,199,503	2,701,141	21,498,362
362	Special Collecting Structures			0
363	Services to Customers			0
364	Flow Measuring Devices	47,360	20,467	26,893
365	Flow Measuring Installations			0
370	Receiving Wells	860,393	178,702	681,692
380	Treatment and Disposal Equip.	5,451,238	1,413,602	4,037,637
381	Plant Sewers	49,044	6,468	42,576
382	Outfall Sewer Lines	343,681	71,579	272,102
389	Other Plant and Misc. Equipment	7,455,562	2,210,767	5,244,795
390	Office Furniture and Equipment	198,772	59,761	139,011
391	Transportation Equipment	29,446	10,399	19,048
393	Tools, Shop and Garage Equip.	70,014	10,675	59,339
394	Laboratory Equipment	173,948	62,040	111,908
395	Power Operated Equipment			0
398	Other Tangible Plant			0
	TOTALS	61,635,652	9,022,731	52,612,921

This amount goes on the Balance Sheet Acct. No. 108

COMPANY NAME
Litchfield Park Service Company (Sewer)

CALCULATION OF DEPRECIATION EXPENSE

Acct. No.	DESCRIPTION	Original Cost (1)	Depreciation Percentage (2)	Depreciation Expense (1x2)
351	Organization	-		0
352	Franchises	-		0
353	Land and Land Rights	1,783,426		0
354	Structures and Improvements	19,249,060		431,626
355	Power Generation Equipment	543,475		27,174
360	Collection Sewers - Force	1,180,729		22,358
361	Collection Sewers - Gravity	24,199,503		445,388
362	Special Collecting Structures	-		0
363	Services to Customers	-		0
364	Flow Measuring Devices	47,360		4,736
365	Flow Measuring Installations	-		0
370	Receiving Wells	860,393		28,680
380	Treatment and Disposal Equip.	5,451,238		266,238
381	Plant Sewers	49,044		1,460
382	Outfall Sewer Lines	343,681		11,456
389	Other Plant and Misc. Equipment	7,455,562		367,597
390	Office Furniture and Equipment	198,772		12,440
391	Transportation Equipment	29,446		4,318
393	Tools, Shop and Garage Equip.	70,014		2,495
394	Laboratory Equipment	173,948		17,368
395	Power Operated Equipment	-		0
398	Other Tangible Plant	-		0
	SUBTOTAL	61,635,652		1,643,332
	CIAC Amortization			(316,182)
	TOTALS	61,635,652		1,327,150

This amount goes on Comparative Statement of Income and Expense Acct. 403

COMPANY NAME
Litchfield Park Service Company (Sewer)

BALANCE SHEET

Acct. No.	ASSETS	BALANCE AT BEGINNING OF TEST YEAR	BALANCE AT END OF YEAR
	CURRENT AND ACCRUED ASSETS		
131	Cash	$ 705,743	$ 914,359
132	Special Deposits		
135	Temporary Cash Investments		
141	Customer Accounts Receivable	410,661	380,068
146	Notes/Receivables from Associated Companies		
151	Plant Material and Supplies		
162	Prepayments	371,372	375,234
174	Miscellaneous Current and Accrued Assets	140,553	131,851
	TOTAL CURRENT AND ACCRUED ASSETS	$ 1,628,329	$ 1,801,512
	FIXED ASSETS		
101	Utility Plant in Service	48,035,844	61,635,652
103	Property Held for Future Use		
105	Construction Work in Progress	4,146,948	652,885
108	Accumulated Depreciation - Utility Plant	7,379,398	9,022,731
121	Non-Utility Property		
122	Accumulated Depreciation - Non Utility		
	TOTAL FIXED ASSETS	$ 44,803,394	$ 53,265,806
	TOTAL ASSETS	$ 46,431,722	$ 55,067,318

NOTE: Total Assets on this page should equal Total Liabilities and Capital on the following page.

COMPANY NAME
Litchfield Park Service Company (Sewer)

BALANCE SHEET (CONTINUED)

Acct. No.	LIABILITIES	BALANCE AT BEGINNING OF TEST YEAR	BALANCE AT END OF YEAR
	CURRENT LIABILITES		
231	Accounts Payable	$ 195,606	$ 88,605
232	Notes Payable (Current Portion)	115,000	120,000
234	Notes/Accounts Payable to Associated Companies	498,264	(584,042)
235	Customer Deposits	124,685	121,281
236	Accrued Taxes	145,115	150,802
237	Accrued Interest	84,406	91,687
241	Miscellaneous Current and Accrued Liabilities	364,055	770,735
	TOTAL CURRENT LIABILITIES	$ 1,527,131	$ 759,069
	LONG-TERM DEBT (Over 12 Months)		
224	Long-Term Notes and Bonds	$ 5,634,650	$ 5,520,098
	DEFERRED CREDITS		
252	Advances in Aid of Construction	$ 7,137,808	$ 9,503,368
253	Other Deferred Credits		
255	Accumulated Deferred Investment Tax Credits		
271	Contributions in Aid of Construction	10,192,337	11,343,809
272	Less: Amortization of Contributions	1,320,180	1,536,654
281	Accumulated Deferred Income Tax	335,487	335,487
	TOTAL DEFERRED CREDITS	$ 16,345,452	$ 19,646,010
	TOTAL LIABILITIES	$ 23,507,232	$ 25,925,177
	CAPITAL ACCOUNTS		
201	Common Stock Issued	$ 759,326	$ 759,326
211	Other Paid in Capital	10,784,090	22,125,982
215	Retained Earnings	11,381,074	6,256,833
218	Proprietary Capital (Sole Props and Partnerships)		
	TOTAL CAPITAL	$ 22,924,490	$ 29,142,141
	TOTAL LIABILITIES AND CAPITAL	$ 46,431,722	$ 55,067,318

COMPANY NAME
Litchfield Park Service Company (Sewer)

COMPARATIVE STATEMENT OF INCOME AND EXPENSE

	OPERATING REVENUES	PRIOR YEAR	TEST YEAR
521	Flat Rate Revenues	$ 6,088,021	$ 6,090,521
522	Measured Revenues		152,087
536	Other Wastewater Revenues	195,503	152,571
	TOTAL REVENUES	$ 6,283,524	$ 6,395,180
	OPERATING EXPENSES		
701	Salaries and Wages		
710	Purchased Wastewater Treatment	335	2,752
711	Sludge Removal Expense	210,520	221,295
715	Purchased Power	625,892	677,056
716	Fuel for Power Production		425
718	Chemicals	432,896	257,028
720	Materials and Supplies	85,425	84,962
731	Contractual Services - Professional	42,708	25,864
735	Contractual Services - Testing	26,225	29,186
736	Contractual Services - Other	1,468,087	2,597,812
740	Rents	51,507	86,185
750	Transportation Expense	39,330	65,759
755	Insurance Expense	42,187	23,530
765	Regulatory Commission Expense		
775	Miscellaneous Expense	75,864	87,833
403	Depreciation Expense	1,138,035	1,327,151
408	Taxes Other Than Income		
408.11	Property Taxes	455,666	423,415
409	Income Taxes	34,471	34,471
	TOTAL OPERATING EXPENSES	$ 4,729,148	$ 5,944,724
	OTHER INCOME/EXPENSE		
419	Interest and Dividend Income	$ 7,788	$ 45,732
421	Non-Utility Income		
426	Miscellaneous Non-Utility Expenses		
427	Interest Expense	389,564	394,489
	TOTAL OTHER INCOME/EXP	$ (381,776)	$ (348,757)
	NET INCOME/(LOSS)	$ 1,172,600	$ 101,699

COMPANY NAME	Litchfield Park Service Company

SUPPLEMENTAL FINANCIAL DATA
Long-Term Debt

	LOAN #1	LOAN #2	LOAN #3	LOAN #4
Date Issued	04/01/1999	06/01/2001		
Source of Loan	IDA	IDA		
ACC Decision No.	61655	63775		
Reason for Loan	Capital Expansion	Capital Expansion		
Dollar Amount Issued	$5,335,000	$7,500,000	$	$
Amount Outstanding	$4,180,000	$7,290,000	$	$
Date of Maturity	10/01/2023	10/01/2031		
Interest Rate	5.88%	6.70%	%	%
Current Year Interest	$256,782	$490,664	$	$
Current Year Principle	$170,000	$60,000	$	$

COMPANY NAME	Litchfield Park Service Company

WASTEWATER COMPANY PLANT DESCRIPTION

TREATMENT FACILITY

TYPE OF TREATMENT (Extended Aeration, Step Aeration, Oxidation Ditch, Aerobic Lagoon, Anaerobic Lagoon, Trickling Filter, Septic Tank, Wetland, Etc.)	Activated Sludge (SBR)
DESIGN CAPACITY OF PLANT (Gallons Per Day)	4,100,000 GPD

LIFT STATION FACILITIES

Location	Quantity of Pumps	Horsepower Per Pump	Capacity Per Pump (GPM)	Wet Well Capacity (gals)
LPSCO Lift Station No. 2	2	18	350	25,000
LPSCO Lift Station No. 3	3	47	1,050	30,000

FORCE MAINS

Size	Material	Length (Feet)
10"	PVC	17,550
12"	PVC	6,100
8"	DIP	3,550
10"	DIP	3,925
12"	DIP	47
16"	DIP	5,200
24"	DIP	6,484

MANHOLES

Type	Quantity
Standard	4,250
Drop	61

CLEANOUTS

Quantity
170

COMPANY NAME	Litchfield Park Service Company

WASTEWATER COMPANY PLANT DESCRIPTION (CONTINUED)

COLLECTION MAINS

Size (in inches)	Material	Length (in feet)
4"	VCP;DIP;PVC	208,097
6"	VCP;DIP;PVC	4,667
8"	VCP;DIP;PVC	1,162,087
10"	VCP;DIP;PVC	70,196
12"	VCP;DIP;PVC	53,213
15"	VCP;DIP;PVC	85,886
18"	VCP;DIP;PVC	22,180
21"	VCP;DIP;PVC	23,016
24"	VCP;DIP;PVC	12,188
30"	VCP;DIP;PVC	3,663

SERVICES

Size (in inches)	Material	Quantity
4	VCP;DIP;PVC	114,763
6	VCP;DIP;PVC	110
8	VCP;DIP;PVC	26
10	VCP;DIP;PVC	1

FOR THE FOLLOWING FIVE ITEMS, LIST THE UTILITY OWNED ASSETS IN EACH CATEGORY

SOLIDS PROCESSING AND HANDLING FACILITIES	Aerobic Digester/ Centrifuge
DISINFECTION EQUIPMENT (Chlorinator, Ultra-Violet, Etc.)	Ultra-Violet
FILTRATION EQUIPMENT (Rapid Sand, Slow Sand, Activated Carbon, Etc.)	Aqua Disk-Filter Disk
STRUCTURES (Buildings, Fences, Etc.)	The facility currently contains 4 steel frame buildings w/ concrete masonry unit (CMU) facia on enclosed concrete tank structures. The facility is bordered by aluminum fencing and gates.
OTHER (Laboratory Equipment, Tools, Vehicles, Standby Power Generators, Etc.	1 Standby Generator, Tools, Lab Equipment, 22 Vehicles, 2 golf carts, 3 trailers

COMPANY NAME	Litchfield Park Service Company

WASTEWATER FLOWS

MONTH/YEAR (Most Recent 12 Months)	NUMBER OF SERVICES	TOTAL MONTHLY SEWAGE FLOW	SEWAGE FLOW ON PEAK DAY
Jan-08	17,681	102,723,000	3,852,000
Feb-08	17,824	96,744,000	3,653,000
Mar-08	17,839	102,798,000	3,680,000
Apr-08	17,797	91,672,000	3,737,000
May-08	17,948	97,978,000	3,566,000
Jun-08	17,916	90,424,000	3,510,000
Jul-08	17,946	98,955,000	4,133,000
Aug-08	17,667	101,119,000	3,529,000
Sep-08	17,691	98,085,000	3,916,000
Oct-08	17,719	104,161,000	4,158,000
Nov-08	17,855	104,856,000	3,881,000
Dec-08	17,907	104,864,000	4,136,000

PROVIDE THE FOLLOWING INFORMATION AS APPLICABLE

Method of Effluent Disposal (leach field, surface water discharge, reuse, injection wells, groundwater recharge, evaporation ponds, etc.)	Reuse, surface discharge
Wastewater Inventory Number (all wastewater systems are assigned an inventory number)	100310
Groundwater Permit Number	N/A
ADEQ Aquifer Protection Permit Number	P100310
ADEQ Reuse Permit Number	R105272, R105472, R105221, R23573, R23618, R23577,R105644,R105706,R105669,R103615
EPA NPDES Permit Number	N/A

STATISTICAL INFORMATION

Total number of customers	17,907
Total number of gallons treated	1,194,379,000

COMPANY NAME Litchfield Park Service Company YEAR ENDING 12/31/2008

INCOME TAXES

For this reporting period, provide the following:

Federal Taxable Income Reported	Unable to isolate due to Consolidated Return filed
Estimated or Actual Federal Tax Liability	
State Taxable Income Reported	Unable to isolate due to Consolidated Return filed
Estimated or Actual State Tax Liability	
Amount of Grossed-Up Contributions/Advances:	
Amount of Contributions/Advances	N/A
Amount of Gross-Up Tax Collected	N/A
Total Grossed-Up Contributions/Advances	N/A

Decision No. 55774 states, in part, that the utility will refund any excess gross-up funds collected at the close of the tax year when tax returns are completed. Pursuant to this Decision, if gross-up tax refunds are due to any Payer or if any gross-up tax refunds have already been made, attach the following information by Payer: name and amount of contribution/advance, the amount of gross-up tax collected, the amount of refund due to each Payer, and the date the Utility expects to make or has made the refund to the Payer.

CERTIFICATION

The undersigned hereby certifies that the Utility has refunded to Payers all gross-up tax refunds reported in the prior year's annual report. This certification is to be signed by the President or Chief Executive Officer, if a corporation; the managing general partner, if a partnership; the managing member, if a limited liability company or the sole proprietor, if a sole proprietorship.

SIGNATURE	**DATE** 4/14/09
PRINTED NAME Gregory S. Sorensen	**TITLE** Director of Operations

COMPANY NAME Litchfield Park Service Company YEAR ENDING 12/31/2008

PROPERTY TAXES

Amount of actual property taxes paid during Calendar Year 2008 was: $ 513,911

Attach to this annual report proof (e.g. property tax bills stamped "paid in full" or copies of cancelled checks for property tax payments) of any and all property taxes paid during the calendar year.

If no property taxes paid, explain why.

VERIFICATION
AND
SWORN STATEMENT

Taxes

RECEIVED
2009
CORP COMM
Director Utilities

VERIFICATION

STATE OF ARIZONA

I, THE UNDERSIGNED

OF THE

COUNTY OF (COUNTY NAME)
MARICOPA
NAME (OWNER OR OFFICIAL) TITLE
Greg Sorensen, V.P.
COMPANY NAME
LITCHFIELD PARK SERVICE COMPANY

DO SAY THAT THIS ANNUAL UTILITY PROPERTY TAX AND SALES TAX REPORT TO THE ARIZONA CORPORATION COMMISSION

FOR THE YEAR ENDING

MONTH	DAY	YEAR
12	31	2008

HAS BEEN PREPARED UNDER MY DIRECTION, FROM THE ORIGINAL BOOKS, PAPERS AND RECORDS OF SAID UTILITY; THAT I HAVE CAREFULLY EXAMINED THE SAME, AND DECLARE THE SAME TO BE A COMPLETE AND CORRECT STATEMENT OF BUSINESS AND AFFAIRS OF SAID UTILITY FOR THE PERIOD COVERED BY THIS REPORT IN RESPECT TO EACH AND EVERY MATTER AND THING SET FORTH, TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

SWORN STATEMENT

I HEREBY ATTEST THAT ALL PROPERTY TAXES FOR SAID COMPANY ARE CURRENT AND PAID IN FULL.

I HEREBY ATTEST THAT ALL SALES TAXES FOR SAID COMPANY ARE CURRENT AND PAID IN FULL.

Greg Sorensen
SIGNATURE OF OWNER OR OFFICIAL

623 298 3353
TELEPHONE NUMBER

SUBSCRIBED AND SWORN TO BEFORE ME

A NOTARY PUBLIC IN AND FOR THE COUNTY OF

COUNTY NAME	
Maricopa	
MONTH April	2009

THIS 14th **DAY OF**

(SEAL)

OFFICIAL SEAL
LINDA A. BYRD
Notary Public - State of Arizona
MARICOPA COUNTY
My Comm. Expires July 22, 2011

Linda A Byrd
SIGNATURE OF NOTARY PUBLIC

MY COMMISSION EXPIRES July 22, 2011

VERIFICATION AND SWORN STATEMENT

Intrastate Revenues Only

RECEIVED
APR 17 2009
AZ CORP COMM
Electric Utilities

VERIFICATION

STATE OF ARIZONA

I, THE UNDERSIGNED

OF THE

COUNTY OF MARICOPA
NAME (OWNER OR OFFICIAL) TITLE Greg Sorensen, V.P.
COMPANY NAME Litchfield Park Service Company

DO SAY THAT THIS ANNUAL UTILITY REPORT TO THE ARIZONA CORPORATION COMMISSION

FOR THE YEAR ENDING

MONTH	DAY	YEAR
12	31	2008

HAS BEEN PREPARED UNDER MY DIRECTION, FROM THE ORIGINAL BOOKS, PAPERS AND RECORDS OF SAID UTILITY; THAT I HAVE CAREFULLY EXAMINED THE SAME, AND DECLARE THE SAME TO BE A COMPLETE AND CORRECT STATEMENT OF BUSINESS AND AFFAIRS OF SAID UTILITY FOR THE PERIOD COVERED BY THIS REPORT IN RESPECT TO EACH AND EVERY MATTER AND THING SET FORTH, TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

SWORN STATEMENT

IN ACCORDANCE WITH THE REQUIREMENT OF TITLE 40, ARTICLE 8, SECTION 40-401, ARIZONA REVISED STATUTES, IT IS HEREIN REPORTED THAT THE GROSS OPERATING REVENUE OF SAID UTILITY DERIVED FROM ARIZONA INTRASTATE UTILITY OPERATIONS DURING CALENDAR YEAR 2008 WAS:

Arizona Intrastate Gross Operating Revenues Only ($)
$ 6,395,180

(THE AMOUNT IN BOX ABOVE INCLUDES $ 0 IN SALES TAXES BILLED, OR COLLECTED)

****REVENUE REPORTED ON THIS PAGE MUST INCLUDE SALES TAXES BILLED OR COLLECTED. IF FOR ANY OTHER REASON, THE REVENUE REPORTED ABOVE DOES NOT AGREE WITH TOTAL OPERATING REVENUES ELSEWHERE REPORTED, ATTACH THOSE STATEMENTS THAT RECONCILE THE DIFFERENCE. (EXPLAIN IN DETAIL)**

SIGNATURE OF OWNER OR OFFICIAL

623 298 3753
TELEPHONE NUMBER

SUBSCRIBED AND SWORN TO BEFORE ME

A NOTARY PUBLIC IN AND FOR THE COUNTY OF

COUNTY NAME	
Maricopa	
MONTH April	, 20 09

THIS 14th **DAY OF**

OFFICIAL SEAL
LINDA A. BYRD
Notary Public - State of Arizona
MARICOPA COUNTY
My Comm. Expires July 22, 2011

(SEAL)

Linda A Byrd
SIGNATURE OF NOTARY PUBLIC

MY COMMISSION EXPIRES July 22, 2011

VERIFICATION
AND
SWORN STATEMENT
RESIDENTIAL REVENUE
INTRASTATE REVENUES ONLY

RECEIVED
APR 17 2009
Director Utilities

VERIFICATION

STATE OF ARIZONA

COUNTY OF MARICOPA	
NAME (OWNER OR OFFICIAL) Greg Sorensen	TITLE V.P.
COMPANY NAME Litchfield Park Service Company	

I, THE UNDERSIGNED

OF THE

DO SAY THAT THIS ANNUAL UTILITY REPORT TO THE ARIZONA CORPORATION COMMISSION

FOR THE YEAR ENDING

MONTH	DAY	YEAR
12	31	2008

HAS BEEN PREPARED UNDER MY DIRECTION, FROM THE ORIGINAL BOOKS, PAPERS AND RECORDS OF SAID UTILITY; THAT I HAVE CAREFULLY EXAMINED THE SAME, AND DECLARE THE SAME TO BE A COMPLETE AND CORRECT STATEMENT OF BUSINESS AND AFFAIRS OF SAID UTILITY FOR THE PERIOD COVERED BY THIS REPORT IN RESPECT TO EACH AND EVERY MATTER AND THING SET FORTH, TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

SWORN STATEMENT

IN ACCORDANCE WITH THE REQUIREMENTS OF TITLE 40, ARTICLE 8, SECTION 40-401.01, ARIZONA REVISED STATUTES, IT IS HEREIN REPORTED THAT THE GROSS OPERATING REVENUE OF SAID UTILITY DERIVED FROM ARIZONA INTRASTATE UTILITY OPERATIONS RECEIVED FROM RESIDENTIAL CUSTOMERS DURING CALENDAR YEAR 2008 WAS:

ARIZONA INTRASTATE GROSS OPERATING REVENUES
$ 5,415,525

(THE AMOUNT IN BOX AT LEFT INCLUDES $ 0 IN SALES TAXES BILLED, OR COLLECTED

***RESIDENTIAL REVENUE REPORTED ON THIS PAGE MUST INCLUDE SALES TAXES BILLED.**

X _____
SIGNATURE OF OWNER OR OFFICIAL

623 298 3753
TELEPHONE NUMBER

SUBSCRIBED AND SWORN TO BEFORE ME

A NOTARY PUBLIC IN AND FOR THE COUNTY OF

NOTARY PUBLIC NAME Linda A Byrd	
COUNTY NAME Maricopa	
MONTH April	20 09

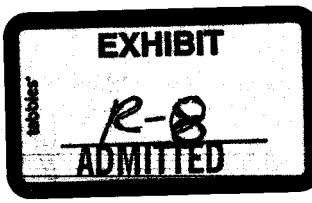
THIS 14th **DAY OF**

(SEAL)

OFFICIAL SEAL
LINDA A. BYRD
Notary Public - State of Arizona
MARICOPA COUNTY
My Comm. Expires July 22, 2011

MY COMMISSION EXPIRES July 22, 2011

X Linda A Byrd
SIGNATURE OF NOTARY PUBLIC



LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103 AND W-01427A-09-0104
RESPONSE TO RUCO'S SIXTH SET OF DATA REQUESTS

October 29, 2009

Response provided by:	Greg Sorensen
Title:	Director of Operations
Company Name:	Liberty Water
Address:	12725 W Indian School Rd D-101 Avondale, AZ 85392

Company Response Number: MJR 6.1

Q. Please provide any and all engineering reports relating to the 4.1 mgd and 8.2 mgd Palm Valley Water Reclamation Facility, ("PVWRF"), including, but not limited to the August 16, 2005 and August 27, 2008 Final Engineering Reports cited on page 23 of the September 30, 2008 APP provided in response to RUCO data request MJR 2.10.

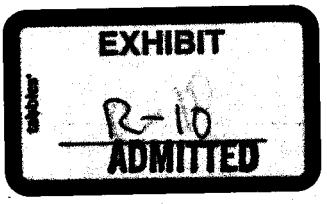
OBJECTION: Because there is no such thing as the "8.2 mgd PVWRF", LPSCO cannot answer questions related to such project. LPSCO notes that there is an ADEQ permit, as well as MAAG 208 approval to expand the current 4.1 mgd PVWRF up to a maximum of 8.1 mgd. There are no engineering reports related to the expansion of the facility beyond its current capacity.

RESPONSE: Without waiving its objection, LPSCO refers RUCO to the attached PACE design report for 2001. The two reports referred in the data request are not, to the Company's knowledge, in its records. Since the Company could not locate those reports without the issuing engineer's name, the information has been requested from ADEQ. This response will be supplemented as needed with any additional information that is received.

Sales / Invoices SALES000000001036

Algonquin Water Services LLC
12725 W. Indian School Road
Suite D 101
Avondale AZ 85323

Date 9/30/2008



Litchfield Park Service Company
12725 W Indian School Rd
Suite D101
Avondale AZ 85323

Purchase Order	Customer ID	Salesperson ID	Shipping Method	Payment Terms ID
	400LPSCO		AR	

airlink bill 4 factor	US$8,230.00

8600.20100.69.5321.0000 4,938.00
020.69.5321.0000 3,292.00

Subtotal	US$8,230.00
Misc	US$0.00
Tax	US$0.00
Freight	US$0.00
Trade Discount	US$0.00
Payment	US$0.00
Total Due	US$8,230.00

Sales / Invoices SALES000000001019

Algonquin Water Services LLC
12725 W. Indian School Road
Suite D 101
Avondale AZ 85323

Date 9/30/2008

Litchfield Park Service Company
12725 W Indian School Rd
Suite D101
Avondale AZ 85323

Purchase Order	Customer ID	Salesperson ID	Shipping Method	Payment Terms ID
	400LPSCO		AR	

airlink bill 4 factor US$32,274.00

Travel
8600-2-0100-69-5320-0000 19,364.40
0200-69-5320-0000 12,909.60

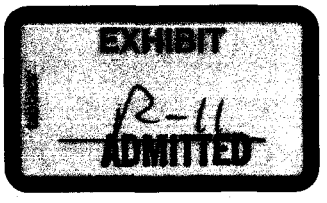
Subtotal	US$32,274.00
Misc	US$0.00
Tax	US$0.00
Freight	US$0.00
Trade Discount	US$0.00
Payment	US$0.00
Total Due	US$32,274.00

R-11

2008

ALGONQUIN POWER INCOME FUND

ANNUAL FINANCIAL RESULTS



ALGONQUIN POWER

depreciation and amortization expense which are derived from a number of non-operating factors, accounting methods and assumptions. APMI believes that presentation of this measure will enhance an investor's understanding of Algonquin's operating performance. EBITDA is not intended to be representative of cash provided by operating activities or results of operations determined in accordance with GAAP.

Overview

Algonquin is a company that owns and has interests in a diverse portfolio of clean, renewable power generation and sustainable infrastructure assets across North America, including 42 renewable energy facilities, 11 thermal energy facilities, and 17 water distribution and waste-water facilities. Algonquin Power was established in 1997 and produces stable earnings through a diversified portfolio of renewable energy and utility assets.

Algonquin owns 41 hydroelectric facilities operating in Ontario, Québec, Newfoundland, Alberta, New York State, New Hampshire, Vermont and New Jersey with a combined generating capacity of 140 MW. The company also owns a 99 MW wind farm in Manitoba. The renewable energy facilities are generally facilities operating under power purchase agreements with major utilities that have an average remaining life of 18 years. The Company's 11 thermal energy facilities also operate under power purchase agreements with an average remaining contract length of 10 years with a combined generating capacity of 320 MW. The Company's Utility Services business unit owns 17 regulated utilities in the United States of America providing water and wastewater services in the states of Arizona, Texas, Missouri and Illinois. These utility operating companies are regulated investor-owned utilities subject to regulation, including rate regulation, by the public utility commissions of the states in which they operate.

Business Strategy

Algonquin's business strategy is to maximize long term unitholder value by strengthening its position as a strong renewable energy and infrastructure company. The Company is focused on growth in cash flow and earnings in the business segments in which it operates. Algonquin currently makes monthly cash distributions to unitholders of $0.02 per trust unit per month or $0.24 per trust unit per annum. This sustainable level of cash distributions allows for both an immediate return on investment for unitholders and retention of sufficient cash to fund growth opportunities, fund anticipated tax liabilities when the new tax policies affecting income trusts are implemented, and mitigate the impact of volatility in foreign exchange.

Algonquin's operations are aligned into two major business units: *Power Generation & Development*, and *Utility Services*. The two business units reflect the Company's business strategy to be a leading provider of essential services and how Algonquin manages its business and classifies its operations for planning and measuring performance.

The Power Generation & Development business unit develops and operates a diversified portfolio of electrical energy generation facilities. Within this business unit there are three distinct divisions: Renewable Energy, Thermal Energy and Development. The Renewable Energy division operates the Company's hydro-electric and wind power facilities. The Thermal Energy division operates co-generation, energy from waste, steam production and other thermal facilities. The Development division develops Algonquin's greenfield power generation projects, pursues accretive acquisitions of electrical energy generation facilities as well as development of organic growth opportunities within Algonquin's existing portfolio of renewable energy and thermal energy facilities. The renewable power and thermal energy generation business of Algonquin is managed with an emphasis on growth through the development of green-field projects and opportunities within Algonquin's existing portfolio. This involves building on the Company's expertise in the origination of greenfield renewable energy projects, building upon the Company's existing portfolio of assets for further growth, and capitalizing on opportunities that may emerge in the current turbulence of the capital markets.

The Utility Services business unit provides safe, reliable transportation and delivery of water and waste-water treatment in its service area and pursues accretive water and waste-water utility acquisition opportunities. Building on its experience in the regulated water utility sector, Utility Services is also considering expanding its operations into other regulated essential utilities such as natural gas distribution and electricity distribution.

Annual results from operations

Key Selected Annual Financial Information

	Year ended December 31		
	2008	**2007**	**2006**
Revenue [1]	**$ 213,796**	$ 186,175	$ 193,244
EBITDA [3]	**$ 90,028**	$ 86,169	$ 92,038
Cash provided by operating activities	**66,874**	40,427	69,332
Net earnings (Loss) from continuing operations	**(19,038)**	24,763	30,728
Net earnings (Loss)	**(19,038)**	23,671	27,956
Distribution to Unitholders [2]	**57,755**	69,923	66,957
Per trust unit			
Net earnings (Loss) from continuing operations	**(0.25)**	0.34	0.43
Net earnings (Loss)	**(0.25)**	0.32	0.39
Diluted net earnings (loss)	**(0.25)**	0.31	0.39
Cash provided by Operating Activities [4]	**0.86**	0.53	0.95
Distribution to Unitholders	**0.75**	0.92	0.92
Total Assets	**978,130**	954,067	1,048,324
Long Term Debt	**293,590**	281,725	229,006

[1] Prior period comparative amounts have been adjusted due to the classification of certain landfill-gas and New England hydroelectric facilities sold during the 2007 fiscal year as Discontinued Operations.
[2] Includes distributions to non-controlling interest.
[3] Non-GAAP measurement, see "Reconciliation of EBITDA to net earnings" in this MD&A.
[4] The change in cash provided by operating activities in the twelve months ended December 31, 2008 is primarily due to increased cash from operations and increased cash from working capital balances primarily in relation to final payments to Vestas regarding the achievement of commercial operation at the St. Leon facility in the prior year.

For the year ended December 31, 2008, Algonquin reported total revenue of $213.8 million as compared to $186.2 million during the same period in 2007, a $27.6 million or 14.8% increase. The increase in revenue from energy sales in 2008 as compared to the same period in 2007 was primarily the result of an increase of $8.5 million due to a combination of higher energy production and increased weighted average energy rates generated in the Renewable Energy division, $1.5 million in Utility Services due to rate increases combined with organic growth at existing facilities, and an increase of $11.3 million due to a combination of changes in production and average energy rates at the Sanger and Windsor Locks facilities in the Thermal Energy division as compared to the prior year. A more detailed analysis of these factors is presented within the business unit analysis.

For the year ended December 31, 2008, the Company experienced an average U.S. exchange rate of approximately $1.067 as compared to $1.074 in the same period in 2007. As such, any year over year variance in revenue or expenses, in local currency, at any of Algonquin's U.S. entities may be affected by a change in the average exchange rate, upon conversion to Algonquin's reporting currency. Although a weaker Canadian dollar relative to the U.S. dollar has an impact on both revenue and expenses generated by its U.S. subsidiaries, Algonquin has foreign exchange forward contracts in place, which partially mitigate the impact on cash available for distribution (see Risk Management – Currency Fluctuations).

EBITDA in the year ended December 31, 2008 increased by $3.8 million to $90.0 million compared to $86.2 million in the same period in 2007, an increase of 4.4%. The increase in EBITDA is primarily related to increased earnings from operations of $6.5 million due to improved hydrological conditions and higher gas prices at the co-generation facilities, partially offset by decreased interest, dividend and other income of $2.4 million due to lower gains on sale of certain fixed assets than in the comparative period. The prior period included a non-recurring reduction in operating expenses related to the achievement of commercial operation at the St. Leon facility, the recognition of interest income earned on unpaid liquidated damages at the St. Leon facility totaling approximately $2.1 million and a termination fee of $1.75 million earned in connection with Algonquin's offer to purchase the outstanding units of Clean Power Income Fund ("CPIF") included in the comparative period.

For the year ended December 31, 2008, net loss from continuing operations totalled $19.0 million as compared to net earnings of $24.8 million during the same period in 2007. The decrease in net earnings as compared to

term expectations. Algonquin's power development team will continue to pursue new opportunities for power generation projects in both Canada and the United States. Utility Services is expecting limited organic growth due to the slowdown in the U.S. housing market. Utility Services has initiated rate cases at a number of its utilities and will initiate additional rate cases in 2009. These rate cases are discussed in further detail within this MD&A (see UTILITY SERVICES: Outlook). While a firm forecast of rate increases at these facilities is not possible as the rate case processes are in progress, the resolution of rate cases is expected to potentially result in increased annual EBITDA at Utility Services of more than $10 million. The regulatory review of the rates and tariffs for these facilities are expected to conclude in the second half of 2009, with the new rates and tariffs going into effect between mid 2009 and the first half of 2010, depending on the state in which the facility operates. The business unit will also continue to consider accretive water and waste-water utility acquisition opportunities, as well as acquisitions in other regulated utilities, such as natural gas distribution and electricity distribution.

In all of its business units, Algonquin is committed to the growth and development of Algonquin's team through various training programs, challenging assignments and learning opportunities. In addition, Algonquin ensures continuous environmental, health and safety training for its operations and maintenance staff. The Company will continue to invest in information technology to reduce operating and administrative costs.

Overall, Algonquin's business units will focus on priorities that enable Algonquin to be an innovative, respected and socially responsible participant in the renewable energy, power and utility businesses and to maximize value for the Company in the current state of the financial markets. With a mix of complementary regulated and non-regulated businesses, the Company strives to enhance unitholder value through stable cash flows, sustainable cash distributions and a managed risk profile.

POWER GENERATION & DEVELOPMENT

Renewable Energy Division

	Three months ended December 31		Year ended December 31	
	2008	2007	2008	2007
Performance (MW-hrs sold)				
Quebec Region	**78,720**	70,353	**320,025**	275,863
Ontario Region	**33,072**	22,578	**147,125**	113,917
Manitoba Region	**105,643**	93,612	**377,450**	354,986
New England Region *	**21,066**	10,248	**84,950**	52,607
New York Region	**25,461**	17,715	**92,000**	72,841
Western Region	**12,790**	8,193	**69,050**	67,685
Total	**276,752**	222,699	**1,090,600**	937,899
Revenue				
Energy sales *	**$ 19,175**	$ 15,064	**$ 75,549**	$ 49,688
Other revenue	**-**	1,666	**-**	17,123
Total revenue	**$ 19,175**	$ 16,730	**$ 75,549**	$ 66,811
Expenses				
Operating expenses *	**(6,160)**	(4,989)	**(22,015)**	(16,132)
Other income	**507**	442	**1,477**	2,571
Realized Gain (Loss) on derivative financial instruments	**(140)**	83	**(448)**	67
Division operating profit (including other income)	**$ 13,382**	$ 12,266	**$ 54,563**	$ 53,317

* Prior period comparative amounts have been adjusted due to the classification of certain New England hydroelectric facilities as Discontinued Operations.

16. Related party transactions

In addition to the transaction described in note 3 (a) with APMI, the following related party transactions occurred:

APMI provides management services including advice and consultation concerning business planning, support, guidance and policy making and general management services. In 2008 and 2007, APMI was paid on a cost recovery basis for all costs incurred and charged $893 (2007 - $867). APMI is also entitled to an incentive fee of 25% on all distributable cash (as defined in the management agreement) generated in excess of $0.92 per trust unit. During 2008 $nil (2007 - $770) was earned by APMI as an incentive fee.

As part of the project to re-power the Sanger facility, the Fund entered into an agreement with APMI to undertake certain construction management services on the project. APMI is entitled to a development supervision fee plus a performance based contingency fee for its construction management role on the project. During 2008, APMI was paid $23 (2007 - $98) for development supervision. During 2008, the Fund accrued $674 as the final fee owed to APMI with respect to this project. This fee has been accrued and is included in accounts payable on the consolidated balance sheet.

The Fund has leased its head office facilities since 2001 from an entity owned by the shareholders of APMI on a net basis. Base lease costs for 2008 were $296 (2007 - $296).

On March 10, 2008, the Company advanced $225 to the Trustees for purposes of enabling the Trustees to purchase additional Units of the Company. The loans are subject to promissory notes issued in favour of the Company which are repayable upon demand, currently bear interest at 3% per annum, and are recorded as a reduction in Trust Units on the consolidated balance sheet. During 2008 a principal repayment of $8 was made. (2007 - $nil) (note 13)

The Fund utilizes chartered aircrafts, including the use of an aircraft owned by an affiliate of APMI, Airlink. In 2004, the Fund entered into an agreement and remitted $1.3 million to the affiliate as an advance against expense reimbursements (including engine utilization reserves) for the Fund's business use of the aircraft. Under the terms of this arrangement, the Fund will have priority access to make use of the aircraft for a specified number of hours at a cost equal solely to the third party direct operating costs incurred when flying the aircraft; such direct operating costs do not provide the affiliate with any profit or return on or of the capital committed to the aircraft. During the year, the Fund incurred costs in connection with the use of the aircraft of $332 (2007 - $422) and amortization expense related to the advance against expense reimbursements of $90 (2007 - $168). At December 31, 2008, the remaining amount of the advance was $818 (2007 - $908).

Up to August 1, 2008, the Company had project debt from Highground (previously Algonquin Power Venture Fund) in the amount of $3,000 related to the St. Leon facility. Highground advanced $1,600 at a rate of 11.25% as part of the initial financing of the St. Leon facility and advanced $1,400 at a rate of 9.25% during the first quarter of 2007. These amounts have now been eliminated on the Consolidated Balance Sheet of the Company due to the acquisition of Highground (Note 3 (a) and note 10).

Up to July 31, 2008, Highground was paid $150 (2007 - $150) in interest related to debt associated with the St. Leon facility. Some of the directors and shareholders of APMI were also directors, officers and shareholders of the manager of Highground.

In accordance with the construction services agreement related to the St. Leon facility GWAP, a company controlled by APMI, was paid a final payment of $134 (2007 - $845) in 2008 for construction services. In 2008, the Fund also paid $nil (2007 - $1,353) to GWAP on a cost recovery basis related to ongoing operating expenses of the project.

16. Related party transactions (continued)

Pursuant to the St. Leon Limited Partnership Agreement, in 2006, St. Leon Wind Energy LP ("St. Leon LP"), a subsidiary of Airsource and the legal owner of the St. Leon facility, was required to issue 100 Class B units to GWAP. The holders of the Class B Units are entitled to 2.5% of the income allocations and cash distributions from St. Leon LP for a 5 year period commencing after June 17, 2008, two years after the date the facility achieved commercial operations pursuant to the PPA. Such income allocations and cash distributions shall be increased by 2.5% for each successive 5 year period, to a maximum of 10.0%. In any particular period, cash distributions to the holders of the Class B Units are only to be made after distributions have been made to the other partners, in an aggregate amount, equal to the debt service on the outstanding debt in respect of such period. The holders of the Class B units are entitled to cash distributions of $288 for the year ended December 31, 2008 (2007 - $nil).

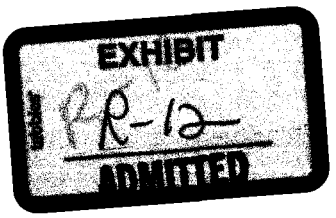
AirSource has agreed to reimburse AirSource Power Fund GP Inc (the "General Partner") of the AirSource Power Fund I LP for reasonable costs incurred by it in acting as registrar and transfer agent and in attending to the administration of the Partnership, as required in the Partnership Agreement. The general partner was paid $nil during the year ended December 31, 2008 (2007 - $11).

Pursuant to the agreement entered into on June 27, 2008 between the Company, Highground and CJIG (Note 3(a)), APMI is entitled to a fee of approximately $240 from the Company. This fee has been accrued and included in accounts payable on the consolidated balance sheet and is included in transaction costs of trust units issued.

APMI is entitled to 50% of the cash flow above 15% return on investment for the BCI project pursuant to its project management contract. During 2008, no amounts were paid under this agreement. However, APMI earned a construction supervision fee of $100 in relation to the development of this project.

LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103, W-01427A-09-0104,
W-01427A-09-0116, AND W-01427A-09-0120
RESPONSE TO STAFF'S FOURTEENTH SET OF DATA REQUESTS

December 29, 2009



Response provided by: Gerald Tremblay

Title: Director of Finance

Company: Algonquin Power Income Fund

Address: 2845 Bristol Circle
Oakville, Ontario Canada L6H 7H7

Company Response Number: JMM 14-1

Water Division (Plant Invoices)

Q. Unsupported Documentation – RUCO has identified the following three invoices as being unsupported:

Invoice: W. Fisher in the amount of $2,750

J.E. Backup in the amount of $242,119

Invoice: Pyramid West Pipeline in the amount of $7,020

Please provide Staff with supporting documentation for the above items.

RESPONSE: Please see attachment JMM 14-1 for supporting invoices. Please note that the invoice for W. Fisher was not found, and the Pyramid West Pipeline invoice consists of 2 invoices, one which was found in the value of $4,822. The remaining invoice could not be located. All of these invoices also were provided as part of Staff's first set of data requests.

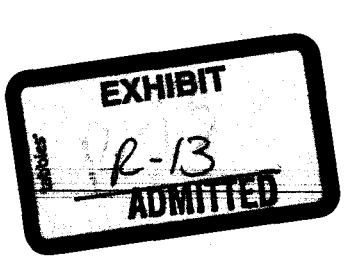


EXHIBIT
R-13
ADMITTED

22475 w. Williams Dr. Surprise, AZ 85387 Office (623) 628-5203 Fax (623) 877-0028

[redacted]

LESCO
111 W. Wigwam Blvd., Suite B
Litchfield Park, AZ. 856340
Attn: Mathew
Re: Work Completed

Pyramid West has completed the following work. You will find P.O. numbers that were issued for this work are included. Please submit to concerned parties for billing. Feel free to contact me with any questions regarding this billing information.

Project: **Windgate Suites**

WATER

[redacted]	
1 EA	ASPHALT PATCH

SUB TOTAL $ 4,128.22

EXCLUSIONS: PERMITS, TAXES, CITY FEES, BONDS,STAKING, CONFLICTS WITH EXISTING UTILITIES, FINAL ADJUSTMENTS, BUILDING CONNECTIONS, METERS, PAINTING & SIGNAGE, HAUL-OFF, TESTING OFF EXISTING UTILITIES, SPECIAL INSURANCE, DRY WELLS, RIP RAP, TAMPER DEVICES, OVERTIME, HARD DIG, DIRT THAT WILL NOT HOLD A VIRTICAL EDGE, POLICE OFFICER, PAVEMENT THICKER THAN 4", ELECTRICAL WORK, PAVEMENT MARKERS, ON-SITE TRAFFIC CONTROL, AND THE REMOVAL & REPLACEMENT OF CONCRETE & LANDSCAPING.

[redacted]

Signature Matt Gaulet

Ask Jim S. - SHE billed

(Warranty)

4,128 22

JMM 13.1

Litchfield Park Service Company

SUPPLIER NAME: Pyramid West Pipelines

G/L POSTING PERIOD:

SUPPLIER ID: 8600-

BATCH #:

INVOICE DATE: 6-10-04

PO #:

INVOICE #: 61004

INVOICE AMOUNT: $4128.22

DATE ENTERED: ENTERED 8-2

DESCRIPTION: Windgate Suites

OPS# / FWO#	COST CODE	$ AMOUNT
8600-0100-ops	3-5200-1052-0050	$4128.22

POSTED

TOTAL $4,128.22

APPROVAL & DATE: Matt Sorlock Aug 7/50

A/P WRITE UP AH

R-14

AMER. STATES WATER NYSE-AWR

RECENT PRICE 36.04 | P/E RATIO 18.8 (Trailing: 22.4 Median: 22.0) | RELATIVE P/E RATIO 1.08 | DIV'D YLD 2.8% | VALUE LINE

TIMELINESS 3 Lowered 6/5/09
SAFETY 3 New 2/4/00
TECHNICAL 3 Raised 10/23/09
BETA .80 (1.00 = Market)

2012-14 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	60	(+65%)	16%
Low	40	(+10%)	6%

Insider Decisions

	N	D	J	F	M	A	M	J	J
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	1	2	0	0	1	0	0	0	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	64	55	66
to Sell	52	66	53
Hld's(000)	8980	9283	10578

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
High:	19.5	26.5	25.3	26.4	29.0	29.0	26.8	34.6	43.8	46.1	42.0	38.8								
Low:	14.1	14.8	16.7	19.0	20.3	21.6	20.8	24.3	30.3	33.6	27.0	29.8								
	9.27	10.43	11.03	11.37	11.44	11.02	12.91	12.17	13.06	13.78	13.98	13.61	14.06	15.76	17.49	18.42	*18.90*	*19.75*	Revenues per sh	*21.75*
	1.67	1.68	1.75	1.75	1.85	2.04	2.26	2.20	2.53	2.54	2.08	2.23	2.64	2.89	3.31	3.37	*3.80*	*3.95*	"Cash Flow" per sh	*4.60*
	1.11	.95	1.03	1.13	1.04	1.08	1.19	1.28	1.35	1.34	.78	1.05	1.32	1.33	1.62	1.55	*1.90*	*2.05*	Earnings per sh A	*2.60*
	.79	.80	.81	.82	.83	.84	.85	.86	.87	.87	.88	.89	.90	.91	.96	1.00	*1.02*	*1.08*	Div'd Decl'd per sh B■	*1.25*
	1.90	2.43	2.19	2.40	2.58	3.11	4.30	3.03	3.18	2.68	3.76	5.03	4.24	3.91	2.89	4.45	*4.00*	*4.25*	Cap'l Spending per sh	*5.00*
	9.95	10.07	10.29	11.01	11.24	11.48	11.82	12.74	13.22	14.05	13.97	15.01	15.72	16.64	17.53	17.95	*16.55*	*19.45*	Book Value per sh	*22.00*
	11.71	11.77	11.77	13.33	13.44	13.44	13.44	15.12	15.12	15.18	15.21	16.75	16.80	17.05	17.23	17.30	*18.50*	*18.75*	Common Shs Outst'g C	*20.00*
	13.4	12.8	11.6	12.6	14.5	15.5	17.1	15.9	16.7	18.3	31.9	23.2	21.9	27.7	24.0	22.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*20.0*
	.79	.84	.78	.79	.84	.81	.97	1.03	.86	1.00	1.82	1.23	1.17	1.50	1.27	1.37			Relative P/E Ratio	*1.35*
	5.3%	6.6%	6.7%	5.8%	5.5%	5.0%	4.2%	4.2%	3.9%	3.6%	3.5%	3.6%	3.1%	2.5%	2.5%	2.9%			Avg Ann'l Div'd Yield	*2.5%*
							173.4	184.0	197.5	209.2	212.7	228.0	236.2	268.6	301.4	318.7	*350*	*370*	Revenues ($mill)	*435*
							16.1	18.0	20.4	20.3	11.9	16.5	22.5	23.1	28.0	26.8	*35.0*	*39.0*	Net Profit ($mill)	*52.0*
							46.0%	45.7%	43.0%	38.9%	43.5%	37.4%	47.0%	40.5%	42.6%	37.8%	*35.5%*	*37.0%*	Income Tax Rate	*40.0%*
							--	--	--	--	--	--	--	12.2%	8.5%	6.9%	*5.0%*	*5.0%*	AFUDC % to Net Profit	*5.0%*
							51.0%	47.5%	54.9%	52.0%	52.0%	47.7%	50.4%	48.6%	46.9%	46.2%	*46.5%*	*46.0%*	Long-Term Debt Ratio	*46.5%*
							48.4%	51.9%	44.7%	48.0%	48.0%	52.3%	49.6%	51.4%	53.1%	53.8%	*53.5%*	*54.0%*	Common Equity Ratio	*53.5%*
							328.2	371.1	447.6	444.4	442.3	480.4	532.5	551.6	569.4	577.0	*665*	*675*	Total Capital ($mill)	*825*
							449.6	509.1	539.8	563.3	602.3	664.2	713.2	750.6	776.4	825.3	*870*	*925*	Net Plant ($mill)	*1025*
							6.6%	6.4%	6.1%	6.5%	4.6%	5.2%	5.4%	6.0%	6.7%	6.4%	*7.0%*	*7.5%*	Return on Total Cap'l	*8.5%*
							10.0%	9.2%	10.1%	9.5%	5.6%	6.6%	8.5%	8.1%	9.3%	8.6%	*10.0%*	*10.5%*	Return on Shr. Equity	*12.0%*
							10.1%	9.3%	10.1%	9.5%	5.6%	6.6%	8.5%	8.1%	9.3%	8.6%	*10.0%*	*10.5%*	Return on Com Equity	*12.0%*
							2.9%	3.0%	3.6%	3.3%	NMF	1.0%	2.8%	2.7%	3.9%	3.1%	*5.0%*	*5.5%*	Retained to Com Eq	*6.0%*
							72%	68%	65%	65%	113%	84%	67%	67%	58%	64%	*56%*	*52%*	All Div'ds to Net Prof	*48%*

Target Price Range 2012 | 2013 | 2014

LEGENDS
1.25 x Dividends p sh divided by Interest Rate
Relative Price Strength
3-for-2 split 6/02
Options: No
Shaded area: prior recession
Latest recession began 12/07

3-for-2

Percent shares traded 12 8 4

128 96 80 64 48 40 32 24 16 12

% TOT. RETURN 9/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	-3.3	12.6
3 yr.	2.5	5.1
5 yr.	67.2	36.4

CAPITAL STRUCTURE as of 6/30/09
Total Debt $317.8 mill. **Due in 5 Yrs** $12.0 mill.
LT Debt $306.3 mill. **LT Interest** $22.0 mill.
(LT interest earned: 4.8x; total interest coverage: 4.4x) (46% of Cap'l)

Leases, Uncapitalized: Annual rentals $2.9 mill.

Pension Assets-12/08 $54.2 mill.
Oblig. $94.5 mill.

Pfd Stock None.

Common Stock 18,499,423 shs.
as of 8/5/09
MARKET CAP: $675 million (Small Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	1.7	7.3	9.8
Other	43.7	66.9	87.6
Current Assets	63.1	90.6	97.4
Accts Payable	29.1	36.6	39.6
Debt Due	37.8	75.3	11.5
Other	27.4	25.5	37.8
Current Liab.	94.3	137.4	88.9
Fix. Chg. Cov.	314%	293%	440%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	4.5%	5.0%	*4.0%*
"Cash Flow"	5.5%	6.0%	*6.5%*
Earnings	3.5%	5.5%	*9.5%*
Dividends	1.5%	2.0%	*4.5%*
Book Value	4.5%	5.0%	*4.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2006	64.3	63.0	75.0	66.3	268.6
2007	72.3	79.3	75.8	74.0	301.4
2008	68.9	80.3	85.3	84.2	318.7
2009	79.6	93.6	*91.8*	*85.0*	*350*
2010	*83.0*	*99.0*	*98.0*	*90.0*	*370*

Calendar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2006	.35	.36	.32	.30	1.33
2007	.40	.42	.44	.35	1.62
2008	.30	.53	.26	.43	1.55
2009	.28	.64	*.56*	*.42*	*1.90*
2010	*.30*	*.65*	*.60*	*.50*	*2.05*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.225	.225	.225	.225	.90
2006	.225	.225	.225	.235	.91
2007	.235	.235	.235	.250	.96
2008	.250	.250	.250	.250	1.00
2009	.250	.250	.250		

BUSINESS: American States Water Co. operates as a holding company. Through its principal subsidiary, Golden State Water Company, it supplies water to more than 250,000 customers in 75 communities in 10 counties. Service areas include the greater metropolitan areas of Los Angeles and Orange Counties. The company also provides electric utility services to nearly 23,250 customers in the city of Big Bear Lake and in areas of San Bernardino County. Acquired Chaparral City Water of Arizona (10/00). Has roughly 675 employees. Officers & directors own 2.5% of common stock (4/09 Proxy). Chairman: Lloyd Ross. President & CEO: Floyd Wicks. Inc: CA. Addr.: 630 East Foothill Boulevard, San Dimas, CA 91773. Tele.: 909-394-3600. Internet: www.aswater.com.

Recent regulatory changes are fueling strength at American States Water. The water utility provider posted earnings of $0.64 a share in the second quarter, 21% better than last year, as a more business friendly approach by the California Public Utilities Commission helped sales improve 17%, to $94 million, despite a decrease in water consumption. Specifically, the adoption of a water rate adjustment mechanism and a modified cost balancing account were $2.2 million accretive to the top line and boosted share earnings by $0.07. We suspect that third-quarter results were probably even more impressive, with the bottom line nearly doubling from last year's weak tally. As a result, we've raised our full-year earnings estimate by 12% to $1.90.

We think there could be some hurdles ahead, however. Comparisons get much tougher beginning with the December quarter and are likely to remain so henceforth. Meanwhile, operating costs appear to be on the rise, with infrastructure and maintenance expenses continuing to mount due to aging water systems. Thus, we look for growth to slow considerably in the fourth quarter and 2010.

Finances remain a major concern. Although management paid down roughly $45 million in debt in the June quarter, it was forced to issue shares to do so. Further debt reduction is highly unlikely going forward, with ongoing financing likely to be used to meet capital requirements. In fact, we look for AWR to tap debt and equity markets in the future in order to comply with increasingly stringent EPA regulations and improve infrastructures. The increased interest rate expense and greater share count that will accompany such maneuverings are likely to dilute future gains, though.

Growth-minded investors can find better options. AWR does not stand out for Timeliness or 3- to 5-year appreciation potential, as infrastructure costs mire future growth rates. Although income-minded investors may be hesitant to jump aboard, given that there has yet to be an announcement about a dividend increase, we are not concerned and suspect that a raise is on the horizon, thus maintaining the history of annual dividend growth.

Andre J. Costanza *October 23, 2009*

(A) *Primary earnings. Excludes nonrecurring* gains/(losses): '04, 14¢; '05, 25¢; '06, 6¢; '08, (27¢). Next earnings report due early Nov. May not add due to rounding.

(B) Dividends historically paid in early March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions, adjusted for split.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	70
Earnings Predictability	70

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To subscribe call 1-800-833-0046.

AQUA AMERICA NYSE-WTR

RECENT PRICE 16.65 | P/E RATIO 20.1 (Trailing: 22.2 Median: 25.0) | RELATIVE P/E RATIO 1.16 | DIV'D YLD 3.5% | VALUE LINE

TIMELINESS 3 Lowered 6/26/09
SAFETY 3 Lowered 8/1/03
TECHNICAL 4 Raised 10/16/09
BETA .65 (1.00 = Market)

2012-14 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	40	(+140%)	26%
Low	25	(+50%)	13%

Insider Decisions

	N	D	J	F	M	A	M	J	J
to Buy	0	0	0	0	0	0	0	0	0
Options	0	1	0	1	0	0	0	0	0
to Sell	0	1	0	0	0	0	0	0	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	131	130	117
to Sell	131	134	136
Hld's(000)	60996	63551	61341

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
High:	11.5	11.5	12.0	14.8	15.0	16.8	18.5	29.2	29.8	26.6	22.0	21.5								
Low:	7.2	7.6	6.3	9.4	9.6	11.8	14.2	17.5	20.1	18.9	12.2	16.1								
	1.70	1.82	1.84	1.86	2.02	2.09	2.41	2.46	2.70	2.85	2.97	3.48	3.85	4.03	4.52	4.63	*5.00*	*5.30*	Revenues per sh	*6.50*
	.42	.42	.47	.50	.56	.61	.72	.76	.86	.94	.96	1.09	1.21	1.26	1.37	1.42	*1.55*	*1.65*	"Cash Flow" per sh	*2.10*
	.24	.26	.29	.30	.34	.40	.42	.47	.51	.54	.57	.64	.71	.70	.71	.73	*.82*	*.90*	Earnings per sh A	*1.25*
	.21	.21	.22	.23	.24	.26	.27	.28	.30	.32	.35	.37	.40	.44	.48	.51	*.54*	*.56*	Div'd Decl'd per sh B■	*.65*
	.47	.46	.52	.48	.58	.82	.90	1.16	1.09	1.20	1.32	1.54	1.84	2.05	1.79	1.98	*2.10*	*2.20*	Cap'l Spending per sh	*2.75*
	2.29	2.41	2.46	2.69	2.84	3.21	3.42	3.85	4.15	4.36	5.34	5.89	6.30	6.96	7.32	7.82	*8.05*	*8.35*	Book Value per sh	*10.60*
	59.40	59.77	63.74	65.75	67.47	72.20	106.80	111.82	113.97	113.19	123.45	127.18	128.97	132.33	133.40	135.37	*136.00*	*136.50*	Common Shs Outst'g C	*138.00*
	14.4	13.5	12.0	15.6	17.8	22.5	21.2	18.2	23.6	23.6	24.5	25.1	31.8	34.7	32.0	24.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*25.0*
	.85	.89	.80	.98	1.03	1.17	1.21	1.18	1.21	1.29	1.40	1.33	1.69	1.87	1.70	1.50			Relative P/E Ratio	*1.65*
	5.9%	6.0%	6.2%	4.9%	3.9%	2.9%	3.0%	3.3%	2.5%	2.5%	2.5%	2.3%	1.8%	1.8%	2.1%	2.8%			Avg Ann'l Div'd Yield	*2.0%*
	257.3	275.5	307.3	322.0	367.2	442.0	496.8	533.5	602.5	627.0	*680*	*730*	Revenues ($mill)	*900*
	45.0	50.7	58.5	62.7	67.3	80.0	91.2	92.0	95.0	97.9	*115*	*125*	Net Profit ($mill)	*170*
	38.4%	38.9%	39.3%	38.5%	39.3%	39.4%	38.4%	39.6%	38.9%	39.7%	*39.0%*	*39.0%*	Income Tax Rate	*39.0%*
	--	--	--	--	--	--	--	--	2.9%	3.1%	*3.5%*	*3.2%*	AFUDC % to Net Profit	*2.5%*
	52.9%	52.0%	52.2%	54.2%	51.4%	50.0%	52.0%	51.6%	55.4%	54.1%	*54.0%*	*54.0%*	Long-Term Debt Ratio	*49.0%*
	46.7%	47.8%	47.7%	45.8%	48.6%	50.0%	48.0%	48.4%	44.6%	45.9%	*46.0%*	*46.0%*	Common Equity Ratio	*51.0%*
	782.7	901.1	990.4	1076.2	1355.7	1497.3	1690.4	1904.4	2191.4	2306.6	*2385*	*2470*	Total Capital ($mill)	*2865*
	1135.4	1251.4	1368.1	1490.8	1824.3	2069.8	2280.0	2506.0	2792.8	2997.4	*3150*	*3300*	Net Plant ($mill)	*3600*
	7.6%	7.4%	7.8%	7.6%	6.4%	6.7%	6.9%	6.4%	5.9%	5.7%	*6.5%*	*6.5%*	Return on Total Cap'l	*6.5%*
	12.2%	11.7%	12.3%	12.7%	10.2%	10.7%	11.2%	10.0%	9.7%	9.3%	*10.5%*	*11.0%*	Return on Shr. Equity	*11.5%*
	12.3%	11.7%	12.4%	12.7%	10.2%	10.7%	11.2%	10.0%	9.7%	9.3%	*10.5%*	*11.0%*	Return on Com Equity	*11.5%*
	4.3%	4.7%	5.1%	5.2%	4.2%	4.6%	4.9%	3.7%	3.2%	2.8%	*4.0%*	*4.5%*	Retained to Com Eq D	*5.5%*
	65%	60%	59%	59%	59%	57%	56%	63%	67%	70%	*64%*	*61%*	All Div'ds to Net Prof	*53%*

CAPITAL STRUCTURE as of 6/30/09
Total Debt $1255.4 mill. **Due in 5 Yrs** $245.0 mill.
LT Debt $1227.7 mill. **LT Interest** $65.0 mill.
(LT interest earned: 3.4x; total interest coverage: 3.4x) (54% of Cap'l)

Pension Assets-12/08 $112.2 mill.
Oblig. $204.7 mill.

Pfd Stock None
Common Stock 135,917,740 shares
as of 7/21/09

MARKET CAP: $2.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	14.5	14.9	13.8
Receivables	82.9	84.5	84.9
Inventory (AvgCst)	8.8	9.8	9.7
Other	9.3	11.8	14.1
Current Assets	115.5	121.0	122.5
Accts Payable	45.8	50.0	29.5
Debt Due	80.8	87.9	27.7
Other	56.6	55.3	148.6
Current Liab.	183.2	193.2	205.8
Fix. Chg. Cov.	323%	329%	325%

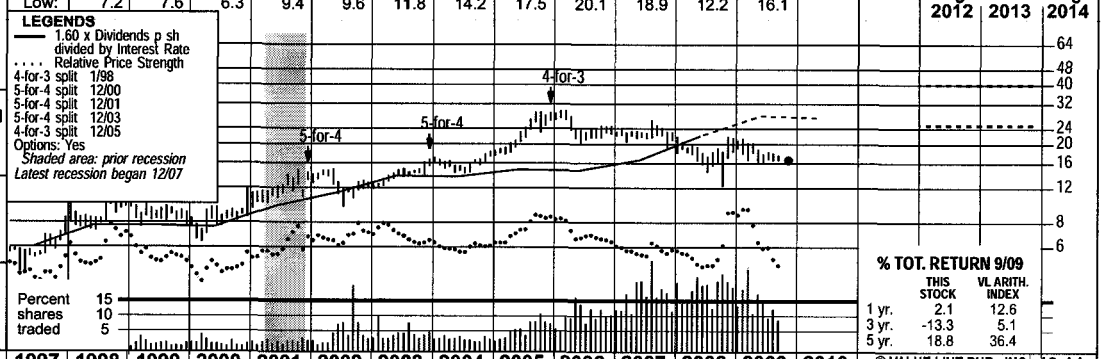
ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	8.0%	9.0%	*6.5%*
"Cash Flow"	9.5%	8.0%	*7.5%*
Earnings	7.5%	5.5%	*10.0%*
Dividends	7.0%	8.0%	*5.5%*
Book Value	9.5%	10.0%	*6.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	117.9	131.7	147.0	136.9	533.5
2007	137.3	150.6	165.5	149.1	602.5
2008	139.3	151.0	177.1	159.6	627.0
2009	154.5	167.3	*185*	*173.2*	*680*
2010	*165*	*185*	*195*	*185*	*730*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	.13	.17	.21	.19	.70
2007	.13	.17	.22	.19	.71
2008	.11	.17	.26	.19	.73
2009	.14	.19	*.28*	*.21*	*.82*
2010	*.15*	*.22*	*.30*	*.23*	*.90*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.098	.098	.098	.107	.40
2006	.107	.107	.115	.115	.44
2007	.115	.115	.125	.125	.48
2008	.125	.125	.125	.135	.51
2009	.135	.135	.135		

LEGENDS
1.60 x Dividends p sh divided by Interest Rate
Relative Price Strength
4-for-3 split 1/98
5-for-4 split 12/00
5-for-4 split 12/01
5-for-4 split 12/03
4-for-3 split 12/05
Options: Yes
Shaded area: prior recession
Latest recession began 12/07



Target Price Range 2012 | 2013 | 2014
64
48
40
32
24
20
16
12
8
6

% TOT. RETURN 9/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	2.1	12.6
3 yr.	-13.3	5.1
5 yr.	18.8	36.4

BUSINESS: Aqua America, Inc. is the holding company for water and wastewater utilities that serve approximately three million residents in Pennsylvania, Ohio, North Carolina, Illinois, Texas, New Jersey, Florida, Indiana, and five other states. Divested three of four non-water businesses in '91; telemarketing group in '93; and others. Acquired AquaSource, 7/03; Consumers Water, 4/99; and others. Water supply revenues '08: residential, 60%; commercial, 14%; industrial & other, 26%. Officers and directors own 1.3% of the common stock (4/09 Proxy). Chairman & Chief Executive Officer: Nicholas DeBenedictis. Incorporated: Pennsylvania. Address: 762 West Lancaster Avenue, Bryn Mawr, Pennsylvania 19010. Telephone: 610-525-1400. Internet: www.aquaamerica.com.

Aqua America completed the second quarter on a good note. Despite unfavorable weather conditions and the slowdown in the home building market, the company registered revenue and earnings growth of nearly 11%. Also, a number of rate increases were approved by the courts, and the year-to-date approval of $27.2 million in upward rate adjustments should help bolster the top and bottom lines over the next few quarters.

The company is likely to build on this momentum in 2010. Indeed, several rate-relief cases should be decided in the latter half of this year, and the more than $9 million request this year would be accretive to revenues and earnings going into 2010, provided the cases are ruled in Aqua's favor. Additional rate increase petitions for upwards of $50 million will also be filed during the next few months, notably in Pennsylvania and New Jersey.

Aqua America will likely remain active on the acquisition front. One of the company's current growth strategies involves purchasing available utilities and making infrastructure improvements in order to procure rate relief judgments. This should benefit WTR's cost structure, as well as expand its customer base.

A focus will also remain on procuring favorable rate increase judgments over the next few years. As a portion of capital spending (currently planned to run up to about $315 million per annum), approximately 10% is earmarked for "compliance spending", which is used for adjustments mandated by regulating agencies. The remaining 90% will likely be used to make improvements to current facilities in order to petition for more rate increases.

The board of directors approved a dividend increase. During its annual strategy session, a 7.4% rise was instituted, and will bring the year-ahead dividend up to $0.58 a share.

This neutrally ranked stock may appeal to conservative investors. The probable steady dividend growth and the worthwhile appreciation potential over the 2012–2014 horizon support the appeal of these shares. Also of note are the high marks for Stock Price Stability and Earnings Predictability.

John D. Burke *October 23, 2009*

(A) Diluted shares. Excl. nonrec. gains (losses): '99, (11¢); '00, 2¢; '01, 2¢; '02, 5¢; '03, 4¢. Excl. gain from disc. operations: '96, 2¢. Next earnings report due early November.

(B) Dividends historically paid in early March, June, Sept. & Dec. ■ Div'd. reinvestment plan available (5% discount).

(C) In millions, adjusted for stock splits.

Company's Financial Strength	B+
Stock's Price Stability	95
Price Growth Persistence	70
Earnings Predictability	100

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CALIFORNIA WATER NYSE-CWT

RECENT PRICE	39.52	P/E RATIO	18.7 (Trailing: 18.7 Median: 22.0)	RELATIVE P/E RATIO	1.07	DIV'D YLD	3.0%	VALUE LINE

TIMELINESS 3 Lowered 7/3/09

SAFETY 3 Lowered 7/27/07

TECHNICAL 4 Raised 10/23/09

BETA .75 (1.00 = Market)

	High:	Low:
	33.8	20.8
	32.0	22.6
	31.4	21.5
	28.6	22.9
	26.9	20.5
	31.4	23.7
	37.9	26.1
	42.1	31.2
	45.8	32.8
	45.4	34.2
	46.6	27.7
	48.3	33.5

Target Price Range 2012 | 2013 | 2014

2012-14 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	65	(+65%)	15%
Low	45	(+15%)	6%

Insider Decisions

	N	D	J	F	M	A	M	J	J
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	1	0	0	0	0	0	0	0	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	107	83	76
to Sell	46	81	85
Hld's(000)	9799	10000	10018

% TOT. RETURN 9/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	4.3	12.6
3 yr.	14.8	5.1
5 yr.	53.7	36.4

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
13.34	12.59	13.17	14.48	15.48	14.76	15.96	16.16	16.26	17.33	16.37	17.18	17.44	16.20	17.76	19.80	*21.45*	*21.85*	Revenues per sh	*24.45*
2.25	2.02	2.07	2.50	2.92	2.60	2.75	2.52	2.20	2.65	2.51	2.83	3.03	2.71	3.12	3.72	*4.15*	*4.20*	"Cash Flow" per sh	*4.65*
1.35	1.22	1.17	1.51	1.83	1.45	1.53	1.31	.94	1.25	1.21	1.46	1.47	1.34	1.50	1.90	*2.10*	*2.20*	Earnings per sh A	*2.65*
.96	.99	1.02	1.04	1.06	1.07	1.09	1.10	1.12	1.12	1.12	1.13	1.14	1.15	1.16	1.17	*1.18*	*1.19*	Div'd Decl'd per sh B ■	*1.34*
2.53	2.26	2.17	2.83	2.61	2.74	3.44	2.45	4.09	5.82	4.39	3.73	4.01	4.28	3.68	4.82	*5.00*	*5.00*	Cap'l Spending per sh	*5.00*
10.90	11.56	11.72	12.22	13.00	13.38	13.43	12.90	12.95	13.12	14.44	15.66	15.79	18.15	18.50	19.44	*19.75*	*20.45*	Book Value per sh C	*22.20*
11.38	12.49	12.54	12.62	12.62	12.62	12.94	15.15	15.18	15.18	16.93	18.37	18.39	20.66	20.67	20.72	*21.00*	*21.50*	Common Shs Outst'g D	*22.50*
13.6	14.1	13.7	11.9	12.6	17.8	17.8	19.6	27.1	19.8	22.1	20.1	24.9	29.2	26.1	19.8	*Bold figures are*		Avg Ann'l P/E Ratio	*21.0*
.80	.92	.92	.75	.73	.93	1.01	1.27	1.39	1.08	1.26	1.06	1.33	1.58	1.39	1.20	*Value Line*		Relative P/E Ratio	*1.40*
5.2%	5.8%	6.4%	5.8%	4.6%	4.2%	4.0%	4.3%	4.4%	4.5%	4.2%	3.9%	3.1%	2.9%	3.0%	3.1%	*estimates*		Avg Ann'l Div'd Yield	*2.4%*
						206.4	244.8	246.8	263.2	277.1	315.6	320.7	334.7	367.1	410.3	*450*	*470*	Revenues ($mill) E	*550*
						19.9	20.0	14.4	19.1	19.4	26.0	27.2	25.6	31.2	39.8	*45.0*	*47.0*	Net Profit ($mill)	*60.0*
						37.9%	42.3%	39.4%	39.7%	39.9%	39.6%	42.4%	37.4%	39.9%	37.7%	*38.5%*	*38.5%*	Income Tax Rate	*39.0%*
						--	--	--	--	10.3%	3.2%	3.3%	10.6%	8.3%	8.6%	*8.5%*	*10.0%*	AFUDC % to Net Profit	*10.0%*
						46.9%	48.9%	50.3%	55.3%	50.2%	48.6%	48.3%	43.5%	42.9%	41.6%	*48.5%*	*47.0%*	Long-Term Debt Ratio	*45.0%*
						52.0%	50.2%	48.8%	44.0%	49.1%	50.8%	51.1%	55.9%	56.6%	58.4%	*51.5%*	*53.0%*	Common Equity Ratio	*55.0%*
						333.8	388.8	402.7	453.1	498.4	565.9	568.1	670.1	674.9	690.4	*800*	*825*	Total Capital ($mill)	*950*
						515.4	582.0	624.3	697.0	759.5	800.3	862.7	941.5	1010.2	1112.4	*1175*	*1240*	Net Plant ($mill)	*1425*
						7.8%	6.8%	5.3%	5.9%	5.6%	6.1%	6.3%	5.2%	5.9%	7.1%	*7.0%*	*7.0%*	Return on Total Cap'l	*8.0%*
						11.2%	10.0%	7.2%	9.4%	7.8%	8.9%	9.3%	6.8%	8.1%	9.9%	*11.5%*	*10.5%*	Return on Shr. Equity	*12.0%*
						11.4%	10.1%	7.2%	9.5%	7.9%	9.0%	9.3%	6.8%	8.1%	9.9%	*11.5%*	*10.5%*	Return on Com Equity	*12.0%*
						3.5%	1.8%	NMF	1.0%	.7%	2.1%	2.1%	1.0%	1.8%	3.8%	*5.0%*	*5.0%*	Retained to Com Eq	*6.0%*
						70%	82%	119%	90%	91%	77%	78%	86%	77%	61%	*55%*	*54%*	All Div'ds to Net Prof	*50%*

CAPITAL STRUCTURE as of 6/30/09
Total Debt $398.2 mill. **Due in 5 Yrs** $39.8 mill.
LT Debt $383.5 mill. **LT Interest** $24.0 mill.

(LT interest earned: 4.7x; total int. cov.: 4.3x)

Pension Assets-12/08 $66.9 mill.
Oblig. $192.9 mill.

Pfd Stock None

Common Stock 20,744,952 shs.
as of 8/3/09

MARKET CAP: $825 million (Small Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	6.7	13.9	41.5
Other	53.3	65.9	83.0
Current Assets	60.0	79.8	124.5
Accts Payable	36.7	45.1	48.3
Debt Due	2.7	42.8	14.7
Other	30.3	35.3	38.2
Current Liab.	69.7	123.2	101.2
Fix. Chg. Cov.	333%	398%	432%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	2.0%	1.5%	*5.5%*
"Cash Flow"	2.0%	5.5%	*6.5%*
Earnings	--	7.0%	*9.0%*
Dividends	1.0%	0.5%	*2.5%*
Book Value	4.0%	6.5%	*3.0%*

Cal-endar	QUARTERLY REVENUES ($ mill.) E Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	65.2	81.1	107.8	80.6	334.7
2007	71.6	95.8	113.8	85.9	367.1
2008	72.9	105.6	131.7	100.1	410.3
2009	86.7	116.7	*138.6*	*108*	*450*
2010	*90.0*	*120*	*145*	*115*	*470*

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	.04	.31	.68	.31	1.34
2007	.07	.37	.67	.39	1.50
2008	.01	.48	1.06	.35	1.90
2009	.12	.58	*1.04*	*.36*	*2.10*
2010	*.13*	*.60*	*1.08*	*.39*	*2.20*

Cal-endar	QUARTERLY DIVIDENDS PAID B ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.285	.285	.285	.285	1.14
2006	.2875	.2875	.2875	.2875	1.15
2007	.290	.290	.290	.290	1.16
2008	.293	.293	.293	.293	1.17
2009	.295	.295	.295		

BUSINESS: California Water Service Group provides regulated and nonregulated water service to roughly 463,600 customers in 83 communities in California, Washington, New Mexico, and Hawaii. Main service areas: San Francisco Bay area, Sacramento Valley, Salinas Valley, San Joaquin Valley & parts of Los Angeles. Acquired Rio Grande Corp; West Hawaii Utilities (9/08). Revenue breakdown, '08: residential, 69%; business, 18%; public authorities, 5%; industrial, 5%; other, 3%. '08 reported depreciation rate: 2.4%. Has roughly 929 employees. Chairman: Robert W. Foy. President & CEO: Peter C. Nelson (4/09 Proxy). Inc.: Delaware. Address: 1720 North First Street, San Jose, California 95112-4598. Telephone: 408-367-8200. Internet: www.calwatergroup.com.

An improved regulatory environment has created a more favorable backdrop for California Water Service Group. Indeed, the water utility provider exceeded high expectations in the second quarter, reporting earnings of $0.58 a share, 21% better than last year. The top line advanced 11%, to $116 million, with rate increases adding $19.2 million and offsetting lower usage by existing customers. We expect the top line to continue benefiting from ongoing progress on this front, particularly the California Public Utilities Commission's recent adoption of a water revenue adjustment mechanism, the implementation of a modified cost balancing account, and tiered rates. The company filed a general rate case seeking an additional $70.6 million in 2011, with requests of roughly $25 million for 2012 and 2013. Interim cases, meanwhile, should add nearly $9 million annually.

Nevertheless, we suspect that growth hit a speed bump in the September period . . . (Results were not out when we went to press with this issue.) Although we look for demand to remain healthy, tough comparisons probably resulted in a modest share-net shortfall. Plus, we expect that operating costs did not abate.

. . . and will remain moderate going forward. Even though tough comps ought to subside a bit over the next few quarters, profitability will likely be limited by rising infrastructure costs. Maintenance expenses should continue to rise as many pipelines and wells are in need of serious attention. Meanwhile, the additional finance commitments that will have to be assumed, given CWT's weak balance sheet and high costs of doing business, are expected to limit bottom-line growth for the foreseeable future.

This stock is not for everybody. Its growth prospects are dull, given the growing infrastructure costs that we envision being required over the next couple of years. The issue may, however, interest those looking to take shelter from the economic uncertainty that has resulted in recent broad market volatility. Indeed, CWT's steady dividend growth makes an attractive component in today's market and may well appeal to risk-averse investors seeking a low-risk alternative.

Andre J. Costanza *October 23, 2009*

(A) Basic EPS. Excl. nonrecurring gain (loss): '00, (7¢); '01, 4¢; '02, 8¢. Next earnings report due late February.
(B) Dividends historically paid in mid-Feb., May, Aug., and Nov. ■ Div'd reinvestment plan available.
(C) Incl. deferred charges. In '08: $3.9 mill., $.19/sh.
(D) In millions, adjusted for split.
(E) Excludes non-reg. rev.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	70
Earnings Predictability	75

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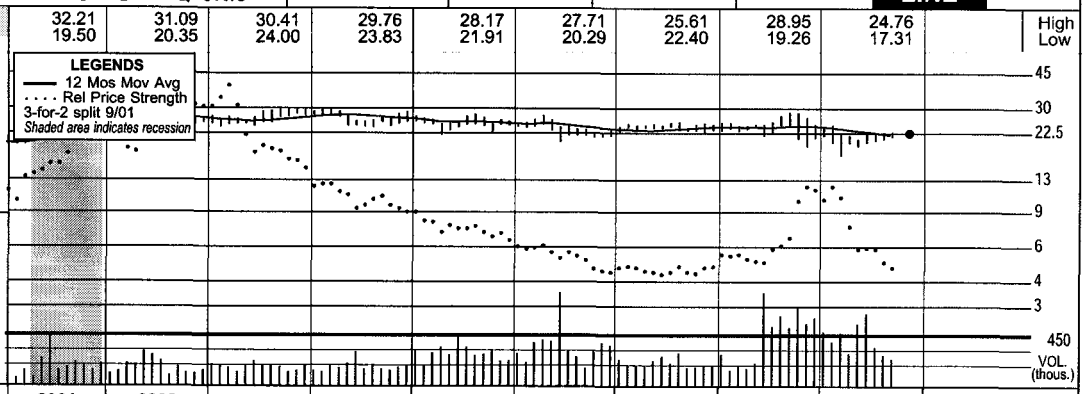
CONN. WATER SERVICES NDQ--CTWS

RECENT PRICE 22.57 | TRAILING P/E RATIO 23.5 | RELATIVE P/E RATIO 1.38 | DIV'D YLD 4.0% | VALUE LINE

RANKS

PERFORMANCE 3 Average
Technical 3 Average
SAFETY 2 Above Average
BETA .85 (1.00 = Market)

Financial Strength B+
Price Stability 90
Price Growth Persistence 40
Earnings Predictability 80



© VALUE LINE PUBLISHING, INC.	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010/2011
SALES PER SH	5.93	5.77	5.91	6.04	5.81	5.68	7.05	7.24	--	
"CASH FLOW" PER SH	1.78	1.78	1.89	1.91	1.62	1.52	1.90	1.95	--	
EARNINGS PER SH	1.13	1.12	1.15	1.16	.88	.81	1.05	1.11	*1.11* [A,B]	*1.01* [C]/NA
DIV'DS DECL'D PER SH	.80	.81	.83	.84	.85	.86	.87	.88	--	
CAP'L SPENDING PER SH	1.86	1.98	1.49	1.58	1.96	1.96	2.24	2.44	--	
BOOK VALUE PER SH	9.25	10.06	10.46	10.94	11.52	11.60	11.95	12.23	--	
COMMON SHS OUTST'G (MILL)	7.65	7.94	7.97	8.04	8.17	8.27	8.38	8.46	--	
AVG ANN'L P/E RATIO	21.5	24.3	23.5	22.9	28.6	29.0	23.0	22.2	*20.3*	*22.3/NA*
RELATIVE P/E RATIO	1.10	1.33	1.34	1.21	1.51	1.57	1.22	1.34	--	
AVG ANN'L DIV'D YIELD	3.3%	3.0%	3.0%	3.1%	3.4%	3.6%	3.6%	3.6%	--	
SALES ($MILL)	45.4	45.8	47.1	48.5	47.5	46.9	59.0	61.3	--	
OPERATING MARGIN	56.1%	57.7%	52.1%	51.0%	48.3%	43.7%	40.8%	49.0%	--	
DEPRECIATION ($MILL)	5.0	5.4	5.9	6.0	6.1	5.9	7.2	7.1	--	
NET PROFIT ($MILL)	8.7	8.8	9.2	9.4	7.2	6.7	8.8	9.4	--	
INCOME TAX RATE	36.1%	33.8%	17.9%	22.9%	--	23.5%	32.4%	27.2%	--	
NET PROFIT MARGIN	19.1%	19.2%	19.5%	19.4%	15.1%	14.3%	14.9%	15.4%	--	
WORKING CAP'L ($MILL)	d3.3	d5.1	d3.9	d.7	13.0	1.2	8.1	d3.3	--	
LONG-TERM DEBT ($MILL)	64.0	64.8	64.8	66.4	77.4	77.3	92.3	92.2	--	
SHR. EQUITY ($MILL)	71.6	80.7	84.2	88.7	94.9	96.7	100.9	104.2	--	
RETURN ON TOTAL CAP'L	7.9%	7.4%	7.5%	7.0%	5.0%	4.9%	5.5%	5.9%	--	
RETURN ON SHR. EQUITY	12.1%	10.9%	10.9%	10.6%	7.5%	6.9%	8.7%	9.0%	--	
RETAINED TO COM EQ	3.6%	3.1%	3.2%	3.1%	.3%	NMF	1.6%	1.9%	--	
ALL DIV'DS TO NET PROF	71%	72%	71%	71%	95%	105%	82%	79%	--	

Bold figures are consensus earnings estimates and, using the recent prices, P/E ratios.

[A] *No. of analysts changing earn. est. in last 10 days: 0 up, 0 down, consensus 5-year earnings growth 9.0% per year.* [B] *Based upon 2 analysts' estimates.* [C] *Based upon 2 analysts' estimates.*

ANNUAL RATES

of change (per share)	5 Yrs.	1 Yr.
Sales	2.5%	2.5%
"Cash Flow"	-0.5%	2.5%
Earnings	-2.5%	5.5%
Dividends	1.5%	1.0%
Book Value	3.5%	2.5%

QUARTERLY SALES ($mill.)

Fiscal Year	1Q	2Q	3Q	4Q	Full Year
12/31/07	13.2	14.4	17.0	14.4	59.0
12/31/08	13.6	16.0	17.0	14.7	61.3
12/31/09	13.4	15.1			
12/31/10					

EARNINGS PER SHARE

Fiscal Year	1Q	2Q	3Q	4Q	Full Year
12/31/06	.21	.12	.45	.03	.81
12/31/07	.18	.22	.46	.19	1.05
12/31/08	.20	.35	.34	.22	1.11
12/31/09	.13	.27	*.54*	*.18*	
12/31/10	*.12*				

QUARTERLY DIVIDENDS PAID

Cal-endar	1Q	2Q	3Q	4Q	Full Year
2006	.213	.213	.215	.215	.86
2007	.215	.215	.218	.218	.87
2008	.218	.218	.222	.222	.88
2009	.222	.222	.228		

INSTITUTIONAL DECISIONS

	4Q'08	1Q'09	2Q'09
to Buy	28	31	29
to Sell	27	24	23
Hld's(000)	2677	2678	2776

ASSETS ($mill.)	2007	2008	6/30/09
Cash Assets	8.6	.7	.3
Receivables	11.1	12.0	11.9
Inventory (Avg cost)	1.0	1.1	1.2
Other	2.3	2.0	2.0
Current Assets	23.0	15.8	15.4
Property, Plant & Equip, at cost	392.5	418.1	--
Accum Depreciation	108.2	115.8	--
Net Property	284.3	302.3	316.6
Other	53.5	54.3	50.8
Total Assets	360.8	372.4	382.8
LIABILITIES ($mill.)			
Accts Payable	6.0	5.7	6.5
Debt Due	6.5	12.1	17.8
Other	2.4	1.3	1.2
Current Liab	14.9	19.1	25.5

LONG-TERM DEBT AND EQUITY as of 6/30/09

Total Debt $109.9 mill. **Due in 5 Yrs.** NA
LT Debt $92.1 mill.
Including Cap. Leases NA (47% of Cap'l)
Leases, Uncapitalized Annual rentals NA

Pension Liability $16.7 mill. in '08 vs. None in '07

Pfd Stock $.8 mill. **Pfd Div'd Paid** NMF

Common Stock 8,526,304 shares (53% of Cap'l)

INDUSTRY: Water Utility

BUSINESS: Connecticut Water Service, Inc. primarily operates as a water utility company in Connecticut. It operates through three segments: Water Activities, Real Estate Transactions, and Services and Rentals. The Water Activities segment supplies public drinking water to its customers. The Real Estate Transactions segment involves in the sale of its limited excess real estate holdings. The Services and Rentals segment provides contracted services to water and wastewater utilities and other clients, as well as leases certain of its properties to third parties. This segment's services include contract operations of water and wastewater facilities; Linebacker, its service line protection plan for public drinking water customers; and provision of bulk deliveries of emergency drinking water to businesses and residences via tanker truck. As of July 8, it provided water to to more than 88,000 customers, or about 300,000 people, in 54 towns throughout Connecticut. Has 226 employees. Chairman, C.E.O. & President: Eric W. Thornburg. Inc.: CT. Address: 93 West Main Street, Clinton, CT 06413. Tel.: (860) 669-8636. Internet: http://www.ctwater.com. *W.T.*

October 23, 2009

TOTAL SHAREHOLDER RETURN

Dividends plus appreciation as of 9/30/2009

3 Mos.	6 Mos.	1 Yr.	3 Yrs.	5 Yrs.
4.28%	12.74%	-19.42%	13.44%	1.32%

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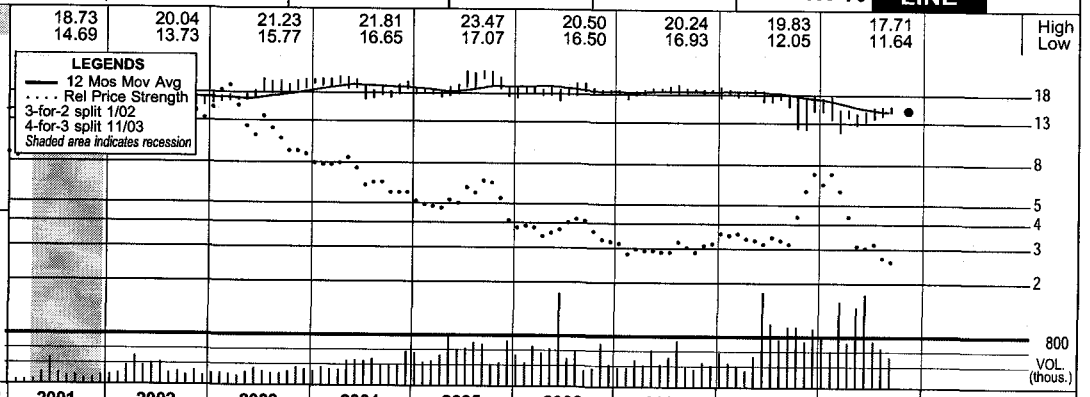
MIDDLESEX WATER NDQ--MSEX

RECENT PRICE 15.08 | TRAILING P/E RATIO 19.1 | RELATIVE P/E RATIO 1.12 | DIV'D YLD 4.7% | VALUE LINE

RANKS

PERFORMANCE 3 Average
Technical 4 Below Average
SAFETY 2 Above Average
BETA .80 (1.00 = Market)

Financial Strength B+
Price Stability 95
Price Growth Persistence 50
Earnings Predictability 90



© VALUE LINE PUBLISHING, INC.	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010/2011
SALES PER SH	5.87	5.98	6.12	6.25	6.44	6.16	6.50	6.79	--	
"CASH FLOW" PER SH	1.18	1.20	1.15	1.28	1.33	1.33	1.49	1.53	--	
EARNINGS PER SH	.66	.73	.61	.73	.71	.82	.87	.89	*.71* [A,B]	*.79* [C]*/NA*
DIV'DS DECL'D PER SH	.62	.63	.65	.66	.67	.68	.69	.70	--	
CAP'L SPENDING PER SH	1.25	1.59	1.87	2.54	2.18	2.31	1.66	2.12	--	
BOOK VALUE PER SH	7.11	7.39	7.60	8.38	8.60	9.82	10.05	10.28	--	
COMMON SHS OUTST'G (MILL)	10.17	10.36	10.48	11.36	11.58	13.17	13.25	13.40	--	
AVG ANN'L P/E RATIO	24.6	23.5	30.0	26.4	27.4	22.7	21.6	19.8	*21.2*	*19.1/NA*
RELATIVE P/E RATIO	1.26	1.28	1.71	1.39	1.45	1.23	1.15	1.19	--	
AVG ANN'L DIV'D YIELD	3.8%	3.7%	3.5%	3.4%	3.5%	3.7%	3.7%	4.0%	--	
SALES ($MILL)	59.6	61.9	64.1	71.0	74.6	81.1	86.1	91.0	--	
OPERATING MARGIN	47.2%	47.1%	44.0%	44.4%	44.4%	47.4%	47.0%	46.9%	--	
DEPRECIATION ($MILL)	5.3	5.0	5.6	6.4	7.2	7.8	8.2	8.5	--	
NET PROFIT ($MILL)	7.0	7.8	6.6	8.4	8.5	10.0	11.8	12.2	--	
INCOME TAX RATE	34.8%	33.3%	32.8%	31.1%	27.6%	33.4%	32.6%	33.2%	--	
NET PROFIT MARGIN	11.7%	12.5%	10.3%	11.9%	11.4%	12.4%	13.8%	13.4%	--	
WORKING CAP'L ($MILL)	d.9	d9.3	d13.3	d11.8	d4.5	2.8	d9.6	d40.9	--	
LONG-TERM DEBT ($MILL)	88.1	87.5	97.4	115.3	128.2	130.7	131.6	118.2	--	
SHR. EQUITY ($MILL)	76.4	80.6	83.7	99.2	103.6	133.3	137.1	141.2	--	
RETURN ON TOTAL CAP'L	5.6%	6.0%	5.0%	5.1%	5.0%	5.1%	5.6%	5.8%	--	
RETURN ON SHR. EQUITY	9.1%	9.6%	7.9%	8.5%	8.2%	7.5%	8.6%	8.6%	--	
RETAINED TO COM EQ	.5%	1.3%	NMF	.9%	.5%	1.2%	1.8%	1.9%	--	
ALL DIV'DS TO NET PROF	94%	87%	106%	90%	94%	84%	79%	78%	--	

Bold figures are consensus earnings estimates and, using the recent prices, P/E ratios.

[A] *No. of analysts changing earn. est. in last 10 days: 0 up, 0 down, consensus 5-year earnings growth 7.5% per year.* [B] *Based upon 3 analysts' estimates.* [C] *Based upon 3 analysts' estimates.*

ANNUAL RATES

of change (per share)	5 Yrs.	1 Yr.
Sales	1.5%	4.5%
"Cash Flow"	4.5%	2.5%
Earnings	5.5%	2.5%
Dividends	2.0%	1.5%
Book Value	6.5%	2.5%

Fiscal Year	QUARTERLY SALES ($mill.) 1Q	2Q	3Q	4Q	Full Year
12/31/07	19.0	21.8	24.1	21.2	86.1
12/31/08	20.8	23.0	25.7	21.5	91.0
12/31/09	20.6	23.1			
12/31/10					

Fiscal Year	EARNINGS PER SHARE 1Q	2Q	3Q	4Q	Full Year
12/31/06	.15	.25	.28	.14	.82
12/31/07	.13	.24	.31	.19	.87
12/31/08	.15	.26	.35	.13	.89
12/31/09	.10	.21	***.30***	***.10***	
12/31/10	***.09***				

Cal-endar	QUARTERLY DIVIDENDS PAID 1Q	2Q	3Q	4Q	Full Year
2006	.17	.17	.17	.173	.68
2007	.173	.173	.173	.175	.69
2008	.175	.175	.175	.178	.70
2009	.178	.178	.178		

INSTITUTIONAL DECISIONS

	4Q'08	1Q'09	2Q'09
to Buy	35	41	41
to Sell	24	27	33
Hld's(000)	4997	4505	4902

ASSETS ($mill.)	2007	2008	6/30/09
Cash Assets	2.0	3.3	3.5
Receivables	12.8	14.3	14.5
Inventory (Avg cost)	1.2	1.5	1.6
Other	1.4	1.5	1.6
Current Assets	17.4	20.6	21.2
Property, Plant & Equip, at cost	398.6	436.8	--
Accum Depreciation	64.7	70.5	--
Net Property	333.9	366.3	376.2
Other	41.4	53.1	52.1
Total Assets	392.7	440.0	449.5
LIABILITIES ($mill.)			
Accts Payable	6.5	5.7	4.4
Debt Due	9.0	43.9	42.5
Other	11.5	11.9	12.4
Current Liab	27.0	61.5	59.3

LONG-TERM DEBT AND EQUITY as of 6/30/09

Total Debt $171.3 mill. **Due in 5 Yrs.** NA
LT Debt $128.8 mill.
Including Cap. Leases NA (48% of Cap'l)
Leases, Uncapitalized Annual rentals NA

Pension Liability $25.5 mill. in '08 vs. $13.3 mill. in '07

Pfd Stock None **Pfd Div'd Paid** None

Common Stock 13,447,000 shares (52% of Cap'l)

INDUSTRY: Water Utility

BUSINESS: Middlesex Water Company engages in the ownership and operation of regulated water utility systems in New Jersey (NJ) and Delaware, and a regulated wastewater utility in NJ. It offers contract operations services and a service line maintenance program through its nonregulated subsidiary, Utility Service Affiliates, Inc. Its water utility system treats, stores, and distributes water for residential, commercial, industrial, and fire prevention purposes. It also provides water treatment and pumping services to the Township of East Brunswick. Its other NJ subsidiaries offer water and wastewater services to residents in Southampton Township. Its Delaware subsidiaries provide water services to retail customers in New Castle, Kent, and Sussex counties. In July, the company approved to implement a Purchased Water Adjustment Clause, which is a pass-through charge that enables it to recover the increased unit cost of raw or finished water purchased from external sources. Has 269 employees. Chairman: J. Richard Tompkins. Address: 1500 Ronson Rd, P.O. BOX 1500, Iselin, NJ 08830. Tel.: 732-634-1500. Internet: http://www.middlesexwater.com. *W.T.*

October 23, 2009

TOTAL SHAREHOLDER RETURN

Dividends plus appreciation as of 9/30/2009

3 Mos.	6 Mos.	1 Yr.	3 Yrs.	5 Yrs.
5.61%	7.40%	-9.48%	-12.26%	1.01%

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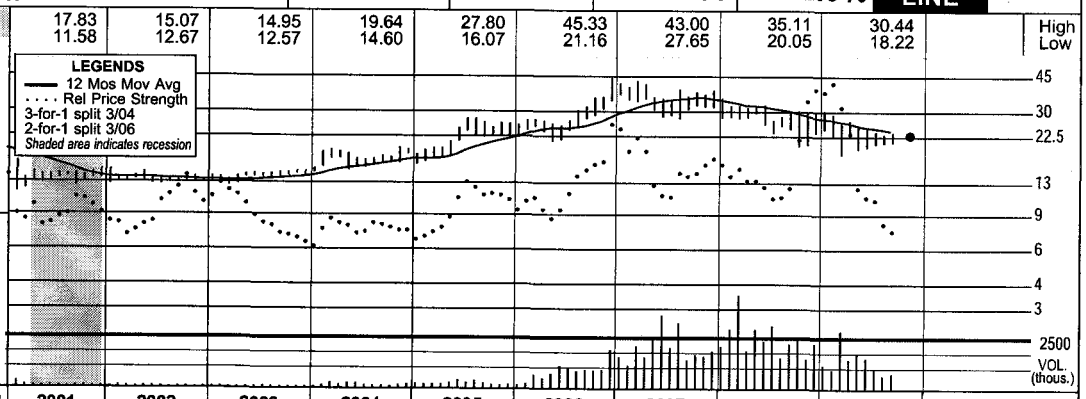
SJW CORP. NYSE--SJW

RECENT PRICE	TRAILING P/E RATIO	RELATIVE P/E RATIO	DIV'D YLD	VALUE LINE
22.96	28.3	1.66	2.9%	

RANKS

PERFORMANCE 3 Average
Technical 4 Below Average
SAFETY 3 Average
BETA .95 (1.00 = Market)

Financial Strength	B+
Price Stability	65
Price Growth Persistence	60
Earnings Predictability	85



© VALUE LINE PUBLISHING, INC.	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010/2011
SALES PER SH	7.45	7.97	8.20	9.14	9.86	10.35	11.25	12.12	--	
"CASH FLOW" PER SH	1.49	1.55	1.75	1.89	2.21	2.38	2.30	2.44	--	
EARNINGS PER SH	.77	.78	.91	.87	1.12	1.19	1.04	1.08	.77 [A,B]	1.12 [C]/NA
DIV'DS DECL'D PER SH	.43	.46	.49	.51	.53	.57	.61	.65	--	
CAP'L SPENDING PER SH	2.63	2.06	3.41	2.31	2.83	3.87	6.62	3.79	--	
BOOK VALUE PER SH	8.17	8.40	9.11	10.11	10.72	12.48	12.90	13.99	--	
COMMON SHS OUTST'G (MILL)	18.27	18.27	18.27	18.27	18.27	18.28	18.36	18.18	--	
AVG ANN'L P/E RATIO	18.5	17.3	15.4	19.6	19.7	23.5	33.4	26.2	29.8	20.5/NA
RELATIVE P/E RATIO	.95	.94	.88	1.04	1.04	1.27	1.77	1.58	--	
AVG ANN'L DIV'D YIELD	3.0%	3.4%	3.5%	3.0%	2.4%	2.0%	1.7%	2.3%	--	
SALES ($MILL)	136.1	145.7	149.7	166.9	180.1	189.2	206.6	220.3	--	
OPERATING MARGIN	64.4%	63.7%	56.0%	56.4%	55.9%	57.0%	41.8%	42.4%	--	
DEPRECIATION ($MILL)	13.2	14.0	15.2	18.5	19.7	21.3	22.9	24.0	--	
NET PROFIT ($MILL)	14.0	14.2	16.7	16.0	20.7	22.2	19.3	20.2	--	
INCOME TAX RATE	34.5%	40.4%	36.2%	42.1%	41.6%	40.8%	39.4%	39.5%	--	
NET PROFIT MARGIN	10.3%	9.8%	11.2%	9.6%	11.5%	11.7%	9.4%	9.2%	--	
WORKING CAP'L ($MILL)	d3.8	d4.9	12.0	13.0	10.8	22.2	d1.4	d11.3	--	
LONG-TERM DEBT ($MILL)	110.0	110.0	139.6	143.6	145.3	163.6	216.3	216.6	--	
SHR. EQUITY ($MILL)	149.4	153.5	166.4	184.7	195.9	228.2	236.9	254.3	--	
RETURN ON TOTAL CAP'L	6.7%	6.9%	6.9%	6.5%	7.6%	7.0%	5.7%	5.8%	--	
RETURN ON SHR. EQUITY	9.4%	9.3%	10.0%	8.7%	10.6%	9.7%	8.2%	8.0%	--	
RETAINED TO COM EQ	4.1%	3.8%	4.7%	3.6%	5.6%	5.2%	3.5%	3.3%	--	
ALL DIV'DS TO NET PROF	56%	59%	53%	58%	47%	46%	57%	59%	--	

Bold figures are consensus earnings estimates and, using the recent prices, P/E ratios.

[A] No. of analysts changing earn. est. in last 10 days: 0 up, 0 down, consensus 5-year earnings growth 10.0% per year. [B] Based upon 2 analysts' estimates. [C] Based upon 2 analysts' estimates.

ANNUAL RATES

of change (per share)	5 Yrs.	1 Yr.
Sales	7.5%	7.5%
"Cash Flow"	8.5%	6.0%
Earnings	6.0%	4.0%
Dividends	5.5%	6.5%
Book Value	9.0%	8.5%

QUARTERLY SALES ($mill.)

Fiscal Year	1Q	2Q	3Q	4Q	Full Year
12/31/07	39.0	55.1	64.9	47.6	206.6
12/31/08	41.3	60.0	69.5	49.5	220.3
12/31/09	40.0	58.2			
12/31/10					

EARNINGS PER SHARE

Fiscal Year	1Q	2Q	3Q	4Q	Full Year
12/31/06	.14	.35	.48	.22	1.19
12/31/07	.12	.29	.43	.20	1.04
12/31/08	.15	.34	.44	.15	1.08
12/31/09	d.01	.23	***.38***	***.16***	
12/31/10	***.09***				

QUARTERLY DIVIDENDS PAID

Cal-endar	1Q	2Q	3Q	4Q	Full Year
2006	.141	.141	.141	.141	.56
2007	.151	.151	.151	.151	.60
2008	.161	.161	.161	.161	.64
2009	.165	.165	.165		

INSTITUTIONAL DECISIONS

	4Q'08	1Q'09	2Q'09
to Buy	34	45	43
to Sell	39	32	40
Hld's(000)	8286	8505	8694

ASSETS ($mill.)	2007	2008	6/30/09
Cash Assets	2.4	3.4	4.8
Receivables	23.0	24.5	31.2
Inventory	.8	.9	.9
Other	5.4	3.2	4.6
Current Assets	31.6	32.0	41.5
Property, Plant & Equip, at cost	904.3	958.7	--
Accum Depreciation	258.8	274.5	--
Net Property	645.5	684.2	709.2
Other	90.2	134.7	119.7
Total Assets	767.3	850.9	870.4
LIABILITIES ($mill.)			
Accts Payable	9.3	5.8	10.4
Debt Due	5.6	19.1	3.7
Other	18.1	18.4	22.9
Current Liab	33.0	43.3	37.0

LONG-TERM DEBT AND EQUITY as of 6/30/09

Total Debt $249.9 mill. **Due in 5 Yrs.** NA
LT Debt $246.2 mill.
Including Cap. Leases NA (50% of Cap'l)
Leases, Uncapitalized Annual rentals NA

Pension Liability $42.3 mill. in '08 vs. $23.4 mill. in '07

Pfd Stock None **Pfd Div'd Paid** None

Common Stock 18,484,831 shares (50% of Cap'l)

INDUSTRY: Water Utility

BUSINESS: SJW Corporation, through its subsidiaries, engages in the production, purchase, storage, purification, distribution, and retail sale of water. The company offers nonregulated water-related services, including water system operations, cash remittances, and maintenance contract services. SJW also owns undeveloped land; a 70% limited partnership interest in 444 West Santa Clara Street, L.P.; and operates commercial buildings in Arizona, California, Connecticut, Florida, Tennessee, and Texas. As of December 31, 2008, SJW provided water service to approximately 226,000 connections that served a population of approximately one million people in the San Jose area. It also provides water service to approximately 8,700 connections that serve approximately 36,000 residents in a service area in the region between San Antonio and Austin, Texas. Has 379 employees. Chairman: Charles J. Toeniskoetter. Inc.: CA. Address: 110 W. Taylor Street, San Jose, CA 95110. Tel.: (408) 279-7800. Internet: http://www.sjwater.com.

W.T.

October 23, 2009

TOTAL SHAREHOLDER RETURN

Dividends plus appreciation as of 9/30/2009

3 Mos.	6 Mos.	1 Yr.	3 Yrs.	5 Yrs.
1.45%	-8.73%	-21.62%	-18.28%	55.54%

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LITCHFIELD PARK SERVICE COMPANY

DOCKET NO. SW-01428A-09-0103

DOCKET NO. W-01427A-09-0104

DIRECT TESTIMONY

OF

SONN S. ROWELL, CPA

ON BEHALF OF

THE

RESIDENTIAL UTILITY CONSUMER OFFICE

NOVEMBER 4, 2009

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APPENDIX 1 – Qualifications of Sonn A. Rowell, CPA

I. Introduction

Q. Please state your name position and employer address.

A. Sonn S. Rowell, Member, Desert Mountain Analytical Services, PLLC ("DMAS")

PO Box 51628, Phoenix, AZ 85076

Q. Please state your background and qualifications in the field of utility regulation.

A. Appendix 1, attached to this testimony lists my educational qualifications and the utility matters I have participated in.

Q. Please state the purpose of your testimony.

A. My testimony describes RUCO's recommended adjustments made to Litchfield Park Service Company's ("LPSCO" or the "Company") pending water and wastewater rate case. This testimony presents RUCO's recommended rate base, revenue requirement and rate design.

II. Background

Q. Please describe your work effort on this project.

A. I obtained and reviewed data and performed analytical procedures (including an audit of underlying source data) necessary to understand the Company's filing as it relates to the rate base, operating income and revenue requirements. My recommendations are based on these analyses. I relied

on the information contained in the Company's rate case application, (testimony and schedules) and responses to RUCO and Commission Staff data requests.

Q. What issues will you address in this testimony?

A I will address RUCO's recommended adjustments based primarily on an audit of underlying source data. I present RUCO's recommended rate base, revenue requirement and rate design. The issues of affiliate expenses and upgrades to the Palm Valley Water Reclamation Facility ("PVWRF") are addressed in the Direct Testimony of Matthew Rowell (also of DMAS.) Cost of capital and issues related to the expansion of the PVWRF are discussed in the Direct Testimony of RUCO witness William Rigsby.

Q. Please identify the exhibits you are sponsoring.

A. Exhibit 1 contains schedules detailing the recommended adjustments to expenses, plant in service and rate base of LPSCO's water division. It also shows RUCO's recommended revenue requirement and rate design for LPSCO's water division.

Exhibit 2 contains the same information for LPSCO's wastewater division.

III. Water Division

1. Revenue Requirement (Water) Schedule 1

Q. What is RUCO's proposed revenue requirement for LPSCO's water division?

A. RUCO is recommending a revenue requirement of $10,923,684 for LPSCO's water division. This represents a 58.8% increase above RUCO's adjusted test year water revenues. This compares with LPSCO's request for a revenue requirement of $13,984,331 for its water division, which would be a 116% increase above LPSCO's adjusted test year water revenues.

2. Rate Base Adjustments (Water) Schedule 2

Q. Please explain Rate Base Adjustment No. 1.

A. This adjustment decreases accumulated depreciation by $189,493 to account for the difference between RUCO's recommended accumulated depreciation balance and the Company's accumulated depreciation balance as filed. It also reduces Utility Plant in Service ("UPIS") by $841,129 to account for RUCO's recommended reductions in Plant in Service.

Q. Please explain Rate Base Adjustment No.2.

A. This adjustment reduces rate base by $48,150 to account for the 2% cap on the (amortized) debt issuance costs associated with LPSCO's IDA bonds.

Q. Why did RUCO make an adjustment reducing the Company's Unamortized Debt Issuance Costs?

A. The Company has two outstanding Series of Industrial Development Authority (IDA) Water and Sewer Revenue Bonds, the first issued in 1999 in the aggregate face amount of $5,335,000, and the second, in 2001, in the aggregate face amount of $7,500,000. Pursuant to the Loan Agreement for each IDA Bond Series, Article II, Section 2.2 (w) limits the debt issuance costs financed by the Project Bonds to two percent (2%) of the aggregate face amount of the Project Bonds. Accordingly, Adjustment No. 2 reduces the Company's allowable debt issuance cost to two percent of the aggregate face amount for both the 1999 and 2001 Series IDA Bonds, with the calculation of the unamortized portion of those costs, as of the Test Year ended September 30, 2008, determined by the number of months of amortization remaining before each respective IDA Bond Series matures.

Q. What was the total amount of the adjustment made by RUCO to this deferred expense account?

A. RUCO reduced the Company's Unamortized Debt Issuance Cost by a total of $96,301. As filed, the Company reported a balance of $268,542 in Unamortized Debt Issuance Costs, and as adjusted, RUCO determined the proper figure is $172,242. The Company allocated its Unamortized Debt Issuance Costs equally between Operating Divisions, with both the Water and Wastewater Division reporting a deferred expense for this item of $134,271

($268,542 / 2). As a consequence, Adjustment no. 2 reduces Unamortized Debt Issuance Costs for each Operating Division by $48,150 ($96,301 / 2).

Q. To the extent the Company may have incurred debt issuance costs in excess of two percent of the aggregate face amount of its IDA Series Bonds, why does RUCO feel it would be inappropriate to allow recovery of that additional expense in rates?

A. The IDA issuing authority limited debt issuance costs to 2% of the aggregate face value of the bond proceeds obtained. To the extent, the Company incurred debt issuance costs in excess of that 2% figure, LPSCO is unable to produce any documentation to that effect. RUCO Data Request MJR 2.24(a) asked the Company to provide supporting documentation for all debt issuance costs incurred for the 1999 and 2001 IDA Series Bonds. In response LPSCO indicted it was unable to find the information requested, citing the fact that Algonquin bought LPSCO in 2003 after the bonds had been issued.

Q. Please Explain Rate Base Adjustment No. 3.

A. This adjustment reduces rate base by $8,256 that was essentially double-counted under the Company's proposed recovery of the deferred regulatory asset associated with the TCE plume.

3. Adjustments to Test Year Plant (Water) Schedule 3

Q. Please explain the test year plant adjustments.

A. Plant Adjustment No. 1 replaces $21,100 in organization costs that were allowed per LPSCO's last rate case decision.

Plant Adjustment Nos. 2 through 7 replace affiliate profit that the Company had removed from various plant accounts. This affiliate profit was originally included in capitalized affiliate labor costs included in water plant by the Company in the years since the last rate case. We are replacing this profit because we are removing almost all of the capitalized affiliate labor costs included in water plant by the Company due to lack of support.

Plant Adjustment Nos. 8 through 14 remove almost all of the capitalized affiliate labor. With the exception of accounts 304 and 333 for 2008 the support associated with the capitalized affiliate labor was inadequate. This issue is discussed further in Section III below.

Plant Adjustment Nos. 15 through 22 reduce plant to account for various invoices that either could not be found or were associated with repair work.

Plant Adjustment 23 capitalizes two items that were inappropriately expensed.

4. Adjustments to Operating Income (Water) Schedule 4

Q. How are the Operating Income Adjustments organized?

A. The Operating Income Adjustments are organized by account.

Q. Please explain the Operating Income Adjustments.

Operating Income Adjustment No. 1 to Metered Water Revenues.

LPSCO had sought an adjustment to its test year revenue of $403,707 based on the premise that it expected to lose the City of Goodyear as a bulk water customer. The loss of the City of Goodyear as a bulk water customer is not a known and measurable event. Furthermore, it is now fully 13 months after the end of the test year and the City of Goodyear is still a bulk water customer of LPSCO. Therefore, Operating Income Adjustment No. 1 reverses the Company's adjustment that removed $403,707 from test year revenue.

Operating Income Adjustment No. 2 to Fuel for Power Production.

RUCO's Operating Income Adjustment No. 2 removes $56,381 of nonrecurring expenses that were inappropriately included in LPSCO's test year expenses.

Operating Income Adjustment No. 3 to Chemicals.

This adjustment removes $2,309 from test year expenses because they were incurred outside of the test year.

Operating Income Adjustment No. 4 Outside Services - Other.

RUCO's Operating Income Adjustment No. 4a removes $9,714 in capital items that were inappropriately booked as expenses and removes $19,912 in expenses that are nonrecurring.

Operating Income Adjustment No. 4b removes $291,708 in costs allocated to LPSCO by Algonquin Power Trust (This adjustment is discussed further in the Direct Testimony of Matthew Rowell.)

Operating Income Adjustment No. 4c removes various unnecessary and inappropriate expenses.

Adjustment 4d removes $153,174, net expenses associated with "Recon Fees to 4 Factor" due to lack of support for these expenses. (This adjustment is discussed further in the Direct Testimony of Matthew Rowell.)

Operating Income Adjustment No. 5 to Water Testing.

This adjustment removes $590, a nonrecurring expense.

Operating Income Adjustment No. 6 to Transportation Expenses.

This adjustment removes $24,302 of expenses that are unnecessary. Adjustment No. 6 also removes $422 of expenses incurred outside of the test year are removed and $37 in non-recurring expenses are removed.

Operating Income Adjustment No. 8 to Miscellaneous Expenses.

This adjustment removes $338 in nonrecurring expenses. Also, $21,689 in unnecessary/inappropriate expenses are removed. These expenses mainly pertain to credit card merchant fees, which are unnecessary and inappropriate for two reasons: (1) To our knowledge LPSCO does not accept credit card payments for its water bills. (2) Allowing credit card merchant fees to be expensed requires customers who do not pay with a credit card to subsidize customers who do. When the Company absorbs the merchant fee it is essentially giving a discount to the customer who pays with the credit card. If the fees are allowed in test year expenses, that discount is funded by all customers regardless of whether they use credit cards or not.

Operating Income Adjustment No. 9 to Depreciation Expense.

Adjustment 9a reduced depreciation expense by $43,211 because of the various RUCO plant adjustments. Adjustment 9b reduces the depreciation expense to recognize the 2% cap on the (amortized) debt issuance costs associated with LPSCO's IDA bonds (this issue is discussed in detail above in Section 2 Rate Base Adjustment 2.)

Operating Income Adjustment No. 10 to Property Tax Expense.

This adjustment reflects a reduction of $38,253 for the Company's property tax and is based on the use of the Arizona Department of Revenue formula.

Operating Income Adjustment No. 11 to Income Tax Expense.

This adjustment develops the income tax expense used in determination of the revenue requirement.

IV. Wastewater Division

1. Revenue Requirement (Wastewater) Schedule 1

Q. What is RUCO's proposed revenue requirement for LPSCO's wastewater division?

A. RUCO is recommending a revenue requirement of $8,169,592 for LPSCO's wastewater division. This represents a 28.47% increase above RUCO's adjusted test year water revenues. This compares with LPSCO's request for a revenue requirement of $11,347,975 for its water division which would be a 78.53% increase above LPSCO's adjusted test year water revenues.

2. Rate Base Adjustments (Wastewater) Schedule 2

Q. Please explain Rate Base Adjustment No. 1.

A. This adjustment decreases accumulated depreciation by $291,308 to account for the difference between RUCO's recommended accumulated depreciation balance and the Company's accumulated depreciation balance as filed. It also reduces UPIS by $6,693,440 to account for RUCO's recommended reductions in Plant in Service.

Q. Please explain Rate Base Adjustment No.2.

A. This adjustment reduces rate base by $48,150 to account for the 2% cap on the (amortized) debt issuance costs associated with LPSCO's IDA bonds. See the above discussion regarding Rate Base Adjustment 2 (Section I.2) for the water division for more information on this topic.

Q. Please Explain Rate Base Adjustment No. 3.

A. This adjustment increases the Company's CIAC balance by $597,670 to account for CIAC that was not included in the Company's rate case application. This results in a reduction in rate base of $597,670.

3. Adjustments to Test Year Plant (Wastewater) Schedule 3

Q. Please explain the test year plant adjustments.

A. Plant Adjustment No. 1 reduces the plant balance by $1,230,049 as a result of the difference in the beginning plant balance utilized by RUCO and the Company. Since the last rate case was resolved by a settlement agreement the Commission Decision associated with that case did not contain detailed information about rate base items at the end of the last test year. As a result RUCO used its plant and accumulated depreciation amounts as recommended in the last rate case.

Plant Adjustment No. 2 reduces plant by $36,500 to disallow the cost of the 2004 PACE engineering report that the Company was unable to locate and

which is associated with the expansion of PVWRF. This issue is discussed further in the Direct Testimony of William Rigsby.

Plant Adjustment Nos. 3 and 4 remove a total of $544,977 from plant to account for the retirement of the Wigwam, Bullard and Litchfield Greens lift stations.

Plant Adjustment No. 5 adjusts plant downward by $38,625 to account for plant transferred to Black Mountain Sewer.

Plant Adjustment Nos. 6 and 7 capitalize test year expenses of $8,534 and $8,589, respectively that were inappropriately expensed.

Plant Adjustment Nos. 8 and 9 remove $170,375 of repair costs that were inappropriately capitalized.

Plant Adjustment Nos. 10 through 14 replace affiliate profit that the Company had removed from various plant accounts. This affiliate profit was originally included in capitalized affiliate labor costs included in plant by the Company in the years since the last rate case. We are replacing this profit because we are removing all of the capitalized affiliate labor costs included in wastewater plant by the Company due to lack of support.

Adjustment Nos. 15 through 19 remove all of the capitalized affiliate labor from wastewater plant. The support associated with the capitalized affiliate labor was inadequate. This issue is discussed further in Section III below.

Adjustment No. 20 reduces plant by $3,500,000 as a result of RUCO's recommendation that the costs of correcting design and construction flaws at the Palm Valley Water Reclamation Facility ("PVWRF") be shared 50/50 between rate payers and shareholders. The Direct Testimony of Matthew Rowell provides the rationale for this adjustment.

4. Adjustments to Operating Income (Wastewater) Schedule 4

Q. How are the Operating Income Adjustments organized?

A. The Operating Income Adjustments are organized by account.

Q. Please explain RUCO's Operating Income Adjustments.

A. **Operating Income Adjustment No. 1 to Measured Revenues**

This adjustment increases test year revenue by $2,813 to account for RUCO's recommended increases in effluent rates. This adjustment is discussed further in Section IV below.

Operating Income Adjustment No. 2 to Fuel for Power Production.

This adjustment moves $425 to purchased power.

Operating Income Adjustment No.3 to Chemicals.

This adjustment removes $13,002 of expenses that were incurred outside of the test year and moves $831 to the Purchased Power account.

Operating Income Adjustment No. 4 to Contractual Services – Other

Adjustment No. 4a removes $17,124 in expenses that should have been capitalized, $16,582 in expenses that were incurred outside of the test year, $19,784 in non-recurring expenses, $16,428 in unnecessary/inappropriate expenses, and $1,136 in expenses that are included in rate case expense.

Adjustment No. 4b removes $102,116 in net expenses associated with "Recon Fees to 4 Factor" due to lack of support for these expenses. (This adjustment is discussed further in the Direct Testimony of Matthew Rowell)

Adjustment No. 4c removes $191,850 in costs allocated to LPSCO by Algonquin Power Trust (This adjustment is discussed further in the Direct Testimony of Matthew Rowell)

Adjustment No. 4d removes $8,283 in unnecessary/inappropriate expenses allocated to LPSCO by Algonquin Water Resources.

Adjustment No. 4e includes $151,179 in test year expenses that were inappropriately capitalized.

Operating Income Adjustment No. 5 to Contractual Services - Testing

Adjustment No. 5 removes $6,398 in expenses that were incurred outside of the test year.

Operating Income Adjustment No. 6 to Transportation Expense

This adjustment removes $17,702 in expenses that were unnecessary or inappropriate and $25 in non-recurring expenses.

Operating Income Adjustment No. 7 to Rental Equipment

Adjustment No. 7 removes $4,387 in non-recurring expenses.

Operating Income Adjustment No. 8 to Materials and Supplies

This adjustment removes $5,975 in unnecessary or inappropriate expenses and $7,545 in expenses incurred outside of the test year.

Operating Income Adjustment No. 9 to Miscellaneous Expenses

Adjustment No. 9 removes expenses totaling $6,409 because they were unnecessary or inappropriate. Most of these expenses are merchant fees. See Water Division Operating Income Adjustment No. 8 for a discussion of why merchant fees are inappropriate.

Operating Income Adjustment No.10 to Bad Debt Expense

This adjustment reduces bad debt expense by $40,848. The bad debt expense incurred by LPSCO's wastewater division during the test year appears to be excessive. The bad debt expense of LPSCO's wastewater division increased by 1,483% (from $2,773 to $43,889) from the year ended September 30, 2006 to the test year. This massive increase in bad debt expense is not explained by LPSCO. LPSCO's water division did not experience a similar remarkable increase in bad debt expense. Because of the extraordinary nature of the wastewater division's test year bad debt expense, an adjustment was made to bring the bad debt expense into a more typical range. The bad debt expense we used was determined by calculating bad debt expense as a percent of revenue for the water division in the test year and applying that percentage to LPSCO wastewater division's revenues.

Operating Income Adjustment No. 11 to Depreciation Expense

Adjustment No. 11a reduces depreciation expense by $225,045 to account for the various adjustments made to the plant accounts.

Adjustment No. 11b adjusts depreciation expense by $9,935 as a result of the 2% expense limit on the IDA bonds. The 2% limit on IDA bond expenses is discussed in detail above in Section 2 Rate Base Adjustment No. 2.

Operating Income Adjustment No. 12 to Property Tax

This adjustment reduces property tax expense by $62,962.

Operating Income Adjustment No. 13 to Income Tax Expense

This adjustment develops the income tax expense used in determination of the revenue requirement.

V. Capitalized Affiliate Labor

Q. Please describe the sources of information you used to evaluate LPSCO's capitalized affiliate labor.

A. I used three sources of information. First, I used the B-2 schedules provided by the Company in its application. Specifically Schedule B-2 pages 3.1 through 3.8 show plant additions and adjustments by year and by account. Relevant to this discussion are the plant adjustments for the removal of affiliate profit. Second, I used the Company's response to RUCO data request MJR 3.7. This data request sought clarification on how the affiliate profit removed from plant was calculated. In response to data request MJR 3.7 the Company provided an Excel spreadsheet that detailed how the affiliate profit numbers were developed. Third, I used information provided by the Company in response to Staff data requests JMM 1.52 and 1.77. These data requests asked for detailed backup for plant additions by year for selected accounts for the water and wastewater divisions respectively.

Q. Could the information from these sources be reconciled?

A. At the aggregate level and broken out by year the affiliate profit shown on the B schedule matched closely with that shown in the response to data request MJR 3.7 (See Table 1 below.) At the individual plant account level within each year there were significant discrepancies between the B-2 schedules and the response to data request MJR 3.7. More importantly, however, the back-up provided in response to data requests JMM 1.52 and 1.77 could not be reconciled with the information provided in response to data request MJR 3.7. Table 2 shows the variance by account for 2008 between the capitalized affiliate labor costs taken from the Company's responses to data requests JMM 1.52 and 1.77 and MJR 3.7.

Q. Are there other problems with the information provided by the Company?

A. Yes. The back-up information for affiliate transactions provided in response to data requests JMM 1.52 and 1.77 was not adequate. For each specified account the Company provided a PDF file with scanned invoices and an Excel spreadsheet summarizing the content of the PDF file. In some cases, the information on the Excel file did not match with the invoices that were actually in the PDF file. Additionally, the invoices for affiliate labor contain almost no relevant information. Each invoice contains the name and address of the billed party (LPSCO), the billing party (Algonquin Water Services, Inc.) and the "Job Address." All three of these addresses are the same. Each invoice contains a field labeled "Description" (presumably the job description)

which is blank. In addition, each invoice shows the employee title (e.g., "Manager") hours worked, hourly rate, and total amount billed. (See attachment 1 for sample affiliate invoices.) Based on this backup provided by the Company, there is no way to determine whether capitalization was the appropriate treatment for these affiliate billings.

Q. What does RUCO recommend regarding the capitalized affiliate labor?

A. Given that the various sources of information provided by the Company regarding capitalized affiliate labor are inconsistent and the backup information provided by the Company for their capitalized affiliate labor is inadequate, RUCO is compelled to recommend that all the capitalized affiliate labor be disallowed with the exception of capitalized affiliate labor included in accounts 304 and 333 for 2008. The backup information for accounts 304 and 333 for 2008 provided by LPSCO included substantially more detail than that provided for all other accounts.

Table 1. Affiliate Profit removed from plant by year

Water Division

Year	B-2	MJR 3.7	Variance
2004	$6,326	$7,967	-26%
2005	$57,061	$59,456	-4%
2006	$38,310	$38,310	0%
2007	$103,128	$103,128	0%
2008	$74,573	$75,148	-1%
Total	$279,398	$284,008	-2%

Wastewater Division

Year	B-2	MJR 3.7	Variance
2004	$107,278	$107,278	0%
2005	$172,590	$172,590	0%
2006	$85,595	$87,404	-2%
2007	$173,659	$174,851	-1%
2008	$112,041	$113,207	-1%
Total	$651,163	$655,330	-1%

Table 2. 2008 Capitalized Affiliate Labor (selected accounts)

Water

	JMM 1.52	MJR 3.7	Variance
303	$72,509	$600	99%
304	$189,611	$168,159	11%
307	$10,032	$4,590	54%
311	$38		100%
320	$30,253	$13,244	-337%
331	$56		100%
333	$56,104	$1,000	98%
334	$1,069		100%
335	$281	$100	64%
339	$100		100%
340	$28,753		100%
341	$-		-
346	$6,500		100%
Total	$395,305	$189,243	52%

Wastewater (selected accounts)

	JMM 1.77	MJR 3.7	Variance
354	$66,768	$158,042	-137%
360	$94	$1,200	-1180%
361	$57,010	$57,356	-5%
366	$1,763	$1,600	9%
371	$18,784	$2,813	85%
375	$15,050	$73,638	9%
380	$32,472	$200	99%
389	$3,900	$42,600	-992%
396	$42,532	$1,850	96%
Total	$238,372	$339,299	-42%

VI. Rate Design

1. Water Division

Q. Have you prepared a schedule presenting your recommended rate design?

A. Yes, as shown on Schedule 5, I am recommending a rate design consistent with RUCO's recommended revenue allocation and requirement. The rate design provides for a 58.8% increase spread equally across all classes of service, which is a decrease of 57.2 percentage points compared to the Company's requested 116% increase.

Q. Are you recommending a tiered rate design?

A. Yes, I am recommending a three tiered rate structure for 5/8" and 3/4" meters and a two tiered rate structure for all large meter sizes.

2. Wastewater Division

Q. Have you prepared a schedule presenting your recommended rate design?

A. Yes, as shown on Schedule 5, I am recommending a rate design consistent with RUCO's recommended revenue allocation and requirement. The rate design provides for a 28.47% overall increase which is a decrease of 50.06% percentage points compared to the Company's requested 78.53%. Across most classes of service the increase is spread equally, with the exception of measured service and effluent sales.

Q. Are you recommending any changes to LPSCOs wastewater rate design?

A. Yes, I am recommending that LPSCO no longer use a "market rate" for treated effluent and I am proposing a tariff rate of $1.50 per thousand gallons for treated effluent.

Q. Why are you proposing this change to LPSCO's effluent rates?

A. Under LPSCO's current tariff its rate for effluent is a "market rate." This means that it can charge whatever rate for effluent it negotiates with each effluent customer (below a cap.) When I examined the current rates that LPSCO is charging its effluent customers, I found them to be excessively low.

Most of LPSCO's customers are currently paying $0.17 per thousand gallons. Given that treated effluent is a valuable resource and that effluent revenues help to offset the impact of rate increases on other customer classes, I believed an adjustment to LPSCO's effluent rates is appropriate. Accordingly I am recommending that LPSCO no longer use a "market rate" for treated effluent and that a tariff rate of $1.50 per thousand gallons for treated effluent be established.

Q. Does your silence on any of the issues, matters or findings addressed in the testimony of any of the witnesses for LPSCO constitute your acceptance of their positions on such issues, matters or findings?

A. No, it does not.

Q. Does this conclude your direct testimony on LPSCO?

A. Yes, it does.

Appendix 1

Qualifications of Sonn S. Rowell

Educational Background

ARIZONA STATE BOARD OF ACCOUNTANCY
Phoenix, AZ
Certified Public Accountant Designation
Certificate Number 10372-E

STATE BOARD OF DIRECTORS FOR COMMUNITY COLLEGES OF ARIZONA Phoenix, AZ
Accountancy Teaching Certificate No. 19397

ARIZONA STATE UNIVERSITY
Tempe, AZ
Bachelor of Science Degree – Accountancy Major

Work Experience

DESERT MOUNTAIN ANALYTICAL SERVICES, PLLC (06/02 – Present)

Member/Manager

- Prepare annual reports for Arizona Corporation Commission Utilities and Corporations Divisions.
- Represent parties before the Arizona Corporation Commission for rate increases, financings, and other applications.
- Prepare quarterly and year-end payroll reporting for client businesses.
- Monthly, quarterly, and year-end processing of transactions for client businesses.
- Corporate, other business, and individual income tax preparation.
- Sales tax and Property tax reporting.

Recent Utility cases I have been involved in include:

Company Name/Class	Docket Number	Case Description
F. Wayne and Dorothy Thompson dba West Village Water Company – Class D	W-03211A-08-0622	Rate Case/Financing
Sonoita Valley Water Company	W-20435A-09-0296	Rate Case/Financing
Valle Verde Water Company – Class C	W-01431A-09-0360	Rate Case/Financing
Bob B. Watkins dba East Slope Water Company – Class C	W-01906A-09-0283	Emergency Surcharge
Antelope Run Water Company – Class D	W-02327A-09-0284	Emergency Surcharge
Indiada Water Company, Inc. – Class E	W-02031A-09-0285	Emergency Surcharge
Wickenburg Ranch Water, LLC – no customers	W-03994A-07-0657	Rate Adjustment
Southland Utilities Company, Inc. – will be filed as a Class C due to proposed rates within the next month	W-02062A-TBD	Rate Case/Financing
Aubrey Water Company – Class D	W-03476A-06-0425	Rate Case
Picacho Peak Water Company, Inc. – Class D	W-02351A-07-0686	Rate Case/Financing
Empirita Water Company, LLC – Class E	W-03948A-07-0495	Rate Case

ARIZONA CORPORATION COMMISSION (07/98 – 05/02)

Rate Analyst II

- Determine necessity and amount of revenue recommended in utility rate increase proceedings
- Revise standard filing documents, train new employees, and review peer work product
- Determine impact on Company financial conditions due to various tariff filings
- Present at Open Meeting and testify at hearings about recommendations
- Lead advisory groups formed to develop recommended policies and procedures to regulate utilities

Utility Auditor III

- Determine rate increase application sufficiency or deficiency for public utilities
- Conduct on-site inspection of utility assets
- Audit utility expenses and plant additions since prior rate increase proceeding
- Coordinate with other departments regarding specialty areas of utility analysis
- Prepare staff report or testimony stating findings and recommendations based on audit results

ATTACHMENT 1

DIRECT TESTIMONY

OF

SONN S. ROWELL, CPA

Examples of Affiliate Invoices

Invoice

Remit To:
Algonquin Water Services LLC
12725 W. Indian School Road
Suite D101
Avondale, AZ 85323

Bill To:
Litchfield Park Service Compan
Attn:

12725 W Indian School Rd
Suite D101
Avondale, AZ 85323

Job Address:
12725 W Indian School Rd
Suite D101
Avondale, AZ 85323

Date	Invoice Number	Customer Order Number	Customer Number	Net Terms
4/26/2007	JC3216	LPSCO	400LPSCO	

Description

Labor	Quantity	Unit Chg	Billable Amount
Manager	58.00	125.00	7,250.00
		Labor Total:	7,250.00

Billing Amount:	US$7,250.00
Retention Withheld:	US$0.00
Retention Due:	US$0.00
Subtotal:	US$7,250.00
Misc:	US$0.00
Tax:	US$0.00
Pay This Amount:	US$7,250.00

Invoice

Remit To:
Algonquin Water Services LLC
12725 W. Indian School Road
Suite D101
Avondale, AZ 85323

Bill To:
Litchfield Park Service Compan
Attn:

12725 W Indian School Rd
Suite D101
Avondale, AZ 85323

Job Address:
12725 W Indian School Rd
Suite D101
Avondale, AZ 85323

Date	Invoice Number	Customer Order Number	Customer Number	Net Terms
5/29/2007	JC3386	LPSCO	400LPSCO	

Description

Labor	Quantity	Unit Chg	Billable Amount
Manager	25.25	125.00	3,156.25
Controller	1.75	100.00	175.00
		Labor Total:	3,331.25

Contractors	Quantity	Unit Chg	Billable Amount
	1.00	168.75	168.75
	1.00	168.75	168.75
	1.00	150.00	150.00
		Contractors Total:	487.50

Billing Amount:	US$3,818.75
Retention Withheld:	US$0.00
Retention Due:	US$0.00
Subtotal:	US$3,818.75
Misc:	US$0.00
Tax:	US$0.00
Pay This Amount:	US$3,818.75

Invoice

Remit To:
Algonquin Water Services LLC
12725 W. Indian School Road
Suite D101
Avondale, AZ 85323

Bill To:
Litchfield Park Service Compan
Attn:

12725 W Indian School Rd
Suite D101
Avondale, AZ 85323

Job Address:
12725 W Indian School Rd
Suite D101
Avondale, AZ 85323

Date	Invoice Number	Customer Order Number	Customer Number	Net Terms
6/27/2007	JC3564	LPSCO	400LPSCO	

Description

Labor	Quantity	Unit Chg	Billable Amount
Manager	36.25	125.00	4,531.25
		Labor Total:	4,531.25

Billing Amount:	US$4,531.25
Retention Withheld:	US$0.00
Retention Due:	US$0.00
Subtotal:	US$4,531.25
Misc:	US$0.00
Tax:	US$0.00
Pay This Amount:	US$4,531.25

Exhibit 1

DIRECT TESTIMONY

OF

SONN S. ROWELL, CPA

Water Division Schedules

Litchfield Park Service Company - Water Division
Docket No. SW-01428-09-0103 and W-01427A-09-0104
Test Year Ended September 30, 2008

Revenue Requirement

LINE NO.	DESCRIPTION	(A) COMPANY OCRB/FVRB COST	(B) RUCO OCRB/FVRB COST
1	Adjusted Original Cost/Fair Value Rate Base	$ 37,930,921	$ 37,222,878
2			
3	Adjusted Operating Income/(Loss)	$ (282,894)	$ 389,947
4			
5	Current Rate of Return (L3 / L1)	-0.75%	1.05%
6			
7	Required Operating Income (L9 X L1)	$ 4,327,918	$ 2,873,606
8			
9	Required Rate of Return on Fair Value Rate Base	11.410%	7.720%
10			
11	Operating Income Deficiency (L7 - L3)	$ 4,610,812	$ 2,483,659
12			
13	Gross Revenue Conversion Factor (Schedule 1, Page 2)	1.6286	1.6286
14			
15	Required Increase in Gross Revenue Requirement (L11 X L13)	$ 7,509,329	$ 4,044,974
16			
17	Adjusted Test Year Revenue	$ 6,475,002	$ 6,878,710
18			
19	Proposed Annual Revenue (L15 + L17)	$ 13,984,331	$ 10,923,684
20			
21	Required Percentage Increase in Revenue (L15 / L17)	115.97%	58.80%
22			
23	Rate of Return on Common Equity	12.500%	8.010%

References:
Column (A): Company Schedules A-1 and C-1
Column (B): RUCO Schedules 2 and 4

GROSS REVENUE CONVERSION FACTOR

LINE NO.	DESCRIPTION	(A)	(B)	(C)	(D)
	CALCULATION OF GROSS REVENUE CONVERSION FACTOR:				
1	Revenue	1.0000			
2	Combined Federal And State Tax Rate (Line 12)	(0.3860)			
3	Subtotal (Line 1 + Line 2)	0.6140			
4	**Revenue Conversion Factor** (L1 / L3)	**1.6286**			
5					
6	CALCULATION OF EFFECTIVE TAX RATE:				
7	Operating Income Before Taxes (Arizona Taxable Income)	100.0000%			
8	Arizona State Income Tax Rate	6.9680%			
9	Federal Taxable Income (L7 - L8)	93.0320%			
10	Applicable Federal Income Tax Rate (Col. (D), L43)	34.0000%			
11	Effective Federal Income Tax Rate (L9 X L10)	31.6309%			
12	Combined Federal And State Income Tax Rate (L8 + L11)	38.5989%			
13					
14	Required Operating Income (Sch.-1, Pg 1, Col. (B), L7)	$ 2,873,606			
15	Adjusted T.Y. Oper'g Inc. (Loss) (Sch.-1, Pg 1, C (B), L3)	389,947			
16	Required Increase In Operating Income (L14 - L15)		$2,483,659		
17					
18	Income Taxes On Recommended Revenue (Col. (D), L31)	$ 1,539,694			
19	Income Taxes On Test Year Revenue (Col. (D), L40)	(21,621)			
20	Required Increase In Revenue To Provide For Income Taxes (L18 - L19)		$1,561,315		
21					
22	Total Required Increase In Revenue (L16 + L20)		$4,044,974		
23					
24	CALCULATION OF INCOME TAX:			RUCO RECOMMENDED	
25	Revenue (Sch -1, Pg 1, Col. (B), L19)			$ 10,923,684	
26	Operating Expense Excluding Income Tax (Sch4, Col. (E), L37 - L32)			6,510,384	
27	Synchronized Interest (Col. (C), L48)			424,341	
28	Arizona Taxable Income (L25 - L26 - L27)			$ 3,988,959	
29	Arizona State Income Tax Rate			6.9680%	
30	Arizona Income Tax (L28 X L29)				$ 277,951
31	Fed. Taxable Income (L28 - L30)			$ 3,711,009	
32	Fed. Tax on 1st Inc. Bracket ($1 - $50,000) @ 15%			$ 7,500	
33	Fed. Tax on 2nd Inc. Bracket ($50,001 - $75,000) @ 25%			6,250	
34	Fed. Tax on 3rd Inc. Bracket ($75,001 - $100,000) @ 34%			8,500	
35	Fed. Tax on 4th Inc. Bracket ($100,001 - $335,000) @ 39%			91,650	
36	Fed. Tax on 5th Inc. Bracket ($335,001 - $10M) @ 34%			1,147,843	
37	Total Federal Income Tax (L32 + L33 + L34 + L35 + L36)				1,261,743
38	Combined Federal and State Income Tax (L30 + L37)				$ 1,539,694
39					
40	Test Year Combined Income Tax, RUCO as Adjusted (Sch 4, Col. (C), L31)				$ (21,621)
41	**RUCO Adjustment To Proposed Income Tax (L38 - L40) (See Sch 1, Col. (D), L32)**				**$ 1,561,315**
42					
43	Applicable Federal Income Tax Rate (Col. (D), L30 / Col. (C), L24)				34.00%
44					
45	CALCULATION OF INTEREST SYNCHRONIZATION:				
46	Rate Base			$ 37,222,878	
47	Weighted Avg. Cost of Debt			1.14%	
48	Synchronized Interest (L35 X L36)			$ 424,341	

RATE BASE - ORIGINAL COST

LINE NO.		(A) COMPANY AS FILED OCRB/FVRB	(B) RUCO ADJM'T No. 1	(C) RUCO ADJM'T No. 2	(D) RUCO ADJM'T No. 3	(E) RUCO ADJ'TED OCRB/FVRB
1	Gross Utility Plant in Service	$ 73,731,715	$ (841,129)			$ 72,890,586
2						-
3	Accumulated Depreciation	(9,097,645)	189,493			(8,908,152)
4						-
5	Net Utility Plant in Service (Sum L1 & L3)	$ 64,634,070	$ (651,636)	$ -	$ -	$ 63,982,434
6						
7	**Less:**					
8	Advances in Aid Of Construction	$ (24,583,673)				$ (24,583,673)
9						-
10	Contribution in Aid of Const.	$ (3,104,068)				(3,104,068)
11	Accumulated Amortization of CIAC	860,706				860,706
12	NET CIAC (L10 + L11)	$ (2,243,362)	$ -	$ -	$ -	$ (2,243,362)
13						
14	Customer Meter Deposits	$ (68,685)				$ (68,685)
15	Deferred Income Tax	(24,518)				(24,518)
16						
17	**Plus:**					
18	Unamortized Debt Issuance Costs	$ 134,528		$ (48,150)		86,378
19	Deferred Regulatory Assets	82,561			$ (8,256)	74,305
20						-
21						-
22	TOTAL RATE BASE (Sum Lines's 5,8,12-19)	$ 37,930,921	$ (651,636)	$ (48,150)	$ (8,256)	$ 37,222,878

References:
Column (A): Company Schedule B-1
Column (B): RUCO Schedule 2, Page 2
Column (C): RUCO Schedule 2, Page 3
Column (D): RUCO Schedule 2, Page 4
Column (E): Sums of Column (A) through Column (D)

EXPLANATION OF RATE BASE ADJUSTMENT NO. 1
TO UTILITY PLANT IN SERVICE

LINE NO.	DESCRIPTION	AMOUNT	REFERENCE
1	RUCO Proposed Utility Plant In Service At End of Test Year	$72,890,586	RUCO Schedule 3, Page 1
2			
3	Company Proposed Utility Plant In Service At End of Test Year	73,731,715	Company Schedule B-1
4			
5	**RUCO Proposed Adjustment To Utility Plant in Service**	**$ (841,129)**	
6			
7			
8	Accumulated Depreciation At End of Prior Test Year	$ 2,016,268	Staff Amount Per Decision 65436
9	2001 Depreciation Expense	301,412	
10	2002 Depreciation Expense	428,370	
11	2003 Depreciation Expense	675,633	
12	2004 Depreciation Expense	832,647	
13	2005 Depreciation Expense	1,036,740	
14	2006 Depreciation Expense	1,151,512	
15	2007 Depreciation Expense	1,227,908	
16	2008 Depreciation Expense (9 months)	1,323,990	
17	Subtotal	$ 8,994,481	Sum of Lines 16 through 19
18			
19	Less 2003 Retirements	$ (84,979)	
20	Less 2006 Retirements	(1,350)	
21			
22	RUCO Proposed Accumulated Depreciation At End of Test Year	$ 8,908,152	Sum of Lines 17, 19, and 20
23			
24	Company Proposed Accumulated Depreciation At End of Test Year	$ 9,097,645	Company Schedule B-1
25			
26	**RUCO Proposed Adjustment To Accumulated Depreciation**	**$ (189,493)**	Line 22 - Line 24

EXPLANATION OF RATE BASE ADJUSTMENT NO. 2
TO UNAMORTIZED DEBT ISSUANCE COSTS

Line No.	Description	(A) 1999 Series Bonds	(B) 2001 Series Bonds	(C) Combined Total (A) + (B)
1	Aggregate Principal Balance of IDA Bonds	$ 5,335,000	$ 7,500,000	$ 12,835,000
2	Allowable Debt Issuance Cost as per 1999 & 2001 IDA Bond Contracts	2.00%	2.00%	
3				
4	Total Allowable Debt Issuance Cost (L1 X L2)	$ 106,700	$ 150,000	$ 256,700
5	Term of Bond Issue, in Years	24	30	
6				
7	Annual Debt Issuance Amortization Expense - Straight Line (L4 / L5)	$ 4,446	$ 5,000	$ 9,446
8	Number of Months in Year	12	12	
9				
10	Allowable Monthly Amortization Expense (L7 / L8)	$ 370	$ 417	$ 787
11	Months Remaining before the Bonds Reach Maturity*	168	264	
12				
13	Unamortized Debt Issuance Costs -- RUCO as Adjusted (L10 X L11)	$ 62,242	$ 110,000	$ 172,242
14				
15				
16	Unamortized Debt Issuance Costs -- Company as Filed	$ 141,268	$ 127,274	$ 268,542
17				
18	Unamortized Debt Issuance costs -- RUCO as Adjusted	62,242	110,000	172,242
19				
20	**Decrease to Unamortized Debt Issuance Costs**	**$ (79,027)**	**$ (17,274)**	**$ (96,301)**
21				
22	Walter Division Cost Allocation Percent			50.00%
23				
24	**RUCO Unamortized Debt Issuance costs - Water Division**			**$ (48,150)**

* Information on the months remaining before the bonds reach maturity was provided in the Company's response to Staff Data Request JMM 1.32, with the 1999 Series IDA Bonds maturing October 1, 2023, and the 2001 Series IDA Bonds Maturing October 1, 2031.

EXPLANATION OF RATE BASE ADJUSTMENT NO. 3
TO DEFERRED REGULATORY ASSETS

LINE NO.	DESCRIPTION	AMOUNT	REFERENCE
1	Deferred Regulatory Assets Per Company (TCE Plume)	$ 82,561	Company Schedule B-1
2			
3	Amortization Period In Years	10	Company Schedule C-2, Page 13
4			
5	Annual Amortization Expense Per Company	$ 8,256	Line 1 / Line 3
6			
7			
8	Portion of Cost Allocated to Rate Base Per RUCO	$ 74,305	Line 1 - Line 5
9			
10	Cost Allocated to Rate Base Per Company	82,561	Company Schedule B-1
11			
12	**RUCO Proposed Adjustment To Deferred Regulatory Assets**	**$ (8,256)**	Line 8 - Line 10
13			
14			
15	Portion of Cost Allocated to Expense Per RUCO	$ 8,256	Line 1 - Line 8
16			
17	Cost Allocated to Expense Per Company	8,256	Company Schedule C-2, Page 13
18			
19	**RUCO Proposed Adjustment To Miscellaneous Expense**	**$ -**	Line 15 - Line 17

Litchfield Park Service Company - Water Division
Docket No. SW-01428A09-0103
Test Year Ended September 30, 2008

UTILITY PLANT IN SERVICE SCHEDULE
TEST YEAR ENDED SEPTEMBER 30, 2008

LINE NO.	ACCT. NO.	ACCOUNT NAME	(A) COMPANY ADJ TEST YR	(B) RUCO ADJUSTMENTS	(C) RUCO PLANT VALUE
1	301	Organization	$ -	$ 21,100	$ 21,100
2	302	Franchises	-	-	-
3	303	Land and Land Rights	1,284,595	(96,170)	1,188,425
4	304	Structures and Improvements	24,698,293	(446,942)	24,251,351
5	307	Wells and Springs	2,382,102	(31,705)	2,350,397
6	310	Power Generation Equipment	202,269	-	202,269
7	311	Electric Pumping Equipment	948,213	(157,561)	790,652
8	320	Water Treatment Equipment	1,337,824	(20,253)	1,317,571
9	320.1	Water Treatment Plants	1,866,965	-	1,866,965
10	320.2	Chemical Solution Feeders	-	-	-
11	330	Distribution Reservoirs & Standpipes	430,644	(3,839)	426,805
12	330.1	Storage Tanks	-	-	-
13	330.2	Pressure Tanks	-	-	-
14	331	Transmission and Distribution Mains	28,929,171	(18,048)	28,911,123
15	333	Services	4,249,744	(57,961)	4,191,783
16	334	Meters	4,138,752	(1,739)	4,137,013
17	335	Hydrants	2,055,781	(1,258)	2,054,523
18	336	Backflow Prevention Devices	38,387	-	38,387
19	339	Other Plant and Miscellaneous Equipment	265,281	(5,175)	260,106
20	340	Office Furniture and Equipment	551,757	-	551,757
21	340.1	Computers and Software	-	-	-
22	341	Transportation Equipment	177,165	(17,669)	159,496
23	342	Stores Equipment	31,711	-	31,711
24	343	Tools, Shop, and Garage Equipment	23,350	-	23,350
25	344	Laboratory Equipment	-	-	-
26	345	Power Operated Equipment	-	-	-
27	346	Communications Equipment	119,710	(3,908)	115,802
28	347	Miscellaneous Equipment	-	-	-
29	348	Other Tangible Plant	-	-	-
30					
31		**TOTAL WATER UTILITY PLANT IN SERVICE**	**$ 73,731,714**	**$ (841,128)**	**$ 72,890,586**

TEST YEAR PLANT SCHEDULE
YEAR ENDED SEPTEMBER 30, 2008

LINE NO.	ACCT. NO.	ACCOUNT NAME	COMPANY AS FILED	RUCO ADJ 1	RUCO ADJ 2	RUCO ADJ 3	RUCO ADJ 4	RUCO ADJ 5	RUCO ADJ 6	RUCO ADJ 7	RUCO ADJ 8	TOTAL PG 1 ADJ
1	301	Organization	$ -	$ 21,100								$ 21,100
2	302	Franchises	-									-
3	303	Land and Land Rights	1,284,595								$ (96,170)	(96,170)
4	304	Structures and Improvements	24,698,293		$ (47,721)	$ 602	$ 28,165	$ 22,752	$ 99,915			103,713
5	307	Wells and Springs	2,382,102				8,385		166	1,925		10,476
6	310	Power Generation Equipment	202,269									-
7	311	Electric Pumping Equipment	948,213		(31,158)	199	8,399					(22,560)
8	320	Water Treatment Equipment	1,337,824				3,517	9,690	2,049	6,948		22,204
9	320.1	Water Treatment Plants	1,866,965									-
10	320.2	Chemical Solution Feeders	-									-
11	330	Distribution Reservoirs & Standpipes	430,644					3,381	969	111		4,461
12	330.1	Storage Tanks	-									-
13	330.2	Pressure Tanks	-									-
14	331	Transmission and Distribution Mains	28,929,171									-
15	333	Services	4,249,744			4,734	6,563	400				11,697
16	334	Meters	4,138,752			280	477	204				961
17	335	Hydrants	2,055,781			511	163			18		692
18	336	Backflow Prevention Devices	38,387									-
19	339	Other Plant and Miscellaneous Equipment	265,281									-
20	340	Office Furniture and Equipment	551,757									-
21	340.1	Computers and Software	-									-
22	341	Transportation Equipment	177,165									-
23	342	Stores Equipment	31,711									-
24	343	Tools, Shop, and Garage Equipment	23,350									-
25	344	Laboratory Equipment	-									-
26	345	Power Operated Equipment	-									-
27	346	Communications Equipment	119,710				1,394	1,883	28	787		4,092
28	347	Miscellaneous Equipment	-									-
29	348	Other Tangible Plant	-									-
30												
31												
32	TOTAL	WATER PLANT	$ 73,731,714	$ 21,100	$ (78,879)	$ 6,326	$ 57,063	$ 38,310	$ 103,127	$ 9,789	$ (96,170)	$ 60,666

ADJ 1 Replace Organization Costs as approved by last Decision
ADJ 2 Retire Litchfield Greens Booster Pump Station in 2003
ADJ 3 Reverse Company Adjustment for 2004 Affiliate Profit
ADJ 4 Reverse Company Adjustment for 2005 Affiliate Profit
ADJ 5 Reverse Company Adjustment for 2006 Affiliate Profit
ADJ 6 Reverse Company Adjustment for 2007 Affiliate Profit
ADJ 7 Reverse Company Adjustment for 2008 Affiliate Profit
ADJ 8 Remove unsupported affiliate labor and accruals, and rent from 2008 plant additions

Capitalized Affiliate Labor - Algonquin	$ (27,040)
Capitalized Affiliate Labor - New Spring	(40,013)
Rent to Maryland 40, LLC	(9,000)
Unsupported Accurals	(20,117)
Total Adjustment 8	$ (96,170)

TEST YEAR PLANT SCHEDULE
YEAR ENDED SEPTEMBER 30, 2008

LINE NO.	ACCT. NO.	ACCOUNT NAME	RUCO ADJ 9	RUCO ADJ 10	RUCO ADJ 11	RUCO ADJ 12	RUCO ADJ 13	RUCO ADJ 14	RUCO ADJ 15	RUCO ADJ 16	RUCO ADJ 17	TOTAL PG 2 ADJ
1	301	Organization										$ -
2	302	Franchises										-
3	303	Land and Land Rights										-
4	304	Structures and Improvements		$ (1,125)		$ (33,156)		$ (267,183)		$ (7,072)		(308,536)
5	307	Wells and Springs	(6,200)			(19,238)	(1,800)				(14,943)	(42,181)
6	310	Power Generation Equipment										-
7	311	Electric Pumping Equipment		(375)	(18,050)							(18,425)
8	320	Water Treatment Equipment			(7,188)		(3,700)	(31,569)				(42,457)
9	320.1	Water Treatment Plants										-
10	320.2	Chemical Solution Feeders										-
11	330	Distribution Reservoirs & Standpipes						(8,300)				(8,300)
12	330.1	Storage Tanks										-
13	330.2	Pressure Tanks										-
14	331	Transmission and Distribution Mains										-
15	333	Services		(10,915)	(14,360)	(875)			(27,700)	(4,170)		(58,020)
16	334	Meters		(800)	(1,325)	(575)						(2,700)
17	335	Hydrants			(1,450)			(100)				(1,550)
18	336	Backflow Prevention Devices										-
19	339	Other Plant and Miscellaneous Equipment			(5,175)							(5,175)
20	340	Office Furniture and Equipment										-
21	340.1	Computers and Software										-
22	341	Transportation Equipment									(17,669)	(17,669)
23	342	Stores Equipment										-
24	343	Tools, Shop, and Garage Equipment										-
25	344	Laboratory Equipment										-
26	345	Power Operated Equipment										-
27	346	Communications Equipment						(8,000)				(8,000)
28	347	Miscellaneous Equipment										-
29	348	Other Tangible Plant										-
30												
31												
32	TOTAL WATER PLANT		$ (6,200)	$ (13,215)	$ (47,548)	$ (53,844)	$ (5,500)	$ (315,152)	$ (27,700)	$ (11,242)	$ (32,612)	$ (513,013)

ADJ 9
ADJ 10 Remove 2004 unsupported affiliate labor costs by estimated year related asset placed in service.
ADJ 11 Remove 2005 unsupported affiliate labor costs by estimated year related asset placed in service.
ADJ 12 Remove 2006 unsupported affiliate labor costs by estimated year related asset placed in service.
ADJ 13 Remove 2007 unsupported affiliate labor costs by estimated year related asset placed in service.
ADJ 14 Remove 2008 unsupported affiliate labor costs by estimated year related asset placed in service.
ADJ 15 Remove 3 repair invoices ($3,000 times 2, and 1 @ $2,700) and 1 unsupported amount ($19,000) from 2001 plant additions from Yahweh Contracting.
ADJ 16 Remove 2 repair invoices from Yahweh ($2,085 times 2) and 1 rent invoice from Suncor ($7,072) from 2002 plant additions.
ADJ 17 Remove 3 unsupported amounts from Huges Supply ($5,081, $4,931, and $4,931), one invoice from W. Fisher for $2,750, and 2002 plant additions one invoice from Courtesy Chevrolet ($14,919) from 2002 plant additions.

TEST YEAR PLANT SCHEDULE
YEAR ENDED SEPTEMBER 30, 2008

LINE NO.	ACCT. NO.	ACCOUNT NAME	RUCO ADJ 18	RUCO ADJ 19	RUCO ADJ 20	RUCO ADJ 21	RUCO ADJ 22	RUCO ADJ 23	TOTAL PG 3 ADJ	TOTAL ALL ADJS
1	301	Organization							$ -	$ 21,100
2	302	Franchises							-	-
3	303	Land and Land Rights							-	(96,170)
4	304	Structures and Improvements	(242,119)						(242,119)	(446,942)
5	307	Wells and Springs							-	(31,705)
6	310	Power Generation Equipment							-	-
7	311	Electric Pumping Equipment		(53,409)		(64,281)		1,114	(116,576)	(157,561)
8	320	Water Treatment Equipment							-	(20,253)
9	320.1	Water Treatment Plants							-	-
10	320.2	Chemical Solution Feeders							-	-
11	330	Distribution Reservoirs & Standpipes							-	(3,839)
12	330.1	Storage Tanks							-	-
13	330.2	Pressure Tanks							-	-
14	331	Transmission and Distribution Mains		(26,648)				8,600	(18,048)	(18,048)
15	333	Services	(8,411)		(3,227)				(11,638)	(57,961)
16	334	Meters							-	(1,739)
17	335	Hydrants					(400)		(400)	(1,258)
18	336	Backflow Prevention Devices							-	-
19	339	Other Plant and Miscellaneous Equipment							-	(5,175)
20	340	Office Furniture and Equipment							-	-
21	340.1	Computers and Software							-	-
22	341	Transportation Equipment							-	(17,669)
23	342	Stores Equipment							-	-
24	343	Tools, Shop, and Garage Equipment							-	-
25	344	Laboratory Equipment							-	-
26	345	Power Operated Equipment							-	-
27	346	Communications Equipment							-	(3,908)
28	347	Miscellaneous Equipment							-	-
29	348	Other Tangible Plant							-	-
30										
31										
32	TOTAL WATER PLANT		$ (250,530)	$ (80,057)	$ (3,227)	$ (64,281)	$ (400)	$ 9,714	$ (388,781)	$ (841,128)

ADJ 18 Remove 1 repair invoice from Pyramid West Pipeline ($1,391), 1 unsupported amount from Pyramid ($7,020), and a journal entry amount not supported by backup ($242,119) from 2004 plant additions.
ADJ 19 Remove 1 repair invoice from CH2OICE Pump ($53,409), and several repair invoices from Ram Pipelines that total $26,648 from 2005 plant additions.
ADJ 20 Remove 1 repair invoice from Yahweh ($2,450), and 1 repair invoice from Ram Pipelines ($777) from 2006 plant additions.
ADJ 21 Remove repair invoice from CH2OICE Pump for $64,281 from 2008 plant additions.
ADJ 22 Remove repair invoice from MS Hernandez Construction for $400 from 2003.
ADJ 23 Capitalize amount removed from expenses from Hydro Controls (2008) for well site clocks, and from Harasimhan Consulting (2007) for distribution system evaluation.

Litchfield Park Service Company - Water Division
Docket No. SW-01428A09-0103
Test Year Ended September 30, 2008

OPERATING INCOME

LINE NO.	DESCRIPTION	(A) COMPANY AS FILED	(B) RUCO TEST YEAR ADJM'TS	REF	(C) RUCO TEST YEAR AS ADJ'TED	(D) RUCO PROPOSED INCREASE	(E) RUCO AS RECOMM'D
1	Revenues						
2	Metered Water Revenue	$6,347,481	$ 403,707	1	$ 6,751,188	$ 4,044,974	$ 10,796,162
3	Unmetered Water Revenue	-			-		-
4	Other Water Revenue	127,522			127,522		127,522
5					-		-
6	TOTAL OPERATING REVENUE	$6,475,003	$ 403,707		$ 6,878,710	$ 4,044,974	$ 10,923,684
7							
8	Operating Expenses						
9	Salaries & Wages	$ -			$ -		$ -
10	Purchased Water	5,011			5,011		5,011
11	Purchased Power	1,013,811			1,013,811		1,013,811
12	Fuel for Power Production	58,147	(56,381)	2	1,766		1,766
13	Chemicals	503,278	(2,309)	3	500,969		500,969
14	Repairs and Maintenance	44,001			44,001		44,001
15	Office Supplies and Expense	-			-		-
16	Outside Services	12,469			12,469		12,469
17	Outside Services - Other	2,382,976	(482,958)	4a-d	1,900,018		1,900,018
18	Outside Services - Legal	14,317			14,317		14,317
19	Water Testing	28,365	(590)	5	27,775		27,775
20	Rents	10,647			10,647		10,647
21	Transportation Expenses	151,879	(24,761)	6	127,118		127,118
22	Insurance - General Liability	95,469			95,469		95,469
23	Insurance - Health and Life	3,319			3,319		3,319
24	Regulatory Comm, Expense	63,662			63,662		63,662
25	Regulatory Comm, Exp. - Rate Case	70,000	(20,000)	7	50,000		50,000
26	Miscellaneous Expense	81,664	(22,027)	8	59,637		59,637
27	Bad Debt Expense	3,264			3,264		3,264
28	Depreciation & Amortization	2,291,982	(49,953)	9a-b	2,242,029		2,242,029
29	Taxes Other Than Income	-			-		-
30	Property Taxes	373,354	(38,253)	10	335,101		335,101
31	Income Tax	(449,717)	428,096	11	(21,621)	1,561,315	1,539,694
32					-		-
33							
34	TOTAL OPERATING EXPENSES	$6,757,898	$ (269,135)		$ 6,488,763	$ 1,561,315	$ 8,050,078
35							
36	**OPERATING INCOME (LOSS)**	**$ (282,895)**	**$ 672,842**		**$ 389,947**	**$ 2,483,659**	**$ 2,873,606**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 1 TO METERED WATER REVENUES

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	Company Proforma Decrease to Test Year Revenue		$ (403,707)
2			
3	RUCO Proposed Decrease to Test Year Revenue		-
4			
5	**RUCO Adjustment to Increase Test Year Revenue**		**$ 403,707**
6			

7 Portion of Company Adjustment 4 related to contract with the City of Goodyear,
8 AZ. Company decreased test year revenue to adjust for the potential loss of
9 this customer.

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 2
TO FUEL FOR POWER PRODUCTION

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	Kohler Rental Power	Invoice 5060152	$ (36,064)
2	Kohler Rental Power	Invoice 5061075	(23,170)
3	Kohler Rental Power	Invoice 5057208	(25,297)
4	Kohler Rental Power	Invoice 5063232	(7,850)
5	Diesel fuel accrual adjustments	JE 46643	36,000
6			
7	**RUCO Adjustment to Remove Non-Recurring Expenses**		**$ (56,381)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 3
TO CHEMICALS

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	HILL BROTHERS CHEMICAL CO.	Invoice 04293499	$ (305)
2	HILL BROTHERS CHEMICAL CO.	Invoice 04293606	(213)
3	HILL BROTHERS CHEMICAL CO.	Invoice 04293605	(228)
4	HOME DEPOT	JE 46704	(814)
5	HOME DEPOT	JE 47955	(749)
6			
7	**RUCO Adjustment To Remove Expenses Outside of Test Year**		**$ (2,309)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4a
TO OUTSIDE SERVICES - OTHER

LINE NO.	DESCRIPTION	AMOUNT	REFERENCE
1	Hydro Controls and Pump Systems (Clocks for well sites)	$ (1,114)	Invoice No. 227 (June 9, 2008)
2	Narasimhan Consulting Services (Distribution System Evaluation)	(8,600)	Invoice No. 0252-1 (Oct. 27, 2007)
3			
4	**RUCO Adjustment To Remove Expenses To Be Capitalized**	**$ (9,714)**	
5			
6			
7	Southwest Ground-water Consultants (Well Spacing Evaluation)	$ (1,380)	Invoice No. B.1426-2-1 (Feb. 13, 2008)
8	Southwest Ground-water Consultants (Well Rehabilitation-Dry Ice)	(4,072)	Invoice No. B.1591-2 (Mar. 20, 2008)
9	Southwest Ground-water Consultants (Recharge Characterization)	(2,613)	Invoice No. B.1426-11 (June 25, 2008)
10	Southwest Ground-water Consultants (Report for Production Well)	(1,225)	Invoice No. B.1661-1V (July 11, 2008)
11	Southwest Ground-water Consultants (Report for Production Well)	(2,800)	Invoice No. B.1661-1 (July 11, 2008)
12	Southwest Ground-water Consultants (Well Impact Analysis)	(4,823)	Invoice No. B.1688-1 (Sept. 8, 2008)
13	Burke Hansen, LLC (Real estate appraisal)	(3,000)	Invoice No. 8107N (June 5, 2008)
14			
15	**RUCO Adjustment to Remove Non-Recurring Expenses**	**$ (19,912)**	
16			
17	**TOTAL RUCO ADJUSTMENT TO OUTSIDE SERVICES - OTHER**	**$ (29,625)**	

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4b
TO OUTSIDE SERVICES - OTHER

LINE NO.	GENERAL LEDGER ACCOUNT	VENDOR	DESCRIPTION	AMOUNT
1	Central Office - Accounting/Administration	Algonquin Power Trust	GENERAL ACCTIN FEE - LPSCO	$ (2,689)
2	Central Office - Human Resources	Algonquin Power Trust	GEN HR FEE- LPSCO	(12,790)
3	Central Office - Information Technology	Algonquin Power Trust	GEN IT FEE- LPSCO	(1,127)
4	Central Office - Operations	Algonquin Power Trust	GENERAL OPS	(1,146)
5	Central Office Fixed Overhead Costs	Algonquin Power Trust	MGMT FEE- LPSCO	(273,956)
6				
7			**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**	**$ (291,708)**

Note: Descriptions above are per company journal entries in the general ledger.

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4c
TO OUTSIDE SERVICES - OTHER

LINE NO.	DESCRIPTION	ACCOUNT	REFERENCE	AMOUNT
1	Algonquin Water Resources	Meals and Entertainment	MISC. SUPPLIES	$ (488)
2	Algonquin Water Resources	Meals and Entertainment	Expense Reports/Travel	(19,123)
5	Algonquin Water Resources	Meals and Entertainment	DJ SERVICE - XMAS PARTY	(495)
6	Algonquin Water Resources	Meals and Entertainment	For Holiday Party Dec. 2008	(4,959)
7	Algonquin Water Resources	Meals and Entertainment	BALANCE DUE FOR 2008 XMAS PART	(953)
8	Algonquin Water Resources	Meals and Entertainment	2007 CAPITAL PRJECTS PLANNING	(211)
9	Algonquin Water Resources	Meals and Entertainment	Exp cost for the DBack game	(6,400)
10	Algonquin Water Resources	Meals and Entertainment	Catered lunch	(412)
11	Algonquin Water Resources	Licenses, Permits & Fees	FALSE ALARM FINE	(150)
12	Algonquin Water Resources	Licenses, Permits & Fees	FALSE ALARM FINE	(200)
13	Algonquin Water Resources	Licenses, Permits & Fees	Credit for Alarm Violation	250
14	Algonquin Water Resources	Dues & Memberships	HR Membership	(274)
15	Algonquin Water Resources	Dues & Memberships	TWC-FY08 DUES	(1,504)
16	Algonquin Water Resources	Dues & Memberships	TWC FY08 MBRSHIP DUES	(709)
17	Algonquin Water Resources	Dues & Memberships	r/c membership fee for 2008	1,378
18	Algonquin Water Resources	Dues & Memberships	r/c membership fee for 2008	650
19	Algonquin Water Resources	Dues & Memberships	MEMBERSHIP RENEWAL	(160)
20	Algonquin Water Resources	Dues & Memberships	MANAGEMENT PUBLICATIONS	(99)
21	Algonquin Water Resources	Dues & Memberships	Exp Tx Rual Water Assoc. Membe	(383)
22	Algonquin Water Resources	Dues & Memberships	Exp Tx Rual Wtr Assoc Membersh	(383)
23	Algonquin Water Resources	Dues & Memberships	exp Tx Rual Water Assoc Member	(383)
24				
25			Total Expenses	$ (35,008)
26				
27			Water Division Allocation Factor	24.14%
28				
29			**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**	**$ (8,451)**

Note: Account names and references above are per Algonquin journal entries in its general ledger.

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4d
TO OUTSIDE SERVICES - OTHER

LINE NO.	GENERAL LEDGER ACCOUNT	VENDOR	DESCRIPTION	AMOUNT
1	Admin Allocation - AWS	Algonquin Water Services	Recon fees to 4 factor	$ (728,574)
2	Contractual Services-AWS	Algonquin Water Services	Recon fees to 4 factor	265,541
3	Contractual Services-AWS	Algonquin Water Services	Recon fees to 4 factor	309,859
4				
5				
6	**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**			**$ (153,174)**

Note: Descriptions above are per company journal entries in the general ledger.

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 5
TO WATER TESTING

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	QUALITY CRANE SERVICES, INC	Invoice 30400	$ (590)
2			
3	**RUCO Adjustment to Remove Non-Recurring Expense**		**$ (590)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 6
TO TRANSPORTATION EXPENSES

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	Algonquin Water Services	Invoice SALES000000001019	$ (19,364)
2	Algonquin Water Services	Invoice SALES000000001036	(4,938)
3			
4	**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**		**$ (24,302)**
5			
6	B&A Auto Repair	Invoice 3266	$ (284)
7	DESERT GOLF CARS	Invoice 45331	(138)
8			
9	**RUCO Adjustment To Remove Expenses Outside of Test Year**		**$ (422)**
10			
11	Commonwealth Tow & Transport	Invoice 4389	(37)
12			
13	**RUCO Adjustment to Remove Non-Recurring Expense**		**$ (37)**
14			
15	**TOTAL RUCO ADJUSTMENT TO TRANSPORTATION EXPENSES**		**$ (24,761)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 8
TO MISCELLANEOUS EXPENSES

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	10/3 Merchant Fees	JE 46993	$ (2,195)
2	11/5 merchant fee	JE47338	(1,538)
3	1/3 Merchant Fees	JE48951	(862)
4	Merchant Fees	JE 49341	(14)
5	2/5 Merchant Fees	JE 49730	(982)
6	BANK & MERCHANT FEES	JE 50008	(1,109)
7	Merchant Fees	JE 50417	(1,072)
8	DISCOVER CARD FEES	JE 51126	(25)
9	MERCHANT FEES	JE 51127	(2,259)
10	Record Credit Card Fees	JE 51940	(2,201)
11	Record Monthly CC Fees	JE 53038	(2,501)
12	record monthly AMEX cr card fe	JE 54076	(6)
13	Record monthly credit card fee	JE 54077	(2,838)
14	record monthly credit card fee	JE 54663	(3,260)
15	Algonquin Power System	LABOR/TRAVEL/INSURANCE Invoice JC34077	(21)
16	Algonquin Water Services	PARTS/MEALS/GAS/MILGE/TELEPHON Invoice JC425E	(19)
17	Algonquin Water Services	MATERIAL/TRAVEL/TELEPHONE Invoice JC4457	(423)
18	Algonquin Water Services	MTRL/CONTRCTS/EQPMT/TRVL/TELE Invoice JC5243	(53)
19	Algonquin Water Services	PARTS/TRAVEL/TELEPHONE Invoice JC5435	(92)
20	Algonquin Water Services	PARTS/TRAVEL/CELLULAR Invoice JC6080	(15)
21	Algonquin Water Services	8600-0100-repairs Invoice JC6285	(204)
22			
23	**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**		**$ (21,689)**
24			
25			
26	Write off Unrec Variance		$ (338)
27			
28	**RUCO Adjustment to Remove Non-Recurring Expense**		**$ (338)**
29			
30	**TOTAL RUCO ADJUSTMENT TO MISCELLANEOUS EXPENSES**		**$ (22,027)**

Note: Descriptions and references above are per company journal entries in the general ledger.

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 9a
TO DEPRECIATION EXPENSE

LINE NO.	ACCT NO.	PLANT ACCOUNT	RUCO ORIGINAL COST	PROPOSED DEPR RATE	PROPOSED DEPR EXPENSE
1	301	Organization	$ 21,100	0.00%	$ -
2	302	Franchises	-	0.00%	-
4	303	Land and Land Rights	1,188,426	0.00%	-
5	304	Structures and Improvements	24,251,352	3.33%	807,570
6	307	Wells and Springs	2,350,398	3.33%	78,268
7	310	Power Generation Equipment	202,270	5.00%	10,114
8	311	Electric Pumping Equipment	790,650	12.50%	98,831
9	320	Water Treatment Equipment	1,317,573	3.33%	43,875
10	320.1	Water Treatment Plants	1,866,965	3.33%	62,170
11	320.2	Chemical Solution Feeders	-	2.22%	-
12	330	Distribution Reservoirs & Standpipes	426,805	2.20%	9,390
13	330.1	Storage Tanks	-	2.20%	-
14	330.2	Pressure Tanks	-	5.00%	-
15	331	Transmission and Distribution Mains	28,911,123	2.00%	578,222
16	333	Services	4,191,784	3.33%	139,586
17	334	Meters	4,137,013	8.33%	344,613
18	335	Hydrants	2,054,522	2.00%	41,090
19	336	Backflow Prevention Devices	38,387	6.67%	2,560
20	339	Other Plant and Miscellaneous Equipment	260,106	6.67%	17,349
21	340	Office Furniture and Equipment	551,757	6.67%	36,802
22	340.1	Computers and Software	-	20.00%	-
23	341	Transportation Equipment	159,496	20.00%	31,899
24	342	Stores Equipment	31,711	4.00%	1,268
25	343	Tools, Shop, and Garage Equipment	23,351	5.00%	1,168
26	344	Laboratory Equipment	-	10.00%	-
27	345	Power Operated Equipment	-	5.00%	-
28	346	Communications Equipment	115,801	10.00%	11,580
29	347	Miscellaneous Equipment	-	10.00%	-
30	348	Other Tangible Plant	-		-
31		**TOTALS**	**$ 72,890,590**		**$ 2,316,357**
32					
33					
34		Proposed Depreciation Expense Per RUCO			$ 2,316,357
35					
36		Less: Amortization of Contributions in Aid of Construction (per Company)			(67,586)
37					
38		Total Proposed Depreciation Expense Per RUCO			$ 2,248,771
39					
40		Total Proposed Depreciation Expense Per Company			$ 2,291,982
41					
42		Net Decrease to Depreciation Expense			$ (43,211)
43					
44		**RUCO Adjustment To Plant Depreciation Expense**			**$ (43,211)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 9b
TO DEPRECIATION EXPENSE

LINE NO.	DESCRIPTION	REFERENCE	1999 Series Bonds (A)	2001 Series Bonds (B)	Combined Total (A) + (B)
1	Aggregate Principal Balance of IDA Bonds		$5,335,000	$7,500,000	$12,835,000
2	Allowable Debt Issuance Cost	1999 & 2001 IDA Bond Contracts	2.00%	2.00%	
3					
4	Total Allowable Debt Issuance Cost	Line 1 X Line 2	$ 106,700	$ 150,000	$ 256,700
5	Term of Bond Issue, in Years	1999 & 2001 IDA Bond Contracts	24	30	
6					
7	Annual Debt Issuance Amortization Expense	Line 4 / Line 5	$ 4,446	$ 5,000	$ 9,446
8	Cost Allocation Percentage to Water Division				50.00%
9					
10				Total Amortization of Debt Discount Per RUCO	$ 4,723
11					
12				Test Year Adjusted Amortization of Debt Discount As Filed	$ 11,465
13					
14				**RUCO Adjustment To Amortization of Debt Discount**	$ (6,742)
15					
16				**TOTAL RUCO ADJUSTMENT TO DEPRECIATION EXPENSE**	**$ (6,742)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 10
TO PROPERTY TAX

LINE NO.	DESCRIPTION	REFERENCE	(A)	(B)
1	Calculation Of The Company's Full Cash Value:			
2				
3	Annual Operating Revenues:			
4	Year Ended 09/30/2008	Co. Sch E-2, Line 2	$ 6,851,029	
5	Year Ended 09/30/2007	Co. Sch E-2, Line 2	6,749,901	
6	Year Ended 09/30/2006	Co. Sch E-2, Line 2	6,389,605	
7	Total Three Year Operating Revenues	Sum of Lines 4, 5, & 6	$ 19,990,535	
8	Average Annual Operating Revenues	Line 7 / 3	$ 6,663,512	
9				
10	Two Times Three Year Average Operating Revenues	Line 8 X 2		$ 13,327,023
11				
12	ADD:			
13	10% of construction Work In Progress ("CWIP"):			
14	Test Year CWIP	Co. Sch E-1, Line 4	$ (222,258)	
15	10% of CWIP	Line 14 X 10%		$ (22,226)
16				
17	SUBTRACT:			
18	Transportation at Book Value:			
19	Original Cost of Transportation Equipment			
20	Accum. Depr. Of Transportation Equipment			
21	Book Value of Transportation Equipment	Line 19 + Line 20		$ -
22				
23	Company's Full Cash Value ("FCV")	Sum of Lines 10, 15, & 21		13,304,798
24				
25	Calculation Of The Company's Tax Liability:			
26				
27	MULTIPLY:			
28	FCV X Valuation Assessment Ratio X Property Tax Rates:			
29	Assessment Ratio (2010)	House Bill 2779	22.5000%	
30	Assessed Value	Line 23 X 29	$ 2,993,579	
31				
32	Property Tax Rates:			
33	Primary Tax Rate	JMM 1.50 - 2008 Budget	7.1250%	
34	Secondary Tax Rate	JMM 1.50 - 2008 Budget	4.0690%	
35	Estimated Tax Rate Liability	Line 33 + Line 34	11.1940%	
36				
37	Company's Total Tax Liability - Based on Full Cash V:	Line 30 X Line 35		$ 335,101
38				
39	Test Year Adjusted Property Tax Expense As Filed	Co. Sch. C-1, Line 28		373,354
40	Decrease in Property Tax Expense	Line 37 - Line 39		$ (38,253)
41				
42	**TOTAL RUCO ADJUSTMENT TO PROPERTY TAXES**			**$ (38,253)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 11 TO INCOME TAX EXPENSE

LINE NO.	DESCRIPTION	(A) REFERENCE	(B) AMOUNT
1	**FEDERAL INCOME TAXES:**		
2			
3	Operating Income Before Taxes	Sch 4, Page 1, Col C, Lines 31 + 34	$ 368,326
4	Less:		
5	Arizona State Tax	Line 21	$ 3,903
6	Interest Expense	Note (A), Line 35	(424,341)
7	Federal Taxable Income	Line 3 + Line 5 + Line 6	$ (52,112)
8			
9	Federal Tax Rate	Schedule 1, Page 2	34.0000%
10	Federal Income Tax Expense	Line 7 X Line 9	$ (17,718)
11			
12	**STATE INCOME TAXES:**		
13			
14	Operating Income Before Taxes	Sch 4, Page 1, Col C, Lines 32 + 37	$ 368,326
15	LESS:		
16	Interest Expense	Note (A), Line 35	(424,341)
17	State Taxable Income	Line 14 + Line 16	$ (56,015)
18			
19	State Tax Rate	Tax Rate	6.9680%
20			
21	State Income Expense	Line 17 X Line 19	$ (3,903)
22			
23	**TOTAL INCOME TAX EXPENSE:**		
24	Federal Income Tax Expense	Line 10	$ (17,718)
25	State Income Tax Expense	Line 21	(3,903)
26	Total Income Tax Expense Per RUCO	Line 24 + Line 25	$ (21,621)
27	Total Income Tax Expense Per Company	Company Sch C-1	(449,717)
28	**Total RUCO Income Tax Adjustment**	Line 26 - Line 27	**$ 428,096**
29			
30			
31	*NOTE (A)*		
32	Interest Synchronization:		
33	Adjusted Rate Base	$ 37,222,878	
34	Weighted Avg. Cost of Debt	1.14%	
35	Synchronized Interest Expense (L33 X L34)	$ 424,341	

Litchfield Park Service Company - Water Division
Docket No. SW-01428A09-0103
Test Year Ended September 30, 2008

Water Bill Count Summary

LINE NO.	Meter Size/Class	Company Present Rates	RUCO Proposed Rates	Increase/ (Decrease) Amount	Increase/ (Decrease) Percent
1	***Residential***				
2	5/8 inch meter	$ 7,865	$ 11,737	$ 3,872	49.23%
3	3/4 inch meter	2,015,346	2,955,672	940,326	46.66%
4	1 inch meter	1,980,115	3,393,468	1,413,353	71.38%
5	1.5 inch meter	53,017	99,093	46,076	86.91%
6	2 inch meter	173,915	305,411	131,496	75.61%
7	4 inch meter	19,356	30,621	11,265	58.20%
8	**Subtotal Residential**	**$ 4,249,614**	**$ 6,796,003**	**$ 2,546,389**	59.90%
9					
10	***Commercial***				
11	5/8 inch meter	$ 25,665	$ 52,136	$ 26,471	103.14%
12	3/4 inch meter	12,070	20,428	8,358	69.25%
13	1 inch meter	28,688	49,253	20,565	71.68%
14	1.5 inch meter	65,438	119,503	54,065	82.62%
15	2 inch meter	413,985	701,546	287,561	69.46%
16	4 inch meter	76,058	117,762	41,704	54.83%
17	8 inch meter	403,707	576,533	172,826	42.81%
18	10 inch meter	17,579	31,111	13,532	76.98%
19	**Subtotal Commercial**	**$ 1,043,190**	**$ 1,668,272**	**$ 625,082**	61.13%
20					
21	***Irrigation***				
22	5/8 inch meter	$ 1,076	$ 2,433	1,357	126.09%
23	3/4 inch meter	36,882	74,860	37,978	102.97%
24	1 inch meter	153,062	284,781	131,719	86.06%
25	1.5 inch meter	156,419	301,284	144,865	92.61%
26	2 inch meter	895,159	1,333,216	438,057	48.94%
27	4 inch meter	104,340	157,617	53,277	51.06%
28	**Subtotal Irrigation**	**$ 1,346,938**	**$ 2,154,191**	**$ 807,253**	59.08%
29					
30	**Hydrant**	**$ 110,558**	**$ 176,809**	**$ 66,251**	59.92%
31					
32	**Total Metered Revenue**	**$ 6,750,300**	**$ 10,795,274**	**$ 4,044,974**	59.92%

PROPOSED RATES AND CHARGES

LINE NO.	DESCRIPTION	MONTHLY MINIMUM	PROPOSED CHARGES AND USAGE FEES
1	**RESIDENTIAL CUSTOMERS**		
2	5/8-inch & 3/4-inch Meters	$ 10.00	
3	First Tier - Zero to 5,000 Gallons		$ 1.000
4	Second Tier - Next 7,000 Gallons		1.944
5	Third Tier - In Excess Of 12,000 Gallons		3.500
6			
7	1-inch Meters	$ 25.00	
8	First Tier - First 50,000 Gallons		$ 1.944
9	Second Tier - In Excess Of 50,000 Gallons		3.500
10			
11	1.5-inch Meters	$ 50.00	
12	First Tier - First 100,000 Gallons		$ 1.944
13	Second Tier - In Excess Of 100,000 Gallons		3.500
14			
15	2-inch Meters	$ 80.00	
16	First Tier - First 100,000 Gallons		$ 1.944
17	Second Tier - In Excess Of 100,000 Gallons		3.500
18			
19	4-inch Meters	$ 250.00	
20	First Tier - First 400,000 Gallons		$ 1.944
21	Second Tier - In Excess Of 400,000 Gallons		3.500
22			
23	**COMMERCIAL CUSTOMERS**		
24	5/8-inch & 3/4-inch Meters	$ 10.00	
25	First Tier - Zero to 5,000 Gallons		$ 1.000
26	Second Tier - Next 7,000 Gallons		1.944
27	Third Tier - In Excess Of 12,000 Gallons		3.500
28			
29	1-inch Meters	$ 25.00	
30	First Tier - First 50,000 Gallons		$ 1.944
31	Second Tier - In Excess Of 50,000 Gallons		3.500
32			
33	1.5-inch Meters	$ 50.00	
34	First Tier - First 100,000 Gallons		$ 1.944
35	Second Tier - In Excess Of 100,000 Gallons		3.500
36			
37	2-inch Meters	$ 80.00	
38	First Tier - First 100,000 Gallons		$ 1.944
39	Second Tier - In Excess Of 100,000 Gallons		3.500

PROPOSED RATES AND CHARGES

LINE NO.	DESCRIPTION	MONTHLY MINIMUM	PROPOSED CHARGES AND USAGE FEES
40			
41	4-inch Meters	$ 250.00	
42	First Tier - First 400,000 Gallons		$ 1.944
43	Second Tier - In Excess Of 400,000 Gallons		3.500
44			
45	8-inch Meters	$ 760.00	
46	First Tier - First 500,000 Gallons		$ 1.850
47	Second Tier - In Excess Of 500,000 Gallons		3.500
48			
49	10-inch Meters	$ 1,000.00	
50	First Tier - First 600,000 Gallons		$ 1.850
51	Second Tier - In Excess Of 600,000 Gallons		3.500
52			
53	**IRRIGATION CUSTOMERS**		
54	5/8-inch & 3/4-inch Meters	$ 10.00	
55	First Tier - First 12,000 Gallons		$ 1.920
56	Second Tier - In Excess Of 12,000 Gallons		3.679
57			
58	1-inch Meters	$ 25.00	
59	First Tier - First 60,000 Gallons		$ 1.920
60	Second Tier - In Excess Of 60,000 Gallons		3.679
61			
62	1.5-inch Meters	$ 50.00	
63	First Tier - First 100,000 Gallons		$ 1.920
64	Second Tier - In Excess Of 100,000 Gallons		3.679
65			
66	2-inch Meters	$ 80.00	
67	First Tier - First 150,000 Gallons		$ 1.920
68	Second Tier - In Excess Of 150,000 Gallons		3.679
69			
70	4-inch Meters	$ 250.00	
71	First Tier - First 200,000 gallons		$ 1.920
72	Second Tier - In Excess Of 200,000 Gallons		3.679
73			
74	**Hydrant Rate**	$ 160.20	$ 4.00

Exhibit 2

DIRECT TESTIMONY

OF

SONN S. ROWELL, CPA

Wastewater Division Schedules

Litchfield Park Service Company - Wastewater Division
Docket No. SW-01428-09-0103 and W-01427A-09-0104
Test Year Ended September 30, 2008

Revenue Requirement

LINE NO.	DESCRIPTION	(A) COMPANY OCRB/FVRB COST	(B) RUCO OCRB/FVRB COST
1	Adjusted Original Cost/Fair Value Rate Base	$ 28,296,903	$ 21,248,950
2			
3	Adjusted Operating Income/(Loss)	163,778	528,810
4			
5	Current Rate of Return (L3 / L1)	0.58%	2.49%
6			
7	Required Operating Income (L9 X L1)	$ 3,228,677	$ 1,640,419
8			
9	Required Rate of Return on Fair Value Rate Base	11.410%	7.720%
10			
11	Operating Income Deficiency (L7 - L3)	$ 3,064,899	$ 1,111,609
12			
13	Gross Revenue Conversion Factor (Schedule 1, Page 2)	1.6286	1.6286
14			
15	Required Increase in Gross Revenue Requirement (L11 X L13	$ 4,991,601	$ 1,810,405
16			
17	Adjusted Test Year Revenue	$ 6,356,374	$ 6,359,187
18			
19	Proposed Annual Revenue (L15 + L17)	$ 11,347,975	$ 8,169,592
20			
21	Required Percentage Increase in Revenue (L15 / L17)	78.53%	28.47%
22			
23	Rate of Return on Common Equity	12.500%	8.010%

GROSS REVENUE CONVERSION FACTOR

LINE NO.	DESCRIPTION	(A)	(B)	(C)	(D)
	CALCULATION OF GROSS REVENUE CONVERSION FACTOR:				
1	Revenue	1.0000			
2	Combined Federal And State Tax Rate (Line 12)	(0.3860)			
3	Subtotal (Line 1 + Line 2)	0.6140			
4	**Revenue Conversion Factor** (L1 / L3)	**1.6286**			
5					
6	CALCULATION OF EFFECTIVE TAX RATE:				
7	Operating Income Before Taxes (Arizona Taxable Income)	100.0000%			
8	Arizona State Income Tax Rate	6.9680%			
9	Federal Taxable Income (L7 - L8)	93.0320%			
10	Applicable Federal Income Tax Rate (Col. (D), L43)	34.0000%			
11	Effective Federal Income Tax Rate (L9 X L10)	31.6309%			
12	Combined Federal And State Income Tax Rate (L8 + L11)	38.5989%			
13					
14	Required Operating Income (Sch.-1, Pg 1, Col. (B), L7)	$ 1,640,419			
15	Adjusted T.Y. Oper'g Inc. (Loss) (Sch.-1, Pg 1, C (B), L3)	528,810			
16	Required Increase In Operating Income (L14 - L15)		$1,111,609		
17					
18	Income Taxes On Recommended Revenue (Col. (D), L31)	$ 878,945			
19	Income Taxes On Test Year Revenue (Col. (D), L40)	180,149			
20	Required Increase In Revenue To Provide For Income Taxes (L18 - L19)		$ 698,796		
21					
22	Total Required Increase In Revenue (L16 + L20)		$1,810,405		
23					
24	CALCULATION OF INCOME TAX:			RUCO RECOMMENDED	
25	Revenue (Sch -1, Pg 1, Col. (B), L19)			$ 8,169,592	
26	Operating Expense Excluding Income Tax (Sch4, Col. (E), L37 - L32)			5,650,228	
27	Synchronized Interest (Col. (C), L48)			242,238	
28	Arizona Taxable Income (L25 - L26 - L27)			$ 2,277,126	
29	Arizona State Income Tax Rate			6.9680%	
30	Arizona Income Tax (L28 X L29)				$ 158,670
31	Fed. Taxable Income (L28 - L30)			$ 2,118,456	
32	Fed. Tax on 1st Inc. Bracket ($1 - $50,000) @ 15%			$ 7,500	
33	Fed. Tax on 2nd Inc. Bracket ($50,001 - $75,000) @ 25%			6,250	
34	Fed. Tax on 3rd Inc. Bracket ($75,001 - $100,000) @ 34%			8,500	
35	Fed. Tax on 4th Inc. Bracket ($100,001 - $335,000) @ 39%			91,650	
36	Fed. Tax on 5th Inc. Bracket ($335,001 - $10M) @ 34%			606,375	
37	Total Federal Income Tax (L32 + L33 + L34 + L35 + L36)				720,275
38	Combined Federal and State Income Tax (L30 + L37)				$ 878,945
39					
40	Test Year Combined Income Tax, RUCO as Adjusted (Sch 4, Col. (C), L32)				$ 180,149
41	**RUCO Adjustment To Proposed Income Tax (L38 - L40) (See Sch 1, Col. (D), L32)**				**$ 698,796**
42					
43	Applicable Federal Income Tax Rate (Col. (D), L30 / Col. (C), L24)				34.00%
44					
45	CALCULATION OF INTEREST SYNCHRONIZATION:				
46	Rate Base			$ 21,248,950	
47	Weighted Avg. Cost of Debt			1.14%	
48	Synchronized Interest (L35 X L36)			$ 242,238	

RATE BASE - ORIGINAL COST

LINE NO.		(A) COMPANY AS FILED OCRB/FVRB	(B) RUCO ADJM'T No. 1	(C) RUCO ADJM'T No. 2	(D) RUCO ADJM'T No. 3	(E) RUCO ADJ'TED OCRB/FVRB
1	Gross Utility Plant in Service	$ 60,394,260	$(6,693,440)			$ 53,700,820
2						-
3	Accumulated Depreciation	(8,475,991)	291,308			(8,184,683)
4						-
5	Net Utility Plant in Service (Sum L1 & L3)	$ 51,918,269	$(6,402,132)	$ -	$ -	$ 45,516,137
6						-
7	**Less:**					-
8	Advances in Aid Of Construction	$ (7,006,208)				$ (7,006,208)
9						-
10	Contribution in Aid of Const.	$ (18,737,132)			$ (597,670)	(19,334,802)
11	Accumulated Amortization of CIAC	2,072,117				2,072,117
12	NET CIAC (L10 + L11)	$ (16,665,015)	$ -	$ -	$ (597,670)	$ (17,262,685)
13						-
14	Customer Meter Deposits	$ (68,685)				$ (68,685)
15	Deferred Income Tax	(15,987)				(15,987)
16						-
17	**Plus:**					-
18	Unamortized Debt Issuance Costs	$ 134,528		$ (48,150)		86,378
19						-
20						-
21						-
22	TOTAL RATE BASE (Sum Lines's 5,8,12-19)	$ 28,296,902	$(6,402,132)	$ (48,150)	$ (597,670)	$ 21,248,950

References:
Column (A): Company Schedule B-1
Column (B): RUCO Schedule 2, Page 2
Column (C): RUCO Schedule 2, Page 3
Column (D): RUCO Schedule 2, Page 4
Column (E): Sums of Column (A) through Column (D)

EXPLANATION OF RATE BASE ADJUSTMENT NO. 1
TO UTILITY PLANT IN SERVICE

LINE NO.	DESCRIPTION	AMOUNT	REFERENCE
1	RUCO Proposed Utility Plant In Service At End of Test Year	$ 53,700,820	RUCO Schedule 3, Page 1
2			
3	Company Proposed Utility Plant In Service At End of Test Year	60,394,260	Company Schedule B-1
4			
5	**RUCO Proposed Adjustment To Utility Plant in Service**	**$ (6,693,440)**	
6			
7			
8	Accumulated Depreciation At End of Prior Test Year	$ 1,261,559	Amount Per RUCO TJC-2
9	2001 Depreciation Expense	263,975	
10	2002 Depreciation Expense	450,920	
11	2003 Depreciation Expense	951,378	
12	2004 Depreciation Expense	1,029,280	
13	2005 Depreciation Expense	1,176,009	
14	2006 Depreciation Expense	1,292,454	
15	2007 Depreciation Expense	1,373,687	
16	2008 Depreciation Expense (9 months)	1,166,295	
17	Subtotal	$ 8,965,557	Sum of Lines 16 through 19
18			
19	Less 2002 Retirements	$ (780,874)	
20			
21	RUCO Proposed Accumulated Depreciation At End of Test Year	$ 8,184,683	Sum of Lines 17, 19, and 20
22			
23	Company Proposed Accumulated Depreciation At End of Test Year	$ 8,475,991	Company Schedule B-1
24			
25	**RUCO Proposed Adjustment To Accumulated Depreciation**	**$ (291,308)**	Line 22 - Line 24

EXPLANATION OF RATE BASE ADJUSTMENT NO. 2
TO UNAMORTIZED DEBT ISSUANCE COSTS

Line No.	Description	(A) 1999 Series Bonds	(B) 2001 Series Bonds	(C) Combined Total (A) + (B)
1	Aggregate Principal Balance of IDA Bonds	$ 5,335,000	$ 7,500,000	$ 12,835,000
2	Allowable Debt Issuance Cost as per 1999 & 2001 IDA Bond Contracts	2.00%	2.00%	
3				
4	Total Allowable Debt Issuance Cost (L1 X L2)	$ 106,700	$ 150,000	$ 256,700
5	Term of Bond Issue, in Years	24	30	
6				
7	Annual Debt Issuance Amortization Expense - Straight Line (L4 / L5)	$ 4,446	$ 5,000	$ 9,446
8	Number of Months in Year	12	12	
9				
10	Allowable Monthly Amortization Expense (L7 / L8)	$ 370	$ 417	$ 787
11	Months Remaining before the Bonds Reach Maturity*	168	264	
12				
13	Unamortized Debt Issuance Costs -- RUCO as Adjusted (L10 X L11)	$ 62,242	$ 110,000	$ 172,242
14				
15				
16	Unamortized Debt Issuance Costs -- Company as Filed	$ 141,268	$ 127,274	$ 268,542
17				
18	Unamortized Debt Issuance costs -- RUCO as Adjusted	62,242	110,000	172,242
19				
20	**Decrease to Unamortized Debt Issuance Costs**	**$ (79,027)**	**$ (17,274)**	**$ (96,301)**
21				
22	Wastewater Division Cost Allocation Percent			50.00%
23				
24	**RUCO Unamortized Debt Issuance costs - Wastewater Division**			**$ (48,150)**

* Information on the months remaining before the bonds reach maturity was provided in the Company's response to Staff Data Request JMM 1.32, with the 1999 Series IDA Bonds maturing October 1, 2023, and the 2001 Series IDA Bonds Maturing October 1, 2031.

EXPLANATION OF RATE BASE ADJUSTMENT NO. 3
TO CONTRIBUTIONS IN AID OF CONSTRUCTION

LINE NO.	DESCRIPTION	AMOUNT	REFERENCE
1	CIAC Balance Per Application	18,737,132	Company Schedule B-2 Page 2
2			
3	CIAC Balance Per Response to Staff Data Request	19,334,802	Company Response to JMM 1.27
4			
5	Increase to CIAC	$ 597,670	Line 3 - Line 1
6			
7	**RUCO Proposed Adjustment To CIAC Balance**	**$ 597,670**	Line 5

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TEST YEAR PLANT SCHEDULE
YEAR ENDED SEPTEMBER 30, 2008

LINE NO.	ACCT. NO.	ACCOUNT NAME	(A) COMPANY ADJ TEST YR	(B) RUCO ADJUSTMENTS	(C) RUCO PLANT VALUE
1	351	Organization	$ -	$ -	$ -
2	353	Land and Land Rights	1,783,426	-	1,783,426
3	354	Structures and Improvements	19,319,421	(4,267,451)	15,051,970
4	355	Power Generation Equipment	543,670	5,004	548,674
5	360	Collection Sewers - Force	1,161,105	(164,647)	996,458
6	361	Collection Sewers - Gravity	23,113,391	(1,795,760)	21,317,631
7	362	Special Collecting Structures		-	-
8	363	Customer Services		-	-
9	364	Flow Measuring Devices	47,019	(412)	46,607
10	366	Reuse Services	3,789,468	(1,249)	3,788,219
11	367	Reuse Meters and Installation	52,331	-	52,331
12	370	Receiving Wells	860,393	-	860,393
13	371	Pumping Equipment	1,858,411	(284,996)	1,573,415
14	374	Reuse Distribution Reservoirs	62,825	-	62,825
15	375	Reuse Trans. And Distrib. System	414,315	(73,638)	340,677
16	380	Treatment and Disposal Equipment	5,469,478	(63,807)	5,405,671
17	381	Plant Sewers	47,786	(178)	47,608
18	382	Outfall Sewer Lines	343,681	-	343,681
19	389	Other Plant and Miscellaneous Equipment	644,609	(41,454)	603,155
20	390	Office Furniture and Equipment	198,772	-	198,772
21	391	Transportation Equipment	26,078	-	26,078
22	392	Stores Equipment	8,968	-	8,968
23	393	Tools, Shop, and Garage Equipment	56,167	-	56,167
24	394	Laboratory Equipment	173,948	-	173,948
25	396	Communications Equipment	418,996	(4,850)	414,146
26	398	Other Tangible Plant	-	-	-
27					
28		**TOTAL WASTEWATER PLANT**	**$ 60,394,258**	**$ (6,693,438)**	**$ 53,700,820**

LINE NO.	ACCT. NO.	ACCOUNT NAME	COMPANY AS FILED	RUCO ADJ 1	RUCO ADJ 2	RUCO ADJ 3	RUCO ADJ 4	RUCO ADJ 5	RUCO ADJ 6	RUCO ADJ 7	RUCO ADJ 8	TOTAL PG 1 ADJ
1	351	Organization	$ -									$ -
2	353	Land	1,783,426									-
3	354	Structures & Improvements	19,482,740		$ (36,500)	$ (348,603)	$ (83,652)			$ 3,725		(465,030)
4	355	Power Generation	543,670						$ 5,004			5,004
5	360	Collection Sewer Forced	1,180,730									-
6	361	Collection Sewers Gravity	23,517,829	$ (1,230,049)		(7,527)	$ (1,203)					(1,238,779)
7	362	Special Collecting Structures	-									-
8	363	Customer Services	-									-
9	364	Flow Measuring Devices	47,360									-
10	366	Reuse Services	3,791,018									-
11	367	Reuse Meters and Installation	52,331									-
12	370	Receiving Wells	860,393									-
13	371	Pumping Equipment	1,872,539			(91,921)	(12,071)		$ 1,530	$ 4,864	$ (136,488)	(234,086)
14	374	Reuse Distribution Reservoirs	62,625									-
15	375	Reuse Trans. and Dist. System	414,315									-
16	380	Treatment & Disposal Equip.	5,487,661					$ (38,625)				(38,625)
17	381	Plant Sewers	48,010									-
18	382	Outfall Sewer Lines	343,681									-
19	389	Other Sewer Plant & Equip.	673,896						$ 2,000			2,000
20	390	Office Furniture & Equipment	198,772									-
21	391	Transportation Equipment	26,078									-
22	392	Stores Equipment	8,967									-
23	393	Tools, Shop And Garage Equip	56,167									-
24	394	Laboratory Equip	173,948									-
25	396	Communication Equip	418,996									-
26	398	Other Tangible Plant	-									-
27												
28		**TOTALS**	$ 61,045,153	$ (1,230,049)	$ (36,500)	$ (448,051)	$ (96,926)	$ (38,625)	$ 8,534	$ 8,589	$ (136,488)	$ (1,969,516)
29												
30												

31 ADJ 1 Adjust for differences in beginning plant balances.
32 ADJ 2 Disallow costs of 2004 PACE Report.
33 ADJ 3 Record abandonment of Wigwam and Bullard lift stations in July of 2002.
34 ADJ 4 Record abandonment of Litchfield Greens lift stations in September of 2007.
35 ADJ 5 Remove water treatment plant transferred to Black Mountain Sewer Company in 2008.
36 ADJ 6 Capitalize test year expenses in 2007 from Loftin Equipment, Precision Electric, and KEOGH Engineering.
37 ADJ 7 Capitalize test year expenses in 2008 from Precision Electric and Dean Fence & Gate.
38 ADJ 8 Reclassify Repair invoices from Precision Electric during 2008 to Contractual Services - Other.

LINE NO.	ACCT. NO.	ACCOUNT NAME	RUCO ADJ 9	RUCO ADJ 10	RUCO ADJ 11	RUCO ADJ 12	RUCO ADJ 13	RUCO ADJ 14	RUCO ADJ 15	RUCO ADJ 16	TOTAL PG 2 ADJ
1	351	Organization									$ -
2	353	Land									-
3	354	Structures & Improvements		$ 31,804	$ 14,187	$ 1,378	$ 57,739	$ 58,210	$ (55,508)	$ (40,684)	67,126
4	355	Power Generation									-
5	360	Collection Sewer Forced		11,360	7,843	268		154	(30,284)	(21,550)	(32,209)
6	361	Collection Sewers Gravity		51,113	135,919	78,415	102,212	36,779	(125,280)	(327,018)	(47,860)
7	362	Special Collecting Structures									-
8	363	Customer Services									-
9	364	Flow Measuring Devices			341					(753)	(412)
10	366	Reuse Services					665	886			1,551
11	367	Reuse Meters and Installation									-
12	370	Receiving Wells									-
13	371	Pumping Equipment	$ (33,887)	604	11,712	568	70	1,174	(1,300)	(25,638)	(46,697)
14	374	Reuse Distribution Reservoirs									-
15	375	Reuse Trans. and Dist. System									-
16	380	Treatment & Disposal Equip.		1,063	872	4,522	11,615	111	(2,000)	(1,860)	14,323
17	381	Plant Sewers						222			222
18	382	Outfall Sewer Lines									-
19	389	Other Sewer Plant & Equip.		11,334	1,715	443	1,357	14,506	(23,209)	(3,750)	2,396
20	390	Office Furniture & Equipment									-
21	391	Transportation Equipment									-
22	392	Stores Equipment									-
23	393	Tools, Shop And Garage Equip									-
24	394	Laboratory Equip									-
25	396	Communication Equip									-
26	398	Other Tangible Plant									-
27											
28		**TOTALS**	$ (33,887)	$ 107,278	$ 172,589	$ 85,594	$ 173,658	$ 112,042	$ (237,581)	$ (421,253)	$ (41,560)
29											
30											

31 ADJ 9 Reclassify Repair invoice from Precision Electric during 2007 to Contractual Services - Other, and remove Precision repair invoice from 2007. The
32 first invoice ($14,691) is within the test year and includable in expense, while the second ($19,196) is outside the test year, and not included in expense.
33 ADJ 10 Reverse Company Adjustment for 2004 Affiliate Profit
34 ADJ 11 Reverse Company Adjustment for 2005 Affiliate Profit
35 ADJ 12 Reverse Company Adjustment for 2006 Affiliate Profit
36 ADJ 13 Reverse Company Adjustment for 2007 Affiliate Profit
37 ADJ 14 Reverse Company Adjustment for 2008 Affiliate Profit
38 ADJ 15 Remove 2004 unsupported affiliate labor costs by estimated year related asset placed in service.
39 ADJ 16 Remove 2005 unsupported affiliate labor costs by estimated year related asset placed in service.

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LINE NO.	ACCT. NO.	ACCOUNT NAME	RUCO ADJ 17	RUCO ADJ 18	RUCO ADJ 19	RUCO ADJ 20	TOTAL PG 3 ADJ	TOTAL ALL ADJS
1	351	Organization					$ -	$ -
2	353	Land					-	-
3	354	Structures & Improvements	$ (7,035)		$ (362,512)	$ (3,500,000)	(3,869,547)	(4,267,451)
4	355	Power Generation					-	5,004
5	360	Collection Sewer Forced	(131,238)		(1,200)		(132,438)	(164,647)
6	361	Collection Sewers Gravity	(162,996)	$ (288,769)	(57,356)		(509,121)	(1,795,760)
7	362	Special Collecting Structures					-	-
8	363	Customer Services					-	-
9	364	Flow Measuring Devices					-	(412)
10	366	Reuse Services		(1,200)	(1,600)		(2,800)	(1,249)
11	367	Reuse Meters and Installation					-	-
12	370	Receiving Wells					-	-
13	371	Pumping Equipment	(1,200)	(200)	(2,813)		(4,213)	(284,996)
14	374	Reuse Distribution Reservoirs					-	-
15	375	Reuse Trans. and Dist. System			(73,638)		(73,638)	(73,638)
16	380	Treatment & Disposal Equip.	(8,756)	(30,549)	(200)		(39,505)	(63,807)
17	381	Plant Sewers			(400)		(400)	(178)
18	382	Outfall Sewer Lines					-	-
19	389	Other Sewer Plant & Equip.	(800)	(2,450)	(42,600)		(45,850)	(41,454)
20	390	Office Furniture & Equipment					-	-
21	391	Transportation Equipment					-	-
22	392	Stores Equipment					-	-
23	393	Tools, Shop And Garage Equip					-	-
24	394	Laboratory Equip					-	-
25	396	Communication Equip			(4,850)		(4,850)	(4,850)
26	398	Other Tangible Plant					-	-
27								
28		**TOTALS**	$ (312,025)	$ (323,168)	$ (547,169)	$ (3,500,000)	$ (4,682,362)	$ (6,693,438)
29								
30								
31	ADJ 17	Remove 2006 unsupported affiliate labor costs by estimated year related asset placed in service.						
32	ADJ 18	Remove 2007 unsupported affiliate labor costs by estimated year related asset placed in service.						
33	ADJ 19	Remove 2008 unsupported affiliate labor costs by estimated year related asset placed in service.						
34	ADJ 20	Remove costs associated with correcting design deficiencies at the PVWRF at 50% of amount incurred and placed in						
35		service during the Test Year per direct testimony of Greg Sorensen at page 7.						

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OPERATING INCOME

LINE NO.	DESCRIPTION	(A) COMPANY AS FILED	(B) RUCO TEST YEAR ADJUSTMENTS	REF	(C) RUCO TEST YEAR AS ADJUSTED	(D) RUCO PROPOSED CHANGES	(E) RUCO AS RECOMM'D
1	Revenues						
2	Flat Rate Revenues	$ 6,164,589			$ 6,164,589	$ 1,471,507	$ 7,636,096
3	Measured Revenues	92,030	2,813	1	94,843	338,898	433,741
4	Other Wastewater Revenues	99,755			99,755		99,755
5					-		-
6	TOTAL OPERATING REVENUE	$ 6,356,374	$ 2,813		$ 6,359,187	$ 1,810,405	$ 8,169,592
7							
8	Operating Expenses						
9	Salaries & Wages	$ -			$ -		$ -
10	Purchased Wastewater Treatment	1,205			1,205		1,205
11	Sludge Removal Expense	267,554			267,554		267,554
12	Purchased Power	632,064	(406)	2/3	631,658		631,658
13	Fuel for Power Production	2,076	(425)	2	1,651		1,651
14	Chemicals	279,749	(12,089)	3	267,660		267,660
15	Materials and Supplies	75,579	(13,520)	8	62,059		62,059
16	Contractual Services	3,117			3,117		3,117
17	Contractual Services - Testing	33,348	(6,398)	5	26,951		26,951
18	Contractual Services - Other	2,716,000	(222,124)	4a-e	2,493,876		2,493,876
19	Contractual Services - Legal	24,084			24,084		24,084
20	Equipment Rental	78,309	(4,387)	7	73,922		73,922
21	Rents - Building	18,976			18,976		18,976
22	Transportation Expenses	69,551	(17,726)	6	51,825		51,825
23	Insurance - General Liability	32,133			32,133		32,133
24	Insurance - Vehicle	2,213			2,213		2,213
25	Regulatory Comm, Expense	19,133			19,133		19,133
26	Regulatory Comm, Exp. - Rate Case	70,000	(20,000)	14	50,000		50,000
27	Miscellaneous Expense	36,656	(6,409)	9	30,247		30,247
28	Bad Debt Expense	43,889	(40,848)	10	3,041		3,041
29	Depreciation & Amortization	1,550,237	(234,980)	11a-b	1,315,257		1,315,257
30	Taxes Other Than Income	-			-		-
31	Property Taxes	336,629	(62,962)	12	273,667		273,667
32	Income Tax	(99,906)	280,055	13	180,149	698,796	878,945
33					-		-
34							
35	TOTAL OPERATING EXPENSES	$ 6,192,596	$ (362,219)		$ 5,830,377	$ 698,796	$ 6,529,173
36							
37	**OPERATING INCOME (LOSS)**	**$ 163,778**	**$ 365,032**		**$ 528,810**	**$ 1,111,608**	**$ 1,640,419**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 1
TO MEASURED REVENUES

LINE NO.	DESCRIPTION	AMOUNT	REFERENCE
1	Company Test Year Effluent Revenue per data Response	$ 94,843	RUCO MJR 2.19 and 2.20
2			
3	Company Test Year Effluent Revenue per Application	92,030	Schedule C-1
4			
5	**RUCO Adjustment to Increase Test Year Effluent Revenue**	**$ 2,813**	

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 2
TO FUEL FOR POWER PRODUCTION

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	APS	MAY08-342122282	$ (425)
2			
3	**RUCO Adjustment to Move Expense to Purchased Power**		**$ (425)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 3 TO CHEMICALS

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	HILL BROTHERS CHEMICAL CO.	Invoice No. 04293182	$ (891)
2	HILL BROTHERS CHEMICAL CO.	Invoice No. 04293614	(267)
3	HILL BROTHERS CHEMICAL CO.	Invoice No. 04293602	(2,226)
4	Ashland Specialty	Invoice No. 2500042992	(9,618)
5			
6	**RUCO Adjustment To Remove Expenses Outside of Test Year**		**$ (13,002)**
7			
8			
9	HILL BROTHERS CHEMICAL CO.	Invoice No. 04305583	$ 831
10			
11	**RUCO Adjustment To Move Expense from Purchased Power**		**$ 831**
12			
13	RUCO Adjustment to Company Annualized Chemicals		$ 82
14			
15	**TOTAL RUCO ADJUSTMENT TO CHEMICALS**		**$ (12,089)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4a
TO CONTRACTUAL SERVICES - OTHER

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	Loftin Equipment Co. (Generator duct fabricated & installed)	Invoice No. 0752086 (Dec. 32, 2007)	$ (5,004)
2	Precision Electric Co. (Install rebuilt pump)	Invoice No. 1-047294 (Oct. 5, 2007)	(1,530)
3	Precision Electric Co. (New reinforced strainer baskets installed	Invoice No. 1-049159 (Mar. 20, 2008)	(4,864)
4	Dean Fence & Gate (Fence fabricated and installed)	Invoice No. 109347 (Jan. 11, 2008)	(3,725)
5	KEOGH Engineering (Odor monitor - site plan and pole mount)	Invoice No. 22477 (Oct. 9, 2007)	(1,450)
6	KEOGH Engineering (Odor monitor - legal description and map)	Invoice No. 22637 (Dec. 6, 2007)	(550)
7			
8	**RUCO Adjustment To Remove Expenses To Be Capitalized**		**$ (17,124)**
9			
10			
11	Keller Equipment Co. (Filter System Repair)	Invoice No. 0167123-IN (Sept. 14, 2007)	$ (8,054)
12	Keller Equipment Co. (Work on UV System)	Invoice No. 0167341-IN (Sept. 19, 2007)	(525)
13	Yahweh Contracting, LLC (Remove Sewer Lift Station)	Invoice No. 1 (September 21, 2007)	(8,003)
14			
15	**RUCO Adjustment To Remove Expenses Outside of Test Year**		**$ (16,582)**
16			
17			
18	SunCor Farms (Effluent Clean Up and Oat Crop Planting)	Invoice No. 093007LPSCO (Oct. 3, 2007)	$ (19,784)
19			
20	**RUCO Adjustment to Remove Non-Recurring Expenses**		**$ (19,784)**
21			
22			
23	GreensKeeper, LLC (Remove weeds at LPSCO Farm)	Invoice No. 4340 (Oct. 18, 2007)	$ (11,500)
24	Pro-Tech Environmental (Clean Sewer Lines in Gilbert, AZ)	Invoice No. 08012201 (Jan. 25, 2008)	(4,928)
25			
26	**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**		**$ (16,428)**
27			
28			
29	Thomas J. Bourassa, CPA (Professional Service)	Invoice No. 1000002402 (Dec 10, 2007)	$ (155)
30	Thomas J. Bourassa, CPA (Rate Review - Water and Sewer)	Invoice No. 1000002413 (Feb 5, 2008)	(981)
31			
32	**RUCO Adjustment to Remove Expenses Included in Estimated Rate Case Expense**		**$ (1,136)**
33			
34			
35	**TOTAL RUCO ADJUSTMENT TO OUTSIDE SERVICES - OTHER**		**$ (71,054)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4b
TO CONTRACTUAL SERVICES - OTHER AND ADMINISTRATIVE ALLOCATION - AWS

LINE NO.	GENERAL LEDGER ACCOUNT	VENDOR	DESCRIPTION	AMOUNT
1	Contractual Services-AWS	Algonquin Water Services	Recon fees to 4 factor	$ 177,028
2	Contractual Services-AWS	Algonquin Water Services	Recon fees to 4 factor	206,573
3	Admin Allocation-AWS	Algonquin Water Services	Recon fees to 4 factor	(485,716)
4				
5				
6			**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**	**$ (102,116)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4c
TO CONTRACTUAL SERVICES - OTHER

LINE NO.	GENERAL LEDGER ACCOUNT	VENDOR	DESCRIPTION	AMOUNT
1	Central Office - Accounting/Administration	Algonquin Power Trust	GENERAL ACCTIN FEE - LPSCO	$ (1,793)
2	Central Office - Human Resources	Algonquin Power Trust	GEN HR FEE- LPSCO	(6,138)
3	Central Office - Information Technology	Algonquin Power Trust	GEN IT FEE- LPSCO	(518)
4	Central Office - Operations	Algonquin Power Trust	GENERAL OPS	(764)
5	Central Office Fixed Overhead Costs	Algonquin Power Trust	MGMT FEE- LPSCO	(182,637)
6				
7			**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**	**$ (191,850)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4d
TO CONTRACTUAL SERVICES - OTHER

LINE NO.	DESCRIPTION	ACCOUNT	REFERENCE	AMOUNT
1	Algonquin Water Resources	Meals and Entertainment	MISC. SUPPLIES	$ (488)
2	Algonquin Water Resources	Meals and Entertainment	Expense Reports/Travel	(19,123)
5	Algonquin Water Resources	Meals and Entertainment	DJ SERVICE - XMAS PARTY	(495)
6	Algonquin Water Resources	Meals and Entertainment	For Holiday Party Dec. 2008	(4,959)
7	Algonquin Water Resources	Meals and Entertainment	BALANCE DUE FOR 2008 XMAS PART	(953)
8	Algonquin Water Resources	Meals and Entertainment	2007 CAPITAL PRJECTS PLANNING	(211)
9	Algonquin Water Resources	Meals and Entertainment	Exp cost for the DBack game	(6,400)
10	Algonquin Water Resources	Meals and Entertainment	Catered lunch	(412)
11	Algonquin Water Resources	Licenses, Permits & Fees	FALSE ALARM FINE	(150)
12	Algonquin Water Resources	Licenses, Permits & Fees	FALSE ALARM FINE	(200)
13	Algonquin Water Resources	Licenses, Permits & Fees	Credit for Alarm Violation	250
14	Algonquin Water Resources	Dues & Memberships	HR Membership	(274)
15	Algonquin Water Resources	Dues & Memberships	TWC-FY08 DUES	(1,504)
16	Algonquin Water Resources	Dues & Memberships	TWC FY08 MBRSHIP DUES	(709)
17	Algonquin Water Resources	Dues & Memberships	r/c membership fee for 2008	1,378
18	Algonquin Water Resources	Dues & Memberships	r/c membership fee for 2008	650
19	Algonquin Water Resources	Dues & Memberships	MEMBERSHIP RENEWAL	(160)
20	Algonquin Water Resources	Dues & Memberships	MANAGEMENT PUBLICATIONS	(99)
21	Algonquin Water Resources	Dues & Memberships	Exp Tx Rual Water Assoc. Membe	(383)
22	Algonquin Water Resources	Dues & Memberships	Exp Tx Rual Wtr Assoc Membersh	(383)
23	Algonquin Water Resources	Dues & Memberships	exp Tx Rual Water Assoc Member	(383)
24				
25			Total Expenses	$ (35,008)
26				
27			Wastewater Division Allocation Factor	23.66%
28				
29			**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**	**$ (8,283)**

Note: Account names and references above are per Algonquin journal entries in its general ledger.

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4e
TO CONTRACTUAL SERVICES - OTHER

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	Precision Electric Co., Inc.	Invoice 1-048214	$ 14,691
2	Precision Electric Co., Inc.	Invoice 1-048528	23,931
5	Precision Electric Co., Inc.	Invoice 1-049514A	25,391
6	Precision Electric Co., Inc.	Invoice 1 -050074	14,862
7	Precision Electric Co., Inc.	Invoice 1-050769	1,239
8	Precision Electric Co., Inc.	Invoice 1 -050812	19,924
9	Precision Electric Co., Inc.	Invoice 1 -050929	28,289
10	Precision Electric Co., Inc.	Invoice 1-051517	7,826
11	Precision Electric Co., Inc.	Invoice 1-050563	15,026
12			
13	**Reclassified from Account 371 for Repairs During the Test Year**		**$ 151,179**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 5
TO CONTRACTUAL SERVICES - TESTING

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	LEGEND TECHNICAL SERVICES	Invoice No. 0714659	$ (28.00)
2	LEGEND TECHNICAL SERVICES	Invoice No. 0714650	(28.00)
3	LEGEND TECHNICAL SERVICES	Invoice No. 0714652	(28.00)
4	LEGEND TECHNICAL SERVICES	Invoice No. 0714647	(28.00)
5	LEGEND TECHNICAL SERVICES	Invoice No. 0714641	(28.00)
6	LEGEND TECHNICAL SERVICES	Invoice No. 0714630	(28.00)
7	LEGEND TECHNICAL SERVICES	Invoice No. 0714601	(252.80)
8	LEGEND TECHNICAL SERVICES	Invoice No. 0714602	(96.00)
9	LEGEND TECHNICAL SERVICES	Invoice No. 0714676	(497.60)
10	LEGEND TECHNICAL SERVICES	Invoice No. 0714665	(28.00)
11	LEGEND TECHNICAL SERVICES	Invoice No. 0714621	(28.00)
12	LEGEND TECHNICAL SERVICES	Invoice No. 0714918	(28.00)
13	LEGEND TECHNICAL SERVICES	Invoice No. 0714916	(28.00)
14	LEGEND TECHNICAL SERVICES	Invoice No. 0714901	(28.00)
15	LEGEND TECHNICAL SERVICES	Invoice No. 0714907	(28.00)
16	LEGEND TECHNICAL SERVICES	Invoice No. 0714896	(28.00)
17	LEGEND TECHNICAL SERVICES	Invoice No. 0712007	(68.00)
18	LEGEND TECHNICAL SERVICES	Invoice No. 0711989	(68.00)
19	LEGEND TECHNICAL SERVICES	Invoice No. 0711986	(68.00)
20	LEGEND TECHNICAL SERVICES	Invoice No. 0711610	(68.00)
21	LEGEND TECHNICAL SERVICES	Invoice No. 0711608	(68.00)
22	Lamb Tech	Invoice No. 1142	(4,375.00)
23	LEGEND TECHNICAL SERVICES	Invoice No. 0807373	(41.60)
24	LEGEND TECHNICAL SERVICES	Invoice No. 0807211	(390.00)
25	LEGEND TECHNICAL SERVICES	Invoice No. 0809433	(40.50)
26			
27	**RUCO Adjustment To Remove Expenses Outside of Test Year**		**$ (6,398)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 6
TO TRANSPORTATION EXPENSES

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	Jerry and Lori King	CHK 3152	$ (1,500)
2	Algonquin Water Services	Invoice No. SALES000000001019	(12,910)
3	Algonquin Water Services	Invoice No. SALES000000001036	(3,292)
4			
5	**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**		**$ (17,702)**
6			
7			
8	Commonwealth Tow & Transport	Invoice No. 4389	$ (25)
9			
10	**RUCO Adjustment to Remove Non-Recurring Expense**		**$ (25)**
11			
12	**TOTAL RUCO ADJUSTMENT TO TRANSPORTATION EXPENSES**		**$ (17,726)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 7
TO RENTAL OF EQUIPMENT

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	RAIN FOR RENT	Invoice No. 092011748	$ (2,303)
2	PUMP RENTAL DURING SUPERBOWL	Invoice No. 0038296	(2,084)
3			
4	**RUCO Adjustment to Remove Non-Recurring Expenses**		$ (4,387)
5			
6			
7	**TOTAL RUCO ADJUSTMENT TO RENTAL OF EQUIPMENT**		**$ (4,387)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 8
TO MATERIALS AND SUPPLIES

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	Culligan	SEP07-291-09981218-7	$ (169)
2	Culligan	SEP07-291099812260	(184)
3	Culligan	OCT07-291099812187	(186)
4	Culligan	OCT07-291099812260	(375)
5	Culligan	291X08946503	(15)
6	Culligan	291X08946602	(428)
7	Culligan	291X09027402	(97)
8	Culligan	291X09027501	(219)
9	Culligan	291X09106107	(49)
10	Culligan	291X09106206	(353)
11	Culligan	291X09188709	(173)
12	Culligan	291X09188808	(488)
13	Culligan	291X09272404	(322)
14	Culligan	291X09359607	(83)
15	Culligan	291X09359706	(400)
16	Culligan	291X09272305	(51)
17	Culligan	291X09448202	(115)
18	Culligan	291X09448301	(438)
19	Culligan	291X09541600	(317)
20	Culligan	291X09541501	(101)
21	Culligan	291X09641400	(644)
22	Culligan	291X09641301	(126)
23	Culligan	291X09748908	(155)
24	Culligan	291X09749005	(487)
25			
26	**RUÇO Adjustment To Remove Unnecessary/Inappropriate Expenses**		**$ (5,975)**
27			
28			
29	HARRINGTON INDUSTRIAL PLASTICS	Invoice No. 015B0142A	$ (662)
30	Pro-Tec Environmental Inc.	Invoice No. 07091001	(6,351)
31	ZEP MFG COMPANY	Invoice No. 69643508	(256)
32	ZEP MFG COMPANY	Invoice No. 69640081	(276)
33			
34	**RUCO Adjustment To Remove Expenses Outside of Test Year**		**$ (7,545)**
35			
36			
37	**TOTAL RUCO ADJUSTMENT TO MATERIALS AND SUPPLIES**		**$ (13,520)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 9
TO MISCELLANEOUS EXPENSES

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	Bank Charges	11/5 merchant fee	$ (1,537.71)
2	Bank Charges	Write off Unrec Variance	(338.37)
3	Bank Charges	1/3 Merchant Fees	(862.48)
4	Bank Charges	Merchant Fees	(13.58)
5	Bank Charges	2/5 Merchant Fees	(981.61)
6	Bank Charges	BANK & MERCHANT FEES	(1,109.27)
7	Bank Charges	Merchant Fees	(1,072.00)
8	Meals and Entertainment	PRTS/TOOLS/MLS/GAS/MILGE/TELEP	(91.93)
9	Meals and Entertainment	MATERIAL/TRAVEL/UTILITIES	(76.56)
10	Meals and Entertainment	MTRL/TRVL/TELEPHONE	(27.97)
11	Meals and Entertainment	PARTS/EQPMT/TRAVEL/TELEPHONE	(116.41)
12	Meals and Entertainment	PARTS/TRAVEL/ TELEPHONE	(15.82)
13	Meals and Entertainment	PARTS/TRAVEL/CELLULAR	(14.98)
14	Meals and Entertainment	8600-0200-repairs	(150.74)
15			
16	**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**		**$ (6,409)**
17			
18	**TOTAL RUCO ADJUSTMENT TO MISCELLANEOUS EXPENSES**		**$ (6,409)**

Note: Descriptions and references above are per company journal entries in the general ledger.

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 10
TO BAD DEBT EXPENSE

Line No.	Description		Amount
1	Bad Debt Expense -- Company as Filed		$ 43,889
2			
3	Test Year Revenues -- Company as Filed	$ 6,383,886	
4	Bad Debt Percentage -- RUCO Selected	x 0.0476%	
5	Bad Debt Expense -- RUCO Adjusted		3,041
6			
7	**RUCO ADJUSTMENT TO BAD DEBT EXPENSE**		**$ (40,848)**

		Wastewater Division			Water Division		
		(A)	(B)	(C)	(D)	(E)	(F)
	Description	Test Year Ended 30-Sep-08	Prior Year Ended 30-Sep-07	Prior Year Ended 30-Sep-06	Test Year Ended 30-Sep-08	Prior Year Ended 30-Sep-07	Prior Year Ended 30-Sep-06
18	Revenues	$6,383,886	$ 6,191,689	$ 5,851,080	$ 6,851,029	$ 6,749,901	$6,389,605
20	Bad Debt Expense	$ 43,889	$ 19,632	$ 2,773	$ 3,264	$ 1,898	$ 20,483
22	Bad Debt as a % of Revenues (L3 / L1)	0.6875%	0.3171%	0.0474%	**0.0476%**	0.0281%	0.3206%
24	Growth in Revenues from Prior Year	3.10%	5.82%		1.50%	5.64%	
26	Growth in Bad Debt from Prior Year	123.56%	607.97%		71.97%	-90.73%	

References:
Revenues and Bad Debt Expense in Columns (A), (B) and (C): Company Schedule E-2 -- Wastewater Division
Revenues and Bad Debt Expense in Columns (D), (E) and (F): Company Schedule E-2 -- Water Division

Note: For purposes of making its adjustment to bad debt expense, RUCO utilized the 0.0476% bad debt as a percent of revenues figure experienced by the Company's Water Division during the test year ended September 30, 2008. This figure appears in Column D, Line 18, of the chart above.

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 11a
TO DEPRECIATION EXPENSE

LINE NO.	ACCT NO.	PLANT ACCOUNT	RUCO ORIGINAL COST	PROPOSED DEPR RATE	PROPOSED DEPR EXPENSE
1	351	Organization	$ -		
2	353	Land	1,783,426		
3	354	Structures & Improvements	15,051,970	3.33%	501,231
4	355	Power Generation	548,674	5.00%	27,434
5	360	Collection Sewer Forced	996,458	2.00%	19,929
6	361	Collection Sewers Gravity	21,317,631	2.00%	426,353
7	362	Special Collecting Structures	-	2.00%	-
8	363	Customer Services	-	2.00%	-
9	364	Flow Measuring Devices	46,607	10.00%	4,661
10	366	Reuse Services	3,788,219	2.00%	75,764
11	367	Reuse Meters and Installation	52,331	8.33%	4,359
12	370	Receiving Wells	860,393	3.33%	28,651
13	371	Pumping Equipment	1,573,415	12.50%	196,677
14	374	Reuse Distribution Reservoirs	62,825	2.50%	1,571
15	375	Reuse Trans. and Dist. System	340,677	2.50%	8,517
16	380	Treatment & Disposal Equip.	5,405,671	5.00%	270,284
17	381	Plant Sewers	47,608	5.00%	2,380
18	382	Outfall Sewer Lines	343,681	3.33%	11,445
19	389	Other Sewer Plant & Equip.	603,155	6.67%	40,230
20	390	Office Furniture & Equipment	198,772	6.67%	13,258
21	391	Transportation Equipment	26,078	20.00%	5,216
22	392	Stores Equipment	8,968	4.00%	359
23	393	Tools, Shop And Garage Equip	56,167	5.00%	2,808
24	394	Laboratory Equip	173,948	10.00%	17,395
25	396	Communication Equip	414,146	10.00%	41,415
26	398	Other Tangible Plant	-		-
27					-
28		**TOTALS**	**$ 53,700,820**		**$ 1,699,935**
29					
30					
31		Less Amortization of Contributions per Company C-2, Page 2			$ (374,743)
32					
33		Total Proposed Depreciation Expense Per RUCO			$ 1,325,192
34					
35		Total Proposed Depreciation Expense Per Company			$ 1,550,237
36					
37		Net Decrease to Depreciation Expense			$ (225,045)
38					
39					
40		**RUCO Adjustment To Plant Depreciation Expense**			**$ (225,045)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 11b
TO DEPRECIATION EXPENSE

LINE NO.	DESCRIPTION	REFERENCE	1999 Series Bonds (A)	2001 Series Bonds (B)	Combined Total (A) + (B)
1	Aggregate Principal Balance of IDA Bonds		$5,335,000	$7,500,000	$12,835,000
2	Allowable Debt Issuance Cost	1999 & 2001 IDA Bond Contracts	2.00%	2.00%	
3					
4	Total Allowable Debt Issuance Cost	Line 1 X Line 2	$ 106,700	$ 150,000	$ 256,700
5	Term of Bond Issue, in Years	1999 & 2001 IDA Bond Contracts	24	30	
6					
7	Annual Debt Issuance Amortization Expense	Line 4 / Line 5	$ 4,446	$ 5,000	$ 9,446
8	Cost Allocation Percentage to Wastewater Division				50.00%
9					
10		Total Amortization of Debt Discount Per RUCO			$ 4,723
11					
12		Test Year Adjusted Amortization of Debt Discount As Filed			$ 14,658
13					
14		**RUCO Adjustment To Amortization of Debt Discount**			$ (9,935)
15					
16		**TOTAL RUCO ADJUSTMENT TO DEPRECIATION EXPENSE**			**$ (9,935)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 12
TO PROPERTY TAX

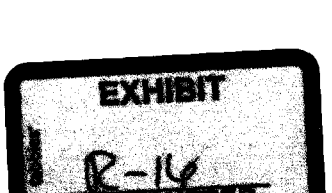
LINE NO.	DESCRIPTION	REFERENCE	(A)	(B)
1	Calculation Of The Company's Full Cash Value:			
2				
3	Annual Operating Revenues:			
4	Year Ended 09/30/2008	Co. Sch E-2, Line 4	$ 6,383,886	
5	Year Ended 09/30/2007	Co. Sch E-2, Line 4	6,191,689	
6	Year Ended 09/30/2006	Co. Sch E-2, Line 4	5,851,080	
7	Total Three Year Operating Revenues	Sum of Lines 4, 5, & 6	$ 18,426,655	
8	Average Annual Operating Revenues	Line 7 / 3	$ 6,142,218	
9				
10	Two Times Three Year Average Operating Revenues	Line 8 X 2		$ 12,284,437
11				
12	ADD:			
13	10% of construction Work In Progress ("CWIP"):			
14	Test Year CWIP	Co. Sch E-1, Line 4	$ 393,011	
15	10% of CWIP	Line 14 X 10%		$ 39,301
16				
17	SUBTRACT:			
18	Transportation at Book Value:			
19	Original Cost of Transportation Equipment			
20	Accum. Depr. Of Transportation Equipment			
21	Book Value of Transportation Equipment	Line 19 + Line 20		$ -
22				
23	Company's Full Cash Value ("FCV")	Sum of Lines 10, 15, & 21		12,323,738
24				
25	Calculation Of The Company's Tax Liability:			
26				
27	MULTIPLY:			
28	FCV X Valuation Assessment Ratio X Property Tax Rates:			
29	Assessment Ratio (2010)	House Bill 2779	22.5000%	
30	Assessed Value	Line 23 X 29	$ 2,772,841	
31				
32	Property Tax Rates:			
33	Primary Tax Rate	JMM 1.50 - 2008 Budget	7.1250%	
34	Secondary Tax Rate	JMM 1.50 - 2008 Budget	4.0690%	
35	Estimated Tax Rate Liability	Line 33 + Line 34	11.1940%	
36				
37	Company's Total Tax Liability - Based on Full Cash Valu	Line 30 X Line 35		$ 310,392
38				
39	Test Year Adjusted Property Tax Expense As Filed	Co. Sch. C-1, Line 28		373,354
40	Decrease in Property Tax Expense	Line 37 - Line 39		$ (62,962)
41				
42	**TOTAL RUCO ADJUSTMENT TO PROPERTY TAXES**			**$ (62,962)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 13
TO INCOME TAX EXPENSE

LINE NO.	DESCRIPTION	(A) REFERENCE	(B) AMOUNT
1	**FEDERAL INCOME TAXES:**		
2			
3	Operating Income Before Taxes	Sch 4, Page 1, Col C, Lines 32 + 37	$ 708,959
4	Less:		
5	Arizona State Tax	Line 21	$ (32,521)
6	Interest Expense	Note (A), Line 35	(242,238)
7	Federal Taxable Income	Line 3 + Line 5 + Line 6	$ 434,200
8			
9	Federal Tax Rate	Schedule 1, Page 2	34.0000%
10	Federal Income Tax Expense	Line 7 X Line 9	$ 147,628
11			
12	**STATE INCOME TAXES:**		
13			
14	Operating Income Before Taxes	Sch 4, Page 1, Col C, Lines 32 + 37	$ 708,959
15	LESS:		
16	Interest Expense	Note (A), Line 35	(242,238)
17	State Taxable Income	Line 14 + Line 16	$ 466,721
18			
19	State Tax Rate	Tax Rate	6.9680%
20			
21	State Income Expense	Line 17 X Line 19	$ 32,521
22			
23	**TOTAL INCOME TAX EXPENSE:**		
24	Federal Income Tax Expense	Line 10	$ 147,628
25	State Income Tax Expense	Line 21	32,521
26	Total Income Tax Expense Per RUCO	Line 24 + Line 25	$ 180,149
27	Total Income Tax Expense Per Company	Company Sch C-1	(99,906)
28	**Total RUCO Income Tax Adjustment**	Line 26 - Line 27	**$ 280,055**
29			
30			
31	*NOTE (A)*		
32	Interest Synchronization:		
33	Adjusted Rate Base	$ 21,248,950	
34	Weighted Avg. Cost of Debt	1.14%	
35	Synchronized Interest Expense (L33 X L34)	$ 242,238	

LITCHFIELD PARK SERVICE COMPANY

DOCKET NO. SW-01428A-09-0103 et al.



SURREBUTTAL TESTIMONY

OF

SONN ROWELL, CPA

ON BEHALF OF

THE

RESIDENTIAL UTILITY CONSUMER OFFICE

DECEMBER 17, 2009

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I. INTRODUCTION

Q. Please state your name, occupation and business address.

A. My name is Sonn S. Rowell. I am a Certified Public Accountant and Utility Consultant. I am also a managing member of Desert Mountain Analytical Services, PLLC ("DMAS"), PO Box 51628, Phoenix, AZ, 85076.

Q. Please state the purpose of your Surrebuttal Testimony.

A. The purpose of my Surrebuttal Testimony is to respond to the Rebuttal Testimony of Litchfield Park Service Company ("LPSCO") regarding the expense and plant adjustments I proposed in my Direct Testimony.

Q. Have you filed any prior testimony in this case on behalf of RUCO?

A. Yes. On November 4, 2009 I filed Direct Testimony on behalf of RUCO.

Q. Please identify the exhibits you are sponsoring.

A. Surrebuttal Exhibit 1 contains schedules detailing the revenue requirement, recommended adjustments to expenses, plant in service and rate base of LPSCO's water division. Surrebuttal Exhibit 2 contains the same schedules and information for LPSCO's wastewater division. Exhibit 3 is an excerpt from LPSCOs FAQ web page.

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Q. Please explain how your Surrebuttal Testimony is organized.

A. This Surrebuttal Testimony will discuss the revenue requirement, surrebuttal rate base adjustments, surrebuttal plant adjustments, and surrebuttal operating income adjustments for LPSCO's Water Division, and then Wastewater Division. The Surrebuttal Schedules and Testimony mainly include only adjustments that have changed or been added since the filing of my Direct Testimony. Details of adjustments contained within my Direct Testimony that have not been altered are not repeated in these Surrebuttal schedules or in this Surrebuttal Testimony.

II. WATER DIVISION

1. Revenue Requirement Surrebuttal Schedule 1 – Water Division

Q. Please discuss your recommended surrebuttal revenue requirement for LPSCO's Water Division.

A. RUCO is recommending a revenue requirement of $11,555,325 for LPSCO's water division. This represents a $4,676,615 increase, or 67.99% above RUCO's adjusted test year water revenues of $6,878,710. This compares with LPSCO's rebuttal request for a revenue requirement of $13,637,738 for its water division, which would necessitate a $6,759,028 increase to LPSCO's adjusted test year water revenues, or a 98.26% increase.

2. Rate Base Surrebuttal Schedule 2 – Water Division

Q. Please explain Rate Base Adjustment No. 1.

A. This adjustment decreases Gross Utility Plant in Service ("UPIS") by $642,746 to account for RUCO's recommended changes to Plant in Service as detailed on Schedule 3. Adjustment 1 also reduces accumulated depreciation by $138,173 per Surrebuttal Schedule 2, Page 2 of 4. This schedule details the differences between RUCO's calculation of depreciation expense by year, and ultimately test year end accumulated depreciation, and the amount used by the Company, resulting from differences in UPIS.

Q. Does Rate Base Adjustment No. 2 reflect a change from your Direct Testimony?

A. Yes. Per Company Rebuttal Testimony, unamortized Debt Issuance Costs have been removed to "help eliminate disputes between the parties" (Bourassa Dt. at 13, line 12). As a result, RUCO's adjustment has been increased to remove this cost from rate base.

Q. Do you agree with LPSCO's argument regarding Adjustment No. 3 and the "double counting" regarding the rate base portion and amortization expense of the deferred regulatory costs?

A. No. RUCO's adjustment serves to allow the Company to earn a return on prudently spent money in rate base while beginning to recover a portion of

that cost each year in expense. Of course, the final treatment of these deferred costs will depend on how the Accounting Order contained in Decision 69912 is interpreted.

Q. Are Rate Base Adjustments No. 4 and No. 5 new?

A. Yes, both of these adjustments are the direct result of information contained within the Company Rebuttal Testimony. Adjustment 4 decreases AIAC by $8,677 and CIAC by $7,888. This corresponds with the UPIS retirement adjustment for the Litchfield Green's Booster Station on Surrebuttal Schedule 3, Page 2 of 4, adjustment 2. Adjustment 5 removes $68,685 from Customer Meter Deposits as the Company asserts this amount represents Security Deposits, not Meter Deposits, and was included in Rate Base originally in error.

Q. Please explain Surrebuttal Rate Base Adjustment No. 6.

A. This adjustment increases LPSCO's Deferred Income Taxes from $24,518 to $446,530. The support for this adjustment is contained on Schedule 2, Page 4 of 4, (5 pages), Calculation of Estimated Deferred Income Taxes.

3. Utility Plant in Service Surrebuttal Schedule 3 – Water Division

Q. Please discuss RUCO's Surrebuttal Plant adjustments.

A. RUCO is recommending a reduction in Gross Water Utility Plant in Service of $642,746.

Q. Please identify which of RUCO's Plant Adjustments are different from your Direct Testimony.

A. RUCO Adjustments 15 and 17 on Surrebuttal Schedule 3, Page 3, and RUCO Adjustments 19, 21, 23, and 24 on Surrebuttal Schedule 3, Page 4.

Q. Explain each of these adjustments please.

A. RUCO Adjustment 15 eliminated the $19,000 reduction as the Company produced an invoice to support this amount. Adjustment 17 related to invoices from Hughes Supply, Courtesy Chevrolet, and W. Fisher was removed in its entirety. Adjustments 19 and 21 remove amounts that decreased electric pumping equipment invoiced from CH2OICE Pump. Adjustment 23 increases the amount capitalized from expense from $9,714 to $19,989 ($10,275), and corresponds to Surrebuttal Schedule 4, Page 3 of 9. Finally, Adjustment 24 increases water treatment plant by $18,805 for post test year arsenic treatment equipment as recommended by Staff Engineer, and per Company Rebuttal Schedule B-2, Page 3.

...

Q. Does the Company agree with your adjustments to remove capitalized affiliate labor?

A. No. LPSCO states detail of the capitalized labor was provided in a work paper in response to the fact that the source documentation was determined to be inadequate by RUCO. RUCO maintains that a work paper file without sufficient supporting documentation, especially with affiliated transactions, is not proper accounting practice.

4. Operating Income Surrebuttal Schedule 4 – Water Division

Q. Please identify which of RUCO's Operating Income Adjustments have changed since your Direct Testimony was filed.

A. Changes were made to Adjustments 3, 4a, 4b, 4d, 7, 9a, 9b, 10, and 11, as detailed on Surrebuttal Schedule 4, Pages 1 through 9.

Q. Begin by explaining the changes to Adjustment 3, and please respond to LPSCO's argument that RUCO's adjustment contained errors.

A. Adjustment 3 was changed to remove 3 items that the Company reversed out of expense, and therefore were not included in test year expenses. While this appears to be the case for three of the amounts RUCO recommended be removed from expense, ($213, $228, and $814), the fourth amount they Company states was reversed ($749) was debited and

credited in the general ledger several times, but ultimately appears to be part of test year expenses. As a result, this amount will remain in Adjustment 3, along with the $305 LPSCO agrees with.

Q. Explain the changes to Adjustment 4a.

A. This adjustment does not change the amount of the total decrease to Outside Services – Other from $29,626. What it does is change the adjustment reason for three invoices from Southwest Ground-water Consultants ($1,380, $4,072, and $4,823 totaling $10,275) from disallowance as a non-recurring expense, to reclassification in a plant account as was discussed above.

Q. Please continue with Adjustments 4b and 4d.

A. Adjustment 4b was decreased to $286,799, and 4d was eliminated in its entirety. The reasons for these changes are addressed in the Surrebuttal Testimony of Matthew Rowell.

Q. Explain Adjustment 7.

A. Adjustment 7 decreases Rate Case Expense by $28,000 to match the recommendation of Staff in its Direct Testimony. RUCO originally recommended a $20,000 decrease in this account based upon a $150,000 cost per division amortized over three years. In this case as most, 5 years is a more appropriate amortization period, so we will allow the full amount

the Company is requesting (which they state is low) as Staff is, but increase the amortization period from 3 years to 5 years.

Q. Why did Adjustment 9a change?

A. Depreciation expense changed due to adjustments made to UPIS accounts for this Surrebuttal Testimony.

Q. Please explain Adjustment 9b.

A. The Company was seeking to include $11,465 in the depreciation expense category related to amortization of unamortized debt issuance costs. RUCO has changed this adjustment to remove this amount from the income statement as we agree with Staff[1] that this is a below-the-line expense like interest, and should be treated as such.

Q. Please explain Adjustment No. 10 to Property Tax expense.

A. The method RUCO uses to calculate property taxes has changed, but was not used in the Direct Testimony filed for the LPSCO rate cases. Surrebuttal Schedule 4, Page 8 of 9, reflects the appropriate method.

Q. Finally, Adjustment No. 11 changed as well?

A. Yes. Test Year income tax expense changed as a result of the adjustments to test year operating expenses as described above.

[1] Michlick Dt at 12

Q. Do you want to address any of the Company's comments regarding other expense adjustment issues?

A. Yes. First in reference to LPSCO rebuttal adjustment number 3 to remove meals and entertainment expenses from Miscellaneous expense, Mr. Bourassa stated that RUCO did not make this adjustment as Staff did, and now the Company proposes to make this adjustment as well ($827). RUCO did in fact include this amount in its Direct Testimony as part of the total adjustment of $22,027, as reflected by Adjustment No. 8 on Schedule 4, Page 11 of 15, and as a result, does not change Adjustment 8.

Q. How do you respond to LPSCO's statement that RUCO's proposed water rates generate too much revenue by approximately $1.4 million?

A. Unfortunately, that is very possible. While doing rate design for surrebuttal, I discovered the program that I have used for many years to do bill counts has a problem generating the correct revenue amount on the larger size meters when the first tier break exceeds 100,000 gallons. This is not a problem I had encountered prior to this case, since an extremely high first tier break amount is fairly new. My Surrebuttal Testimony rate design corrects the problems of the Direct Testimony rate design, and is summarized Surrebuttal Schedule 5.

III. WASTEWATER DIVISION

1. Revenue Requirement Surrebuttal Schedule 1 – Wastewater Division

Q. Please discuss your recommended Surrebuttal revenue requirement for LPSCO's Wastewater Division.

A. RUCO is recommending a revenue requirement of $8,741,497 for LPSCO's wastewater division. This represents a $2,382,310 increase, or 37.46% above RUCO's adjusted test year water revenues of $6,359,187. This compares with LPSCO's rebuttal request for a revenue requirement of $11,132,993 for its wastewater division, which would necessitate a $4,776,618 increase above LPSCO's adjusted test year wastewater revenues, or a 75.15% increase.

2. Rate Base Surrebuttal Schedule 2 – Wastewater Division

Q. Please explain Rate Base Adjustment No. 1.

A. This adjustment decreases Gross Utility Plant in Service ("UPIS") by $5,464,782 to account for RUCO's recommended changes to Plant in Service as detailed on Schedule 3. Adjustment 1 also reduces accumulated depreciation by $191,927 per Surrebuttal Schedule 2, Page 2 of 3. This schedule details the differences between RUCO's calculation of depreciation expense by year, and ultimately test year end accumulated depreciation, and the amount used by the Company, resulting from differences in UPIS.

Q. Will you address LPSCO's assertions that some of RUCO's adjustments to accumulated depreciation are incorrect?

A. Yes. First, the Company discusses a $10,000 difference between RUCO and Staff regarding lift station retirements, and this amount applies to both UPIS and accumulated depreciation since the amounts in question represent a plant retirement. RUCO does not believe its adjustment is incorrect, and the reasons for this conclusion are discussed in more detail in the plant adjustment section of this Surrebuttal Testimony. Second, the Company discovered that accumulated depreciation had not been adjusted for the retirement of the Litchfield Greens lift station in the amount of $96,926, which is now included on Surrebuttal Schedule 2, Page 2, on line 20. Finally, RUCO included $11,040 on line 21 of that same schedule for accumulated depreciation related to the transfer of assets from LPSCO to Black Mountain Sewer.

Q. Does Rate Base Adjustment No. 2 reflect a change from your Direct Testimony?

A. Yes. Per Company Rebuttal Testimony, unamortized Debt Issuance Costs have been removed to "help eliminate disputes between the parties" (Bourassa Dt. at 13, line 12). As a result, RUCO's adjustment has been increased to remove this cost from rate base.

Q. Did you remove Rate Base Adjustment No. 3.

A. Yes. Rate Base Adjustment No. 3 was deleted based upon information contained in the Company Rebuttal Testimony that indicated this amount was in AIAC.

Q. Are Rate Base Adjustments No. 4 and No. 5 new?

A. Yes. Both of these adjustments are the direct result of information contained within the Company Rebuttal Testimony. Adjustment 4 decreases AIAC by $16,649 and CIAC by $93,346. This corresponds with the UPIS retirement adjustment for the Wigwam, Bullard, and Litchfield Green lift stations on Surrebuttal Schedule 3, Page 2 of 4, adjustments 3 and 4. Adjustment 5 removes $68,685 from Customer Meter Deposits as the Company asserts this amount represents Security Deposits, not Meter Deposits, and was included in Rate Base originally in error.

Q. Can you explain the $10,000 difference between plant retirement and accumulated depreciation amounts related to the above lift station retirements that is referenced in footnote 30 on page 20, and footnote 36 on page 21 of Mr. Bourassa's Rebuttal Testimony?

A. Yes. First, footnote 30 states RUCO Adjustments 3 and 4 to UPIS total $544,977, and the Direct Testimony of Staff for the wastewater division totals to $554,977 as reflected on page 7, resulting in a difference of $10,000 related to the lift station retirements.

Q. So, did RUCO increase its adjustment amount by $10,000?

A. No. RUCO amounts came directly from a spreadsheet provided in response to a Staff Engineering data request, MSJ ENG 2-1(C ii-v) Wigwam.xls. The costs referenced on those worksheets related to the retirement of the Wigwam lift station total $261,364, which is the amount RUCO used to retire the Wigwam lift station. It appears, rightfully so, that Staff may have gotten its retirement amounts for the Wigwam lift station directly from LPSCO's response to its Staff Engineering Data Request dated September 3, 2009. Item 1) c. iii., regarding account 361 states $14,289 is the amount for collection sewers – gravity, which differs from the amount for that same plant category in MSJ ENG 2-1(C ii-v) Wigwam.xls. RUCO notes the name of the spreadsheet it was provided differs by the letter "C" when compared to the spreadsheet referenced in data response item 1) c. iii., leading to the conclusion there must be several versions in existence.

Q. Is this the first time that the Company provided information that does not match?

A. No. As delineated in RUCO's Direct Testimony and this Surrebuttal Testimony, LPSCO has provided amounts in data responses that do not reconcile back to source documentation, the general ledger, or other schedules provided, especially in the area of affiliated transactions. Mr. Bourassa claims all this information has been provided to RUCO,

however, examples of differences like the small one highlighted above make reconciliation between LPSCO's many provided amounts difficult at best.

Q. Are LPSCO's source documentation and reconciliation problems you reference above the main part of the reason why you disallow all capitalized affiliate labor not properly supported?

A. Yes. However, the lack of adequate source documentation is the primary reason for the recommended disallowance.

Q. Please explain Rate Base Adjustment No. 6.

A. This adjustment increases the Company's deferred income taxes from $15,987 to $333,803. The support for this adjustment is contained on Schedule 2, Page 3 of 3, (5 pages), Calculation of Estimated Deferred Income Taxes.

3. Utility Plant in Service Surrebuttal Schedule 3 – Wastewater Division

Q. Please discuss RUCO's Surrebuttal Plant adjustments.

A. RUCO is recommending a reduction in Gross Wastewater Utility Plant in Service in the amount of $5,464,782.

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Q. Please identify which of RUCO's Plant Adjustments are different from your Direct Testimony.

A. RUCO Adjustments 1 and 5 on Surrebuttal Schedule 3, Page 2, and RUCO Adjustment 21 on Surrebuttal Schedule 3, Page 4.

Q. Explain each of these adjustments please.

A. RUCO Adjustment 1 in the amount of $1,230,049 was deleted. In its Rebuttal Testimony, LPSCO states this amount was related to a sewer line RUCO classified as CWIP during the last rate case, but Staff and the Company classified it as UPIS, and included it in rate base. After reviewing plant additions in this category, RUCO believes this amount should properly be included in UPIS, and removed this adjustment.

Q. Why did Adjustment 5 change?

A. This adjustment amount was changed to $38,250 as a result of updated amounts provided by the Company in Rebuttal Schedule B-2, Page 3.2.

Q. You also stated that RUCO Adjustment 21 changed, please explain.

A. This adjustment is an addition since Direct Testimony was filed, and is meant to address LPSCO Rebuttal Adjustment D to UPIS from Rebuttal Schedule B-2, Page 3. In that adjustment, the Company is proposing to increase account 354 by $7,072, however, RUCO has not been able to locate an explanation of this amount either in the testimony or schedules.

Assuming this was intended to be a corresponding entry to remove rent costs from UPIS in the water division (even though it was an increase to plant, not a decrease), RUCO determined from the source documentation the amount of rent expense capitalized for the wastewater division was actually $1,768, not $7,072.

Q. Do you agree with the Company's proposal to capitalize expenses in addition to those proposed by RUCO in Adjustments 6 and 7?

A. No. The Company recorded these items originally as expenses outside the test year. If LPSCO believed these items should have been capitalized, opportunities to make this adjustment should have occurred in closing 2007 books, or in the preparation of a rate case test year comprised of part of 2007 and part of 2008. Failing this, the Company must have concluded this should be part of test year expenses, however, the invoices related to the $8,054 and the $525 LPSCO seeks not only reference repairs, they are dated outside the test year.

4. Operating Income Surrebuttal Schedule 4 – Wastewater Division

Q. Please identify which of RUCO's Operating Income Adjustments have changed since your Direct Testimony was filed.

A. Changes were made to Adjustments 4b, 4c, 11a, 11b, 12, 13, and 14 as detailed on Surrebuttal Schedule 4, Pages 1 through 7.

Q. Begin by explaining how Adjustment 4b changed.

A. This change is comprised of two parts. The original amount of this adjustment related to AWS reconciling fees to 4 factor have been removed. Further information related to this adjustment is addressed in the Surrebuttal Testimony of Matthew Rowell. Second, RUCO adopted Company Adjustment 3 as reflected on Rebuttal Schedule C-2, Page 4 related to Aerotek services in the amount of $42,000.

Q. What about the decrease to Adjustment 4c?

A. The changes related to this adjustment are addressed in the Surrebuttal Testimony of Matthew Rowell as well.

Q. Why did Adjustment 11a change?

A. Depreciation expense changed due to adjustments made to UPIS accounts for this Surrebuttal Testimony.

Q. Please explain Adjustment 11b.

A. The Company was seeking to include $14,658 in the depreciation expense category related to amortization of unamortized debt issuance costs. RUCO has changed this adjustment to remove this amount from the income statement as we agree with Staff[2] that this is a below-the-line expense like interest, and should be treated as such.

[2] Michlick Dt at 12

Q. Please explain Adjustment No. 12 to Property Tax expense.

A. The method RUCO uses to calculate property taxes has changed, but was not used in the Direct Testimony filed for the LPSCO rate cases. Surrebuttal Schedule 4, Page 6 of 7, reflects the appropriate method.

Q. Adjustment No. 13 changed as well?

A. Yes. Test Year income tax expense changed as a result of the adjustments to test year operating expenses as described above.

Q. Finally, explain Adjustment No. 14 to rate case expense.

A. My reason for adjusting rate case expense for the wastewater division is the same as my adjustment to rate case expense for the water division. Recommended rate case expense in total is shared equally by both divisions.

Q. Do you want to address any of the Company's comments regarding other expense adjustment issues?

A. Yes. First in reference to LPSCO rebuttal adjustment number 4 to remove meals and entertainment expenses from Miscellaneous Expense, Mr. Bourassa stated that RUCO did not make this adjustment as Staff did, and now the Company proposes to make this adjustment as well ($494). RUCO did in fact include this amount in its Direct Testimony as part of the total adjustment of $6,409, as reflected by Adjustment No. 9 on Schedule 4, Page 14 of 19, and as a result, no changes are made to Adjustment 9.

Q. How do you respond to LPSCO's statement that RUCO's proposed rate schedule for wastewater was not included in its Direct Testimony?

A. It is unclear why Mr. Bourassa made this statement. A check of eDocket on the ACC website shows that my Direct Testimony included a Wastewater Revenue Summary and Rates, Schedule 5, Page 1 of 1. This schedule contained both proof of revenue as well as RUCO proposed rates. I have included a revised copy of Schedule 5 to reflect surrebuttal adjustments as Surrebuttal Schedule 5, Page 1 of 1.

Q. Do you agree with the Company's statement that $1.50 per thousand gallons for effluent is "excessive"?

A. No. In this current environment, effluent is valuable, has many applications, and is less expensive than potable water. LPSCO's current negotiated contract effluent rates are significantly too low.

Q. In his Rebuttal Testimony on Page 30, Mr. Greg Sorensen makes the statement that a "significantly higher price" (line 9) "will decrease the usage (of effluent) significantly, thus increasing the use of groundwater for irrigation" (line 10). Do you agree with his conclusion?

A. No. I do not understand why Mr. Sorenson thinks a responsible businessperson would stop using effluent because it increases to $1.50

per thousand gallons when the commodity rates for potable water are significantly higher. In addition, RUCO's rates were not designed to "shift recovery of the revenue requirement away from our residential customers" (Line 13), but to assign a fair rate for a valuable product. This is exemplified by the fact RUCO has not changed the effluent rate for Surrebuttal Testimony.

Q. In your Direct Testimony you indicated that LPSCO does not accept credit card payments and this was part of the reason why you recommended disallowances of merchant fees (Adjustment 8 for Water and 9 for Wastewater). Do you have anything further to add regarding this point?

A. Yes. The response to Staff Data Request JMM 11-5 indicates that "The Company" does accept credit cards. However, since the Company Name listed on the data request response is "Algonquin Power Income Fund" not LPSCO it is unclear which "Company" is being referred to. Additionally, a review of LPSCO's web page does not reveal a credit card payment option. Exhibit 3 is a print out from LPSCO's FAQ web page, and under the question "How do I pay my bill?" credit cards are not listed as an option.

...

Q. Does your silence on any of the issues, matters or findings addressed in the testimony of any of the witness for LPSCO constitute your acceptance of their positions on such issues, matters or findings?

A. No, it does not.

Q. Does this conclude your direct testimony on LPSCO?

A. Yes, it does.

SONN S. ROWELL, CPA

SURREBUTTAL EXHIBIT 1

WATER DIVISION SCHEDULES 1 THU 5

Litchfield Park Service Company - Water Division
Docket No. SW-01428A-09-0103 and W-01427A-09-0104
Test Year Ended September 30, 2008

Revenue Requirement

LINE NO.	DESCRIPTION	(A) COMPANY OCRB/FVRB COST	(B) RUCO OCRB/FVRB COST
1	Adjusted Original Cost/Fair Value Rate Base	$ 37,930,921	$ 36,946,801
2			
3	Adjusted Operating Income/(Loss)	$ (282,894)	$ 322,028
4			
5	Current Rate of Return (L3 / L1)	-0.75%	0.87%
6			
7	Required Operating Income (L9 X L1)	$ 4,327,918	$ 3,155,257
8			
9	Required Rate of Return on Fair Value Rate Base	11.410%	8.540%
10			
11	Operating Income Deficiency (L7 - L3)	$ 4,610,812	$ 2,833,228
12			
13	Gross Revenue Conversion Factor (Schedule 1, Page 2)	1.6286	1.6506
14			
15	Required Increase in Gross Revenue Requirement (L11 X L13)	$ 7,509,329	$ 4,676,615
16			
17	Adjusted Test Year Revenue	$ 6,475,002	$ 6,878,710
18			
19	Proposed Annual Revenue (L15 + L17)	$ 13,984,331	$ 11,555,325
20			
21	Required Percentage Increase in Revenue (L15 / L17)	115.97%	67.99%
22			
23	Rate of Return on Common Equity	12.500%	8.010%

References:

Column (A): Company Schedules A-1 and C-1
Column (B): RUCO Schedules 2 and 4

GROSS REVENUE CONVERSION FACTOR

LINE NO.	DESCRIPTION	(A)	(B)	(C)	(D)
	CALCULATION OF GROSS REVENUE CONVERSION FACTOR:				
1	Revenue	1.0000			
2	Combined Federal And State Tax Rate (Line 12)	(0.3860)			
3	Staff's Effective Property Tax Factor per Schedule JMM W-2	(0.0082)			
4	Subtotal (Line 1 + Line 2 + Line 3)	0.6058			
5	**Revenue Conversion Factor** (L1 / L4)	**1.6506**			
6					
7	CALCULATION OF EFFECTIVE TAX RATE:				
8	Operating Income Before Taxes (Arizona Taxable Income)	100.0000%			
9	Arizona State Income Tax Rate	6.9680%			
10	Federal Taxable Income (L8 - L9)	93.0320%			
11	Applicable Federal Income Tax Rate (Col. (D), L48)	34.0000%			
12	Effective Federal Income Tax Rate (L10 X L11)	31.6309%			
13	Combined Federal And State Income Tax Rate (L9 + L12)	38.5989%			
14					
15	Required Operating Income (Sch.-1, Pg 1, Col. (B), L7)	$ 3,155,257			
16	Adjusted T.Y. Oper'g Inc. (Loss) (Sch.-1, Pg 1, C (B), L3)	322,028			
17	Required Increase In Operating Income (L15 - L16)		$ 2,833,228		
18					
19	Income Taxes On Recommended Revenue (Col. (D), L43)	$ 1,718,727			
20	Income Taxes On Test Year Revenue (Col. (D), L45)	(62,339)			
21	Required Increase In Revenue To Provide For Income Taxes (L19 - L20)		$ 1,781,066		
22					
23	Property Taxes on Recommended Revenue (Schedule 4, Col (E), L30)	$ 339,203			
24	Property Taxes On Test Year Revenue (Schedule 4, Col. C, L30)	276,882			
25	Required Increase In Revenue To Provide For Property Taxes (L23 - L24)		62,321		
26					
27	Total Required Increase In Revenue (Line 17 + Line 21 + L25)		$ 4,676,615		
28					
29	CALCULATION OF INCOME TAX:			RUCO RECOMMENDED	
30	Revenue (Sch -1, Pg 1, Col. (B), L19)			$ 11,555,325	
31	Operating Expense Excluding Income Tax (Sch 4, Col. (E), L34 - L31)			6,681,342	
32	Synchronized Interest (Col. (C), L53)			421,194	
33	Arizona Taxable Income (L30 - L31 - L32)			$ 4,452,790	
34	Arizona State Income Tax Rate			6.9680%	
35	Arizona Income Tax (L33 X L34)				$ 310,270
36	Fed. Taxable Income (L33 - L35)			$ 4,142,519	
37	Fed. Tax on 1st Inc. Bracket ($1 - $50,000) @ 15%			$ 7,500	
38	Fed. Tax on 2nd Inc. Bracket ($50,001 - $75,000) @ 25%			6,250	
39	Fed. Tax on 3rd Inc. Bracket ($75,001 - $100,000) @ 34%			8,500	
40	Fed. Tax on 4th Inc. Bracket ($100,001 - $335,000) @ 39%			91,650	
41	Fed. Tax on 5th Inc. Bracket ($335,001 - $10M) @ 34%			1,294,557	
42	Total Federal Income Tax (L37 + L38 + L39 + L40 + L41)				1,408,457
43	Combined Federal and State Income Tax (L35 + L42)				$ 1,718,727
44					
45	Test Year Combined Income Tax, RUCO as Adjusted (Sch 4, Col. (C), L31)				$ (62,339)
46	**RUCO Adjustment To Proposed Income Tax (L43 - L45) (See Sch 4, Col. (D), L31)**				**$ 1,781,066**
47					
48	Applicable Federal Income Tax Rate (Col. (D), L42 / Col. (C), L36)				34.00%
49					
50	CALCULATION OF INTEREST SYNCHRONIZATION:				
51	Rate Base			$ 36,946,801	
52	Weighted Avg. Cost of Debt			1.14%	
53	Synchronized Interest (L35 X L36)			$ 421,194	

RATE BASE - ORIGINAL COST

LINE NO.		(A) COMPANY AS FILED OCRB/FVRB	(B) RUCO ADJM'T No. 1	(C) RUCO ADJM'T No. 2	(D) RUCO ADJM'T No. 3	(E) RUCO ADJM'T No. 4	(F) RUCO ADJM'T No. 5	(G) RUCO ADJM'T No. 6	(H) RUCO ADJ'TED OCRB/FVRB
1	Gross Utility Plant in Service	$ 73,731,714	$ (642,746)						$ 73,088,968
2									-
3	Accumulated Depreciation	(9,097,645)	138,173						(8,959,472)
4									-
5	Net Utility Plant in Service (Sum L1 & L3)	$ 64,634,069	$ (504,573)	$ -	$ -	$ -	$ -		$ 64,129,496
6									
7	**Less:**								
8	Advances in Aid Of Construction	$ (24,583,673)				$ 8,677			$ (24,574,996)
9									
10	Contribution in Aid of Const.	$ (3,104,068)				7,888			(3,096,180)
11	Accumulated Amortization of CIAC	860,706							860,706
12	NET CIAC (L10 + L11)	$ (2,243,362)	$ -	$ -	$ -	$ 7,888	$ -		$ (2,235,474)
13									
14	Customer Meter Deposits	$ (68,685)					68,685		$ -
15	Deferred Income Tax	(24,518)						(422,012)	(446,530)
16									
17	***Plus:***								
18	Unamortized Debt Issuance Costs	$ 134,528		$ (134,528)					-
19	Deferred Regulatory Assets	82,561			$ (8,256)				74,305
20									-
21									-
22	TOTAL RATE BASE (Sum Lines's 5,8,12-19)	$ 37,930,920	$ (504,573)	$ (134,528)	$ (8,256)	$ 16,565	$ 68,685	$ (422,012)	$ 36,946,801

References:

Column (A): Company Schedule B-1
Column (B): RUCO Surrebuttal Schedule 2, Page 2
Column (C): Per Company Rebuttal Schedule B-2, Page 2, Adjustment 7
Column (D): RUCO Surrebuttal Schedule 2, Page 3
Column (E): Per Company Rebuttal Schedule B-2, Page 2, Adjustment 4
Column (F): Per Company Rebuttal Schedule B-2, Page 2, Adjustment 6
Column (G): RUCO Surrebuttal Schedule 2, Page 4
Column (H): Sums of Column (A) through Column (G)

EXPLANATION OF RATE BASE ADJUSTMENT NO. 1
TO UTILITY PLANT IN SERVICE

LINE NO.	DESCRIPTION	AMOUNT	REFERENCE
1	RUCO Proposed Utility Plant In Service At End of Test Year	$73,088,968	RUCO Surrebuttal Schedule 3, Page 1
2			
3	Company Proposed Utility Plant In Service At End of Test Year	73,731,714	Company Schedule B-1
4			
5	**RUCO Proposed Adjustment To Utility Plant in Service**	**$ (642,746)**	
6			
7			
8	Accumulated Depreciation At End of Prior Test Year	$ 2,016,268	Staff Amount Per Decision 65436
9	2001 Depreciation Expense	301,164	
10	2002 Depreciation Expense	428,319	
11	2003 Depreciation Expense	680,298	
12	2004 Depreciation Expense	837,311	
13	2005 Depreciation Expense	1,044,743	
14	2006 Depreciation Expense	1,162,853	
15	2007 Depreciation Expense	1,239,248	
16	2008 Depreciation Expense (9 months)	1,335,598	
17	Subtotal	$ 9,045,801	Sum of Lines 16 through 19
18			
19	Less 2003 Retirements	$ (84,979)	
20	Less 2006 Retirements	(1,350)	
21			
22	RUCO Proposed Accumulated Depreciation At End of Test Year	$ 8,959,472	Sum of Lines 17, 19, and 20
23			
24	Company Proposed Accumulated Depreciation At End of Test Year	$ 9,097,645	Company Schedule B-1
25			
26	**RUCO Proposed Adjustment To Accumulated Depreciation**	**$ (138,173)**	Line 22 - Line 24

EXPLANATION OF RATE BASE ADJUSTMENT NO. 3
TO DEFERRED REGULATORY ASSETS

LINE NO.	DESCRIPTION	AMOUNT	REFERENCE
1	Deferred Regulatory Assets Per Company (TCE Plume)	$ 82,561	Company Schedule B-1
2			
3	Amortization Period In Years	10	Company Schedule C-2, Page 13
4			
5	Annual Amortization Expense Per Company	$ 8,256	Line 1 / Line 3
6			
7			
8	Portion of Cost Allocated to Rate Base Per RUCO	$ 74,305	Line 1 - Line 5
9			
10	Cost Allocated to Rate Base Per Company	82,561	Company Schedule B-1
11			
12	**RUCO Proposed Adjustment To Deferred Regulatory Assets**	**$ (8,256)**	Line 8 - Line 10
13			
14			
15	Portion of Cost Allocated to Expense Per RUCO	$ 8,256	Line 1 - Line 8
16			
17	Cost Allocated to Expense Per Company	8,256	Company Schedule C-2, Page 13
18			
19	**RUCO Proposed Adjustment To Miscellaneous Expense**	$ -	Line 15 - Line 17

Calculation of Estimated Deferred Income Taxes

Line No.	Asset Description	Date Placed In Service	Basis for Depreciation	RUCO Proposed S/L Depreciation Rate (%)	Annual S/L Depreciation Expense	Yrs. of Accum. Deprerciation as of Dec. 31, 2006 (Includes Half-Year Convention)	Accumulated Depeciation As of December 31, 2006		Excess of Accelerated Depreciation over S/L Depreciation
							S/L as per RUCO Proposed Rate	Accelerated as per LPSCO 2006 Depreciation Schedule	
1	TRANSMISSION & DIST	6/1/1988	$ 6,404	2.00%	$ 128	18.5	$ 2,369	$ 5,929	$ 3,560
2	METERS	6/1/1990	714	8.33%	59	16.5	981	598	(383)
3	METERS	6/1/1991	665	8.33%	55	15.5	859	528	(331)
4	LINE REPLACEMENT	6/1/1992	46,046	2.00%	921	14.5	13,353	34,406	21,053
5	NEW WELL	6/1/1992	266,687	3.33%	8,881	14.5	128,770	199,265	70,495
6	LINE REPLACEMENT	6/1/1993	2,596	2.00%	52	13.5	701	1,824	1,123
7	OFFICE FURNITURE	6/1/1989	26,188	6.67%	1,747	17.5	30,568	26,188	(4,380)
8	OFFICE FURNITURE	6/1/1990	1,213	6.67%	81	16.5	1,335	1,213	(122)
9	OFFICE EQUIPMENT	6/1/1990	700	6.67%	47	16.5	770	700	(70)
10	OFFICE EQUIPMENT	6/1/1991	2,805	6.67%	187	15.5	2,900	2,805	(95)
11	FIRE HYDRANTS	6/1/1991	5,477	2.00%	110	15.5	1,698	5,424	3,726
12	OFFICE EQUIPMENT	6/1/1992	4,513	6.67%	301	14.5	4,365	4,513	148
13	FIRE HYDRANTS	6/1/1993	106	2.00%	2	13.5	29	95	66
14	SOFTWARE	1/1/1995	703	20.00%	141	11.5	1,617	693	(924)
15	FIRE HYDRANTS	2/1/1995	1,500	2.00%	30	11.5	345	923	578
16	TOOLS - WATER	3/1/1995	647	5.00%	32	11.5	372	647	275
17	METERS & METER BOXES	6/1/1995	94,549	8.33%	7,876	11.5	90,573	57,990	(32,583)
18	8" SEWER HNYSCKLE	2/1/1995	2,413	2.00%	48	11.5	555	1,485	930
19	PUMP STN EQU UPGRADE	6/1/1995	51,302	12.50%	6,413	11.5	73,747	31,466	(42,281)
20	WATER LINE VALVE	12/1/1995	1,613	2.00%	32	11.5	371	989	618
21	WATER LINE REPAIRS	6/1/1995	54,210	2.00%	1,084	11.5	12,468	33,248	20,780
22	WATER METERS	1/31/1996	12,109	8.33%	1,009	10.5	10,591	6,915	(3,676)
23	LINE REPLACEMENT	2/14/1996	70,165	2.00%	1,403	10.5	14,735	40,074	25,339
24	WATER METERS	2/29/1996	1,769	8.33%	147	10.5	1,547	1,010	(537)
25	WELLS	3/18/1996	14,529	3.33%	484	10.5	5,080	8,261	3,181
26	METERS	3/30/1996	8,434	8.33%	703	10.5	7,377	4,795	(2,582)
27	HYDRANTS	4/11/1996	19,156	2.00%	383	10.5	4,023	10,893	6,870
28	METERS	4/30/1996	4,643	8.33%	387	10.5	4,061	2,640	(1,421)
29	METERS	5/15/1996	8,292	8.33%	691	10.5	7,253	4,715	(2,538)
30	METERS	6/24/1996	4,217	8.33%	351	10.5	3,688	2,398	(1,290)
31	SERVICE LINES	6/30/1996	4,411	3.33%	147	10.5	1,542	2,509	967
32	COMPUTER	7/12/1996	192	20.00%	38	10.5	403	192	(211)
33	COMPUTER	7/12/1996	903	20.00%	181	10.5	1,896	903	(993)
34	METERS	7/31/1996	6,254	8.33%	521	10.5	5,470	3,557	(1,913)
35	METERS	8/15/1996	18,373	8.33%	1,530	10.5	16,070	10,448	(5,622)
36	WATER LINES	8/15/1996	241,824	2.00%	4,836	10.5	50,783	137,506	86,723
37									
38	METERS	9/1/1996	13,445	8.33%	1,120	10.5	11,760	7,646	(4,114)
39	SOFTWARE	9/11/1996	1,515	20.00%	303	10.5	3,182	1,515	(1,667)
40	SOFTWARE	9/11/1996	379	20.00%	76	10.5	796	379	(417)
41	METERS	10/1/1996	7,209	8.33%	601	10.5	6,305	3,281	(3,024)
42	METERS	11/1/1996	9,974	8.33%	831	10.5	8,724	4,618	(4,106)
43	SERVICE LINES	11/5/1996	38,759	3.33%	1,291	10.5	13,552	17,945	4,393
44	SEWER PMP CTRL PANEL	11/30/1996	384	12.50%	48	10.5	504	177	(327)
45	TOOLS	12/16/1996	583	5.00%	29	10.5	306	583	277
46	FURNITURE	12/16/1996	219	6.67%	15	10.5	153	219	66
47	FURNITURE	12/16/1996	219	6.67%	15	10.5	153	219	66
48	SERVICES	12/31/1996	5,355	3.33%	178	10.5	1,872	2,479	607
49	METERS	12/31/1996	4,217	8.33%	351	10.5	3,688	1,954	(1,734)
50	L.S. STARTUP	12/31/1996	776	8.33%	65	10.5	679	359	(320)
51	UPGRADE TO STRUCTURE	9/18/1997	216	3.33%	7	9.5	68	53	(15)
52	WELL UPGRADE	8/8/1997	2,204	3.33%	73	9.5	697	861	164
53	CONTROL SYSTEM	8/25/1997	203	3.33%	7	9.5	64	94	30
54	PUMPING UPGRADE	4/22/1997	1,598	12.50%	200	9.5	1,898	736	(1,162)
55	UPGRADE PUMPING EQUIP	10/8/1997	93,433	12.50%	11,679	9.5	110,952	46,359	(64,593)
56	UPGRADE PUMP CONTROL	8/25/1997	29,342	12.50%	3,668	9.5	34,844	14,560	(20,284)
57	WATER TREATMENT UPGR	10/9/1997	964	3.33%	32	9.5	305	480	175
58	UPGRADE TO PUMP CTRL	10/2/1997	19,191	12.50%	2,399	9.5	22,789	9,524	(13,265)
59	UPGRADE TO PUMPS	12/9/1997	367	12.50%	46	9.5	436	183	(253)

Litchfield Park Service Company - Water Division
Docket No. SW-01428A-09-0103 and W-01427A-09-0104
Test Year Ended September 30, 2008

Calculation of Estimated Deferred Income Taxes

Line No.	Asset Description	Date Placed In Service	Basis for Depreciation	RUCO Proposed S/L Depreciation Rate (%)	Annual S/L Depreciation Expense	Yrs. of Accum. Deprerciation as of Dec. 31, 2006 (Includes Half-Year Convention)	Accumulated Depeciation As of December 31, 2006		Excess of Accelerated Depreciation over S/L Depreciation
							S/L as per RUCO Proposed Rate	Accelerated as per LPSCO 2006 Depreciation Schedule	
60	WATER LINES	4/26/1997	1,801	2.00%	36	9.5	342	690	348
61	VALVES	5/12/1997	1,437	2.00%	29	9.5	273	550	277
62	UPGR LG BOOSTER PUMP	9/26/1997	3,668	12.50%	459	9.5	4,356	1,690	(2,666)
63	SERVICE LINES	4/8/1997	10,090	3.33%	336	9.5	3,192	3,869	677
64	SERVICE LINES	6/19/1997	4,698	3.33%	156	9.5	1,486	1,801	315
65	SERVICE LINE REPLACE	10/20/1997	11,206	3.33%	373	9.5	3,545	4,295	750
66	SERVICE LINES	12/9/1997	2,010	3.33%	67	9.5	636	769	133
67	METERS & METER BOXES	1/16/1997	5,030	8.33%	419	9.5	3,980	1,928	(2,052)
68	METERS 1997	6/30/1997	7,205	8.33%	600	9.5	5,702	2,761	(2,941)
69	METERS WATER 1997	12/31/1997	55,272	8.33%	4,604	9.5	43,739	21,188	(22,551)
70	HYDRANTS	12/9/1997	2,029	2.00%	41	9.5	386	778	392
71	TOOLS	6/1/1997	221	5.00%	11	9.5	105	215	110
72	TOOLS	12/31/1997	132	5.00%	7	9.5	63	129	66
73	TOOLS	12/31/1997	33	5.00%	2	9.5	16	33	17
74					-		-		-
75	OFFICE FURNITURE	2/12/1997	146	6.67%	10	9.5	93	146	53
76	COPIER PARTS	5/8/1997	245	6.67%	16	9.5	155	236	81
77	MISC EQUIPMENT	2/12/1996	36	10.00%	4	10.5	38	30	(8)
78	COMPUTER	12/30/1997	2,257	20.00%	451	9.5	4,288	2,198	(2,090)
79	COMPUTER	12/30/1997	564	20.00%	113	9.5	1,072	549	(523)
80	CELL PHONE	5/30/1997	298	10.00%	30	9.5	283	287	4
81	SEWER LINES	8/15/1996	2,489,678	2.00%	49,794	10.5	522,832	1,369,940	847,108
82	SEWER COLLECT SYSTEM	12/15/1997	36,911	2.00%	738	9.5	7,013	14,424	7,411
83	METERS 1998	1/21/1998	10,585	8.33%	882	8.5	7,495	3,527	(3,968)
84	METERS 1998	3/19/1998	9,735	8.33%	811	8.5	6,893	3,244	(3,649)
85	METERS 1998	3/19/1998	1,890	8.33%	157	8.5	1,338	631	(707)
86	METERS 1998	5/27/1998	4,390	8.33%	366	8.5	3,108	1,464	(1,644)
87	METERS 1998	6/11/1998	8,968	8.33%	747	8.5	6,350	2,990	(3,360)
88	METERS 1998	7/11/1998	27,839	8.33%	2,319	8.5	19,711	9,281	(10,430)
89	METERS 1998	8/18/1998	4,530	8.33%	377	8.5	3,207	1,509	(1,698)
90	METERS 1998	9/10/1998	5,435	8.33%	453	8.5	3,848	1,810	(2,038)
91	GENERATOR	1/31/1998	68,655	5.00%	3,433	8.5	29,178	22,885	(6,293)
92	COMPUTER - MAC	5/19/1998	519	20.00%	104	8.5	882	512	(370)
93	COMPUTER - MAC	5/19/1998	2,078	20.00%	416	8.5	3,533	2,049	(1,484)
94	1998 WATER EQUIPMENT	6/1/1998	179,329	3.33%	5,972	8.5	50,759	59,776	9,017
95	SOFTWARE	4/16/1998	325	20.00%	65	8.5	553	325	(228)
96	HYDRANTS	6/1/1998	10,653	2.00%	213	8.5	1,811	3,550	1,739
97	COMPUTER	2/28/1998	1,175	20.00%	235	8.5	1,998	1,077	(921)
98	SOFTWARE	4/16/1998	1,299	20.00%	260	8.5	2,208	1,299	(909)
99	1998 WATER EQUIPMENT	6/1/1998	29,351	3.33%	977	8.5	8,308	9,783	1,475
100	ACEDALINE TORCH	3/31/1998	403	6.67%	27	8.5	228	403	175
101	1998 WATER EQUIPMENT	6/1/1998	180,953	3.33%	6,026	8.5	51,219	60,317	9,098
102	WELL 20B	10/30/1999	179,869	3.33%	5,990	7.5	44,922	26,380	(18,542)
103	1999 WATER EQUIPMENT	6/1/1999	60,570	3.33%	2,017	7.5	15,127	17,768	2,641
104	WATER LINES	12/30/1999	252,528	2.00%	5,051	7.5	37,879	37,039	(840)
105	1999 WATER EQUIPMENT	6/1/1999	411,841	3.33%	13,714	7.5	102,857	120,808	17,951
106	WATER UTILITY - 1986	6/1/1986	794,158		-	20.5		759,744	759,744
107	SOFTWARE	6/1/1999	25,625	20.00%	5,125	7.5	38,438	25,625	(12,813)
108	1999 OFFICE EQUIPMENT	6/1/1999	12,196	6.67%	813	7.5	6,101	12,003	5,902
109	1999 COMPUTER	6/1/1999	11,436	20.00%	2,287	7.5	17,154	11,217	(5,937)
110	TRUCK EQUIPMENT	1/28/2000	901	20.00%	180	6.5	1,171	901	(270)
111					-		-		-
112	POWER GEN PART	6/17/1999	496	5.00%	25	7.5	186	146	(40)
113	COLLECTION LINES	12/7/1999	361,075	2.00%	7,222	7.5	54,161	52,959	(1,202)
114	1999 WATER EQUIPMENT	6/1/1999	14,017	3.33%	467	7.5	3,501	4,113	612
115	RECLAIMED WATER SYST	12/7/1999	303,251	2.00%	6,065	7.5	45,488	44,476	(1,012)
116	TRANSMISSION LINE	12/1/2000	58,813	2.00%	1,176	6.5	7,646	14,900	7,254
117	TRANSMISSION LINE	11/1/2000	59,364	2.00%	1,187	6.5	7,717	18,799	11,082
118	TRANSMISSION LINE	12/1/2000	156,714	2.00%	3,134	6.5	20,373	19,850	(523)

Calculation of Estimated Deferred Income Taxes

Line No.	Asset Description	Date Placed In Service	Basis for Depreciation	RUCO Proposed S/L Depreciation Rate (%)	Annual S/L Depreciation Expense	Yrs. of Accum. Deprerciation as of Dec. 31, 2006 (Includes Half-Year Convention)	Accumulated Depeciation As of December 31, 2006		Excess of Accelerated Depreciation over S/L Depreciation
							S/L as per RUCO Proposed Rate	Accelerated as per LPSCO 2006 Depreciation Schedule	
119	2000 WATER EQUIPMENT	6/1/2000	426,534	3.33%	14,204	6.5	92,323	108,054	15,731
120	OFFICE FURNITURE	12/1/2000	396	6.67%	26	6.5	172	369	197
121	COMPUTER	12/1/2000	3,901	20.00%	780	6.5	5,071	3,826	(1,245)
122	2000 OFFICE FURNITURE	6/1/2000	5,540	6.67%	370	6.5	2,402	5,179	2,777
123	2000 COMPUTER	6/1/2000	19,235	20.00%	3,847	6.5	25,006	18,866	(6,140)
124	DOOR SCREEN	5/1/2000	1,186	3.33%	39	6.5	257	575	318
125	2000 SOFTWARE	6/1/2000	2,462	20.00%	492	6.5	3,201	2,336	(865)
126	2000 WATER EQUIPMENT	6/1/2000	595,048	3.33%	19,815	6.5	128,798	150,745	21,947
127	RECLAIMED WATER LINE	6/1/2000	67,722	2.00%	1,354	6.5	8,804	8,577	(227)
128	SERVICE LINES	8/1/2000	1,014,366	2.00%	20,287	6.5	131,868		(131,868)
129	2001 SOFTWARE	5/1/2001	250	20.00%	50	5.5	275	229	(46)
130	2001 COMPUTER	5/1/2001	4,033	20.00%	807	5.5	4,436	3,904	(532)
131	2001 OFFICE EQUIPMENT	5/1/2001	500	6.67%	33	5.5	183	419	236
132	2001 TOOL & SHOP	5/1/2001	2,586	5.00%	129	5.5	711	1,401	690
133	2001 DISTRIBUTION LINE	5/1/2001	2,327,233	2.20%	51,199	5.5	281,595	246,540	(35,055)
134	2001 WATER EQUIPMENT	5/1/2001	1,877,576	3.33%	62,523	5.5	343,878	393,589	49,711
135	2001 WATER EQUIPMENT	10/1/2001	138,025	3.33%	4,596	5.5	25,279	27,784	2,505
136	SEWER LINES	10/31/2001	61,119	2.00%	1,222	5.5	6,723	6,111	(612)
137	SOFTWARE	12/10/2001	2,100	20.00%	420	5.5	2,310	2,041	(269)
138	OFFICE EQUIPMENT	10/15/2001	1,751	6.67%	117	5.5	642	1,466	824
139	SOFTWARE	12/10/2001	525	20.00%	105	5.5	578	511	(67)
140	FILE DRAWER	10/15/2001	369	6.67%	25	5.5	135	358	223
141	OFFICE EQUIPMENT	10/23/2001	69	6.67%	5	5.5	25	58	33
142	TRANSPORTATION EQUIP	9/18/2001	600	20.00%	120	5.5	660	581	(79)
143	2002 SOFTWARE	6/1/2002	5,352	20.00%	1,070	4.5	4,817	4,560	(257)
144	2002 VEHICLE	11/8/2002	6,695	20.00%	1,339	4.5	6,026	5,025	(1,001)
145	2002 OFFICE EQUIPMENT	6/1/2002	53,503	6.67%	3,569	4.5	16,059	39,381	23,322
146	METERS	6/1/1992	42,470	8.33%	3,538	14.5	51,297	27,037	(24,260)
147	2002 WATER EQUIPMENT	6/1/2002	11,776,139	3.33%	392,145	4.5	1,764,654	2,046,210	281,556
148					-		-		-
149	WATER EQUIPMENT	2/1/2003	67,808	3.33%	2,258	3.5	7,903	10,396	2,493
150	TOOLS & EQUIPMENT	9/1/2003	5,793	5.00%	290	3.5	1,014	3,846	2,832
151	SEWER PLANT & EQUIP	9/1/2003	529	3.33%	18	3.5	62	70	8
152	LABORATORY EQUIPMENT	9/1/2003	1,140	10.00%	114	3.5	399	153	(246)
153	COMMUNICATION EQUIP	3/31/3003	1,583	10.00%	158	3.5	554	1,257	703
154	COMMUNICATION EQUIP	9/1/2003	7,189	10.00%	719	3.5	2,516	5,706	3,190
155	OFFICE FURNITURE	3/31/3003	517	6.67%	34	3.5	121	344	223
156	OFFICE FURNITURE	9/1/2003	15,296	6.67%	1,020	3.5	3,571	10,152	6,581
157	POST '96 AIAC REFUNDS	3/31/3003	2,997	3.33%	100	3.5	349	450	101
158	COMMUNICATION EQUIP	1/1/2004	4,513	10.00%	451	2.5	1,128	543	(585)
159	DISTRIBUTION RESERVOIR	2/1/2004	58,886	2.20%	1,295	2.5	3,239	6,869	3,630
160	HYDRANTS	2/1/2004	194	2.00%	4	2.5	10	23	13
161	FLOW MEASURING DEVICE	3/1/2004	5,326	10.00%	533	2.5	1,332	604	(728)
162	COLLECTION SEWERS FO	11/1/2004	20,252	2.00%	405	2.5	1,013	1,755	742
163	LABORATORY EQUIPMENT	9/1/2004	2,046	10.00%	205	2.5	512	191	(321)
164	METERS & METER INS	7/1/2004	152,100	8.33%	12,670	2.5	31,675	15,210	(16,465)
165	OFFICE FURNITURE & EQUIP	4/1/2004	65,136	6.67%	4,345	2.5	10,861	36,652	25,791
166	PUMPING EQUIPMENT	3/1/2004	51,387	12.50%	6,423	2.5	16,058	5,823	(10,235)
167	SERVICE LINES	7/1/2004	88,747	3.33%	2,955	2.5	7,388	8,875	1,487
168	LAND & LAND RIGHTS	4/1/2004	41,026	0.00%	-	2.5	-		-
169	STRUCTURES & IMPRO	10/1/2004	297,972	3.33%	9,922	2.5	24,806	26,818	2,012
170	POWER GENERATION EQUIP	8/1/2004	60,383	5.00%	3,019	2.5	7,548	5,836	(1,712)
171	TOOLS, SHOP & GARAGE	7/1/2004	323	5.00%	16	2.5	40	32	(8)
172	TRANSMISSION & DIST MAINS	5/1/2004	1,186,484	2.00%	23,730	2.5	59,324	126,558	67,234
173	WATER TREATMENT EQUIP	6/1/2004	26,811	3.33%	893	2.5	2,232	2,770	538
174	WELLS & SPRINGS	6/1/2004	2,080	3.33%	69	2.5	173	215	42
175	TRANSPORTATION EQUIP	9/1/2004	14,112	20.00%	2,822	2.5	7,056	1,316	(5,740)
176	OTHER TANGIBLE PLANT	3/1/2004	52,734	10.00%	5,273	2.5	13,184	5,976	(7,208)
177	POST '96 AIAC REFUNDS	7/1/2004	143,251	3.33%	4,770	2.5	11,926	14,325	2,399

Calculation of Estimated Deferred Income Taxes

Line No.	Asset Description	Date Placed In Service	Basis for Depreciation	RUCO Proposed S/L Depreciation Rate (%)	Annual S/L Depreciation Expense	Yrs. of Accum. Deprerciation as of Dec. 31, 2006 (Includes Half-Year Convention)	Accumulated Depeciation As of December 31, 2006 S/L as per RUCO Proposed Rate	Accumulated Depeciation As of December 31, 2006 Accelerated as per LPSCO 2006 Depreciation Schedule	Excess of Accelerated Depreciation over S/L Depreciation
178	WATER EQUIPMENT - JAN	1/1/2005	196,930	3.33%	6,558	1.5	9,837	15,754	5,917
179	WATER EQUIPMENT - FEB	2/1/2005	65,175	3.33%	2,170	1.5	3,255	4,997	1,742
180	WATER EQUIPMENT - MARCH	3/1/2005	55,130	3.33%	1,836	1.5	2,754	4,043	1,289
181	OFFICE FURNITURE	3/1/2005	11,690	6.67%	780	1.5	1,170	4,534	3,364
182	WATER EQUIPMENT - APRIL	4/1/2005	41,622	3.33%	1,386	1.5	2,079	2,914	835
183	OFFICE FURNITURE	4/1/2005	105	6.67%	7	1.5	11	41	30
184	COMPUTERS	4/1/2005	2,460	20.00%	492	1.5	738	1,279	541
185					-		-		-
186	WATER EQUIP - MAY	5/1/2005	99,464	3.33%	3,312	1.5	4,968	6,631	1,663
187	WATER EQUIP - JUNE	6/1/2005	285,963	3.33%	9,523	1.5	14,284	18,111	3,827
188	WATER EQUIP - JULY	7/1/2005	85,126	3.33%	2,835	1.5	4,252	5,108	856
189	WATER EQUIP - AUGUST	8/1/2005	172,145	3.33%	5,732	1.5	8,599	9,755	1,156
190	WATER EQUIP - SEPT	9/1/2005	260,636	3.33%	8,679	1.5	13,019	13,900	881
191	WATER EQUIP - OCT	10/1/2005	65,749	3.33%	2,189	0.5	1,095	657	(438)
192	WATER EQUIP - NOV	11/1/2005	84,208	3.33%	2,804	1.5	4,206	3,929	(277)
193	WATER EQUIP - DEC	12/1/2005	546,547	3.33%	18,200	1.5	27,300	23,684	(3,616)
194	METERS &	1/15/2006	77,741	8.33%	6,476	0.5	3,238	1,555	(1,683)
195	TRANSMISSION	1/15/2006	747	2.00%	15	0.5	7	30	23
196	FORCE	1/15/2006	40,291	2.00%	806	0.5	403	1,612	1,209
197	PUMPING	1/15/2006	500	12.50%	63	0.5	31	20	(11)
198	STRUCTURES & IMPRO	1/15/2006	1,350	3.33%	45	0.5	22	54	32
199	PUMPING	2/15/2006	7,509	12.50%	939	0.5	469	275	(194)
200	METERS &	2/15/2006	69,281	8.33%	5,771	0.5	2,886	2,540	(346)
201	TREATMENT	2/15/2006	2,429	3.33%	81	0.5	40	89	49
202	TRANSMISSION	2/15/2006	150	2.00%	3	0.5	2	6	5
203	METERS &	3/15/2006	36,114	8.33%	3,008	0	-		-
204	FORCE	3/15/2006	450	2.00%	9	0.5	5	15	11
205	TRANSMISSION	3/15/2006	125	2.00%	3	0	-		-
206	SERVICES	3/15/2006	1,869	3.33%	62	0.5	31	62	31
207	TRANSMISSION	4/15/2006	7,188	2.00%	144	0.5	72	216	144
208	METERS &	4/15/2006	3,357	8.33%	280	0.5	140	101	(39)
209	OFFICE FURNITURE	4/12/2006	472	6.67%	31	0.5	16	84	68
210	OTHER TANGIBLE PLANT	4/30/2006	18,106	6.67%	1,208	0.5	604	483	(121)
211	SERVICES	4/30/2006	3,320	3.33%	111	0.5	55	89	34
212	TREATMENT	4/30/2006	11,236	3.33%	374	0.5	187	300	113
213	FORCE	4/30/2006	300	2.00%	6	0.5	3	8	5
214	TRANSMISSION	5/29/2006	100	2.00%	2	0.5	1	2	1
215	METERS &	5/17/2006	21,910	8.33%	1,825	0.5	913	511	(402)
216	OFFICE FURNITURE	5/4/2006	2,191	6.67%	146	0.5	73	391	318
217	LABORATORY EQUIPMENT	5/31/2006	3,221	10.00%	322	0.5	161	77	(84)
218	OTHER TANGIBLE PLANT	5/31/2006	2,638	6.67%	176	0.5	88	62	(26)
219	SERVICES	5/16/2006	2,781	3.33%	93	0.5	46	65	19
220	TREATMENT	5/31/2006	36,458	3.33%	1,214	0.5	607	851	244
221	POWER GENERATOR	5/31/2006	16,426	5.00%	821	0.5	411	383	(28)
222					-		-		-
223	METERS &	6/13/2006	19,511	8.33%	1,625	0.5	813	455	(358)
224	SERVICES	6/19/2006	12,400	3.33%	413	0.5	206	248	42
225	LABORATORY EQUIPMENT	6/30/2006	1,957	10.00%	196	0.5	98	39	(59)
226	OTHER TANGIBLE PLANT	6/30/2006	801	6.67%	53	0	-		-
227	PUMPING	6/29/2006	3,100	12.50%	388	0.5	194	62	(132)
228	WELLS & SPRINGS	6/30/2006	48,928	3.33%	1,629	0.5	815	979	164
229	STRUCTURES & IMPRO	6/29/2006	150	3.33%	5	0.5	2	3	1
230	METERS &	7/31/2006	19,031	8.33%	1,585	0.5	793	317	(476)
231	SERVICES	7/31/2006	33,252	3.33%	1,107	0.5	554	554	0
232	TREATMENT	7/10/2006	5,403	3.33%	180	0.5	90	108	18
233	FORCE	7/31/2006	579,402	2.00%	11,588	0.5	5,794	9,657	3,863
234	STRUCTURES & IMPRO	7/31/2006	730,847	3.33%	24,337	0.5	12,169	12,181	12
235	POWER GENERATOR	7/31/2006	115,679	5.00%	5,784	0.5	2,892	1,928	(964)
236	HYDRANTS	7/31/2006	41,743	2.00%	835	0.5	417	696	279
237	TRANSMISSION	8/31/2006	108,904	2.00%	2,178	0.5	1,089	1,452	363

Calculation of Estimated Deferred Income Taxes

Line No.	Asset Description	Date Placed In Service	Basis for Depreciation	RUCO Proposed S/L Depreciation Rate (%)	Annual S/L Depreciation Expense	Yrs. of Accum. Deprerciation as of Dec. 31, 2006 (Includes Half-Year Convention)	Accumulated Depeciation As of December 31, 2006: S/L as per RUCO Proposed Rate	Accumulated Depeciation As of December 31, 2006: Accelerated as per LPSCO 2006 Depreciation Schedule	Excess of Accelerated Depreciation over S/L Depreciation
238	METERS &	8/7/2006	37,926	8.33%	3,159	0.5	1,580	632	(948)
239	OFFICE FURNITURE	8/30/2006	5,263	6.67%	351	0.5	176	564	388
240	SERVICES	8/31/2006	7,400	3.33%	246	0.5	123	99	(24)
241	HYDRANTS	8/31/2006	1,100	2.00%	22	0.5	11	15	4
242	STRUCTURES & IMPRO	8/31/2006	65,100	3.33%	2,168	0.5	1,084	868	(216)
243	METERS &	9/30/2006	19,717	8.33%	1,642	0.5	821	197	(624)
244	OFFICE FURNITURE	9/27/2006	1,577	6.67%	105	0.5	53	169	116
245	SERVICES	9/22/2006	8,850	3.33%	295	0.5	147	89	(58)
246	STRUCTURES & IMPRO	9/30/2006	39,372	3.33%	1,311	0.5	656	394	(262)
247	METERS &	10/31/2006	20,737	8.33%	1,727	0.5	864	138	(726)
248	OFFICE FURNITURE	10/30/2006	2,465	6.67%	164	0.5	82	88	6
249	SERVICES	10/31/2006	8,755	3.33%	292	0.5	146	58	(88)
250	TREATMENT	10/30/2006	34,268	3.33%	1,141	0.5	571	228	(343)
251	STRUCTURES & IMPRO	10/30/2006	23,256	3.33%	774	0.5	387	155	(232)
252	PUMPING	10/30/2006	60	12.50%	8	0.5	4		(4)
253	TRANSPORT	10/31/2006	2,429	20.00%	486	0.5	243	16	(227)
254	METERS &	11/30/2006	209	8.33%	17	0.5	9	1	(8)
255	OFFICE FURNITURE	11/30/2006	85,082	6.67%	5,675	0.5	2,837	3,037	200
256	TREATMENT	11/30/2006	14,216	3.33%	473	0.5	237	47	(190)
257	FORCE	11/30/2006	135,206	2.00%	2,704	0.5	1,352	451	(901)
258	PUMPING	11/30/2006	2,400	12.50%	300	0.5	150	8	(142)
259					-		-		-
260	STRUCTURES & IMPRO	11/30/2006	28,036	3.33%	934	0.5	467	93	(374)
261	HYDRANTS	11/30/2006	30	2.00%	1	0.5	0		(0)
262	TRANSMISSION	12/31/2006	238,303	2.00%	4,766	0.5	2,383		(2,383)
263	METERS &	12/31/2006	68,617	8.33%	5,716	0.5	2,858		(2,858)
264	OFFICE FURNITURE	12/31/2006	18,468	6.67%	1,232	0.5	616	659	43
265	SERVICES	12/31/2006	68,846	3.33%	2,293	0.5	1,146		(1,146)
266	FORCE	12/31/2006	900	2.00%	18	0.5	9		(9)
267	DISTRIBUTION MAINS	12/31/2006	16,657	2.00%	333	0.5	167		(167)
268	HYDRANTS	12/31/2006	7,800	2.00%	156	0.5	78		(78)
269	STRUCTURES & IMPRO	12/31/2006	650	3.33%	22	0.5	11		(11)
270	WELLS & SPRINGS	12/31/2006	4,000	3.33%	133	0.5	67		(67)
271	FLOW MEASURING EQUIP	12/31/2006	4,961	10.00%	496	0.5	248		(248)
272	TRANSPORT	12/31/2006	6,193	20.00%	1,239	0.5	619		(619)
273									
274	**TOTALS**		$ 32,957,874				$ 5,214,316	$ 7,104,035	$ 1,889,719
275									

276 ***Information Derived from LPSCO 2006 Depreciation Schedule (provided in response to JMM 1.55)***

277

	Calculated as per Information Shown Above	Adjusted as per Information Shown Above
278		
279		
280		
281		
282		
283 Total Accelerated Depreciation	$ 7,104,035	$ 7,104,035
284 Add: Depreciation Expense Not Taken	-	131,868
285 Less: S/L Depreciation	(5,214,316)	(5,214,316)
286		
287 Excess Accelerated Depreciation	$ (1,889,719)	$ (2,021,587)
288		
289 Total Tax Percentage	38.60%	38.60%
290		
291 Estimated Deferred Income Taxes	$ (729,432)	$ (780,333)
292		
293 Water Division Allocation Factor		57.2230%
294		
295 Water Division Deferred Tax Liability		$ (446,530)
296		
297 Company Amount Per Schedule B-1		24,518
298		
299 **RUCO Adjustment to Deferred Taxes**		**$ (422,012)**

UTILITY PLANT IN SERVICE SCHEDULE
TEST YEAR ENDED SEPTEMBER 30, 2008

LINE NO.	ACCT. NO.	ACCOUNT NAME	(A) COMPANY ADJUSTED TEST YEAR	(B) RUCO SURREBUTTAL ADJUSTMENTS	(C) RUCO SURREBUTTAL PLANT VALUE
1	301	Organization	$ -	$ 21,100	$ 21,100
2	302	Franchises	-	-	-
3	303	Land and Land Rights	1,284,595	(96,170)	1,188,425
4	304	Structures and Improvements	24,698,293	(446,942)	24,251,351
5	307	Wells and Springs	2,382,102	(5,373)	2,376,729
6	310	Power Generation Equipment	202,269	-	202,269
7	311	Electric Pumping Equipment	948,213	(40,985)	907,228
8	320	Water Treatment Equipment	1,337,824	(20,253)	1,317,571
9	320.1	Water Treatment Plants	1,866,965	18,805	1,885,770
10	320.2	Chemical Solution Feeders	-	-	-
11	330	Distribution Reservoirs & Standpipes	430,644	(3,839)	426,805
12	330.1	Storage Tanks	-	-	-
13	330.2	Pressure Tanks	-	-	-
14	331	Transmission and Distribution Mains	28,929,171	(18,048)	28,911,123
15	333	Services	4,249,744	(38,961)	4,210,783
16	334	Meters	4,138,752	(1,739)	4,137,013
17	335	Hydrants	2,055,781	(1,258)	2,054,523
18	336	Backflow Prevention Devices	38,387	-	38,387
19	339	Other Plant and Miscellaneous Equipment	265,281	(5,175)	260,106
20	340	Office Furniture and Equipment	551,757	-	551,757
21	340.1	Computers and Software	-	-	-
22	341	Transportation Equipment	177,165	-	177,165
23	342	Stores Equipment	31,711	-	31,711
24	343	Tools, Shop, and Garage Equipment	23,350	-	23,350
25	344	Laboratory Equipment	-	-	-
26	345	Power Operated Equipment	-	-	-
27	346	Communications Equipment	119,710	(3,908)	115,802
28	347	Miscellaneous Equipment	-	-	-
29	348	Other Tangible Plant	-	-	-
30					
31		**TOTAL WATER UTILITY PLANT IN SERVICE**	**$ 73,731,714**	**$ (642,746)**	**$ 73,088,968**

TEST YEAR PLANT SCHEDULE
YEAR ENDED SEPTEMBER 30, 2008

LINE NO.	ACCT. NO.	ACCOUNT NAME	COMPANY AS FILED	RUCO ADJ 1	RUCO ADJ 2	RUCO ADJ 3	RUCO ADJ 4	RUCO ADJ 5	RUCO ADJ 6	RUCO ADJ 7	RUCO ADJ 8	TOTAL PG 1 ADJ
1	301	Organization	$ -	$ 21,100								$ 21,100
2	302	Franchises	-									-
3	303	Land and Land Rights	1,284,595								$ (96,170)	(96,170)
4	304	Structures and Improvements	24,698,293		$ (47,721)	$ 602	$ 28,165	$ 22,752	$ 99,915			103,713
5	307	Wells and Springs	2,382,102				8,385		166	1,925		10,476
6	310	Power Generation Equipment	202,269									-
7	311	Electric Pumping Equipment	948,213		(31,158)	199	8,399					(22,560)
8	320	Water Treatment Equipment	1,337,824				3,517	9,690	2,049	6,948		22,204
9	320.1	Water Treatment Plants	1,866,965									-
10	320.2	Chemical Solution Feeders	-									-
11	330	Distribution Reservoirs & Standpipes	430,644					3,381	969	111		4,461
12	330.1	*Storage Tanks*	-									-
13	330.2	Pressure Tanks	-									-
14	331	Transmission and Distribution Mains	28,929,171									-
15	333	Services	4,249,744			4,734	6,563	400				11,697
16	334	Meters	4,138,752			280	477	204				961
17	335	Hydrants	2,055,781			511	163			18		692
18	336	Backflow Prevention Devices	38,387									-
19	339	Other Plant and Miscellaneous Equipment	265,281									-
20	340	Office Furniture and Equipment	551,757									-
21	340.1	Computers and Software	-									-
22	341	Transportation Equipment	177,165									-
23	342	Stores Equipment	31,711									-
24	343	Tools, Shop, and Garage Equipment	23,350									-
25	344	Laboratory Equipment	-									-
26	345	Power Operated Equipment	-									-
27	346	Communications Equipment	119,710				1,394	1,883	28	787		4,092
28	347	Miscellaneous Equipment	-									-
29	348	Other Tangible Plant	-									-
30												
31												
32	TOTAL WATER PLANT		$ 73,731,714	$ 21,100	$ (78,879)	$ 6,326	$ 57,063	$ 38,310	$ 103,127	$ 9,789	$ (96,170)	$ 60,666

ADJ 1 Replace Organization Costs as approved by last Decision
ADJ 2 Retire Litchfield Greens Booster Pump Station in 2003
ADJ 3 Reverse Company Adjustment for 2004 Affiliate Profit
ADJ 4 Reverse Company Adjustment for 2005 Affiliate Profit
ADJ 5 Reverse Company Adjustment for 2006 Affiliate Profit
ADJ 6 Reverse Company Adjustment for 2007 Affiliate Profit
ADJ 7 Reverse Company Adjustment for 2008 Affiliate Profit
ADJ 8 Remove unsupported affiliate labor and accruals, and rent from 2008 plant additions

Capitalized Affiliate Labor - Algonquin	$ (27,040)
Capitalized Affiliate Labor - New Spring	(40,013)
Rent to Maryland 40, LLC	(9,000)
Unsupported Accurals	(20,117)
Total Adjustment 8	$ (96,170)

TEST YEAR PLANT SCHEDULE
YEAR ENDED SEPTEMBER 30, 2008

LINE NO.	ACCT. NO.	ACCOUNT NAME	RUCO ADJ 9	RUCO ADJ 10	RUCO ADJ 11	RUCO ADJ 12	RUCO ADJ 13	RUCO ADJ 14	RUCO ADJ 15	RUCO ADJ 16	RUCO ADJ 17	TOTAL PG 2 ADJ
1	301	Organization										$ -
2	302	Franchises										-
3	303	Land and Land Rights		$ (1,125)		$ (33,156)		$ (267,183)		$ (7,072)		-
4	304	Structures and Improvements	(6,200)			(19,238)	(1,800)					(308,536)
5	307	Wells and Springs										(27,238)
6	310	Power Generation Equipment		(375)	(18,050)							-
7	311	Electric Pumping Equipment			(7,188)		(3,700)	(31,569)				(18,425)
8	320	Water Treatment Equipment										(42,457)
9	320.1	Water Treatment Plants										-
10	320.2	Chemical Solution Feeders										-
11	330	Distribution Reservoirs & Standpipes						(8,300)				(8,300)
12	330.1	Storage Tanks										-
13	330.2	Pressure Tanks										-
14	331	Transmission and Distribution Mains										-
15	333	Services		(10,915)	(14,360)	(875)			(8,700)	(4,170)		(39,020)
16	334	Meters		(800)	(1,325)	(575)						(2,700)
17	335	Hydrants			(1,450)			(100)				(1,550)
18	336	Backflow Prevention Devices										-
19	339	Other Plant and Miscellaneous Equipment			(5,175)							(5,175)
20	340	Office Furniture and Equipment										-
21	340.1	Computers and Software										-
22	341	Transportation Equipment										-
23	342	Stores Equipment										-
24	343	Tools, Shop, and Garage Equipment										-
25	344	Laboratory Equipment										-
26	345	Power Operated Equipment										-
27	346	Communications Equipment						(8,000)				(8,000)
28	347	Miscellaneous Equipment										-
29	348	Other Tangible Plant										-
30												
31												
32	TOTAL WATER PLANT		$ (6,200)	$ (13,215)	$ (47,548)	$ (53,844)	$ (5,500)	$ (315,152)	$ (8,700)	$ (11,242)	$ -	$ (461,401)

ADJ 9
ADJ 10 Remove 2004 unsupported affiliate labor costs by estimated year related asset placed in service.
ADJ 11 Remove 2005 unsupported affiliate labor costs by estimated year related asset placed in service.
ADJ 12 Remove 2006 unsupported affiliate labor costs by estimated year related asset placed in service.
ADJ 13 Remove 2007 unsupported affiliate labor costs by estimated year related asset placed in service.
ADJ 14 Remove 2008 unsupported affiliate labor costs by estimated year related asset placed in service.
ADJ 15 Remove 3 repair invoices ($3,000 times 2, and 1 @ $2,700) from 2001 plant additions.
ADJ 16 Remove 2 repair invoices from Yahweh ($2,085 times 2) and 1 rent invoice from Suncor ($7,072) from 2002 plant additions.
ADJ 17 Deleted

TEST YEAR PLANT SCHEDULE
YEAR ENDED SEPTEMBER 30, 2008

LINE NO.	ACCT. NO.	ACCOUNT NAME	RUCO ADJ 18	RUCO ADJ 19	RUCO ADJ 20	RUCO ADJ 21	RUCO ADJ 22	RUCO ADJ 23	RUCO ADJ 24	TOTAL PG 3 ADJ	TOTAL ALL ADJS
1	301	Organization								-	$ 21,100
2	302	Franchises								-	-
3	303	Land and Land Rights								-	(96,170)
4	304	Structures and Improvements	(242,119)							(242,119)	(446,942)
5	307	Wells and Springs						11,389		11,389	(5,373)
6	310	Power Generation Equipment								-	-
7	311	Electric Pumping Equipment		-		-		-		-	(40,985)
8	320	Water Treatment Equipment								-	(20,253)
9	320.1	Water Treatment Plants							18,805	18,805	18,805
10	320.2	Chemical Solution Feeders								-	-
11	330	Distribution Reservoirs & Standpipes								-	(3,839)
12	330.1	Storage Tanks								-	-
13	330.2	Pressure Tanks								-	-
14	331	Transmission and Distribution Mains		(26,648)				8,600		(18,048)	(18,048)
15	333	Services	(8,411)		(3,227)					(11,638)	(38,961)
16	334	Meters								-	(1,739)
17	335	Hydrants					(400)			(400)	(1,258)
18	336	Backflow Prevention Devices								-	-
19	339	Other Plant and Miscellaneous Equipment								-	(5,175)
20	340	Office Furniture and Equipment								-	-
21	340.1	Computers and Software								-	-
22	341	Transportation Equipment								-	-
23	342	Stores Equipment								-	-
24	343	Tools, Shop, and Garage Equipment								-	-
25	344	Laboratory Equipment								-	-
26	345	Power Operated Equipment								-	-
27	346	Communications Equipment								-	(3,908)
28	347	Miscellaneous Equipment								-	-
29	348	Other Tangible Plant								-	-
30											
31											
32		TOTAL WATER PLANT	$ (250,530)	$ (26,648)	$ (3,227)	$ -	$ (400)	$ 19,989	$ 18,805	$ (242,011)	$ (642,746)

ADJ 18 Remove 1 repair invoice from Pyramid West Pipeline ($1,391), 1 unsupported amount from Pyramid ($7,020), and a journal entry amount not supported by backup ($242,119) from 2004 plant additions.
ADJ 19 Remove several repair invoices from Ram Pipelines that total $26,648 from 2005 plant additions.
ADJ 20 Remove 1 repair invoice from Yahweh ($2,450), and 1 repair invoice from Ram Pipelines ($777) from 2006 plant additions.
ADJ 21 Deleted
ADJ 22 Remove repair invoice from MS Hernandez Construction for $400 from 2003.
ADJ 23 Capitalize amount removed from expenses per RUCO Income Statement adjustment 4a.
ADJ 24 Increase post test year plant per Company Rebuttal Schedule B-2, Page 3.

OPERATING INCOME

LINE NO.	DESCRIPTION	(A) COMPANY AS FILED	(B) RUCO TEST YEAR ADJM'TS	REF	(C) RUCO TEST YEAR AS ADJ'TED	(D) RUCO PROPOSED INCREASE	(E) RUCO AS RECOMM'D
1	Revenues						
2	Metered Water Revenue	$6,347,481	$ 403,707	1	$ 6,751,188	$ 4,676,615	$ 11,427,803
3	Unmetered Water Revenue	-			-		-
4	Other Water Revenue	127,522			127,522		127,522
5					-		-
6	TOTAL OPERATING REVENUE	$6,475,003	$ 403,707		$ 6,878,710	$ 4,676,615	$ 11,555,325
7							
8	Operating Expenses						
9	Salaries & Wages	$ -			$ -		$ -
10	Purchased Water	5,011			5,011		5,011
11	Purchased Power	1,013,811			1,013,811		1,013,811
12	Fuel for Power Production	58,147	(56,381)	2	1,766		1,766
13	Chemicals	503,278	(1,054)	3	502,224		502,224
14	Repairs and Maintenance	44,001			44,001		44,001
15	Office Supplies and Expense	-			-		-
16	Outside Services	12,469			12,469		12,469
17	Outside Services - Other	2,382,976	(324,876)	4a-d	2,058,100		2,058,100
18	Outside Services - Legal	14,317			14,317		14,317
19	Water Testing	28,365	(590)	5	27,775		27,775
20	Rents	10,647			10,647		10,647
21	Transportation Expenses	151,879	(24,761)	6	127,118		127,118
22	Insurance - General Liability	95,469			95,469		95,469
23	Insurance - Health and Life	3,319			3,319		3,319
24	Regulatory Comm, Expense	63,662			63,662		63,662
25	Regulatory Comm, Exp. - Rate Case	70,000	(28,000)	7	42,000		42,000
26	Miscellaneous Expense	81,664	(22,027)	8	59,637		59,637
27	Bad Debt Expense	3,264			3,264		3,264
28	Depreciation & Amortization	2,291,982	(34,434)	9a-b	2,257,548		2,257,548
29	Taxes Other Than Income	-			-		-
30	Property Taxes	373,354	(96,472)	10	276,882	62,321	339,203
31	Income Tax	(449,717)	387,378	11	(62,339)	1,781,066	1,718,727
32					-		-
33							
34	TOTAL OPERATING EXPENSES	$6,757,898	$ (201,216)		$ 6,556,682	$ 1,843,387	$ 8,400,069
35							
36	**OPERATING INCOME (LOSS)**	**$ (282,895)**	**$ 604,923**		**$ 322,028**	**$ 2,833,228**	**$ 3,155,257**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 3
TO CHEMICALS

LINE NO.	DESCRIPTION	REFERENCE	AMOUNT
1	HILL BROTHERS CHEMICAL CO.	Invoice 04293499	$ (305)
2	HOME DEPOT	JE 47955	(749)
3			
4			
5			
6			
7	**RUCO Adjustment To Remove Expenses Outside of Test Year**		**$ (1,054)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4a
TO OUTSIDE SERVICES - OTHER

LINE NO.	DESCRIPTION	AMOUNT	REFERENCE
1	Hydro Controls and Pump Systems (Clocks for well sites)	$ (1,114)	Invoice No. 227 (June 9, 2008)
2	Narasimhan Consulting Services (Distribution System Evaluation)	(8,600)	Invoice No. 0252-1 (Oct. 27, 2007)
3	Southwest Ground-water Consultants (Well Spacing Evaluation)	(1,380)	Invoice No. B.1426-2-1 (Feb. 13, 2008)
4	Southwest Ground-water Consultants (Well Rehabilitation-Dry Ice)	(4,072)	Invoice No. B.1591-2 (Mar. 20, 2008)
5	Southwest Ground-water Consultants (Well Impact Analysis)	(4,823)	Invoice No. B.1688-1 (Sept. 8, 2008)
6			
7	**RUCO Adjustment To Remove Expenses To Be Capitalized**	**$ (19,989)**	
8			
9			
10	Southwest Ground-water Consultants (Recharge Characterization)	(2,613)	Invoice No. B.1426-11 (June 25, 2008)
11	Southwest Ground-water Consultants (Report for Production Well)	(1,225)	Invoice No. B.1661-1V (July 11, 2008)
12	Southwest Ground-water Consultants (Report for Production Well)	(2,800)	Invoice No. B.1661-1 (July 11, 2008)
13	Burke Hansen, LLC (Real estate appraisal)	(3,000)	Invoice No. 8107N (June 5, 2008)
14			
15	**RUCO Adjustment to Remove Non-Recurring Expenses**	**$ (9,638)**	
16			
17	**TOTAL RUCO ADJUSTMENT TO OUTSIDE SERVICES - OTHER**	**$ (29,626)**	

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4b
TO OUTSIDE SERVICES - OTHER

LINE NO.	GENERAL LEDGER ACCOUNT	VENDOR	DESCRIPTION	AMOUNT
1	Central Office - Accounting/Administration	Algonquin Power Trust	GENERAL ACCTIN FEE - LPSCO	$ (2,689)
2	Central Office - Human Resources	Algonquin Power Trust	GEN HR FEE- LPSCO	(12,790)
3	Central Office - Information Technology	Algonquin Power Trust	GEN IT FEE- LPSCO	(1,127)
4	Central Office - Operations	Algonquin Power Trust	GENERAL OPS	(1,146)
5	Central Office Fixed Overhead Costs	Algonquin Power Trust	MGMT FEE- LPSCO	(269,047)
6				
7			**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**	**$ (286,799)**

Note: Descriptions above are per company journal entries in the general ledger.

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4d
TO OUTSIDE SERVICES - OTHER

LINE NO.	GENERAL LEDGER ACCOUNT	VENDOR	DESCRIPTION	AMOUNT
1	Admin Allocation - AWS	Algonquin Water Services	Recon fees to 4 factor	$ -
2	Contractual Services-AWS	Algonquin Water Services	Recon fees to 4 factor	-
3	Contractual Services-AWS	Algonquin Water Services	Recon fees to 4 factor	-
4				
5				
6	**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**			**$ -**

Note: Descriptions above are per company journal entries in the general ledger.

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 9a
TO DEPRECIATION EXPENSE

LINE NO.	ACCT NO.	PLANT ACCOUNT	RUCO ORIGINAL COST	PROPOSED DEPR RATE	PROPOSED DEPR EXPENSE
1	301	Organization	$ 21,100	0.00%	$ -
2	302	Franchises	-	0.00%	-
4	303	Land and Land Rights	1,188,425	0.00%	-
5	304	Structures and Improvements	24,251,351	3.33%	807,570
6	307	Wells and Springs	2,376,729	3.33%	79,145
7	310	Power Generation Equipment	202,269	5.00%	10,113
8	311	Electric Pumping Equipment	907,228	12.50%	113,404
9	320	Water Treatment Equipment	1,317,571	3.33%	43,875
10	320.1	Water Treatment Plants	1,885,770	3.33%	62,796
11	320.2	Chemical Solution Feeders	-	2.22%	-
12	330	Distribution Reservoirs & Standpipes	426,805	2.20%	9,390
13	330.1	Storage Tanks	-	2.20%	-
14	330.2	Pressure Tanks	-	5.00%	-
15	331	Transmission and Distribution Mains	28,911,123	2.00%	578,222
16	333	Services	4,210,783	3.33%	140,219
17	334	Meters	4,137,013	8.33%	344,613
18	335	Hydrants	2,054,523	2.00%	41,090
19	336	Backflow Prevention Devices	38,387	6.67%	2,560
20	339	Other Plant and Miscellaneous Equipment	260,106	6.67%	17,349
21	340	Office Furniture and Equipment	551,757	6.67%	36,802
22	340.1	Computers and Software	-	20.00%	-
23	341	Transportation Equipment	177,165	20.00%	35,433
24	342	Stores Equipment	31,711	4.00%	1,268
25	343	Tools, Shop, and Garage Equipment	23,350	5.00%	1,168
26	344	Laboratory Equipment	-	10.00%	-
27	345	Power Operated Equipment	-	5.00%	-
28	346	Communications Equipment	115,802	10.00%	11,580
29	347	Miscellaneous Equipment	-	10.00%	-
30	348	Other Tangible Plant	-		-
31		**TOTALS**	**$ 73,088,968**		**$ 2,336,599**
32					
33					
34		Depreciation Expense Per RUCO			$ 2,336,599
35					
36		Less: Amortization of Contributions in Aid of Construction (per Company)			(67,586)
37					
38		Total Proposed Depreciation Expense Per RUCO			$ 2,269,013
39					
40		Total Proposed Depreciation Expense Per Company			$ 2,291,982
41					
42		Net Decrease to Depreciation Expense			$ (22,969)
43					
44		**RUCO Adjustment To Plant Depreciation Expense**			**$ (22,969)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 9b
TO DEPRECIATION EXPENSE

LINE NO.	DESCRIPTION	REFERENCE	TOTAL
1	Total Amortization of Debt Discount Per RUCO		$ -
2			
3	Test Year Adjusted Amortization of Debt Discount As Filed		11,465
4			
5	**RUCO Adjustment To Amortization of Debt Discount**		$ (11,465)
6			
7	**TOTAL RUCO ADJUSTMENT TO DEPRECIATION EXPENSE**		**$ (11,465)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 10
TO PROPERTY TAX

LINE NO.	DESCRIPTION	REFERENCE	(A)	(B)
1	Calculation Of The Company's Full Cash Value:			
2				
3	Annual Operating Revenues:			
4	Adjusted Test Year Ended 09/30/2008		$ 6,878,710	
5	Adjusted Test Year Ended 09/30/2008		6,878,710	
6	Proposed Revenue		11,555,325	
7	Total Three Year Operating Revenues	Sum of Lines 4, 5, & 6	$ 25,312,745	
8	Average Annual Operating Revenues	Line 7 / 3	$ 8,437,582	
9				
10	Two Times Three Year Average Operating Revenues	Line 8 X 2		$ 16,875,164
11				
12	ADD:			
13	10% of construction Work In Progress ("CWIP"):			
14	Test Year CWIP		$ -	
15	10% of CWIP	Line 14 X 10%		$ -
16				
17	SUBTRACT:			
18	Transportation at Book Value:			
19	Original Cost of Transportation Equipment		177,165	
20	Accum. Depr. Of Transportation Equipment		(83,064)	
21	Book Value of Transportation Equipment	Line 19 + Line 20		$ 94,101
22				
23	Company's Full Cash Value ("FCV")	Sum of Lines 10, 15, & 21		16,969,264
24				
25	Calculation Of The Company's Tax Liability:			
26				
27	MULTIPLY:			
28	FCV X Valuation Assessment Ratio X Property Tax Rates:			
29	Assessment Ratio	House Bill 2779	21.0000%	
30	Assessed Value	Line 23 X 29	$ 3,563,546	
31				
32	Property Tax Rates:			
33	Composite Property Tax Rate (Per Company)		9.5187%	
34				
35	Estimated Tax Rate Liability		9.5187%	
36				
37	Company's Total Tax Liability - Based on Full Cash Value	Line 30 X Line 35		$ 339,203
38				
39	RUCO Adjusted Test Year Property Tax Expense			276,882
40	Increase in Property Tax Expense	Line 37 - Line 39		$ 62,321
41				
42	**TOTAL RUCO ADJUSTMENT TO PROPERTY TAXES**			**$ 62,321**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 11 TO INCOME TAX EXPENSE

LINE NO.	DESCRIPTION	(A) REFERENCE	(B) AMOUNT
1	**FEDERAL INCOME TAXES:**		
2			
3	Operating Income Before Taxes	Sch 4, Page 1, Col C, Lines 31 + 34	$ 259,690
4	Less:		
5	Arizona State Tax	Line 21	$ 11,254
6	Interest Expense	Note (A), Line 35	(421,194)
7	Federal Taxable Income	Line 3 + Line 5 + Line 6	$ (150,250)
8			
9	Federal Tax Rate	Schedule 1, Page 2	34.0000%
10	Federal Income Tax Expense	Line 7 X Line 9	$ (51,085)
11			
12	**STATE INCOME TAXES:**		
13			
14	Operating Income Before Taxes	Sch 4, Page 1, Col C, Lines 32 + 37	$ 259,690
15	LESS:		
16	Interest Expense	Note (A), Line 35	(421,194)
17	State Taxable Income	Line 14 + Line 16	$ (161,504)
18			
19	State Tax Rate	Tax Rate	6.9680%
20			
21	State Income Expense	Line 17 X Line 19	$ (11,254)
22			
23	**TOTAL INCOME TAX EXPENSE:**		
24	Federal Income Tax Expense	Line 10	$ (51,085)
25	State Income Tax Expense	Line 21	(11,254)
26	Total Income Tax Expense Per RUCO	Line 24 + Line 25	$ (62,339)
27	Total Income Tax Expense Per Company	Company Sch C-1	(449,717)
28	**Total RUCO Income Tax Adjustment**	Line 26 - Line 27	**$ 387,378**
29			
30			
31	*NOTE (A)*		
32	Interest Synchronization:		
33	Adjusted Rate Base	$ 36,946,801	
34	Weighted Avg. Cost of Debt	1.14%	
35	Synchronized Interest Expense (L33 X L34)	$ 421,194	

Water Division Bill Count Summary

Line No.	Meter Size/Class	Company Present Rates	RUCO Proposed Rates	Increase/ (Decrease) Amount	Increase/ (Decrease) Percent
1	***Residential***				
2	5/8 inch meter	$ 7,865	$ 11,412	$ 3,547	45.10%
3	3/4 inch meter	2,015,346	2,791,062	775,716	38.49%
4	1 inch meter	1,980,115	3,461,612	1,481,497	74.82%
5	1.5 inch meter	53,017	98,000	44,983	84.85%
6	2 inch meter	173,915	287,993	114,078	65.59%
7	4 inch meter	19,356	35,619	16,263	84.02%
8	**Subtotal Residential**	**$ 4,249,614**	**$ 6,685,698**	**$ 2,436,084**	57.30%
9					
10	***Commercial***				
11	5/8 inch meter	$ 25,665	$ 46,884	$ 21,219	82.68%
12	3/4 inch meter	12,070	19,809	7,739	64.12%
13	1 inch meter	28,688	51,470	22,782	79.41%
14	1.5 inch meter	65,438	120,551	55,113	84.22%
15	2 inch meter	413,985	664,465	250,480	60.50%
16	4 inch meter	76,058	138,210	62,152	81.72%
17	8 inch meter	403,707	885,438	481,731	119.33%
18	10 inch meter	17,579	21,221	3,642	20.72%
19	**Subtotal Commercial**	**$ 1,043,190**	**$ 1,948,046**	**$ 904,856**	88.50%
20					
21	***Irrigation***				
22	5/8 inch meter	$ 1,076	$ 2,076	1,000	92.91%
23	3/4 inch meter	36,882	65,031	28,149	76.32%
24	1 inch meter	153,062	293,272	140,210	91.60%
25	1.5 inch meter	156,419	292,425	136,006	86.95%
26	2 inch meter	895,159	1,748,366	853,207	95.31%
27	4 inch meter	104,340	206,372	102,032	97.79%
28	**Subtotal Irrigation**	**$ 1,346,938**	**$ 2,607,542**	**$ 1,260,604**	92.26%
29					
30	**Hydrant**	**$ 110,558**	**$ 185,591**	**$ 75,033**	67.87%
31					
32	**Total Metered Revenue**	**$ 6,750,300**	**$ 11,426,878**	**$ 4,676,578**	69.28%

PROPOSED RATES AND CHARGES

LINE NO.	DESCRIPTION	MONTHLY MINIMUM	PROPOSED CHARGES AND USAGE FEES
1	**RESIDENTIAL CUSTOMERS**		
2	5/8-inch & 3/4-inch Meters	$ 10.00	
3	First Tier - Zero to 5,000 Gallons		$ 1.0000
4	Second Tier - Next 7,000 Gallons		1.8500
5	Third Tier - In Excess Of 12,000 Gallons		2.9077
6			
7	1-inch Meters	$ 25.00	
8	First Tier - First 20,000 Gallons		1.8500
9	Second Tier - In Excess Of 20,000 Gallons		2.9077
10			
11	1.5-inch Meters	$ 50.00	
12	First Tier - First 50,000 Gallons		1.8500
13	Second Tier - In Excess Of 50,000 Gallons		2.9077
14			
15	2-inch Meters	$ 80.00	
16	First Tier - First 75,000 Gallons		1.8500
17	Second Tier - In Excess Of 75,000 Gallons		2.9077
18			
19	4-inch Meters	$ 250.00	
20	First Tier - First 250,000 Gallons		1.8500
21	Second Tier - In Excess Of 250,000 Gallons		2.9077
22			
23	**COMMERCIAL CUSTOMERS**		
24	5/8-inch & 3/4-inch Meters	$ 10.00	
25	First Tier - Zero to 12,000 Gallons		1.8500
26	Second Tier - In Excess Of 12,000 Gallons		2.9077
27			
28	1-inch Meters	$ 25.00	
29	First Tier - First 20,000 Gallons		1.8500
30	Second Tier - In Excess Of 20,000 Gallons		2.9077
31			
32	1.5-inch Meters	$ 50.00	
33	First Tier - First 50,000 Gallons		1.8500
34	Second Tier - In Excess Of 50,000 Gallons		2.9077
35			
36	2-inch Meters	$ 80.00	
37	First Tier - First 75,000 Gallons		1.8500
38	Second Tier - In Excess Of 75,000 Gallons		2.9077
39			

PROPOSED RATES AND CHARGES

LINE NO.	DESCRIPTION	MONTHLY MINIMUM	PROPOSED CHARGES AND USAGE FEES
40	4-inch Meters	$ 250.00	
41	First Tier - First 250,000 Gallons		1.8500
42	Second Tier - In Excess Of 250,000 Gallons		2.9077
43			
44	8-inch Meters	$ 750.00	
45	First Tier - First 500,000 Gallons		1.8500
46	Second Tier - In Excess Of 500,000 Gallons		2.9077
47			
48	10-inch Meters	$ 1,000.00	
49	First Tier - First 750,000 Gallons		1.8500
50	Second Tier - In Excess Of 750,000 Gallons		2.9077
51			
52	**IRRIGATION CUSTOMERS**		
53	5/8-inch & 3/4-inch Meters	$ 10.00	
54	First Tier - First 12,000 Gallons		1.8500
55	Second Tier - In Excess Of 12,000 Gallons		2.9077
56			
57	1-inch Meters	$ 25.00	
58	First Tier - First 20,000 Gallons		1.8500
59	Second Tier - In Excess Of 20,000 Gallons		2.9077
60			
61	1.5-inch Meters	$ 50.00	
62	First Tier - First 50,000 Gallons		1.8500
63	Second Tier - In Excess Of 50,000 Gallons		2.9077
64			
65	2-inch Meters	$ 80.00	
66	First Tier - First 75,000 Gallons		1.8500
67	Second Tier - In Excess Of 75,000 Gallons		2.9077
68			
69	4-inch Meters	$ 250.00	
70	First Tier - First 250,000 gallons		1.8500
71	Second Tier - In Excess Of 250,000 Gallons		2.9077
72			
73	**Hydrant Rate**	$ 168.00	$ 4.2000

SONN S. ROWELL, CPA

SURREBUTTAL EXHIBIT 2

WASTEWATER DIVISION SCHEDULES 1 THRU 5

Litchfield Park Service Company - Wastewater Division
Docket No. SW-01428A-09-0103 and W-01427A-09-0104
Test Year Ended September 30, 2008

Revenue Requirement

LINE NO.	DESCRIPTION	(A) COMPANY OCRB/FVRB COST	(B) RUCO OCRB/FVRB COST
1	Adjusted Original Cost/Fair Value Rate Base	$ 28,296,903	$ 22,750,383
2			
3	Adjusted Operating Income/(Loss)	163,778	499,992
4			
5	Current Rate of Return (L3 / L1)	0.58%	2.20%
6			
7	Required Operating Income (L9 X L1)	$ 3,228,677	$ 1,942,883
8			
9	Required Rate of Return on Fair Value Rate Base	11.410%	8.540%
10			
11	Operating Income Deficiency (L7 - L3)	$ 3,064,899	$ 1,442,890
12			
13	Gross Revenue Conversion Factor (Schedule 1, Page 2)	1.6286	1.6511
14			
15	Required Increase in Gross Revenue Requirement (L11 X L13)	$ 4,991,601	$ 2,382,310
16			
17	Adjusted Test Year Revenue	$ 6,356,374	$ 6,359,187
18			
19	Proposed Annual Revenue (L15 + L17)	$ 11,347,975	$ 8,741,497
20			
21	Required Percentage Increase in Revenue (L15 / L17)	78.53%	37.46%
22			
23	Rate of Return on Common Equity	12.500%	8.010%

GROSS REVENUE CONVERSION FACTOR

LINE NO.	DESCRIPTION	(A)	(B)	(C)	(D)
	CALCULATION OF GROSS REVENUE CONVERSION FACTOR:				
1	Revenue	1.0000			
2	Combined Federal And State Tax Rate (Line 13)	(0.3860)			
3	Effective Property Tax Factor	(0.0084)			
4	Subtotal (Line 1 + Line 2 + Line 3)	0.6057			
5	**Revenue Conversion Factor** (L1 / L4)	**1.6511**			
6					
7	CALCULATION OF EFFECTIVE TAX RATE:				
8	Operating Income Before Taxes (Arizona Taxable Income)	100.0000%			
9	Arizona State Income Tax Rate	6.9680%			
10	Federal Taxable Income (L8 - L9)	93.0320%			
11	Applicable Federal Income Tax Rate (Col. (D), L48)	34.0000%			
12	*Effective Federal Income Tax Rate* (L10 X L11)	31.6309%			
13	Combined Federal And State Income Tax Rate (L9 + L12)	38.5989%			
14					
15	Required Operating Income (Sch.-1, Pg 1, Col. (B), L7)	1,942,883			
16	Adjusted T.Y. Oper'g Inc. (Loss) (Sch.-1, Pg 1, Col (B), L3)	499,992			
17	Required Increase In Operating Income (L15 - L16)		$ 1,442,890		
18					
19	Income Taxes On Recommended Revenue (Col. (D), L43)	$ 1,058,324			
20	Income Taxes On Test Year Revenue (Col. (D), L45)	151,273			
21	Required Increase In Revenue To Provide For Income Taxes (L19 - L20)		$ 907,051		
22					
23	Property Taxes on Recommended Revenue (Schedule 4, Col (E), L31)	$ 287,075			
24	Property Taxes On Test Year Revenue (Schedule 4, Col. C, L31)	254,705			
25	Required Increase In Revenue To Provide For Property Taxes (L23 - L24)		$ 32,370		
26					
27	Total Required Increase In Revenue (L17 + L21 + L25)		$ 2,382,310		
28					
29	CALCULATION OF INCOME TAX:			RUCO RECOMMENDED	
30	Revenue (Sch -1, Pg 1, Col. (B), L19)			$ 8,741,497	
31	Operating Expense Excluding Income Tax (Sch 4, Col (E), L35 - L32)			5,740,291	
32	Synchronized Interest (Col. (C), L53)			259,354	
33	Arizona Taxable Income (L30 - L31 - L32)			$ 2,741,851	
34	Arizona State Income Tax Rate			6.9680%	
35	Arizona Income Tax (L33 X L34)				$ 191,052
36	Fed. Taxable Income (L33 - L35)			$ 2,550,799	
37	Fed. Tax on 1st Inc. Bracket ($1 - $50,000) @ 15%			$ 7,500	
38	Fed. Tax on 2nd Inc. Bracket ($50,001 - $75,000) @ 25%			6,250	
39	Fed. Tax on 3rd Inc. Bracket ($75,001 - $100,000) @ 34%			8,500	
40	Fed. Tax on 4th Inc. Bracket ($100,001 - $335,000) @ 39%			91,650	
41	Fed. Tax on 5th Inc. Bracket ($335,001 - $10M) @ 34%			753,372	
42	Total Federal Income Tax (L37 + L38 + L39 + L40 + L41)				867,272
43	Combined Federal and State Income Tax (L35 + L42)				$ 1,058,324
44					
45	Test Year Combined Income Tax, RUCO as Adjusted (Sch 4, Col. (C), L32)				$ 151,273
46	**RUCO Adjustment To Proposed Income Tax (L43 - L45) (See Sch 4, Col. (D), L32)**				**$ 907,051**
47					
48	Applicable Federal Income Tax Rate (Col. (D), L42 / Col. (C), L36)				34.00%
49					
50	CALCULATION OF INTEREST SYNCHRONIZATION:				
51	Rate Base			$ 22,750,383	
52	Weighted Avg. Cost of Debt			1.14%	
53	Synchronized Interest (L51 X L52)			$ 259,354	

RATE BASE - ORIGINAL COST

LINE NO.		(A) COMPANY AS FILED OCRB/FVRB	(B) RUCO ADJM'T No. 1	(C) RUCO ADJM'T No. 2	(D) RUCO ADJM'T No. 3	(E) RUCO ADJM'T No. 4	(F) RUCO ADJM'T No. 5	(G) RUCO ADJM'T No. 6	(H) RUCO ADJ'TED OCRB/FVRB
1	Gross Utility Plant in Service	$ 60,394,260	$ (5,464,782)						$ 54,929,478
2									
3	Accumulated Depreciation	(8,475,991)	191,927						(8,284,064)
4									
5	Net Utility Plant in Service (Sum L1 & L3)	$ 51,918,269	$ (5,272,855)	$ -	$ -	$ -	$ -	$ -	$ 46,645,414
6									
7	**Less:**								
8	Advances in Aid Of Construction	$ (7,006,208)				$ 16,649			$ (6,989,559)
9									
10	Contribution in Aid of Const.	$ (18,737,132)				$ 93,346			$ (18,643,786)
11	Accumulated Amortization of CIAC	2,072,117							2,072,117
12	NET CIAC (L10 + L11)	$ (16,665,015)	$ -	$ -	$ -	$ 93,346	$ -	$ -	$ (16,571,669)
13									
14	Customer Meter Deposits	$ (68,685)					$ 68,685		$ -
15	Deferred Income Tax	(15,987)						(317,816)	(333,803)
16									
17	**Plus:**								
18	Unamortized Debt Issuance Costs	$ 134,528		$ (134,528)					-
19									
20									
21									
22	TOTAL RATE BASE (Sum Lines's 5,8,12-18)	$ 28,296,902	$ (5,272,855)	$ (134,528)	$ -	$ 109,995	$ 68,685	$(317,816)	$ 22,750,383

References:
Column (A): Company Schedule B-1
Column (B): RUCO Surrebuttal Schedule 2, Page 2
Column (C): Per Company Rebuttal Schedule B-2, Page 2, Adjustment 6
Column (D): Deleted
Column (E): Per Company Rebuttal Schedule B-2, Page 2, Adjustment 4
Column (F): Per Company Rebuttal Schedule B-2, Page 2, Adjustment 5
Column (G): RUCO Surrebuttal Schedule 2, Page 3
Column (H): Sums of Column (A) through Column (G)

EXPLANATION OF RATE BASE ADJUSTMENT NO. 1
TO UTILITY PLANT IN SERVICE

LINE NO.	DESCRIPTION	AMOUNT	REFERENCE
1	RUCO Proposed Utility Plant In Service At End of Test Year	$ 54,929,478	RUCO Schedule 3, Page 1
2			
3	Company Proposed Utility Plant In Service At End of Test Year	60,394,260	Company Schedule B-1
4			
5	**RUCO Proposed Adjustment To Utility Plant in Service**	**$ (5,464,782)**	
6			
7			
8	Accumulated Depreciation At End of Prior Test Year	$ 1,261,559	Amount Per RUCO TJC-2
9	2001 Depreciation Expense	299,711	
10	2002 Depreciation Expense	481,407	
11	2003 Depreciation Expense	975,920	
12	2004 Depreciation Expense	1,053,822	
13	2005 Depreciation Expense	1,200,551	
14	2006 Depreciation Expense	1,316,996	
15	2007 Depreciation Expense	1,398,229	
16	2008 Depreciation Expense (9 months)	1,184,709	
17	Subtotal	$ 9,172,904	Sum of Lines 8 through 16
18			
19	Less 2002 Retirements	$ (780,874)	
20	Less 2007 Retirements	(96,926)	
21	Black Mountain Sewer Transfer/Adjustment	(11,040)	
22	Subtotal	$ (888,840)	Sum of Lines 19 through 21
23			
24	RUCO Proposed Accumulated Depreciation At End of Test Year	$ 8,284,064	Line 17 plus Line 22
25			
26	Company Proposed Accumulated Depreciation At End of Test Year	$ 8,475,991	Company Schedule B-1
27			
28	**RUCO Proposed Adjustment To Accumulated Depreciation**	**$ (191,927)**	Line 24 - Line 26

Calculation of Estimated Deferred Income Taxes

Line No.	Asset Description	Date Placed In Service	Basis for Depreciation	RUCO Proposed S/L Depreciation Rate (%)	Annual S/L Depreciation Expense	Yrs. of Accum. Deprerciation as of Dec. 31, 2006 (Includes Half-Year Convention)	Accumulated Depeciation As of December 31, 2006		Excess of Accelerated Depreciation over S/L Depreciation
							S/L as per RUCO Proposed Rate	Accelerated as per LPSCO 2006 Depreciation Schedule	
1	TRANSMISSION & DIST	6/1/1988	$ 6,404	2.00%	$ 128	18.5	$ 2,369	$ 5,929	$ 3,560
2	METERS	6/1/1990	714	8.33%	59	16.5	981	598	(383)
3	METERS	6/1/1991	665	8.33%	55	15.5	859	528	(331)
4	LINE REPLACEMENT	6/1/1992	46,046	2.00%	921	14.5	13,353	34,406	21,053
5	NEW WELL	6/1/1992	266,687	3.33%	8,881	14.5	128,770	199,265	70,495
6	LINE REPLACEMENT	6/1/1993	2,596	2.00%	52	13.5	701	1,824	1,123
7	OFFICE FURNITURE	6/1/1989	26,188	6.67%	1,747	17.5	30,568	26,188	(4,380)
8	OFFICE FURNITURE	6/1/1990	1,213	6.67%	81	16.5	1,335	1,213	(122)
9	OFFICE EQUIPMENT	6/1/1990	700	6.67%	47	16.5	770	700	(70)
10	OFFICE EQUIPMENT	6/1/1991	2,805	6.67%	187	15.5	2,900	2,805	(95)
11	FIRE HYDRANTS	6/1/1991	5,477	2.00%	110	15.5	1,698	5,424	3,726
12	OFFICE EQUIPMENT	6/1/1992	4,513	6.67%	301	14.5	4,365	4,513	148
13	FIRE HYDRANTS	6/1/1993	106	2.00%	2	13.5	29	95	66
14	SOFTWARE	1/1/1995	703	20.00%	141	11.5	1,617	693	(924)
15	FIRE HYDRANTS	2/1/1995	1,500	2.00%	30	11.5	345	923	578
16	TOOLS - WATER	3/1/1995	647	5.00%	32	11.5	372	647	275
17	METERS & METER BOXES	6/1/1995	94,549	8.33%	7,876	11.5	90,573	57,990	(32,583)
18	8" SEWER HNYSCKLE	2/1/1995	2,413	2.00%	48	11.5	555	1,485	930
19	PUMP STN EQU UPGRADE	6/1/1995	51,302	12.50%	6,413	11.5	73,747	31,466	(42,281)
20	WATER LINE VALVE	12/1/1995	1,613	2.00%	32	11.5	371	989	618
21	WATER LINE REPAIRS	6/1/1995	54,210	2.00%	1,084	11.5	12,468	33,248	20,780
22	WATER METERS	1/31/1996	12,109	8.33%	1,009	10.5	10,591	6,915	(3,676)
23	LINE REPLACEMENT	2/14/1996	70,165	2.00%	1,403	10.5	14,735	40,074	25,339
24	WATER METERS	2/29/1996	1,769	8.33%	147	10.5	1,547	1,010	(537)
25	WELLS	3/18/1996	14,529	3.33%	484	10.5	5,080	8,261	3,181
26	METERS	3/30/1996	8,434	8.33%	703	10.5	7,377	4,795	(2,582)
27	HYDRANTS	4/11/1996	19,156	2.00%	383	10.5	4,023	10,893	6,870
28	METERS	4/30/1996	4,643	8.33%	387	10.5	4,061	2,640	(1,421)
29	METERS	5/15/1996	8,292	8.33%	691	10.5	7,253	4,715	(2,538)
30	METERS	6/24/1996	4,217	8.33%	351	10.5	3,688	2,398	(1,290)
31	SERVICE LINES	6/30/1996	4,411	3.33%	147	10.5	1,542	2,509	967
32	COMPUTER	7/12/1996	192	20.00%	38	10.5	403	192	(211)
33	COMPUTER	7/12/1996	903	20.00%	181	10.5	1,896	903	(993)
34	METERS	7/31/1996	6,254	8.33%	521	10.5	5,470	3,557	(1,913)
35	METERS	8/15/1996	18,373	8.33%	1,530	10.5	16,070	10,448	(5,622)
36	WATER LINES	8/15/1996	241,824	2.00%	4,836	10.5	50,783	137,506	86,723
37									
38	METERS	9/1/1996	13,445	8.33%	1,120	10.5	11,760	7,646	(4,114)
39	SOFTWARE	9/11/1996	1,515	20.00%	303	10.5	3,182	1,515	(1,667)
40	SOFTWARE	9/11/1996	379	20.00%	76	10.5	796	379	(417)
41	METERS	10/1/1996	7,209	8.33%	601	10.5	6,305	3,281	(3,024)
42	METERS	11/1/1996	9,974	8.33%	831	10.5	8,724	4,618	(4,106)
43	SERVICE LINES	11/5/1996	38,759	3.33%	1,291	10.5	13,552	17,945	4,393
44	SEWER PMP CTRL PANEL	11/30/1996	384	12.50%	48	10.5	504	177	(327)
45	TOOLS	12/16/1996	583	5.00%	29	10.5	306	583	277
46	FURNITURE	12/16/1996	219	6.67%	15	10.5	153	219	66
47	FURNITURE	12/16/1996	219	6.67%	15	10.5	153	219	66
48	SERVICES	12/31/1996	5,355	3.33%	178	10.5	1,872	2,479	607
49	METERS	12/31/1996	4,217	8.33%	351	10.5	3,688	1,954	(1,734)
50	L.S. STARTUP	12/31/1996	776	8.33%	65	10.5	679	359	(320)
51	UPGRADE TO STRUCTURE	9/18/1997	216	3.33%	7	9.5	68	53	(15)
52	WELL UPGRADE	8/8/1997	2,204	3.33%	73	9.5	697	861	164
53	CONTROL SYSTEM	8/25/1997	203	3.33%	7	9.5	64	94	30
54	PUMPING UPGRADE	4/22/1997	1,598	12.50%	200	9.5	1,898	736	(1,162)
55	UPGRADE PUMPING EQUIP	10/8/1997	93,433	12.50%	11,679	9.5	110,952	46,359	(64,593)
56	UPGRADE PUMP CONTROL	8/25/1997	29,342	12.50%	3,668	9.5	34,844	14,560	(20,284)
57	WATER TREATMENT UPGR	10/9/1997	964	3.33%	32	9.5	305	480	175
58	UPGRADE TO PUMP CTRL	10/2/1997	19,191	12.50%	2,399	9.5	22,789	9,524	(13,265)
59	UPGRADE TO PUMPS	12/9/1997	367	12.50%	46	9.5	436	183	(253)

Calculation of Estimated Deferred Income Taxes

Line No.	Asset Description	Date Placed In Service	Basis for Depreciation	RUCO Proposed S/L Depreciation Rate (%)	Annual S/L Depreciation Expense	Yrs. of Accum. Deprerciation as of Dec. 31, 2006 (Includes Half-Year Convention)	Accumulated Depeciation As of December 31, 2006		Excess of Accelerated Depreciation over S/L Depreciation
							S/L as per RUCO Proposed Rate	Accelerated as per LPSCO 2006 Depreciation Schedule	
60	WATER LINES	4/26/1997	1,801	2.00%	36	9.5	342	690	348
61	VALVES	5/12/1997	1,437	2.00%	29	9.5	273	550	277
62	UPGR LG BOOSTER PUMP	9/26/1997	3,668	12.50%	459	9.5	4,356	1,690	(2,666)
63	SERVICE LINES	4/8/1997	10,090	3.33%	336	9.5	3,192	3,869	677
64	SERVICE LINES	6/19/1997	4,698	3.33%	156	9.5	1,486	1,801	315
65	SERVICE LINE REPLACE	10/20/1997	11,206	3.33%	373	9.5	3,545	4,295	750
66	SERVICE LINES	12/9/1997	2,010	3.33%	67	9.5	636	769	133
67	METERS & METER BOXES	1/16/1997	5,030	8.33%	419	9.5	3,980	1,928	(2,052)
68	METERS 1997	6/30/1997	7,205	8.33%	600	9.5	5,702	2,761	(2,941)
69	METERS WATER 1997	12/31/1997	55,272	8.33%	4,604	9.5	43,739	21,188	(22,551)
70	HYDRANTS	12/9/1997	2,029	2.00%	41	9.5	386	778	392
71	TOOLS	6/1/1997	221	5.00%	11	9.5	105	215	110
72	TOOLS	12/31/1997	132	5.00%	7	9.5	63	129	66
73	TOOLS	12/31/1997	33	5.00%	2	9.5	16	33	17
74					-		-		-
75	OFFICE FURNITURE	2/12/1997	146	6.67%	10	9.5	93	146	53
76	COPIER PARTS	5/8/1997	245	6.67%	16	9.5	155	236	81
77	MISC EQUIPMENT	2/12/1996	36	10.00%	4	10.5	38	30	(8)
78	COMPUTER	12/30/1997	2,257	20.00%	451	9.5	4,288	2,198	(2,090)
79	COMPUTER	12/30/1997	564	20.00%	113	9.5	1,072	549	(523)
80	CELL PHONE	5/30/1997	298	10.00%	30	9.5	283	287	4
81	SEWER LINES	8/15/1996	2,489,678	2.00%	49,794	10.5	522,832	1,369,940	847,108
82	SEWER COLLECT SYSTEM	12/15/1997	36,911	2.00%	738	9.5	7,013	14,424	7,411
83	METERS 1998	1/21/1998	10,585	8.33%	882	8.5	7,495	3,527	(3,968)
84	METERS 1998	3/19/1998	9,735	8.33%	811	8.5	6,893	3,244	(3,649)
85	METERS 1998	3/19/1998	1,890	8.33%	157	8.5	1,338	631	(707)
86	METERS 1998	5/27/1998	4,390	8.33%	366	8.5	3,108	1,464	(1,644)
87	METERS 1998	6/11/1998	8,968	8.33%	747	8.5	6,350	2,990	(3,360)
88	METERS 1998	7/11/1998	27,839	8.33%	2,319	8.5	19,711	9,281	(10,430)
89	METERS 1998	8/18/1998	4,530	8.33%	377	8.5	3,207	1,509	(1,698)
90	METERS 1998	9/10/1998	5,435	8.33%	453	8.5	3,848	1,810	(2,038)
91	GENERATOR	1/31/1998	68,655	5.00%	3,433	8.5	29,178	22,885	(6,293)
92	COMPUTER - MAC	5/19/1998	519	20.00%	104	8.5	882	512	(370)
93	COMPUTER - MAC	5/19/1998	2,078	20.00%	416	8.5	3,533	2,049	(1,484)
94	1998 WATER EQUIPMENT	6/1/1998	179,329	3.33%	5,972	8.5	50,759	59,776	9,017
95	SOFTWARE	4/16/1998	325	20.00%	65	8.5	553	325	(228)
96	HYDRANTS	6/1/1998	10,653	2.00%	213	8.5	1,811	3,550	1,739
97	COMPUTER	2/28/1998	1,175	20.00%	235	8.5	1,998	1,077	(921)
98	SOFTWARE	4/16/1998	1,299	20.00%	260	8.5	2,208	1,299	(909)
99	1998 WATER EQUIPMENT	6/1/1998	29,351	3.33%	977	8.5	8,308	9,783	1,475
100	ACEDALINE TORCH	3/31/1998	403	6.67%	27	8.5	228	403	175
101	1998 WATER EQUIPMENT	6/1/1998	180,953	3.33%	6,026	8.5	51,219	60,317	9,098
102	WELL 20B	10/30/1999	179,869	3.33%	5,990	7.5	44,922	26,380	(18,542)
103	1999 WATER EQUIPMENT	6/1/1999	60,570	3.33%	2,017	7.5	15,127	17,768	2,641
104	WATER LINES	12/30/1999	252,528	2.00%	5,051	7.5	37,879	37,039	(840)
105	1999 WATER EQUIPMENT	6/1/1999	411,841	3.33%	13,714	7.5	102,857	120,808	17,951
106	WATER UTILITY - 1986	6/1/1986	794,158		-	20.5		759,744	759,744
107	SOFTWARE	6/1/1999	25,625	20.00%	5,125	7.5	38,438	25,625	(12,813)
108	1999 OFFICE EQUIPMENT	6/1/1999	12,196	6.67%	813	7.5	6,101	12,003	5,902
109	1999 COMPUTER	6/1/1999	11,436	20.00%	2,287	7.5	17,154	11,217	(5,937)
110	TRUCK EQUIPMENT	1/28/2000	901	20.00%	180	6.5	1,171	901	(270)
111					-		-		-
112	POWER GEN PART	6/17/1999	496	5.00%	25	7.5	186	146	(40)
113	COLLECTION LINES	12/7/1999	361,075	2.00%	7,222	7.5	54,161	52,959	(1,202)
114	1999 WATER EQUIPMENT	6/1/1999	14,017	3.33%	467	7.5	3,501	4,113	612
115	RECLAIMED WATER SYST	12/7/1999	303,251	2.00%	6,065	7.5	45,488	44,476	(1,012)
116	TRANSMISSION LINE	12/1/2000	58,813	2.00%	1,176	6.5	7,646	14,900	7,254
117	TRANSMISSION LINE	11/1/2000	59,364	2.00%	1,187	6.5	7,717	18,799	11,082
118	TRANSMISSION LINE	12/1/2000	156,714	2.00%	3,134	6.5	20,373	19,850	(523)

Calculation of Estimated Deferred Income Taxes

Line No.	Asset Description	Date Placed In Service	Basis for Depreciation	RUCO Proposed S/L Depreciation Rate (%)	Annual S/L Depreciation Expense	Yrs. of Accum. Deprerciation as of Dec. 31, 2006 (Includes Half-Year Convention)	Accumulated Depeciation As of December 31, 2006		Excess of Accelerated Depreciation over S/L Depreciation
							S/L as per RUCO Proposed Rate	Accelerated as per LPSCO 2006 Depreciation Schedule	
119	2000 WATER EQUIPMENT	6/1/2000	426,534	3.33%	14,204	6.5	92,323	108,054	15,731
120	OFFICE FURNITURE	12/1/2000	396	6.67%	26	6.5	172	369	197
121	COMPUTER	12/1/2000	3,901	20.00%	780	6.5	5,071	3,826	(1,245)
122	2000 OFFICE FURNITURE	6/1/2000	5,540	6.67%	370	6.5	2,402	5,179	2,777
123	2000 COMPUTER	6/1/2000	19,235	20.00%	3,847	6.5	25,006	18,866	(6,140)
124	DOOR SCREEN	5/1/2000	1,186	3.33%	39	6.5	257	575	318
125	2000 SOFTWARE	6/1/2000	2,462	20.00%	492	6.5	3,201	2,336	(865)
126	2000 WATER EQUIPMENT	6/1/2000	595,048	3.33%	19,815	6.5	128,798	150,745	21,947
127	RECLAIMED WATER LINE	6/1/2000	67,722	2.00%	1,354	6.5	8,804	8,577	(227)
128	SERVICE LINES	8/1/2000	1,014,366	2.00%	20,287	6.5	131,868		(131,868)
129	2001 SOFTWARE	5/1/2001	250	20.00%	50	5.5	275	229	(46)
130	2001 COMPUTER	5/1/2001	4,033	20.00%	807	5.5	4,436	3,904	(532)
131	2001 OFFICE EQUIPMENT	5/1/2001	500	6.67%	33	5.5	183	419	236
132	2001 TOOL & SHOP	5/1/2001	2,586	5.00%	129	5.5	711	1,401	690
133	2001 DISTRIBUTION LINE	5/1/2001	2,327,233	2.20%	51,199	5.5	281,595	246,540	(35,055)
134	2001 WATER EQUIPMENT	5/1/2001	1,877,576	3.33%	62,523	5.5	343,878	393,589	49,711
135	2001 WATER EQUIPMENT	10/1/2001	138,025	3.33%	4,596	5.5	25,279	27,784	2,505
136	SEWER LINES	10/31/2001	61,119	2.00%	1,222	5.5	6,723	6,111	(612)
137	SOFTWARE	12/10/2001	2,100	20.00%	420	5.5	2,310	2,041	(269)
138	OFFICE EQUIPMENT	10/15/2001	1,751	6.67%	117	5.5	642	1,466	824
139	SOFTWARE	12/10/2001	525	20.00%	105	5.5	578	511	(67)
140	FILE DRAWER	10/15/2001	369	6.67%	25	5.5	135	358	223
141	OFFICE EQUIPMENT	10/23/2001	69	6.67%	5	5.5	25	58	33
142	TRANSPORTATION EQUIP	9/18/2001	600	20.00%	120	5.5	660	581	(79)
143	2002 SOFTWARE	6/1/2002	5,352	20.00%	1,070	4.5	4,817	4,560	(257)
144	2002 VEHICLE	11/8/2002	6,695	20.00%	1,339	4.5	6,026	5,025	(1,001)
145	2002 OFFICE EQUIPMENT	6/1/2002	53,503	6.67%	3,569	4.5	16,059	39,381	23,322
146	METERS	6/1/1992	42,470	8.33%	3,538	14.5	51,297	27,037	(24,260)
147	2002 WATER EQUIPMENT	6/1/2002	11,776,139	3.33%	392,145	4.5	1,764,654	2,046,210	281,556
148					-		-		-
149	WATER EQUIPMENT	2/1/2003	67,808	3.33%	2,258	3.5	7,903	10,396	2,493
150	TOOLS & EQUIPMENT	9/1/2003	5,793	5.00%	290	3.5	1,014	3,846	2,832
151	SEWER PLANT & EQUIP	9/1/2003	529	3.33%	18	3.5	62	70	8
152	LABORATORY EQUIPMENT	9/1/2003	1,140	10.00%	114	3.5	399	153	(246)
153	COMMUNICATION EQUIP	3/31/3003	1,583	10.00%	158	3.5	554	1,257	703
154	COMMUNICATION EQUIP	9/1/2003	7,189	10.00%	719	3.5	2,516	5,706	3,190
155	OFFICE FURNITURE	3/31/3003	517	6.67%	34	3.5	121	344	223
156	OFFICE FURNITURE	9/1/2003	15,296	6.67%	1,020	3.5	3,571	10,152	6,581
157	POST '96 AIAC REFUNDS	3/31/3003	2,997	3.33%	100	3.5	349	450	101
158	COMMUNICATION EQUIP	1/1/2004	4,513	10.00%	451	2.5	1,128	543	(585)
159	DISTRIBUTION RESERVOIR	2/1/2004	58,886	2.20%	1,295	2.5	3,239	6,869	3,630
160	HYDRANTS	2/1/2004	194	2.00%	4	2.5	10	23	13
161	FLOW MEASURING DEVICE	3/1/2004	5,326	10.00%	533	2.5	1,332	604	(728)
162	COLLECTION SEWERS FO	11/1/2004	20,252	2.00%	405	2.5	1,013	1,755	742
163	LABORATORY EQUIPMENT	9/1/2004	2,046	10.00%	205	2.5	512	191	(321)
164	METERS & METER INS	7/1/2004	152,100	8.33%	12,670	2.5	31,675	15,210	(16,465)
165	OFFICE FURNITURE & EQUIP	4/1/2004	65,136	6.67%	4,345	2.5	10,861	36,652	25,791
166	PUMPING EQUIPMENT	3/1/2004	51,387	12.50%	6,423	2.5	16,058	5,823	(10,235)
167	SERVICE LINES	7/1/2004	88,747	3.33%	2,955	2.5	7,388	8,875	1,487
168	LAND & LAND RIGHTS	4/1/2004	41,026	0.00%	-	2.5	-		-
169	STRUCTURES & IMPRO	10/1/2004	297,972	3.33%	9,922	2.5	24,806	26,818	2,012
170	POWER GENERATION EQUIP	8/1/2004	60,383	5.00%	3,019	2.5	7,548	5,836	(1,712)
171	TOOLS, SHOP & GARAGE	7/1/2004	323	5.00%	16	2.5	40	32	(8)
172	TRANSMISSION & DIST MAINS	5/1/2004	1,186,484	2.00%	23,730	2.5	59,324	126,558	67,234
173	WATER TREATMENT EQUIP	6/1/2004	26,811	3.33%	893	2.5	2,232	2,770	538
174	WELLS & SPRINGS	6/1/2004	2,080	3.33%	69	2.5	173	215	42
175	TRANSPORTATION EQUIP	9/1/2004	14,112	20.00%	2,822	2.5	7,056	1,316	(5,740)
176	OTHER TANGIBLE PLANT	3/1/2004	52,734	10.00%	5,273	2.5	13,184	5,976	(7,208)
177	POST '96 AIAC REFUNDS	7/1/2004	143,251	3.33%	4,770	2.5	11,926	14,325	2,399

Calculation of Estimated Deferred Income Taxes

Line No.	Asset Description	Date Placed In Service	Basis for Depreciation	RUCO Proposed S/L Depreciation Rate (%)	Annual S/L Depreciation Expense	Yrs. of Accum. Deprerciation as of Dec. 31, 2006 (Includes Half-Year Convention)	Accumulated Depeciation As of December 31, 2006		Excess of Accelerated Depreciation over S/L Depreciation
							S/L as per RUCO Proposed Rate	Accelerated as per LPSCO 2006 Depreciation Schedule	
178	WATER EQUIPMENT - JAN	1/1/2005	196,930	3.33%	6,558	1.5	9,837	15,754	5,917
179	WATER EQUIPMENT - FEB	2/1/2005	65,175	3.33%	2,170	1.5	3,255	4,997	1,742
180	WATER EQUIPMENT - MARCH	3/1/2005	55,130	3.33%	1,836	1.5	2,754	4,043	1,289
181	OFFICE FURNITURE	3/1/2005	11,690	6.67%	780	1.5	1,170	4,534	3,364
182	WATER EQUIPMENT - APRIL	4/1/2005	41,622	3.33%	1,386	1.5	2,079	2,914	835
183	OFFICE FURNITURE	4/1/2005	105	6.67%	7	1.5	11	41	30
184	COMPUTERS	4/1/2005	2,460	20.00%	492	1.5	738	1,279	541
185					-		-		-
186	WATER EQUIP - MAY	5/1/2005	99,464	3.33%	3,312	1.5	4,968	6,631	1,663
187	WATER EQUIP - JUNE	6/1/2005	285,963	3.33%	9,523	1.5	14,284	18,111	3,827
188	WATER EQUIP - JULY	7/1/2005	85,126	3.33%	2,835	1.5	4,252	5,108	856
189	WATER EQUIP - AUGUST	8/1/2005	172,145	3.33%	5,732	1.5	8,599	9,755	1,156
190	WATER EQUIP - SEPT	9/1/2005	260,636	3.33%	8,679	1.5	13,019	13,900	881
191	WATER EQUIP - OCT	10/1/2005	65,749	3.33%	2,189	0.5	1,095	657	(438)
192	WATER EQUIP - NOV	11/1/2005	84,208	3.33%	2,804	1.5	4,206	3,929	(277)
193	WATER EQUIP - DEC	12/1/2005	546,547	3.33%	18,200	1.5	27,300	23,684	(3,616)
194	METERS &	1/15/2006	77,741	8.33%	6,476	0.5	3,238	1,555	(1,683)
195	TRANSMISSION	1/15/2006	747	2.00%	15	0.5	7	30	23
196	FORCE	1/15/2006	40,291	2.00%	806	0.5	403	1,612	1,209
197	PUMPING	1/15/2006	500	12.50%	63	0.5	31	20	(11)
198	STRUCTURES & IMPRO	1/15/2006	1,350	3.33%	45	0.5	22	54	32
199	PUMPING	2/15/2006	7,509	12.50%	939	0.5	469	275	(194)
200	METERS &	2/15/2006	69,281	8.33%	5,771	0.5	2,886	2,540	(346)
201	TREATMENT	2/15/2006	2,429	3.33%	81	0.5	40	89	49
202	TRANSMISSION	2/15/2006	150	2.00%	3	0.5	2	6	5
203	METERS &	3/15/2006	36,114	8.33%	3,008	0	-		-
204	FORCE	3/15/2006	450	2.00%	9	0.5	5	15	11
205	TRANSMISSION	3/15/2006	125	2.00%	3	0	-		-
206	SERVICES	3/15/2006	1,869	3.33%	62	0.5	31	62	31
207	TRANSMISSION	4/15/2006	7,188	2.00%	144	0.5	72	216	144
208	METERS &	4/15/2006	3,357	8.33%	280	0.5	140	101	(39)
209	OFFICE FURNITURE	4/12/2006	472	6.67%	31	0.5	16	84	68
210	OTHER TANGIBLE PLANT	4/30/2006	18,106	6.67%	1,208	0.5	604	483	(121)
211	SERVICES	4/30/2006	3,320	3.33%	111	0.5	55	89	34
212	TREATMENT	4/30/2006	11,236	3.33%	374	0.5	187	300	113
213	FORCE	4/30/2006	300	2.00%	6	0.5	3	8	5
214	TRANSMISSION	5/29/2006	100	2.00%	2	0.5	1	2	1
215	METERS &	5/17/2006	21,910	8.33%	1,825	0.5	913	511	(402)
216	OFFICE FURNITURE	5/4/2006	2,191	6.67%	146	0.5	73	391	318
217	LABORATORY EQUIPMENT	5/31/2006	3,221	10.00%	322	0.5	161	77	(84)
218	OTHER TANGIBLE PLANT	5/31/2006	2,638	6.67%	176	0.5	88	62	(26)
219	SERVICES	5/16/2006	2,781	3.33%	93	0.5	46	65	19
220	TREATMENT	5/31/2006	36,458	3.33%	1,214	0.5	607	851	244
221	POWER GENERATOR	5/31/2006	16,426	5.00%	821	0.5	411	383	(28)
222					-		-		-
223	METERS &	6/13/2006	19,511	8.33%	1,625	0.5	813	455	(358)
224	SERVICES	6/19/2006	12,400	3.33%	413	0.5	206	248	42
225	LABORATORY EQUIPMENT	6/30/2006	1,957	10.00%	196	0.5	98	39	(59)
226	OTHER TANGIBLE PLANT	6/30/2006	801	6.67%	53	0	-		-
227	PUMPING	6/29/2006	3,100	12.50%	388	0.5	194	62	(132)
228	WELLS & SPRINGS	6/30/2006	48,928	3.33%	1,629	0.5	815	979	164
229	STRUCTURES & IMPRO	6/29/2006	150	3.33%	5	0.5	2	3	1
230	METERS &	7/31/2006	19,031	8.33%	1,585	0.5	793	317	(476)
231	SERVICES	7/31/2006	33,252	3.33%	1,107	0.5	554	554	0
232	TREATMENT	7/10/2006	5,403	3.33%	180	0.5	90	108	18
233	FORCE	7/31/2006	579,402	2.00%	11,588	0.5	5,794	9,657	3,863
234	STRUCTURES & IMPRO	7/31/2006	730,847	3.33%	24,337	0.5	12,169	12,181	12
235	POWER GENERATOR	7/31/2006	115,679	5.00%	5,784	0.5	2,892	1,928	(964)
236	HYDRANTS	7/31/2006	41,743	2.00%	835	0.5	417	696	279
237	TRANSMISSION	8/31/2006	108,904	2.00%	2,178	0.5	1,089	1,452	363

Calculation of Estimated Deferred Income Taxes

Line No.	Asset Description	Date Placed In Service	Basis for Depreciation	RUCO Proposed S/L Depreciation Rate (%)	Annual S/L Depreciation Expense	Yrs. of Accum. Deprerciation as of Dec. 31, 2006 (Includes Half-Year Convention)	Accumulated Depeciation As of December 31, 2006: S/L as per RUCO Proposed Rate	Accumulated Depeciation As of December 31, 2006: Accelerated as per LPSCO 2006 Depreciation Schedule	Excess of Accelerated Depreciation over S/L Depreciation
238	METERS &	8/7/2006	37,926	8.33%	3,159	0.5	1,580	632	(948)
239	OFFICE FURNITURE	8/30/2006	5,263	6.67%	351	0.5	176	564	388
240	SERVICES	8/31/2006	7,400	3.33%	246	0.5	123	99	(24)
241	HYDRANTS	8/31/2006	1,100	2.00%	22	0.5	11	15	4
242	STRUCTURES & IMPRO	8/31/2006	65,100	3.33%	2,168	0.5	1,084	868	(216)
243	METERS &	9/30/2006	19,717	8.33%	1,642	0.5	821	197	(624)
244	OFFICE FURNITURE	9/27/2006	1,577	6.67%	105	0.5	53	169	116
245	SERVICES	9/22/2006	8,850	3.33%	295	0.5	147	89	(58)
246	STRUCTURES & IMPRO	9/30/2006	39,372	3.33%	1,311	0.5	656	394	(262)
247	METERS &	10/31/2006	20,737	8.33%	1,727	0.5	864	138	(726)
248	OFFICE FURNITURE	10/30/2006	2,465	6.67%	164	0.5	82	88	6
249	SERVICES	10/31/2006	8,755	3.33%	292	0.5	146	58	(88)
250	TREATMENT	10/30/2006	34,268	3.33%	1,141	0.5	571	228	(343)
251	STRUCTURES & IMPRO	10/30/2006	23,256	3.33%	774	0.5	387	155	(232)
252	PUMPING	10/30/2006	60	12.50%	8	0.5	4		(4)
253	TRANSPORT	10/31/2006	2,429	20.00%	486	0.5	243	16	(227)
254	METERS &	11/30/2006	209	8.33%	17	0.5	9	1	(8)
255	OFFICE FURNITURE	11/30/2006	85,082	6.67%	5,675	0.5	2,837	3,037	200
256	TREATMENT	11/30/2006	14,216	3.33%	473	0.5	237	47	(190)
257	FORCE	11/30/2006	135,206	2.00%	2,704	0.5	1,352	451	(901)
258	PUMPING	11/30/2006	2,400	12.50%	300	0.5	150	8	(142)
259					-		-		-
260	STRUCTURES & IMPRO	11/30/2006	28,036	3.33%	934	0.5	467	93	(374)
261	HYDRANTS	11/30/2006	30	2.00%	1	0.5	0		(0)
262	TRANSMISSION	12/31/2006	238,303	2.00%	4,766	0.5	2,383		(2,383)
263	METERS &	12/31/2006	68,617	8.33%	5,716	0.5	2,858		(2,858)
264	OFFICE FURNITURE	12/31/2006	18,468	6.67%	1,232	0.5	616	659	43
265	SERVICES	12/31/2006	68,846	3.33%	2,293	0.5	1,146		(1,146)
266	FORCE	12/31/2006	900	2.00%	18	0.5	9		(9)
267	DISTRIBUTION MAINS	12/31/2006	16,657	2.00%	333	0.5	167		(167)
268	HYDRANTS	12/31/2006	7,800	2.00%	156	0.5	78		(78)
269	STRUCTURES & IMPRO	12/31/2006	650	3.33%	22	0.5	11		(11)
270	WELLS & SPRINGS	12/31/2006	4,000	3.33%	133	0.5	67		(67)
271	FLOW MEASURING EQUIP	12/31/2006	4,961	10.00%	496	0.5	248		(248)
272	TRANSPORT	12/31/2006	6,193	20.00%	1,239	0.5	619		(619)
273									
274	**TOTALS**		$ 32,957,874				$ 5,214,316	$ 7,104,035	$ 1,889,719
275									

Information Derived from LPSCO 2006 Depreciation Schedule (provided in response to JMM 1.55)

	Calculated as per Information Shown Above	Adjusted as per Information Shown Above
Total Accelerated Depreciation	$ 7,104,035	$ 7,104,035
Add: Depreciation Expense Not Taken	-	131,868
Less: S/L Depreciation	(5,214,316)	(5,214,316)
Excess Accelerated Depreciation	$ (1,889,719)	$ (2,021,587)
Total Tax Percentage	38.60%	38.60%
Estimated Deferred Income Taxes	$ (729,432)	$ (780,333)
Wastewater Division Allocation Factor		42.7770%
Wastewater Division Deferred Tax Liability		$ (333,803)
Company Amount Per Schedule B-1		15,987
RUCO Adjustment to Deferred Taxes		**$ (317,816)**

TEST YEAR PLANT SCHEDULE
YEAR ENDED SEPTEMBER 30, 2008

LINE NO.	ACCT. NO.	ACCOUNT NAME	(A) COMPANY ADJ TEST YR	(B) RUCO ADJUSTMENTS	(C) RUCO PLANT VALUE
1	351	Organization	$ -	$ -	$ -
2	353	Land and Land Rights	1,783,426	-	1,783,426
3	354	Structures and Improvements	19,319,421	(4,269,219)	15,050,202
4	355	Power Generation Equipment	543,670	5,004	548,674
5	360	Collection Sewers - Force	1,161,105	(164,647)	996,458
6	361	Collection Sewers - Gravity	23,113,391	(565,711)	22,547,680
7	362	Special Collecting Structures		-	-
8	363	Customer Services		-	-
9	364	Flow Measuring Devices	47,019	(412)	46,607
10	366	Reuse Services	3,789,468	(1,249)	3,788,219
11	367	Reuse Meters and Installation	52,331	-	52,331
12	370	Receiving Wells	860,393	-	860,393
13	371	Pumping Equipment	1,858,411	(284,996)	1,573,415
14	374	Reuse Distribution Reservoirs	62,825	-	62,825
15	375	Reuse Trans. And Distrib. System	414,315	(73,638)	340,677
16	380	Treatment and Disposal Equipment	5,469,478	(63,432)	5,406,046
17	381	Plant Sewers	47,788	(178)	47,610
18	382	Outfall Sewer Lines	343,681	-	343,681
19	389	Other Plant and Miscellaneous Equipment	644,609	(41,454)	603,155
20	390	Office Furniture and Equipment	198,772	-	198,772
21	391	Transportation Equipment	26,078	-	26,078
22	392	Stores Equipment	8,968	-	8,968
23	393	Tools, Shop, and Garage Equipment	56,167	-	56,167
24	394	Laboratory Equipment	173,948	-	173,948
25	396	Communications Equipment	418,996	(4,850)	414,146
26	398	Other Tangible Plant	-	-	-
27					
28		**TOTAL WASTEWATER PLANT**	**$ 60,394,260**	**$ (5,464,782)**	**$ 54,929,478**

LINE NO.	ACCT. NO.	ACCOUNT NAME	COMPANY AS FILED	RUCO ADJ 1	RUCO ADJ 2	RUCO ADJ 3	RUCO ADJ 4	RUCO ADJ 5	RUCO ADJ 6	RUCO ADJ 7	RUCO ADJ 8	TOTAL PG 1 ADJ
1	351	Organization	$ -									$ -
2	353	Land	1,783,426									-
3	354	Structures & Improvements	19,319,421		$ (36,500)	$ (348,603)	$ (83,652)			$ 3,725		(465,030)
4	355	Power Generation	543,670						$ 5,004			5,004
5	360	Collection Sewer Forced	1,161,105									-
6	361	Collection Sewers Gravity	23,113,391	$ -		(7,527)	$ (1,203)					(8,730)
7	362	Special Collecting Structures	-									-
8	363	Customer Services	-									-
9	364	Flow Measuring Devices	47,019									-
10	366	Reuse Services	3,789,468									-
11	367	Reuse Meters and Installation	52,331									-
12	370	Receiving Wells	860,393									-
13	371	Pumping Equipment	1,858,411			(91,921)	(12,071)		$ 1,530	$ 4,864	$ (136,488)	(234,086)
14	374	Reuse Distribution Reservoirs	62,825									-
15	375	Reuse Trans. and Dist. System	414,315									-
16	380	Treatment & Disposal Equip.	5,469,478					$ (38,250)				(38,250)
17	381	Plant Sewers	47,788									-
18	382	Outfall Sewer Lines	343,681									-
19	389	Other Sewer Plant & Equip.	644,609						$ 2,000			2,000
20	390	Office Furniture & Equipment	198,772									-
21	391	Transportation Equipment	26,078									-
22	392	Stores Equipment	8,968									-
23	393	Tools, Shop And Garage Equip	56,167									-
24	394	Laboratory Equip	173,948									-
25	396	Communication Equip	418,996									-
26	398	Other Tangible Plant	-									-
27												
28		**TOTALS**	$ 60,394,260	$ -	$ (36,500)	$ (448,051)	$ (96,926)	$ (38,250)	$ 8,534	$ 8,589	$ (136,488)	$ (739,092)
29												
30												
31	ADJ 1	Removed.										
32	ADJ 2	Disallow costs of 2004 PACE Report.										
33	ADJ 3	Record abandonment of Wigwam and Bullard lift stations in July of 2002 per response to Staff Engineering request dated September 3, 2009.										
34	ADJ 4	Record abandonment of Litchfield Greens lift stations in September of 2007.										
35	ADJ 5	Remove water treatment plant transferred to Black Mountain Sewer Company in 2008 using company revised amount per Rebuttal Schedule B-2, Page 3.2.										
36	ADJ 6	Capitalize test year expenses in 2007 from Loftin Equipment, Precision Electric, and KEOGH Engineering.										
37	ADJ 7	Capitalize test year expenses in 2008 from Precision Electric and Dean Fence & Gate.										
38	ADJ 8	Reclassify Repair invoices from Precision Electric during 2008 to Contractual Services - Other.										

LINE NO.	ACCT. NO.	ACCOUNT NAME	RUCO ADJ 9	RUCO ADJ 10	RUCO ADJ 11	RUCO ADJ 12	RUCO ADJ 13	RUCO ADJ 14	RUCO ADJ 15	RUCO ADJ 16	TOTAL PG 2 ADJ
1	351	Organization									$ -
2	353	Land									-
3	354	Structures & Improvements		$ 31,804	$ 14,187	$ 1,378	$ 57,739	$ 58,210	$ (55,508)	$ (40,684)	67,126
4	355	Power Generation									-
5	360	Collection Sewer Forced		11,360	7,843	268		154	(30,284)	(21,550)	(32,209)
6	361	Collection Sewers Gravity		51,113	135,919	78,415	102,212	36,779	(125,280)	(327,018)	(47,860)
7	362	Special Collecting Structures									-
8	363	Customer Services									-
9	364	Flow Measuring Devices			341					(753)	(412)
10	366	Reuse Services					665	886			1,551
11	367	Reuse Meters and Installation									-
12	370	Receiving Wells									-
13	371	Pumping Equipment	$ (33,887)	604	11,712	568	70	1,174	(1,300)	(25,638)	(46,697)
14	374	Reuse Distribution Reservoirs									-
15	375	Reuse Trans. and Dist. System									-
16	380	Treatment & Disposal Equip.		1,063	872	4,522	11,615	111	(2,000)	(1,860)	14,323
17	381	Plant Sewers						222			222
18	382	Outfall Sewer Lines									-
19	389	Other Sewer Plant & Equip.		11,334	1,715	443	1,357	14,506	(23,209)	(3,750)	2,396
20	390	Office Furniture & Equipment									-
21	391	Transportation Equipment									-
22	392	Stores Equipment									-
23	393	Tools, Shop And Garage Equip									-
24	394	Laboratory Equip									-
25	396	Communication Equip									-
26	398	Other Tangible Plant									-
27											
28		**TOTALS**	$ (33,887)	$ 107,278	$ 172,589	$ 85,594	$ 173,658	$ 112,042	$ (237,581)	$ (421,253)	$ (41,560)
29											
30											

31 ADJ 9 Reclassify Repair invoice from Precision Electric during 2007 to Contractual Services - Other, and remove Precision repair invoice from 2007. The
32 first invoice ($14,691) is within the test year and includable in expense, while the second ($19,196) is outside the test year, and not included in expense.
33 ADJ 10 Reverse Company Adjustment for 2004 Affiliate Profit
34 ADJ 11 Reverse Company Adjustment for 2005 Affiliate Profit
35 ADJ 12 Reverse Company Adjustment for 2006 Affiliate Profit
36 ADJ 13 Reverse Company Adjustment for 2007 Affiliate Profit
37 ADJ 14 Reverse Company Adjustment for 2008 Affiliate Profit
38 ADJ 15 Remove 2004 unsupported affiliate labor costs by estimated year related asset placed in service.
39 ADJ 16 Remove 2005 unsupported affiliate labor costs by estimated year related asset placed in service.

LINE NO.	ACCT. NO.	ACCOUNT NAME	RUCO ADJ 17	RUCO ADJ 18	RUCO ADJ 19	RUCO ADJ 20	RUCO ADJ 21	TOTAL PG 3 ADJ	TOTAL ALL ADJS
1	351	Organization						$ -	$ -
2	353	Land						-	-
3	354	Structures & Improvements	$ (7,035)		$ (362,512)	$ (3,500,000)	$ (1,768)	(3,871,315)	(4,269,219)
4	355	Power Generation						-	5,004
5	360	Collection Sewer Forced	(131,238)		(1,200)			(132,438)	(164,647)
6	361	Collection Sewers Gravity	(162,996)	$ (288,769)	(57,356)			(509,121)	(565,711)
7	362	Special Collecting Structures						-	-
8	363	Customer Services						-	-
9	364	Flow Measuring Devices						-	(412)
10	366	Reuse Services		(1,200)	(1,600)			(2,800)	(1,249)
11	367	Reuse Meters and Installation						-	-
12	370	Receiving Wells						-	-
13	371	Pumping Equipment	(1,200)	(200)	(2,813)			(4,213)	(284,996)
14	374	Reuse Distribution Reservoirs						-	-
15	375	Reuse Trans. and Dist. System			(73,638)			(73,638)	(73,638)
16	380	Treatment & Disposal Equip.	(8,756)	(30,549)	(200)			(39,505)	(63,432)
17	381	Plant Sewers			(400)			(400)	(178)
18	382	Outfall Sewer Lines						-	-
19	389	Other Sewer Plant & Equip.	(800)	(2,450)	(42,600)			(45,850)	(41,454)
20	390	Office Furniture & Equipment						-	-
21	391	Transportation Equipment						-	-
22	392	Stores Equipment						-	-
23	393	Tools, Shop And Garage Equip						-	-
24	394	Laboratory Equip						-	-
25	396	Communication Equip			(4,850)			(4,850)	(4,850)
26	398	Other Tangible Plant						-	-
27									
28		**TOTALS**	$ (312,025)	$ (323,168)	$ (547,169)	$ (3,500,000)	$ (1,768)	$ (4,684,130)	$ (5,464,782)
29									
30									

31 ADJ 17 Remove 2006 unsupported affiliate labor costs by estimated year related asset placed in service.
32 ADJ 18 Remove 2007 unsupported affiliate labor costs by estimated year related asset placed in service.
33 ADJ 19 Remove 2008 unsupported affiliate labor costs by estimated year related asset placed in service.
34 ADJ 20 Remove costs associated with correcting design deficiencies at the PVWRF at 50% of amount incurred and placed in
35 service during the Test Year per direct testimony of Greg Sorensen at page 7.
36 ADJ 21 Per Rebuttal Schedule B-2, Page 3, Adjustment D adds $7,072 to account 354, yet this amount is not explained. RUCO makes an
37 adjustment to remove the actual amount recorded to account 354 for rent in 2002.

Litchfield Park Service Company - Wastewater Division
Docket No. SW-01428A-09-0103 and W-01427A-09-0104
Test Year Ended September 30, 2008

OPERATING INCOME

LINE NO.	DESCRIPTION	(A) COMPANY AS FILED	(B) RUCO TEST YEAR ADJUSTMENTS	REF	(C) RUCO TEST YEAR AS ADJUSTED	(D) RUCO PROPOSED CHANGES	(E) RUCO AS RECOMM'D
1	Revenues						
2	Flat Rate Revenues	$ 6,164,589			$ 6,164,589	$ 2,043,412	$ 8,208,001
3	Measured Revenues	92,030	2,813	1	94,843	338,898	433,741
4	Other Wastewater Revenues	99,755			99,755		99,755
5					-		-
6	TOTAL OPERATING REVENUE	$ 6,356,374	$ 2,813		$ 6,359,187	$ 2,382,310	$ 8,741,497
7							
8	Operating Expenses						
9	Salaries & Wages	$ -			$ -		$ -
10	Purchased Wastewater Treatment	1,205			1,205		1,205
11	Sludge Removal Expense	267,554			267,554		267,554
12	Purchased Power	632,064	(406)	2/3	631,658		631,658
13	Fuel for Power Production	2,076	(425)	2	1,651		1,651
14	Chemicals	279,749	(12,089)	3	267,660		267,660
15	Materials and Supplies	75,579	(13,520)	8	62,059		62,059
16	Contractual Services	3,117			3,117		3,117
17	Contractual Services - Testing	33,348	(6,398)	5	26,951		26,951
18	Contractual Services - Other	2,716,000	(157,307)	4a-e	2,558,693		2,558,693
19	Contractual Services - Legal	24,084			24,084		24,084
20	Equipment Rental	78,309	(4,387)	7	73,922		73,922
21	Rents - Building	18,976			18,976		18,976
22	Transportation Expenses	69,551	(17,726)	6	51,825		51,825
23	Insurance - General Liability	32,133			32,133		32,133
24	Insurance - Vehicle	2,213			2,213		2,213
25	Regulatory Comm. Expense	19,133			19,133		19,133
26	Regulatory Comm, Exp. - Rate Case	70,000	(28,000)	14	42,000		42,000
27	Miscellaneous Expense	36,656	(6,409)	9	30,247		30,247
28	Bad Debt Expense	43,889	(40,848)	10	3,041		3,041
29	Depreciation & Amortization	1,550,237	(215,142)	11a-b	1,335,095		1,335,095
30	Taxes Other Than Income	-			-		-
31	Property Taxes	336,629	(81,924)	12	254,705	32,370	287,075
32	Income Tax	(99,906)	251,179	13	151,273	907,051	1,058,324
33					-		-
34							
35	TOTAL OPERATING EXPENSES	$ 6,192,596	$ (333,401)		$ 5,859,195	$ 939,421	$ 6,798,615
36							
37	**OPERATING INCOME (LOSS)**	**$ 163,778**	**$ 336,214**		**$ 499,992**	**$ 1,442,890**	**$ 1,942,883**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4b
TO CONTRACTUAL SERVICES - OTHER AND ADMINISTRATIVE ALLOCATION - AWS

LINE NO.	GENERAL LEDGER ACCOUNT	VENDOR	DESCRIPTION	AMOUNT
1	Contractual Services-AWS	Algonquin Water Services	Recon fees to 4 factor	$ -
2	Contractual Services-AWS	Algonquin Water Services	Recon fees to 4 factor	-
3	Admin Allocation-AWS	Algonquin Water Services	Recon fees to 4 factor	-
4				
5	Contractual Services-Other	Aerotek/AWS	Rebuttal Schedule C-1, Page 2.1	(42,200)
6				
7				
8			**RUCO Adjustment To Remove Expenses**	**$ (42,200)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 4c
TO CONTRACTUAL SERVICES - OTHER

LINE NO.	GENERAL LEDGER ACCOUNT	VENDOR	DESCRIPTION	AMOUNT
1	Central Office - Accounting/Administration	Algonquin Power Trust	GENERAL ACCTIN FEE - LPSCO	$ (1,793)
2	Central Office - Human Resources	Algonquin Power Trust	GEN HR FEE- LPSCO	(6,138)
3	Central Office - Information Technology	Algonquin Power Trust	GEN IT FEE- LPSCO	(518)
4	Central Office - Operations	Algonquin Power Trust	GENERAL OPS	(764)
5	Central Office Fixed Overhead Costs	Algonquin Power Trust	MGMT FEE- LPSCO	(177,737)
6				
7			**RUCO Adjustment To Remove Unnecessary/Inappropriate Expenses**	**$ (186,950)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 11a
TO DEPRECIATION EXPENSE

LINE NO.	ACCT NO.	PLANT ACCOUNT	RUCO ORIGINAL COST	PROPOSED DEPR RATE	PROPOSED DEPR EXPENSE
1	351	Organization	$ -		
2	353	Land	1,783,426		
3	354	Structures & Improvements	15,050,202	3.33%	501,172
4	355	Power Generation	548,674	5.00%	27,434
5	360	Collection Sewer Forced	996,458	2.00%	19,929
6	361	Collection Sewers Gravity	22,547,680	2.00%	450,954
7	362	Special Collecting Structures	-	2.00%	-
8	363	Customer Services	-	2.00%	-
9	364	Flow Measuring Devices	46,607	10.00%	4,661
10	366	Reuse Services	3,788,219	2.00%	75,764
11	367	Reuse Meters and Installation	52,331	8.33%	4,359
12	370	Receiving Wells	860,393	3.33%	28,651
13	371	Pumping Equipment	1,573,415	12.50%	196,677
14	374	Reuse Distribution Reservoirs	62,825	2.50%	1,571
15	375	Reuse Trans. and Dist. System	340,677	2.50%	8,517
16	380	Treatment & Disposal Equip.	5,406,046	5.00%	270,302
17	381	Plant Sewers	47,610	5.00%	2,381
18	382	Outfall Sewer Lines	343,681	3.33%	11,445
19	389	Other Sewer Plant & Equip.	603,155	6.67%	40,230
20	390	Office Furniture & Equipment	198,772	6.67%	13,258
21	391	Transportation Equipment	26,078	20.00%	5,216
22	392	Stores Equipment	8,968	4.00%	359
23	393	Tools, Shop And Garage Equip	56,167	5.00%	2,808
24	394	Laboratory Equip	173,948	10.00%	17,395
25	396	Communication Equip	414,146	10.00%	41,415
26	398	Other Tangible Plant	-		-
27					-
28		**TOTALS**	**$ 54,929,478**		**$ 1,724,496**
29					
30					
31		Less Amortization of Contributions per Company C-2, Page 2			$ (374,743)
32					
33		Total Proposed Depreciation Expense Per RUCO			$ 1,349,753
34					
35		Total Proposed Depreciation Expense Per Company			$ 1,550,237
36					
37		Net Decrease to Depreciation Expense			$ (200,484)
38					
39					
40		**RUCO Adjustment To Plant Depreciation Expense**			**$ (200,484)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 11b
TO DEPRECIATION EXPENSE

LINE NO.	DESCRIPTION	REFERENCE	TOTAL
1	Total Amortization of Debt Discount Per RUCO		$ -
2			
3	Test Year Adjusted Amortization of Debt Discount As Filed		$ 14,658
4			
5	**RUCO Adjustment To Amortization of Debt Discount**		$ (14,658)
6			
7	**TOTAL RUCO ADJUSTMENT TO DEPRECIATION EXPENSE**		**$ (14,658)**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 12
TO PROPERTY TAX

LINE NO.	DESCRIPTION	REFERENCE	(A)	(B)
1	Calculation Of The Company's Full Cash Value:			
2				
3	Annual Operating Revenues:			
4	Year Ended 09/30/2008		$ 6,359,187	
5	Year Ended 09/30/2008		6,359,187	
6	Proposed Revenue		8,741,497	
7	Total Three Year Operating Revenues	Sum of Lines 4, 5, & 6	$ 21,459,871	
8	Average Annual Operating Revenues	Line 7 / 3	$ 7,153,290	
9				
10	Two Times Three Year Average Operating Revenues	Line 8 X 2		$ 14,306,580
11				
12	ADD:			
13	10% of construction Work In Progress ("CWIP"):			
14	Test Year CWIP	Co. Sch E-1, Line 4	$ 393,011	
15	10% of CWIP	Line 14 X 10%		$ 39,301
16				
17	SUBTRACT:			
18	Transportation at Book Value:			
19	Original Cost of Transportation Equipment		26,078	
20	Accum. Depr. Of Transportation Equipment		(10,496)	
21	Book Value of Transportation Equipment	Line 19 + Line 20		$ 15,582
22				
23	Company's Full Cash Value ("FCV")	Sum of Lines 10, 15, & 21		14,361,464
24				
25	Calculation Of The Company's Tax Liability:			
26				
27	MULTIPLY:			
28	FCV X Valuation Assessment Ratio X Property Tax Rates:			
29	Assessment Ratio	House Bill 2779	21.0000%	
30	Assessed Value	Line 23 X 29	$ 3,015,907	
31				
32	Property Tax Rates:			
33	Composite Tax Rate (Per Company)	Rebuttal Schedule C-2, Page 3	9.5187%	
34				
35	Estimated Tax Rate Liability		9.5187%	
36				
37	Company's Total Tax Liability - Based on Full Cash Value	Line 30 X Line 35		$ 287,075
38				
39	RUCO Adjusted Test Year Property Tax Expense			254,705
40	Decrease in Property Tax Expense	Line 37 - Line 39		$ 32,370
41				
42	**TOTAL RUCO ADJUSTMENT TO PROPERTY TAXES**			**$ 32,370**

EXPLANATION OF OPERATING INCOME ADJUSTMENT NO. 13
TO TEST YEAR INCOME TAX EXPENSE

LINE NO.	DESCRIPTION	(A) REFERENCE	(B) AMOUNT
1	**FEDERAL INCOME TAXES:**		
2			
3	Operating Income Before Taxes	Sch 4, Page 1, Col C, Lines 32 + 37	$ 651,266
4	Less:		
5	Arizona State Tax	Line 21	$ (27,308)
6	Interest Expense	Note (A), Line 35	(259,354)
7	Federal Taxable Income	Line 3 + Line 5 + Line 6	$ 364,603
8			
9	Federal Tax Rate	Schedule 1, Page 2	34.0000%
10	Federal Income Tax Expense	Line 7 X Line 9	$ 123,965
11			
12	**STATE INCOME TAXES:**		
13			
14	Operating Income Before Taxes	Sch 4, Page 1, Col C, Lines 32 + 37	$ 651,266
15	LESS:		
16	Interest Expense	Note (A), Line 35	(259,354)
17	State Taxable Income	Line 14 + Line 16	$ 391,911
18			
19	State Tax Rate	Tax Rate	6.9680%
20			
21	State Income Expense	Line 17 X Line 19	$ 27,308
22			
23	**TOTAL TEST YEAR INCOME TAX EXPENSE:**		
24	Federal Income Tax Expense	Line 10	$ 123,965
25	State Income Tax Expense	Line 21	27,308
26	Total Income Tax Expense Per RUCO	Line 24 + Line 25	$ 151,273
27	Total Income Tax Expense Per Company	Company Sch C-1	(99,906)
28	**Total RUCO Income Tax Adjustment**	Line 26 - Line 27	**$ 251,179**
29			
30			
31	*NOTE (A)*		
32	Interest Synchronization:		
33	Adjusted Rate Base	$ 22,750,383	
34	Weighted Avg. Cost of Debt	1.14%	
35	Synchronized Interest Expense (L33 X L34)	$ 259,354	

Wastewater Revenue Summary and Proposed Rates

	Company Present Rates	RUCO Proposed Rates	Increase/ (Decrease) Amount	Increase/ (Decrease) Percent	RUCO PROPOSED MONTHLY RATE	RUCO PROPOSED RATE PER THOUSAND
Revenue By Class						
Residential	$ 4,610,726	$ 6,061,749	$ 1,451,023	31.47%	**$ 35.76**	
Residential HOA 135	44,064	57,931	13,867	31.47%	**35.76**	
Residential HOA 160	52,224	68,659	16,435	31.47%	**35.76**	
Residential HOA 520	169,728	223,142	53,414	31.47%	**35.76**	
Subtotal Residential	**$ 4,876,742**	**$ 6,411,482**	**$ 1,534,740**	31.47%		
Multi-Unit 3	$ 9,923	$ 13,048	$ 3,125	31.49%	**$ 33.20**	
Multi-Unit 5	3,156	4,150	994	31.50%	**33.20**	
Multi-Unit 6	1,818	2,390	572	31.49%	**33.20**	
Multi-Unit 7	8,484	11,155	2,671	31.49%	**33.20**	
Multi-Unit 8	75,144	98,803	23,659	31.49%	**33.20**	
Multi-Unit 9	2,727	3,586	859	31.49%	**33.20**	
Multi-Unit 14	46,662	61,354	14,692	31.49%	**33.20**	
Multi-Unit 16	116,352	152,986	36,634	31.49%	**33.20**	
Multi-Unit 17	5,151	6,773	1,622	31.49%	**33.20**	
Multi-Unit 18	5,454	7,171	1,717	31.49%	**33.20**	
Multi-Unit 24	7,272	9,562	2,290	31.49%	**33.20**	
Multi-Unit 46	13,938	18,326	4,388	31.49%	**33.20**	
Multi-Unit 84	25,452	33,466	8,014	31.49%	**33.20**	
Multi-Unit 90	27,270	35,856	8,586	31.49%	**33.20**	
Multi-Unit 132	79,992	105,178	25,186	31.49%	**33.20**	
Multi-Unit 304	92,112	121,114	29,002	31.49%	**33.20**	
Subtotal Multi-Unit	**$ 520,907**	**$ 684,916**	**$ 164,009**	31.49%		
Small Commercial	**$ 84,456**	**$ 111,060**	**$ 26,604**	31.50%	**$ 60.49**	
Measured Regular Domestic Service	$ 277,822	$ 366,272	$ 88,450	31.84%	**$ 33.50**	**$ 2.6800**
Msrd Restrnt, Motels, Groc, Dry Clean	234,293	308,516	74,223	31.68%	**33.50**	**4.0232**
Subtotal Measured Service	**$ 512,115**	**$ 674,788**	**$ 162,673**	31.76%		
Wigwam Resort - Per Room	$ 103,929	$ 136,651	$ 32,722	31.49%	**$ 33.20**	
Wigwam Resort - Main	12,000	15,780	3,780	31.50%	**1,315.00**	
Subtotal Wigwam	**$ 115,929**	**$ 152,431**	**$ 36,502**	31.49%		
Elementary Schools	$ 32,640	$ 42,922	$ 10,282	31.50%	**$ 894.20**	
Middle and High Schools	28,800	37,872	9,072	31.50%	**1,052.00**	
Community College	14,880	19,567	4,687	31.50%	**1,630.60**	
Subtotal Educational Facilities	**$ 76,320**	**$ 100,361**	**$ 24,041**	31.50%		
Effluent @ $0.1688/thousand	$ 50,842	$ 448,604	$ 397,763	782.35%		**$ 1.50**
Effluent @ $0.6905/thousand	44,331	80,310	35,979	81.16%		**1.50**
Subtotal Effluent Sales	**$ 95,173**	**$ 528,914**	**$ 433,741**	455.74%		
Total Revenue	**$ 6,281,642**	**$ 8,663,952**	**$ 2,382,310**	**37.92%**		

SONN S. ROWELL, CPA

SURREBUTTAL EXHIBIT 3

LPSCO FAQ's

Litchfield Park Service Company - Wastewater Division
Docket No. SW-01428A09-0103
Test Year Ended September 30, 2008

Wastewater Revenue Summary and Rates

	Company Present Rates	RUCO Proposed Rates	Increase/ (Decrease) Amount	Increase/ (Decrease) Percent	RUCO Proposed Mo. Rate	RUCO Rate Per Thousand
Revenue By Class						
Residential	$4,610,726	$ 5,636,274	$ 1,025,548	22.24%	$ 33.25	
Residential HOA 135	44,064	53,865	9,801	22.24%	33.25	
Residential HOA 160	52,224	63,840	11,616	22.24%	33.25	
Residential HOA 520	169,728	207,480	37,752	22.24%	33.25	
Subtotal	**$4,876,742**	**$ 5,961,459**	**$ 1,084,717**	22.24%		
Multi-Unit 3	$ 9,923	$ 12,128	$ 2,205	22.22%	$ 30.86	
Multi-Unit 5	3,156	3,858	702	22.23%	30.86	
Multi-Unit 6	1,818	2,222	404	22.22%	30.86	
Multi-Unit 7	8,484	10,369	1,885	22.22%	30.86	
Multi-Unit 8	75,144	91,839	16,695	22.22%	30.86	
Multi-Unit 9	2,727	3,333	606	22.22%	30.86	
Multi-Unit 14	46,662	57,029	10,367	22.22%	30.86	
Multi-Unit 16	116,352	142,203	25,851	22.22%	30.86	
Multi-Unit 17	5,151	6,295	1,144	22.22%	30.86	
Multi-Unit 18	5,454	6,666	1,212	22.22%	30.86	
Multi-Unit 24	7,272	8,888	1,616	22.22%	30.86	
Multi-Unit 46	13,938	17,035	3,097	22.22%	30.86	
Multi-Unit 84	25,452	31,107	5,655	22.22%	30.86	
Multi-Unit 90	27,270	33,329	6,059	22.22%	30.86	
Multi-Unit 132	79,992	97,764	17,772	22.22%	30.86	
Multi-Unit 304	92,112	112,577	20,465	22.22%	30.86	
Subtotal Multi-Unit	**$ 520,907**	**$ 636,642**	**$ 115,735**	22.22%		
Small Commercial	**$ 84,456**	**$ 103,238**	**$ 18,782**	22.24%	$ 56.23	
Measured Regular Domestic Service	$ 277,822	$ 354,781	$ 76,959	27.70%	$ 31.48	$ 2.61
Msrd Restrnt, Motels, Groc, Dry Clean	234,293	271,981	37,688	16.09%	31.48	3.53
Subtotal Measured Service	**$ 512,115**	**$ 626,762**	**$ 114,647**	22.39%		
Wigwam Resort - Per Room	$ 103,929	$ 127,061	$ 23,132	22.26%	$ 30.85	
Wigwam Resort - Main	12,000	14,670	2,670	22.25%	$1,222.50	
Subtotal Wigwam	**$ 115,929**	**$ 141,731**	**$ 25,802**	22.26%		
Elementary Schools	$ 32,640	$ 39,902	$ 7,262	22.25%	$ 831.30	
Middle and High Schools	28,800	35,208	6,408	22.25%	978.00	
Community College	14,880	18,191	3,311	22.25%	1,515.90	
Subtotal Educational Facilities	**$ 76,320**	**$ 93,301**	**$ 16,981**	22.25%		
Effluent @ $0.1688/thousand	$ 50,842	$ 448,604	$ 397,763	782.35%	$1.50/thou	
Effluent @ $0.6905/thousand	44,331	80,310	35,979	81.16%	$1.50/thou	
Subtotal Effluent Sales	**$ 95,173**	**$ 528,914**	**$ 433,741**	455.74%		
Total Revenue	**$6,281,642**	**$ 8,092,047**	**$ 1,810,405**	28.82%		

Frequently Asked Questions

What are Liberty Water's business hours?
Where is Liberty Water located?
What is Liberty Water's phone number?
If I have an emergency in the evening or weekend where do I call?
How do I sign up for service?
When is my bill due?
Where do I go to pay my bill?
Will I be charged a late fee if my payment doesn't get to you on the due date?
How long does it take to process a payment?
Why does it take so long for my payment to be posted when I pay by On-Line Banking?
How can I pay my bill?
How does your Surepay progam work?
How do I sign up for Surepay?
How can I stop a Surepay payment if I believe my bill is incorrect?
Do you have a payment drop box?
Where do I report water leaks?
How long will it take for someone to respond to a water leak?
What is Arizona Bluestake?
What should I do if there are bees in my water meter box?
Do you estimate the usage on my bill?
How can I tell if my bill is estimated?
How can I help prevent an estimated bill?
Can I turn off my own water service?
There's no shut off valve on my side of the meter and I need to have the water turned off for a plumbing repair.

What are Liberty Water's business hours?

Monday through Friday 7:30am to 4:30pm.

TOP

Where is Liberty Water located?

The business office is located at 12725 West Indian School Road, Suite D101, Avondale, Arizona 85392.

TOP

What is Liberty Water's phone number?

During regular business hours you can contact us at 623-935-9367.

TOP

If I have an emergency in the evening or weekend where do I call?

For emergencies that occur after business hours or on a weekend or holiday, please contact 623-935-3395.

TOP

How do I sign up for service?

An application must be completed at least two business days before service is desired. You may apply in person or contact the office at 623-935-9367 to request an application to be sent by mail, fax, or email.

TOP

When is my bill due?

Water bills are due upon rendering and delinquent 15 days after.

TOP

Where do I go to pay my bill?

Payments in the form of a check or money order can be mailed or delivered in person to the address below:

12725 W Indian School Road, Suite D101
Avondale, AZ 85323

TOP

Will I be charged a late fee if my payment doesn't get to you on the due date?

A 1.5% late fee will be assessed on the unpaid balance.

TOP

How long does it take to process a payment?

Payments are usually processed within 24 hours of receipt at our office. Since postal deliveries vary, please allow sufficient time for your payment to reach us. Mailing your payment at least 5 days before the due date is recommended.

TOP

Why does it take so long for my payment to be posted when I pay by On-Line Banking?

When you pay by "On-Line" banking the bank sends your payment to us via a check in the mail. This process takes a few days and may cause payments to arrive late at our facility. Please check with your on-line banking company to determine the amount of time you will need to allow for on time payments.

TOP

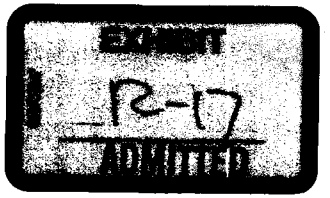
How can I pay my bill?

Checks or money orders can be mailed or dropped off at our business office. An envelope is included with your statement for convenience. Cash payments are accepted at the business office. Payments can also be made electronically through our Surepay program.

TOP

LPSCO Wastewater Division Test Year Effluent Sales

Name	Data	10/1/2007	11/1/2007	12/1/2007	1/1/2008	2/1/2008	3/1/2008	4/1/2008	5/1/2008	6/1/2008
ARCAL GOLF INC	Sum of Amount	$ 375.70	$ 469.20	$ 144.50	$ 47.60	$ 75.65	$ 51.85	$ 169.15	$ 433.50	$ 515.95
	Sum of Consumption	2,225,858.56	2,779,805.26	856,099.45	282,009.23	448,193.24	307,188.62	1,002,139.94	2,568,298.34	3,056,778.61
	Sum of ACRE FEET	6.83	8.53	2.63	0.87	1.38	0.94	3.08	7.88	9.38
	Cost per acre foot	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**
	Sum / 1000	2,225.86	2,779.81	856.10	282.01	448.19	307.19	1,002.14	2,568.30	3,056.78
	Cost per 1000 gallons	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**
CITY OF GOODYEAR	Sum of Amount	$ 323.00	$ 340.00	$ 323.00	$ 42.50	$ 199.07	$ -	$ 48.96	$ 43.86	$ 48.45
	Sum of Consumption	1,913,634.05	2,014,351.64	1,913,634.05	251,793.95	1,179,402.88		290,066.64	259,851.36	287,045.11
	Sum of ACRE FEET	5.87	6.18	5.87	0.77	3.62		0.89	0.80	0.88
	Cost per acre foot	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**		**$ 55.00**	**$ 55.00**	**$ 55.00**
	Sum / 1000	1,913.63	2,014.35	1,913.63	251.79	1,179.40		290.07	259.85	287.05
	Cost per 1000 gallons	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**		**$ 0.1688**	**$ 0.1688**	**$ 0.1688**
J BANICKI CONSTRUCTION INC	Sum of Amount									
	Sum of Consumption									
	Sum of ACRE FEET									
	Cost per acre foot									
	Sum / 1000									
	Cost per 1000 gallons									
JSA CONSTRUCTION INC	Sum of Amount	$ 6,274.93	$ 6,111.40	$ 2,766.49	$ 841.39	$ 1,528.76	$ 1,483.29	$ 2,656.43	$ 2,922.63	$ 2,940.57
	Sum of Consumption	9,087,520.96	8,850,692.45	4,006,504.59	1,218,523.44	2,213,991.00	2,148,140.13	3,847,112.76	4,232,630.70	4,258,611.89
	Sum of ACRE FEET	27.89	27.16	12.30	3.74	6.79	6.59	11.81	12.99	13.07
	Cost per acre foot	**$ 225.00**	**$ 225.00**	**$ 225.00**	**$ 225.00**	**$ 225.00**	**$ 225.00**	**$ 225.00**	**$ 225.00**	**$ 225.00**
	Sum / 1000	9,087.52	8,850.69	4,006.50	1,218.52	2,213.99	2,148.14	3,847.11	4,232.63	4,258.61
	Cost per 1000 gallons	**$ 0.6905**	**$ 0.6905**	**$ 0.6905**	**$ 0.6905**	**$ 0.6905**	**$ 0.6905**	**$ 0.6905**	**$ 0.6905**	**$ 0.6905**
PALM VALLEY GOLF CLUB	Sum of Amount	$ -	$ -	$ 1,530.00	$ 170.00	$ 283.05	$ 469.88	$ 1,214.99	$ 2,129.42	$ 4,633.35
	Sum of Consumption	-	-	9,064,582.36	1,007,175.82	1,676,947.74	2,783,833.96	7,198,285.57	12,615,884.30	27,450,576.92
	Sum of ACRE FEET	-	-	27.82	3.09	5.15	8.54	22.09	38.72	84.24
	Cost per acre foot			**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**
	Sum / 1000			9,064.58	1,007.18	1,676.95	2,783.83	7,198.29	12,615.88	27,450.58
	Cost per 1000 gallons			**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**
PEBBLECREEK HOA	Sum of Amount	$ 2,450.21	$ 3,941.62	$ 1,914.71	$ 396.61	$ 270.81	$ -	$ 2,103.24	$ 3,330.13	$ 3,455.42
	Sum of Consumption	14,516,425.07	23,352,378.52	11,343,821.24	2,349,741.18	1,604,431.08	-	12,460,779.22	19,729,567.10	20,471,855.68
	Sum of ACRE FEET	44.55	71.67	34.81	7.21	4.92	-	38.24	60.55	62.83
	Cost per acre foot	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**		**$ 55.00**	**$ 55.00**	**$ 55.00**
	Sum / 1000	14,516.43	23,352.38	11,343.82	2,349.74	1,604.43	-	12,460.78	19,729.57	20,471.86
	Cost per 1000 gallons	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**		**$ 0.1688**	**$ 0.1688**	**$ 0.1688**
PV WATER RECLAMATION FACILITY	Sum of Amount	$ 33.15	$ 70.72	$ 38.93	$ 29.75	$ 20.74	$ 5.10	$ 50.83	$ 64.77	$ 51.34
	Sum of Consumption	196,399.28	418,985.14	230,643.26	176,255.77	122,875.45	30,215.27	301,145.57	383,733.99	304,167.10
	Sum of ACRE FEET	0.60	1.29	0.71	0.54	0.38	0.09	0.92	1.18	0.93
	Cost per acre foot	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**
	Sum / 1000	196.40	418.99	230.64	176.26	122.88	30.22	301.15	383.73	304.17
	Cost per 1000 gallons	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**
SUNCOR DEVELOPMENT COMPANY	Sum of Amount	$ 1,489.92	$ 0.21							
	Sum of Consumption	2,157,741.88	304.13							
	Sum of ACRE FEET	6.62	0.00							
	Cost per acre foot	**$ 225.00**	**$ 225.00**							
	Sum / 1000	2,157.74	0.30							
	Cost per 1000 gallons	**$ 0.6905**	**$ 0.6905**							
Total Sum of Amount		$ 10,946.91	$ 10,933.15	$ 6,717.63	$ 1,527.85	$ 2,378.08	$ 2,010.12	$ 6,243.60	$ 8,924.31	$ 11,645.08
Total Sum of Consumption		30,097,579.80	37,416,517.13	27,415,284.96	5,285,499.39	7,245,841.39	5,269,377.99	25,099,529.70	39,789,965.79	55,829,035.31
Total Sum of ACRE FEET		92.37	114.83	84.13	16.22	22.24	16.17	77.03	122.11	171.33
Average cost Acre/Foot		**$ 118.52**	**$ 95.21**	**$ 79.84**	**$ 94.19**	**$ 106.94**	**$ 124.30**	**$ 81.06**	**$ 73.08**	**$ 67.97**
Average cost per thousand gallons		**$ 0.3637**	**$ 0.2922**	**$ 0.2450**	**$ 0.2891**	**$ 0.3282**	**$ 0.3815**	**$ 0.2488**	**$ 0.2243**	**$ 0.2086**



LPSCO Wastewater Division Test Year Effluent Sales

Name	Data	7/1/2008	8/1/2008	9/1/2008	Grand Total
ARCAL GOLF INC	Sum of Amount	$ 597.55	$ 675.75	$ 623.90	$ 4,180.30
	Sum of Consumption	3,540,223.00	4,003,523.88	3,696,335.25	24,766,453.37
	Sum of ACRE FEET	10.86	12.29	11.34	76.01
	Cost per acre foot	**$ 55.00**	**$ 55.00**	**$ 55.00**	**55.00**
	Sum / 1000	3,540.22	4,003.52	3,696.34	24,766.45
	Cost per 1000 gallons	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**
CITY OF GOODYEAR	Sum of Amount	$ 4.42	$ -	$ 340.00	$ 1,713.26
	Sum of Consumption	26,186.57		2,014,351.64	10,150,317.90
	Sum of ACRE FEET	0.08		6.18	31.15
	Cost per acre foot	**$ 55.00**		**$ 55.00**	**55.00**
	Sum / 1000	26.19		2,014.35	10,150.32
	Cost per 1000 gallons	**$ 0.1688**		**$ 0.1688**	**$ 0.1688**
J BANICKI CONSTRUCTION INC	Sum of Amount			$ 5,464.73	$ 5,464.73
	Sum of Consumption			7,914,167.71	7,914,167.71
	Sum of ACRE FEET			24.29	24.29
	Cost per acre foot			**$ 225.00**	**225.00**
	Sum / 1000			7,914.17	7,914.17
	Cost per 1000 gallons			**$ 0.6905**	**$ 0.6905**
JSA CONSTRUCTION INC	Sum of Amount	$ 4,142.21	$ 3,956.94	$ 1,783.37	$ 37,408.41
	Sum of Consumption	5,998,858.98	5,730,546.03	2,582,723.99	54,175,856.92
	Sum of ACRE FEET	18.41	17.59	7.93	166.26
	Cost per acre foot	**$ 225.00**	**$ 225.00**	**$ 225.00**	**$ 225.00**
	Sum / 1000	5,998.86	5,730.55	2,582.72	54,175.86
	Cost per 1000 gallons	**$ 0.6905**	**$ 0.6905**	**$ 0.6905**	**$ 0.6905**
PALM VALLEY GOLF CLUB	Sum of Amount	$ 2,624.63	$ 1,983.39	$ 50.15	$ 15,088.86
	Sum of Consumption	15,549,787.46	11,750,720.27	297,116.87	89,394,911.27
	Sum of ACRE FEET	47.72	36.06	0.91	274.34
	Cost per acre foot	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**
	Sum / 1000	15,549.79	11,750.72	297.12	89,394.91
	Cost per 1000 gallons	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**
PEBBLECREEK HOA	Sum of Amount	$ 2,943.72	$ 5,616.29	$ 2,609.50	$ 29,032.26
	Sum of Consumption	17,440,256.47	33,274,067.51	15,460,148.81	172,003,471.88
	Sum of ACRE FEET	53.52	102.11	47.45	527.86
	Cost per acre foot	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**
	Sum / 1000	17,440.26	33,274.07	15,460.15	172,003.47
	Cost per 1000 gallons	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**
PV WATER RECLAMATION FACILITY	Sum of Amount	$ 26.86	$ 37.91	$ 34.85	$ 464.95
	Sum of Consumption	159,133.78	224,600.21	206,471.04	2,754,625.86
	Sum of ACRE FEET	0.49	0.69	0.63	8.45
	Cost per acre foot	**$ 55.00**	**$ 55.00**	**$ 55.00**	**$ 55.00**
	Sum / 1000	159.13	224.60	206.47	2,754.63
	Cost per 1000 gallons	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**	**$ 0.1688**
SUNCOR DEVELOPMENT COMPANY	Sum of Amount			$ -	$ 1,490.13
	Sum of Consumption			-	2,158,046.00
	Sum of ACRE FEET			-	6.62
	Cost per acre foot				**$ 225.00**
	Sum / 1000				2,158.05
	Cost per 1000 gallons				**$ 0.6905**
Total Sum of Amount		$ 10,339.39	$ 12,270.28	$ 10,906.50	$ 94,842.90
Total Sum of Consumption		42,714,446.26	54,983,457.89	32,171,315.31	363,317,850.91
Total Sum of ACRE FEET		131.09	168.74	98.73	1,114.98
Average cost Acre/Foot		**$ 78.88**	**$ 72.72**	**$ 110.47**	**$ 85.06**
Average cost per thousand gallons		**$ 0.2421**	**$ 0.2232**	**$ 0.3390**	**$ 0.2610**

July 6, 01

Job Invoice

R-18

Yahweh Contracting LLC
7019 W. Georgia Ave.
Glendale, AZ 85303
Office: (623) 247-1379
Fax: (623) 247-0976

RECEIVED
JUL - 9 2001

To: LPSCO Water Service Co
Address: 111 W. Wigwam Blvd, suite B

1.1202

Attention: Conde Sluga

Qty	Material	Unit	Amount

220 Litchfield Rd.

2" water Service Repair
New Corp w/ new copper
Backhoe, laborers, Crew truck
Sales Tax, Insurance
Replace New rubber Asphalt

PAYMENT
APPR BY (B) DATE: 7-9-01
AMOUNT APPR. $ 3,000
COMMENTS New Copper Service

DISTRIBUTION
ACC # 100-000-107-00 $ 3000
ACC # _____ $ _____
ACC # _____ $ _____

Labor & Equipment
Truck & Tools

Work Ordered By:

Customer Approval Signature: James Martinez

Authorized Signature: _____

Total Cost: $3000.00

EXHIBIT
R-18
ADMITTED

JWy 6, 01

Job Invoice

Yahweh Contracting LLC
7019 W. Georgia Ave.
Glendale, AZ 85303
Office: (623) 247-1379
Fax: (623) 247-0976

RECEIVED
JUL - 9 2001

To: LPSCo Water Service Co.
Address: 111 W. Wigwam Blvd. suite B

Attention: Conde Sluga 002003

Qty	Material	Unit	Amount
	~~[illegible] ALCALA ST~~ LOT 130 PAJARO ST		
	1" water Service Repair		
	New Corp w/new Copper - 50 ft. run		
	Backhoe, Laborers, Crew truck		
	Asphalt replacement		
	Sales Tax, Insurance		

PAYMENT
APPR BY CB DATE: 7-9-01
AMOUNT APPR. $ 3000
COMMENTS New Copper Georgia

DISTRIBUTION
ACC # 100-000-1017-00 $ 3000
ACC # _____ $ _____
ACC # _____ $ _____

Labor & Equipment
Truck & Tools

Work Ordered By:

Customer Approval Signature: [signature]

Authorized Signature: _____

Total Cost: $ 3000.00

Job Invoice

July 6, 01

Yahweh Contracting LLC
7019 W. Georgia Ave.
Glendale, AZ 85303
Office: (623) 247-1379
Fax: (623) 247- 0976

RECEIVED
JUL - 9 2001

To: LPSCO Water Service Co. Suite B
Address: 111 W. Wigwam Blvd.

Attention: Conde Sluga

n.2004

Qty	Material	Unit	Amount

614 Alcala

1" service repair
New Corp w/new copper
Backhoe, Laborers, Crew truck
Sales Tax, Insurance
Asphalt replacement

PAYMENT
APPR BY OE DATE: 7-9-01
AMOUNT APPR. $ 2700
COMMENTS New Service w/ Copper
DISTRIBUTION
100-000-10n-a ACC # _____ $ 2700
ACC # _____ $ _____
ACC # _____ $ _____

Labor & Equipment
Truck & Tools

Work Ordered By:

Customer Approval Signature: James Stanley

Authorized Signature: _____

Total Cost: $ 2700.00

R-19

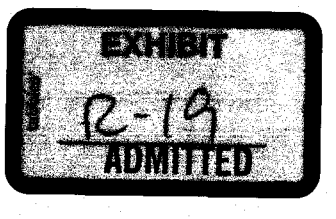
LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103 AND W-01427A-09-0104
RESPONSE TO STAFF'S FIRST SET OF DATA REQUESTS

May 27, 2009

Response provided by:	Gerald Tremblay
Title:	Director of Finance
Company Name:	Algonquin Power Income Fund
Address:	2845 Bristol Circle Oakville, Ontario Canada L6H 7H7
Company Response Number:	JMM 1.23

Q. Capitalization Policy – For the water and wastewater divisions, please state the dollar threshold for costs that are expensed versus capitalized. Is this threshold in writing?

RESPONSE: All capital is work order driven. That is to say, if a project is categorized as a capital job, all costs are capitalized, thus there is no dollar threshold.



UNIFORM SYSTEM OF ACCOUNTS

FOR

CLASS A

R-20

WASTEWATER UTILITIES

1996

EXHIBIT
R-20
ADMITTED

NATIONAL ASSOCIATION
OF
REGULATORY UTILITY COMMISSIONERS

(2) When a retirement unit is retired from utility plant, with or without replacement, the book cost thereof shall be credited to the utility plant account in which it is included, determined in the manner set forth in paragraph D, below. If the retirement unit is of a depreciable class, the book cost of the unit retired and credited to utility plant shall be charged to the accumulated depreciation applicable to such property. The cost of removal and the salvage shall be charged or credited, as appropriate, to such depreciation account.

C. The addition and retirement of minor items of property shall be accounted for as follows:

(1) When a minor item of property which did not previously exist is added to plant and a substantial addition results, the cost thereof shall be accounted for in the same manner as for the addition of a retirement unit, as set forth in paragraph B(1), above, otherwise the charge shall be to the appropriate maintenance expense account

(2) When a minor item of property is retired and not replaced, the book cost thereof shall be credited to the utility plant account in which it is included; and, in the event the minor item is a part of a depreciable plant, the account for accumulated depreciation shall be charged with the book cost and cost of removal and credited with the salvage. If, however, the book cost the minor item retired and not replaced has been or will be accounted for when such unit is retired, no separate credit to the property account is required.

(3) When a minor item of depreciable property is replaced independently of the retirement unit of which it is a part, the cost of replacement shall be charged to the maintenance expense account appropriate for the item, except that if the replacement effects a substantial betterment (the primary aim of which is to make the property affected more useful, more efficient, of greater durability, or of greater capacity), the excess cost the replacement over the estimated cost at current prices of replacing without betterment shall be charged to appropriate utility plant account.

UNIFORM SYSTEM OF ACCOUNTS FOR CLASS A WATER UTILITIES

1996

R-21

NATIONAL ASSOCIATION OF REGULATORY UTILITY COMMISSIONERS
1201 Constitution Avenue, N.W., Suite 1102
Post Office Box 684
Washington, DC 20044-0684
Telephone No. (202) 898-2200
Facsimile No. (202) 898-2213

Price: $25.00

EXHIBIT
R-21
ADMITTED

(2) When a retirement unit is retired from utility plant, with or without replacement, the book cost thereof shall be credited to the utility plant account in which it is included, determined in the manner set forth in paragraph D, below. If the retirement unit is of a depreciable class, the book cost of the unit retired and credited to utility plant shall be charged to the accumulated depreciation applicable to such property. The cost of removal and the salvage shall be charged or credited, as appropriate, to such depreciation account.

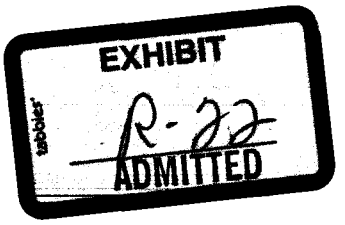
C. The addition and retirement of minor items of property shall be accounted for as follows:

(1) When a minor item of property which did not previously exist is added to plant and a substantial addition results, the cost thereof shall be accounted for in the same manner as for the addition of a retirement unit, as set forth in paragraph B(1), above, otherwise the charge shall be to the appropriate maintenance expense account.

(2) When a minor item of property is retired and not replaced, the book cost thereof shall be credited to the utility plant account in which it is included; and, in the event the minor item is a part of a depreciable plant, the account for accumulated depreciation shall be charged with the book cost and cost of removal and credited with the salvage. If, however, the book cost of the minor item retired and not replaced has been or will be accounted for when such unit is retired, no separate credit to the property account is required.

(3) When a minor item of depreciable property is replaced independently of the retirement unit of which it is a part, the cost of replacement shall be charged to the maintenance expense account appropriate for the item, except that if the replacement effects a substantial betterment (the primary aim of which is to make the property affected more useful, more efficient, of greater durability, or of greater capacity), the excess cost of the replacement over the estimated cost at current prices of replacing without betterment shall be charged to the appropriate utility plant account.

D. The book cost of the utility plant retired shall be the amount at which such property is included in the utility plant accounts, including all components of construction costs. The book cost shall be determined from the utility's records and if this cannot be done, it shall be estimated. When it is impracticable to



LITCHFIELD PARK SERVICE COMPANY

DOCKET NO. SW-01428A-09-0103

DOCKET NO. W-01427A-09-0104

DIRECT TESTIMONY

OF

MATTHEW ROWELL

ON BEHALF OF

THE

RESIDENTIAL UTILITY CONSUMER OFFICE

NOVEMBER 4, 2009

TABLE OF CONTENTS

I. Introduction 1

II. Background 2

III. Design and Construction Problems at the PVWRF 2

IV. Affiliate Operating Expenses allocated to LPSCO 6

APPENDIX 1 – Qualifications of Matthew Rowell

I. Introduction

Q. Please state your name position and employer address.

A. Matthew J. Rowell

Member

Desert Mountain Analytical Services, PLLC ("DMAS")

PO Box 51628

Phoenix, AZ 85076

Q. Please state your background and qualifications in the field of utility regulation.

A. Appendix 1, attached to this testimony lists my educational qualifications and the utility matters in which I have participated.

Q. Please state the purpose of your testimony.

A. My testimony discusses the issue of design and construction problems at the Palm Valley Water Reclamation Facility ("PVWRF") and the allocation of affiliate operating expenses to Litchfield Park Service Company ("LPSCO" or "the Company") by its various affiliate entities. The issues of revenue requirement, rate base, plant and expense adjustments, and rate design are discussed in the Direct Testimony of Sonn S. Rowell (also of DMAS.) Cost of capital and issues related to the expansion of the PVWRF are discussed in the Direct Testimony of RUCO witness William Rigsby.

II. Background

Q. Please describe your work effort on this project.

A. I obtained and reviewed data and performed analytical procedures (including an audit of underlying source data) necessary to understand the Company's filing as it relates to the rate base, operating income and revenue requirements. My recommendations are based on these analyses. I relied on the information contained in the Company's rate case application, (testimony and schedules) and responses to RUCO and Commission Staff data requests.

Q. What issues will you address in this testimony?

A I will address RUCO's recommended adjustments based primarily on an audit of underlying source data. I present RUCO's recommended rate base, revenue requirement and rate design. The issue of affiliate expenses and upgrades to the Palm Valley Water Reclamation Facility ("PVWRF") are addressed in the testimony of RUCO witness Matthew Rowell (also of DMAS.) Cost of capital and issues related to the expansion of the PVWRF are discussed in the testimony of RUCO witness William Rigsby.

III. Design and Construction Problems at the PVWRF

Q. Please discuss LPSCO's wastewater plant additions since the last rate case.

A. The last rate case used the calendar year 2000 as the test year. Since that time, plant additions have been substantial. Table one shows plant additions

by year from 2001 to the end of the current rate case test year as submitted by the Company.

Table 1. LPSCO Waste Water Plant Additions (adjusted) per LPSCO Schedule B2

Year	Add/(ret)
2001	$2,216,710
2002	$14,910,039
2003	$144,272
2004	$6,696,665
2005	$5,721,506
2006	$3,111,106
2007	$2,285,823
2008 (Through Sep)	$12,897,735

The $14.9 million addition in 2002 results from the Palm Valley Water Reclamation Facility ("PVWRF") going into service. The PVWRF is a waste water processing plant that went into service with an average capacity of 4.1 mgd.

Q. Has LPSCO needed to expand the capacity of the PVWRF since 2002 due to customer growth?

A. According to the Company, no. The initial 4.1 mgd average capacity of the PVWRF has been and is currently sufficient to serve all of LPSCO's customers. Additionally, LPSCO indicated that they have no plans to begin construction necessary to increase the capacity of the PVWRF until late 2010 at the earliest (Response to RUCO Data Request MJR 2.9.)

Q. What accounts for the substantial plant additions made during the test year portion of 2008?

A. LPSCO indicates that a large investment in plant was necessary to remedy deficiencies at the PVWRF. In his Direct Testimony, LPSCO witness Greg Sorensen states: "...in the summer of 2007, the plant had two spill events that confirmed that the plant, *as originally designed and constructed* by our predecessor owners, was lacking certain redundancy capabilities and needed some upgrades to achieve an acceptable level of reliability." (Emphasis added.) Additionally, in response to RUCO data request MJR 2.14 the Company provided excerpts from a report developed by McBride Engineering Solutions, Inc. ("MES") that document several design problems at the PVWRF that resulted in excessive odors, insufficient reliability and a lack of redundancy capability. (The excerpts from the MES report were provided pursuant to a confidentiality agreement so we have not provided direct quotes from the report.)

Q. So as originally designed and constructed the PVWRF had significant problems?

A. Yes. The information provided by LPSCO indicates that there were significant design problems at the PVWRF. Correcting these problems necessitated significant upgrades. The additional plant associated with those upgrades was put into service during the test year.

Q. Do you believe it is fair that LPSCO customers should bear the full cost of the upgrades necessitated by the PVWRF's design problems?

A. No. Utilities have an obligation to design and build plant that meets acceptable levels of reliability. It is inherently unfair to saddle the customers with the excess and duplicative costs that result when utilities fail in that obligation.

Q. What do you recommend regarding LPSCO's 2008 waste water plant additions?

A. We believe the costs of the PVWRF upgrades necessitated by the PVWRF's design problems should be shared between the shareholders and the customers. At page 7 of his Direct Testimony Mr. Sorenesen states that the Company spent $7 million on improvements to the PVWRF to correct the deficiencies resulting from the plant's design problems. We propose that the costs of these improvements be split 50/50 between the ratepayers and the shareholders. This results in a disallowance of $3.5 million of test year plant additions.

Q. The PVWRF was originally built by LPSCO's former owners not its current owner (Algonquin.) Does this fact affect RUCO's recommendation that a portion of test year plant additions be disallowed?

A. No. Prior to making a purchase as substantial as LPSCO, sound business practices would require a thorough review of LPSCO's facilities. Design

problems identified at that stage would have provided the purchaser with significant leverage in price negotiations.

Additionally, allowing for full recovery of the PVWRF redesign costs based on the fact that the facility changed hands would send the wrong signal to the industry. Companies looking to purchase utilities in Arizona would have less incentive to do proper due diligence if they know that the costs of fixing any existing problems could be imposed on the ratepayers. Similarly, if utilities that are building plant know that any problems with the plant can be dispensed with through a sale to another entity their incentive to build the plant properly in the first place will be diminished.

IV. Affiliate Operating Expenses allocated to LPSCO

Q. Have you examined the method the Company uses to allocate affiliate costs to LPSCO's water and sewer divisions?

A. Yes. The Company has indicated the following: "The new method of allocation is to charge all direct operations labor costs related to LPSCO via timesheets. All customer service and financial related costs are allocated based on customer counts to all AWS-operated utilities, and all administration costs are allocated based on a 4 factor formula to all Algonquin-owned utilities. This allocation is based on a weighted average of rate base, customer counts, wages, and operating expenses for all our utilities. Engineering services have remained allocating their time via the job costing

timesheet process but have moved from market chargeable rates to cost recovery rates".[1]

Q. Has the Company used this method of allocation in the past?

A. No. This is a new method being used in this and other current Algonquin rate cases.

Q. What is the effect of this new allocation method on LPSCO?

A. In response to RUCO data request MJR 3.3(b) the Company provided a comparison of its old and new allocation methods that indicated that the new allocation method allocates $250,577 less to LPSCO water and $505,816 more to LPSCO sewer relative to their previous method of allocating affiliate costs.

Q. Were these changes the result of the reallocation only?

A. No. The Company's response to MJR 3.3(b) indicates that in addition to reallocating the affiliate costs, $136,903 in *additional* affiliate costs were allocated to the various Algonquin owned water and waste water companies under the new allocation method.

[1] Response to RUCO data request MJR 2.4

Q. What is the source of this $136,903 increase in allocated costs?

A. I have been unable to determine the source of this $136,903 increase in allocated costs.

Q. Do you know how much was allocated to LPSCO in the test year based on LPSCO's new allocation method?

A. Table 2 below shows the amount allocated to LPSCO under the new allocation method. This information was provided by LPSCO in response to RUCO data request MJR 3.3(b). The Company provided the following numbers:

Table 2. LPSCO Affiliate Allocations

	Allocated to LPSCO **Water**	Allocated to LPSCO **Sewer**	Total	Allocation Method
Ops Costs	806,047	924,018	1,730,065	Timesheets
Act/Billing	430,806	477,294	908,100	Customer Count
Overhead Costs	705,667	691,664	1,397,331	4 – factor
Total	1,942,520	2,092,976	4,035,497	

Q. Were you able to reconcile the allocated amounts as described in response to MJR 3.3(b) with the Company's rate case application?

A. The Company has indicated that the amounts allocated by the above described method are booked to expense accounts 636 Contractual Services

– Other and 736 Contractual Services – Other for the water and sewer divisions, respectively.

The Company did not actually use the above described allocation process to determine and record transactions in these accounts through the test year. Rather, for purposes of the rate case filing, the Company's expenses were trued up to conform with the allocation method by Mr. Bourassa's adjustment(s) number 11 (Mr. Bourassa makes separate adjustments no. 11 for the water and for the waste water divisions.)

Initially, I could not reconcile the affiliate costs contained in accounts 636 and 736 with the amounts provided in response to RUCO Data Request MJR 3.3(b.) However, reviewing LPSCO's response to Staff Data Request JMM 5.3 revealed that the allocation method described in its response to MJR 3.3(b) (and summarized in Table 2 above) only pertained to allocations from Algonquin Water Services ("AWS"), not to amounts allocated from Algonquin Power Trust ("APT".) Based on the Company's response to Staff Data Request JMM 5.3 and adjustment(s) number 11 made by Company witness Bourassa, the allocations from AWS contained in accounts 636 and 736 do reconcile with the above described allocation method.

Q. What sort of transactions has the Company booked to accounts 636 and 736?

A. In response to Staff data requests JMM 1.42 and 1.67 the Company provided back-up detailing each transaction booked to these accounts. For purposes of responding to JMM 1.42 and 1.67 the Company broke each of the accounts into four broad categories. Table 3 below summarizes the content of accounts 636 and 736 as provided in the rate case application.

Table 3 Contractual Services - Other

	Water (636)	Sewer (736)	Total
Central Office Costs - Algonquin Power Trust (APT)			
Management Fees	273,956	182,637	456,593
Accounting fees and costs	2,689	2,747	5,436
HR costs and fees	12,927	5,276	18,203
IT costs	990	427	1,417
General OPS	1,146	764	1,910
Total	**291,708**	**191,850**	**483,558**
Contract Services - Algonquin Water Services (AWS)			
Water/Waste Fee	559,787	538,599	1,098,385
Operating Costs	861,949	613,862	1,475,811
OPS fee	463,158	333,776	796,933
Overhead	85,521	57,014	142,535
To amortize arsenic media proj	8,025		8,025
Accounting Fee	56,843	52,416	109,259
Other (credits)	(58,055)	(100,059)	158,114)
ACC Fee	53,588	35,725	89,313
8600-010008-act	64,764	62,811	127,575
Recon fees to 4 factor	(575,400)	(383,600)	(959,001)
reclassed to wtr ops fee		50,030	50,030
Total	**1,520,179**	**1,260,574**	**2,780,753**
Admin Allocation AWS			

Recon fees to 4 factor	728,574	485,716	1,214,290
Contractual Services Other			
Services provided by outside (non-affiliate) vendors	148,748	431,175	579,923
Grand Total	**2,689,209**	**2,369,315**	**5,058,525**

Q. Are there issues with the costs allocated to LPSCO by AWS?

A. Yes. In response to JMM 5.3 the Company provided the operating costs that were allocated to LPSCO's water and sewer divisions by the 4 factor method. These numbers are close to but do not match the operating costs allocated via the 4 factor method as shown in the Company's response to MJR 3.3(b).

Additionally, the invoices provided to support the AWS allocations (provided in response to Staff data requests JMM 1.42 and 1.67) essentially contain no detail. Thus, it is impossible to audit the transactions between AWS and LPSCO based on those invoices. The same is true concerning the invoices between APT and LPSCO provided in response to Staff's 5th set of data requests.

Q. What do you recommend regarding the costs allocated to LPSCO by Algonquin Water Services?

A. The lack of backup for these costs could support a recommendation that all of these costs be disallowed. However, AWS does actually provide services to

LPSCO that are necessary for the provision of utility service. Also, the amounts allocated by AWS (after RUCO's adjustments) when taken on a per-customer basis are not out of line with what is typically charged by management companies to water utilities. Because of this we recommend that these costs be allowed, with one exception. The one exception is the allocations labeled as "Recon fees to 4 factor." The Company has provided no explanation for what these allocations are, they do not appear to be necessary for the provision of utility services, and they cannot be reconciled with the Company's description of how their 4 factor allocation method works. Therefore we recommend disallowance of the allocations labeled "Recon fees to 4 factor" which net to $153,174 for LPSCO Water and $102,116 for LPSCO Sewer.

Q. Do you have concerns with the Central Office Costs charged to LPSCO by Algonquin Power Trust?

A. Yes. In its rate case application and in response to several data requests the Company described the allocation of affiliate costs by indicating that operating costs are billed out by time sheets. Accounting and billing costs are allocated based on customer counts and overhead costs are allocated by the 4-factor method. No mention was made of the additional layer of allocated costs from Algonquin Power Trust. It was not until Staff specifically asked about these costs in its Data Request JMM 5.3 that the Company provided any information about this additional layer of affiliate costs allocated to LPSCO.

The Central Office Costs charged to LPSCO by Algonquin Power Trust are of concern for several reasons:

- In response to Staff data request JMM 5.3 the Company indicated that $250,979 and $267,462 were allocated to LPSCO's water and sewer divisions respectively by Algonquin Power Trust. However, $291,708 and $191,850 were actually allocated to LPSCO's water and sewer divisions, respectively, by Algonquin Power Trust.

- In January of 2008 (during the test year) the management fees charged to LPSCO by Algonquin Power Trust increased from $13,200 to $26,040 per month for LPSCO water and $8,800 to $17,360 per month for LPSCO sewer. The Company has provided no explanation for this increase in management fees from Algonquin Power Trust.

- The invoices provided by Algonquin Power Trust essentially contain no detail. Thus, it is impossible to audit the transactions between Algonquin Power Trust and LPSCO based on those invoices.

- Most importantly, in response to JMM 5.3 the Company provided explanations for the various categories of costs allocated to LPSCO by Algonquin Power Trust. These explanations were insufficient and did not establish that the "services" provided by Algonquin Power Trust are necessary for the provision of water and waste water service.

For all of these reasons we recommend that the Central Office Costs allocated to LPSCO by Algonquin Power Trust ($291,708 for water and $191,850 for sewer) be disallowed.

Q. Are there other issues regarding LPSCO's affiliate relations that are concerning?

A. There are several other issues that if taken alone would not be extremely concerning but taken together and in light of the above discussion raise to the

level of concern. I believe the Commission should be aware of these issues so they are listed here:

- No manual or contracts: Algonquin does not have and does not plan to produce a manual or other document that details the cost allocation process. (RUCO DR MJR 3.8) Additionally, there are no contracts between LPSCO and any of the Algonquin affiliates. (RUCO DR MJR 3.2) Thus, it appears that Algonquin has no safeguards that would prevent the allocation process from taking place on an ad hoc basis.

- Organizational Chart: The organizational chart for the Algonquin organization provided in response to JMM 1.17 is inaccurate and incomplete. For example, APT (the entity that charged LPSCO $483,558 during the test year) does not appear on the organizational chart and AWS and Algonquin Power Systems are portrayed as independent entities.

- Affiliates other than water and sewer: The allocation methods described above allocate parent level costs across Algonquin's water and waste water utilities (located primarily in Arizona, Missouri and Texas.) In addition, to these utilities several electric generation companies fall under the Algonquin umbrella. It is not clear from any of the information provided by the Company (e.g. organizational charts) how these electric generation companies fit into the Algonquin corporate structure and how APT's costs are allocated between its water/waste water holdings and its electric generation holdings. Additionally, the rent invoices for APT provided in response to Staff Data Request JMM 5.5 indicates that an entity called Algonquin Power Property Limited Partnership is APT's landlord (in Ontario.) Algonquin Power Property Limited Partnership is presumably another Algonquin affiliate; but it is not clear how it fits into the Algonquin corporate structure.

- Bank fees: The banking fees that AWS passes through to LPSCO contain several inappropriate charges (see the Direct Testimony of RUCO witness Sonn Rowell, Water Division Operating Income Adjustment No. 8 and Wastewater Division Operating Income Adjustment No. 9 for a discussion of this issue.)

- Convoluted basic accounting system: The accounting system used to track day to day activity seems unnecessarily convoluted. For example, examination of Company provided invoices show that when an AWS employee makes a purchase at Lowe's for material necessary for repairs at LPSCO, that purchase is booked at the AWS level and then allocated down to LPSCO. Conceivably, purchases such as this could be initially booked directly to LPSCO which would eliminate several steps in the cost allocation process.

- Name Changes: AWS recently changed its name to Liberty Water. Several years ago the name was changed from New Spring Water to AWS. In spite of several years passing since the name New Spring Water was used officially it still shows up on documents produced in the test year.

Q. Does your silence on any of the issues, matters or findings addressed in the testimony of any of the witnesses for LPSCO constitute your acceptance of their positions on such issues, matters or findings?

A. No, it does not.

Q. Does this conclude your direct testimony on LPSCO?

A. Yes, it does.

Appendix 1

Qualifications of Matthew Rowell

Professional History

Desert Mountain Analytical Services, PLLC 2007 – Present
Member

Prepare testimony and analysis for utilities regarding regulatory issues. Most recently I prepared and sponsored testimony on behalf of Global Water regarding their multi-system rate case, Docket No. W-20446A-09-0080 and their Notice of Intent to Restructure, Docket No. W-20446A-08-0247.

Arizona Corporation Commission 1996 to 2007

Chief Economist (July 2001 to February 2007)
Was responsible for supervising a staff of nine professionals who analyzed and produced testimony or staff reports on a wide variety of energy and telecommunications issues. Recent cases for which I provided testimony myself include:

APS Rate Case E-01345A-05-0816: Provided testimony on staff's position on APS' proposed Environmental Improvement Charge. I also acted as the overall case manager and was responsible for coordinating all of staff's testimony.

APS Application to acquire a power plant in the Yuma area E-01345A-06-0464: Provided testimony in support of APS' application. Interveners in this case raised a variety of complex issues that needed to be addressed.

Southern California Edison's application to build a high voltage power line linking Arizona to Southern California L-00000A-06-0295-00130: Provided testimony detailing the potential economic effects of SCE's proposed power line.

Accipiter's complaint against Cox Communications regarding the Vistancia development T-03471A-05-0064: Provided written testimony regarding Accipiter's allegations concerning Cox's dealings with the developers of Vistancia.

Significant past responsibilities included managing staff's case (including negotiating a settlement agreement) in APS' 2003 rate case, negotiating the settlement between staff and Qwest regarding three enforcement dockets, supervising the "independent monitor" of APS' and Tucson Electric Power's (TEP) wholesale power procurement, providing testimony on Qwest's noncompliance with the Commission's wholesale rate order, managing staff's case regarding Qwest's alleged noncompliance with the Federal Telecommunications Act, and acting as staff's lead witness in the Commission's reevaluation of the electric competition rules which resulted in the suspension of APS' and TEP's obligation to divest their generation assets.

Economist (October 1996 to July 2001)
Significant responsibilities included supervising the testing of Qwest's operational support systems (OSS), analyzing Qwest's compliance with Section 271 of the Federal Telecommunications Act, providing testimony on the geographic de-averaging of Qwest's Unbundled Network Element prices, and acting as Chairman of the Commission's Water Task Force.

Arizona Department of Transportation, Phoenix, AZ 1996, 1998, and 1999

Research Analyst

Authored research reports on the costs and benefits of traffic demand management policies, the relative merit of various highway-financing techniques, and air pollution reduction technologies.

Arizona State University, Tempe, AZ 1992-1996.

Lecturer-economics 1994-1996

Responsible for teaching microeconomics classes requiring the creation of lectures and tests as well as full responsibility for assigning grades.

Teaching assistant 1992-1994

Responsible for assisting professors in administering tests, grading, and teaching.

Education

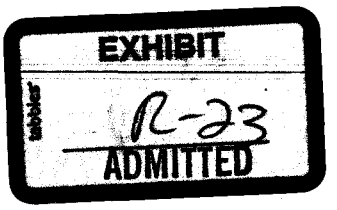
Master of Science and ABD Economics, 1995, Arizona State University.

I have successfully completed all course work and exams necessary for a Ph.D. Course work included an emphasis in industrial organization and extensive experience with statistical analysis, public sector economics, and financial economics.

Bachelor of Science Economics, 1992, Florida State University.

Minors: Philosophy, Statistics

LITCHFIELD PARK SERVICE COMPANY



DOCKET NO. SW-01428A-09-0103 et al.

SURREBUTTAL TESTIMONY

OF

MATTHEW ROWELL

ON BEHALF OF

THE

RESIDENTIAL UTILITY CONSUMER OFFICE

DECEMBER 17, 2009

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I. INTRODUCTION

Q. Please state your name occupation and business address.

A. My name is Matthew Rowell. Member, Desert Mountain Analytical Services, PLLC ("DMAS") PO Box 51628, Phoenix, AZ 85076

Q. Please state the purpose of your Surrebuttal Testimony.

A. The purpose of my Surrebuttal Testimony is to respond to the Rebuttal Testimony of Litchfield Park Service Company ("LPSCO") regarding the issues of affiliate allocations and the need for significant plant upgrades at the Palm Valley Water Reclamation Facility ("PVWRF.")

Q. Have you filed any prior testimony in this case on behalf of RUCO?

A. Yes. On November 4, 2009 I filed Direct Testimony on behalf of RUCO.

II. ALGONQUIN POWER TRUST ALLOCATIONS TO LPSCO

Q. Please discuss the total payment by LPSCO to Algonquin Power Trust ("APT") during the test year.

A. Table 1 below shows the amounts collected from LPSCO by APT during the test year.

...

TABLE 1: Test Year APT Billings to LPSCO

	Water (636)	Sewer (736)	Total
Central Office Costs - Algonquin Power Trust (APT)			
Management Fees	273,956	182,637	456,593
Accounting fees and costs	2,689	2,747	5,436
HR costs and fees	12,927	5,276	18,203
IT costs	990	427	1,417
General OPS	1,146	764	1,910
Total	**291,708**	**191,850**	**483,558**

The amounts and categories shown in table one were developed from LPSCO's general ledger entries and invoices provided in response to Staff's first set of data requests.

Q. Based on Mr. Sorensen's Rebuttal Testimony[1] it appears that there was some misunderstanding on your part of the Management Fees billed to LPSCO by APT.

A. Yes. I mistakenly assumed that invoices clearly labeled as being for "Management Fees" were in fact for Management Fees. These invoices labeled as "Management Fees" are actually for a "myriad of Central Office Administration costs."[2] A copy of a representative invoice is attached as Exhibit 1. Mr. Sorensen indicates that "The monthly invoices from APT to

[1] G. Sorensen Rt. At 27, 13-19.
[2] Id.

LPSCO may have said 'Management Fees,' but that was only for the sake of brevity."[3]

Q. Is it standard accounting practice to remove relevant information from invoices "for the sake of brevity?"

A. No. Withholding relevant descriptive information from invoices is not consistent with NARUC's Uniform System of Accounts.

Q. There also was a misunderstanding regarding the total amount allocated by APT to LPSCO.

A. Yes, in my Direct Testimony I pointed out that the total amount billed to LPSCO by APT (shown in Table 1 above) did not match the amounts provided by the Company in response to Staff Data Request JMM 5.3. In his Rebuttal Testimony Mr. Bourassa states that "RUCO's inability to reconcile those numbers stems from RUCO's failure to understand that those numbers apply to a different time periods (sic)."[4] Mr. Bourassa goes on to explain that the amounts provided in response to JMM 5.3 were budgeted amounts for the 2008 calendar year.[5] This is in spite of the facts that in JMM 5.3 Staff specifically asked for "updated" amounts and the Excel spreadsheet provided in response to JMM 5.3 containing the numbers at issue was titled: "JMM – 5.3 Affiliates transactions for the test

[3] Id.
[4] Bourassa Rt. At 34.
[5] Id. At 35.

year- APT". I believe it is reasonable to conclude that a spreadsheet labeled "Affiliate transactions for the test year" actually includes affiliate transactions for the test year. Additionally, Staff data request JMM 5.4 specifically asked for the amounts allocated from APT to LPSCO. In its response LPSCO simply referenced its response to JMM 5.3.

I note that Staff witness Mr. Michlik reached the same conclusion and based his analysis and adjustments on the amounts provided by the Company in response to JMM 5.3.

Q. In your Direct Testimony you pointed out that the "Management Fees" charged to LPSCO by APT increased dramatically during the test year and that the company had provided no explanation for this increase. Please discuss the Company's Rebuttal Testimony regarding this issue.

A. Amazingly, Mr. Bourassa characterizes the significant increase in "Management Fees" during the test year as "irrelevant."[6] He also states that "RUCO admits that the new method of cost allocation was not through the test year"[7] and cites page 9 of my Direct Testimony. However, the discussion at page 9 of my Direct pertains to the change in allocation methodology for Algonquin Water Services' ("AWS") allocations, not APT's allocations. Mr. Sorensen explains that the increase in APT's

[6] Id. at 35
[7] Id.

"Management Fees" resulted from a true up from 2003 estimates.[8] Prior to the filing of the Company's Rebuttal Testimony this true up was not mentioned either in the Company's Direct Testimony or in response to the several Data Requests on affiliate allocations sent by Staff, RUCO and the City of Litchfield Park ("CLP.")

Q. So what actually makes up the "Management Fees" allocated to LPSCO by APT?

A. Mr. Sorensen indicates that the "Management Fees" are "a myriad of Central Office Administration costs that are incurred, including those for trustee fees, management fees, unit holder communications, other professional services (i.e., maintenance of the ERP system), general office costs, public registrant fees, and depreciation expense."[9]

Q. Has the Company provided supporting documentation for this myriad of costs?

A. For some of the categories it has, but for others it has not. Table two below shows each category of cost and whether or not supporting documentation has been provided.

[8] Sorensen Dt. At 27.
[9] Id.

Table 2: APT cost categories

APT Cost Category	Supporting Documentation Provided (Yes/No)[10]
Audit	Yes
Tax Services	Yes
Legal	No[11]
Other Professional Services	No
Management Fee	No (See discussion below)
Unit Holder Communication	No
Trustee Fees	No
Escrow and Transfer Agent Fees	No
Rent	Yes
Licenses/Fees & Permits	Yes
Office Expenses	Yes
Depreciation	No

Q. Please discuss each of the categories of APT costs.

A. I have reviewed the provided supporting documentation and the descriptions of the cost categories and I will discuss each of them in turn.

1. Audit: A review of the back-up information provided for the Audit category reveals that only a very small portion of these costs could be associated with LPSCO. One KPMG invoice (dated May 30, 2008) indicates a charge of $8,200 for consultation on "overall US Tax Matters." Other than that all the invoices indicate audit or consulting work done for APT or its affiliates other than LPSCO.
2. Tax Services: Apparently LPSCO's taxes are prepared on a consolidated basis at APT. Thus LPSCO does benefit from some of these costs. However, the total cost pool includes costs that clearly are unrelated to

[10] Per LPSCO response to Staff Data Request JMM 5.5.
[11] The Company has not provided legal invoices but has stated that they will make them available for inspection.

preparation of LPSCO's taxes. For example, a KPMG invoice dated June 26, 2008 pertains only to Canadian tax matters. Additionally, the Grant Thornton invoices for tax preparation actually break out the preparation cost by utility. Thus, it appears that these costs should be directly billed rather than allocated.

3. Legal: These are legal expenses for APT and provide no benefit to the operation of LPSCO.

4. Other Professional Services: The Company indicates that these costs include the payroll system, 401K services, health benefit services and enterprise resource planning (ERP) system used by AWS (and thus the Arizona utilities.) So these costs are related to providing a service to LPSCO. Since these costs are directly related to employees they should be allocated based on employee headcount or wages.

5. Management Fee: The company indicates that these costs are associated with "provid(ing) management services including strategic advice and consultation concerning business planning, support, guidance and policy making and general services."[12] The Company has not established that LPSCO receives any benefit from these services. Additionally, if the Company were to establish that LPSCO receives benefits from these services, these types of services should be billed directly, not allocated across all the utilities. The Company did provide supporting invoices for these "Management Fee" costs but they are inadequate. All of these

[12] LPSCO response to JMM 5.3

invoices are from an entity identified only as "Private Companies" that has the same address as APT. A representative invoice is attached as Exhibit 2.

6. Unit Holder Communication: These costs pertain exclusively to ATP and have no connection to the operation of LPSCO.
7. Trustee Fees: These are costs associated with APT's Board of Trustees and have no connection to the operation of LPSCO.
8. Escrow and Transfer Agent Fees: These are costs associated with distributions to Unit Holders and convertible debenture holders and have no connection to the operation of LPSCO.
9. Rent: This is the rent expense for APT's Ontario office. Since APT does provide tax and payroll services to LPSCO some portion of the rent expense should be allocated to LPSCO.
10. Licenses/Fees & Permits: The Company has agreed with Staff's assessment that these costs should not be recovered from LPSCO.
11. Office Expenses: These are general office expenses for the Ontario office.
12. Depreciation: These are depreciation expenses related to equipment at the Ontario office.

...

Q. What treatment does RUCO recommend for each category of cost?

A. Table 3 below summarizes RUCO's assessment of whether these cost categories should be recoverable from LPSCO at all and if so whether they should be allocated or directly billed.

Table 3: LPSCO recommendation on APT cost categories

APT Cost Category	Recoverable from LPSCO (Yes/No)	Allocation or Direct Billing
Audit	See Below	
Tax Services	Yes	Direct Billing
Legal	No	
Other Professional Services	Yes	Allocation
Management Fee	No	
Unit Holder Communication	No	
Trustee Fees	No	
Escrow and Transfer Agent Fees	No	
Rent	Yes	Allocation
Licenses/Fees & Permits	No	
Office Expenses	No	
Depreciation	No	

Q. Please discuss RUCO's recommendation regarding the Audit cost category.

A. Generally, APT's audit expenses should not be recoverable from the utilities. However, one KPMG invoice (dated May 30, 2008) indicates a charge of $8,200 for consultation on "overall US Tax Matters." This $8,200 should be allocated across Algonquin's US operations. This results in $405 allocated to LPSCO's waste water division and $413 allocated to LPSCO water division.

Q. Please discuss RUCO's recommendation regarding the Tax Services cost category.

A. As discussed above many of the invoices provided to support the tax services costs clearly pertain to Algonquin operations other than LPSCO. Other invoices lack sufficient detail to determine what part of Algonquin's operations they pertain to. Several Grant Thornton invoices for tax services do specifically identify LPSCO as a beneficiary of tax preparation services. The amounts allocated to LPSCO by Grant Thornton total $586. Splitting this cost 50/50 between LPSCO's water and wastewater divisions yields $293 allocated to each division.

Q. Please discuss RUCO's recommendation regarding the Other Professional Services cost category.

A. As I stated above, since these costs are directly related to employees they should be allocated based on employee headcount or wages. I do not have access to employee head counts for each Algonquin subsidiary so for purposes of this testimony I will allocate these costs based on the total number of facilities. The Company indicates that $448,761 in costs are attributable to Other Professional Services. Dividing this by the total number of Algonquin facilities (71) yields $6,321. Splitting this 50/50 between the LPSCO water and Sewer division yields $3160.50 to be allocated to each LPSCO division.

Q. Please discuss RUCO's recommendation regarding the Rent cost category.

A. The Ontario office does provide some services to LPSCO and the other utilities but it also engages in activities pertaining only to APIF. The Company indicates that there are $295,887 in rent expenses. Dividing this 50/50 between the utilities and the APIF yields $147,944 to be allocated across the utilities. Dividing this by 71 (the total number of facilities) yields $2,084 to be allocated to LPSCO. This yields $1,042 to be allocated to LPSCO's water and waste water divisions.

Q. Please summarize RUCO's recommendations regarding the APT allocations.

A. In summary RUCO recommends that $4,908.50 and $4,900.50 of APT allocations be allowed for LPSCO's water and waste water division respectively.

Q. That takes care of the "Management Fees" identified in Table One above. What about the other APT billings to LPSCO identified in Table One?

A. In addition to the "Management Fees" billed to LPSCO there are $26,966 of other billings to LPSCO for Accounting Fees and Costs, HR Costs and Fees, IT Costs, and General OPS. The company has provided no explanation for these costs and they should therefore be disallowed.

Q. Do you have anything further to add regarding the APT allocations?

A. Yes. As I stated in my Direct Testimony in spite of multiple data requests regarding affiliate allocations LPSCO failed to provide any meaningful information regarding the APT allocations until Staff specifically asked for the appropriate information in their 5th set of data requests which was motivated by information uncovered in the Black Mountain rate case. RUCO did not receive LPSCO's response to Staff's 5th set of DRs until October 23, less than two weeks prior to the Direct Testimony deadline for intervenors. At page 27 and 28 of his testimony Mr. Sorensen disputes these facts and indicates that LPSCO's responses to RUCO data requests MJR 2.4 and MJR 2.5 contained clear definitions of the APT "cost pools." This is simply not true. LPSCO's response to MJR 2.4 contains no information about the APT cost pools and only mentions APT in passing. LPSCO objected to MJR 2.5 and did not answer it at all. LPSO's response to MJR 2.4 and objection to MJR 2.5 are attached as Exhibit 3.

III. ALGONQUIN WATER SERVICES (LIBERTY WATER) ALLOCATIONS TO LPSCO

Q. In your Direct Testimony you recommended a disallowance of the Algonquin Water Services ("AWS") allocations labeled "Recon fees to 4 factor" which net to $153,174 for LPSCO Water and $102,116 for LPSCO Waste Water. Are you still recommending this disallowance?

A. No. In his Direct Testimony Mr. Bourassa indicated that his Income Statement Adjustment No. 11 (for water and wastewater) was intended to true-up the AWS allocations as a result of the new allocation method. Mr. Bourassa clarifies in his Rebuttal Testimony that the true-up is accomplished through both his Adjustment No. 11 and the "Recon fees to 4 factor." Based on this clarification we believe the disallowance of $153,174 for LPSCO Water and $102,116 for LPSCO waste water is no longer necessary.

IV. RATE BASE DISALLOWANCE

Q. Has RUCO altered its recommendation to disallow $3.5 million in rate base associated with "upgrades" at the Palm Valley Water Reclamation Facility ("PVWRF".)

A. No. RUCO believes it is inappropriate for ratepayers to bear the full cost of upgrades necessitated by design and construction errors. At this time there are unanswered questions that preclude RUCO from concluding that

the upgrades at the PVWRF were not the result of design and construction errors.

Q. In his Rebuttal Testimony Mr. Sorensen disputes your interpretation of his Direct Testimony. Do you agree that Mr. Sorensen's Direct Testimony does not indicate that there were design and construction errors at the PVWRF?

A. No. However, I do agree that Mr. Sorensen's testimony "speaks for itself"[13] and I suggest that the Commissioners and Administrative Law Judge examine page 7, lines 7 through 26 of Mr. Sorensen's Direct Testimony and draw their own conclusions.

Q. In his Rebuttal Testimony Mr. McBride disputes your interpretation of the "Litchfield Park Service Company Water Reclamation Facilities Strategic Planning and Evaluation Report" ("Evaluation Report") prepared by McBride Engineering Solutions ("MES".) How do you respond?

A. The Evaluation Report speaks for itself. The Evaluation Report is attached to this testimony as Exhibit 4 and I suggest that the Commissioners and Administrative Law Judge examine it and draw their own conclusions.

[13] Sorensen Rt at p. 19

Q. You cited "unanswered questions" in your response above. Please clarify what "unanswered questions" you are referring to.

A. The Rebuttal Testimonies of Mr. Sorensen and Mr. McBride are not clear on several points:

Operational challenges: Both Mr. Sorensen and Mr. McBride refer to "operational challenges"[14] at the PVWRF. Neither Mr. McBride nor Mr. Sorensen discuss what the source of those operational challenges was. If the operational challenges did not result from design and construction problems what did they result from?

Nature of work performed: Both Mr. Sorensen and Mr. McBride characterize the 2007/2008 upgrades as "additions."[15] However, Mr. McBride also characterizes some of the upgrades as conversions.[16] "Addition" is a fundamentally different concept than "conversion" and this apparent discrepancy is unexplained. Further, LPSCO has contended that the PVWRF did not need any upgrades as a result of increased capacity.[17] So it is unclear why plant additions were necessary.

Nature of changed circumstances: Mr. Sorensen contends that the upgrades were necessary because of "increased customer demand and various changed conditions ... including changed zoning requirements, in-fill residential development, and increased customer demands for more odor control." LPSCO's contention that the PVWRF did not need any

[14] Sorensen Rt at 22, McBride Rt at 4.
[15] Sorensen Rt at 22, McBride Rt at 5.
[16] McBride Rt at 5.
[17] LPSCO response to RUCO MJR 2.11, MJR 3.1, MJR 5.1, MJR 5.4

upgrades as a result of increased capacity[18] appears to conflict with Mr. Sorensen's assertion that increased customer demand was partially responsible for the needed upgrades. Additionally, while RUCO would agree that the company should not be held responsible for changed zoning requirements, it is not clear to what extent the changed zoning requirements were responsible for the "operational challenges" at the PVWRF.

Increases in capacity: Staff's March 21, 2008 Compliance Filing Per Decision No. 69165 in Docket SW-01428A-06-044 indicates (on page 2) that on March 5, 2008 the PVWRF was "under construction to increase the plant capacity by 1.0 million gallons per day."[19] This conflicts with the Company's assertions that no increases in capacity were necessary and that all of the 2008 upgrades were necessitated by "operational challenges."

Q. Do you have any concluding remarks regarding the PVWRF upgrades?

A. Clearly, the PVWRF has faced significant challenges. The Company is seeking to include in rate base significant amounts spent to deal with those challenges. Regardless of whether that spending resulted from Design and Construction problems, "operational challenges" or was

[18] Id.
[19] Mr. McBride's resume provided in response to RUCO's 9th set of Data Requests also references a 1.0 MGD capacity expansion at the PVWRF.

necessitated by some other reason; given the history of the PVWRF it would not be appropriate to approve rate base treatment of that spending without having answers to the above questions.

Q. Does your silence on any of the issues, matters or findings addressed in the testimony of any of the witness for LPSCO constitute your acceptance of their positions on such issues, matters or findings?

A. No, it does not.

Q. Does this conclude your direct testimony on LPSCO?

A. Yes, it does.

MATTHEW ROWELL

SURREBUTTAL EXHIBIT 1

Trust

ALGONQUIN POWER INCOME FUND
2845 Bristol Circle
Oakville ON L6H 7H7

Sales Invoices	SALES000000003473
Date	12/12/2007
Exchange Rate	0.9671191

Customer:

Litchfield Park Services Company

ENTD DEC 12 2007

Purchase Order	Customer ID	Salesperson ID	Shipping Method	Payment Terms ID
	1100LPSCO		AR	

Description:
LPSCO MGMT FEE

Amount
US$22,000.00

RECEIVED	VENDOR ID
	8600 APT
COMPANY	**G/L CODE**
LPSCO	8600-2-0100-69-5700-0050 13,200.00
APPROVED	JOB # 8600-2-0200-69-5700-0050 8,800.00
PAID	ST

Subtotal	US$22,000.00
[illegible]	US$0.00
[illegible]	US$0.00
[illegible]	US$0.00
Trade Discount	US$0.00
Payment	US$0.00
Total Due	US$22,000.00

ALGONQUIN POWER INCOME FUND
2845 Bristol Circle
Oakville ON L6H 7H7

Sales Invoices	SALES000000003517
Date	1/16/2008
Exchange Rate	1.0031474

Customer:

Litchfield Park Services Company

RCVD JAN 18 2008

Purchase Order	Customer ID	Salesperson ID	Shipping Method	Payment Terms ID
	1100LPSCO		AR	

Description:
MGMT FEE LPSCO

Amount
US$43,399.25

8600·2·0100·69·5700·0050 26039.55
8600·2·0200·69·5700·0050 17,359.70

Subtotal	US$43,399.25
Misc	US$0.00
Tax	US$0.00
Freight	US$0.00
Trade Discount	US$0.00
Payment	US$0.00
Total Due	US$43,399.25

MATTHEW ROWELL

SURREBUTTAL EXHIBIT 2

Sales / Invoices SALES00000000029006

Private Companies
2845 Bristol Circle

Oakville ON L6H 7H7

Date 10/28/2007

Algonquin Power Trust
2845 Bristol Circle

Oakville ON L6H 7H7

Purchase Order	Customer ID	Salesperson ID	Shipping Method	Payment Terms ID
	003APT		AR	

Management Fee Inc.Oct07-APT	$72,406.42

Subtotal	$72,406.42
Misc	$0.00
Tax	$5,068.45
Freight	$0.00
Trade Discount	$0.00
Payment	$0.00
Total Due	$77,474.87

MATTHEW ROWELL

SURREBUTTAL EXHIBIT 3

LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103 AND W-01427A-09-0104
RESPONSE TO RUCO'S SECOND SET OF DATA REQUESTS

September 25, 2009

Response provided by:	Gerald Tremblay
Title:	Director of Finance
Company Name:	Algonquin Power Income Fund
Address:	2845 Bristol Circle Oakville, Ontario Canada L6H 7H7

Company Response Number: MJR 2.4

Q. Please provide a narrative description of how affiliate costs are allocated to the utilities.

RESPONSE: Algonquin Water Services (now Liberty Water and formerly New Spring) in all years allocated costs in the following manner. Day to day operating costs of the utility were charged out at a fixed rate per month. Customer service and administration costs where billed out at a dollar rate per customer. Engineering labor was charged out at market hourly rates on a job by job basis.

It was determined that, for the test year, a change in allocation method was in order. This new method was used to allocate all expenses on a cost recovery basis and eliminate any profit component obtained by AWS. The new method of allocation is to charge all direct operations labor costs related to LPSCO via timesheets. All customer service and finance related costs are allocated based on customer counts to all AWS-operated utilities, and all administration costs are allocated based on a 4 factor formula to all Algonquin-owned utilities. This allocation is based on a weighted average of rate base, customer counts, wages, and operating expenses for all our utilities. Engineering services have remained allocating their time via the job costing timesheet process but have moved from market chargeable rates to cost recovery rates. This process was initiated after the test year, thus a reconciliation was performed to adjust the test year results to this new process.

SUBJECT TO NON-DISCLOSURE AND CONFIDENTIALITY AGREEMENT

If any engineering services from Algonquin Power Systems are needed, all labor is charged out at standard rates to recoup the cost of labor, burden, and administration

overhead costs. Algonquin Power Trust charges a fixed fee to all the utilities based on the number of facilities in the Algonquin group to recoup its administration costs. The utility group then apportions its share of APT costs to each facility via customer count.

All affiliated profit has been eliminated.

SUBJECT TO NON-DISCLOSURE AND CONFIDENTIALITY AGREEMENT

LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103 AND W-01427A-09-0104
RESPONSE TO RUCO'S SECOND SET OF DATA REQUESTS

September 16, 2009

Response provided by:

Title:

Company Name:

Address:

Company Response Number: MJR 2.5

Q. Please provide a complete list (in Excel format) of all affiliate accounts and/or asset classes that are allocated or billed to the utilities. For each account/asset class provide the name of the affiliate, the total test-year amount of the account/asset class, the allocation method used, the amount allocated to EACH (i.e., not just LPSCO) utility level affiliate, and the specific utility level account(s) where they are ultimately booked (e.g., "Outside Services – Other.")

OBJECTION: This is a proceeding to set the rates for LPSCO. As such, the relationships between third parties that are not parties to this rate case is immaterial, and not calculated to lead to the discovery of admissible evidence in this proceeding. Furthermore, to the extent RUCO seeks information regarding "all" such third party transactions the request is overly broad and unduly burdensome.

MATTHEW ROWELL

SURREBUTTAL EXHIBIT 4

Litchfield Park Sewer Company
Water Reclamation Facilities Strategic Planning
Evaluation Report

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Litchfield Park Sewer Company
Water Reclamation Facilities Strategic Planning
Evaluation Report

1.0 INTRODUCTION

Algonquin Water retained McBride Engineering Solutions, Inc. (MES) to conduct a study to review the existing and planned water reclamation facilities (WRFs) in their Litchfield Park Service Company (LPSCO) service area and to develop a list of strategic options that Algonquin might consider to achieve their treatment, operations, and redundant capacity goals for these facilities. This report is intended to describe the investigations of the current conditions and summarize the findings and recommendations of the study.

Algonquin currently owns and operates the Palm Valley Water Reclamation Facility (WRF) in its Litchfield Park service area. This facility, which utilizes a sequential batch reactor (SBR) treatment technology, is rated for a treatment capacity of 4.1 mgd with a planned ultimate capacity of 8.2 mgd. In addition, to meet the future needs of the growing community within the service area, there are plans to construct a second facility to be called the Sarival Water Reclamation Facility. Like the Palm Valley WRF, the Sarival WRF is planned to have an initial capacity of 4.1 mgd with an ultimate capacity of 8.2 mgd. At present there is a lift station at Sarival Road that pumps the wastewater from that service area to the Palm Valley WRF.

According to Algonquin's own managers, engineers, and operators, the existing Palm Valley WRF has numerous operational shortcomings that need to be addressed. These include hydraulic issues, redundant capacity shortfalls, odor control problems, process control difficulties, equipment reliability concerns, trouble-shooting limitations, excessive maintenance requirements, and a lack of operational flexibility, among others. In addition, it is expected that the current rated capacity of the plant will be exceeded within one year.

It is apparent that the challenges facing Algonquin in regard to the LPSCO facilities are diverse and numerous. Some will require short-term attention while others will require longer term planning consideration. However, to achieve the treatment, operations, and redundant capacity goals for these facilities an overall strategy will be required that prioritizes action items, accounts for future needs, and considers a range of problem-solving options, including less conventional ones. This study was

conducted to assist Algonquin in developing a sound strategy by investigating the current condition and proposing a range of options that would focus on solutions.

2.0 BACKGROUND

The facilities currently operated by LPSCO include the Palm Valley WRF and the Sarival Lift Station. The Palm Valley WRF was planned to be built in two phases with a capacity of 4.1 mgd each. The Sarival Lift Station has a capacity of approximately 1 and conveys sewage to the Palm Valley WRF. Like the Palm Valley WRF, the future Sarival WRF is planned to be built in two phases of 4.1 mgd each.

The following subsections describe the capabilities and equipment of the existing Palm Valley WRF and the Sarival Lift Station.

2.1 Palm Valley WRF

The Palm Valley Water Reclamation Facility (WRF) is wastewater treatment plant that utilizes a sequential batch reactor (SBR) technology. It is designed to produce ARS Title 18 "Class A-plus" quality effluent for various reuse applications. The rated treatment capacity for the plant is 4.1 million gallons per day (mgd) on an average-day-peak-month basis and 11.1 mgd on a peak-flow basis. The present treatment train consists of the following liquid-stream processes and equipment:

- Influent Meter Station – located near Manhole No. 2 upstream of the plant
- Influent Pump Station – consisting of three 5.55-mgd submersible pumps in a 39-foot deep wetwell that is common-walled with the Anoxic Reactor
- Mechanical Screening – utilizing two auger screens with 6-millimeter perforated openings
- Grit Removal – through one 12-foot diameter vortex-type steel settling tank with grit washer
- Anoxic Reactor – a 589,000-gallon tank with air-liquid jet mixing, three 7.9-mgd submersible transfer pumps and one 7.9-mgd submersible jet-motive pump; designed with approximately 295,000 gallons of equalization capacity
- Sequential Batch Reactors – consisting of two 1.6-MG reactor tanks with air-liquid jet mixing, fixed-level decanters, a common flow-return trough, and four submersible jet-motive pumps each
- Process Air System – utilizing eight 100-horsepower constant-speed rotary blowers; two for the secondary treatment system with a capacity of 1,500 cfm each at 11 psig, and three for the sludge digestion tanks with a capacity of 2,000 cfm each at 8.5 psig

- Post-Equalization – through a serpentine-baffled surge tank with approximately 245,000 gallons of equalization capacity and two VFD-equipped vertical turbine filter feed pumps with a capacity of 8.2-mgd each
- Tertiary Filters – utilizing three trains of cloth-media disk filters
- Post-Filtration Storage – Clear well tank with approximately 175,000 gallons of equalization capacity and three VFD-equipped vertical turbine effluent discharge (UV feed) pumps with a capacity of 4.1-mgd each
- Tablet Chlorination System – (presumably) for pre-treatment of the UV system influent
- Ultra-Violet (UV) Disinfection – consisting of seven in-line medium pressure UV reactors with a capacity of 1.44 mgd each
- Effluent Metering – utilizing a non-invasive external electronic flow meter on the 24-inch effluent line

The solids handling system for the facility includes the following:

- WAS Metering – a Doppler-style external meter on the 8-inch thickener feed line
- Sludge Thickening – utilizing two rotary-drum thickeners with a capacity of 325 gpm each at 0.25 percent solids
- Sludge Dewatering – consisting of one decanting centrifuge with a capacity of 90 gpm at 3 percent solids, a screw pump, and two 20-cubic-yard roll-off containers

The odor control system for the facility includes the following:

- One 10,000 cfm multi-stage chemical scrubber for the Headworks Building and Anoxic Basin
- One 6,000-cfm multi-stage chemical scrubber for the Solids Dewatering Building and ATAD Basins
- One 16,000-cfm granular activated carbon (GAC) packed-bed filter (now under construction), designed in series with the scrubbers to polish the exhaust from both

2.2 Sarival Lift Station

The Sarival Lift Station is a wastewater pumping facility that was designed to convey sewage to the Palm Valley WRF. MES had been unable to determine the capacity or hydraulic characteristics of the pumps that were installed.

2.3 Sarival WRF (Planned)

The Sarival WRF will be the second wastewater facility treating flows from the LPSCO service area. Like the Palm Valley WRF, the Sarival WRF is expected to be an SBR facility and is planned to have an initial capacity of 4.1 mgd with an ultimate capacity of 8.2 mgd.

3.0 CHALLENGE AREAS AT PALM VALLEY WRF

To identify challenge areas for the Palm Valley WRF, MES reviewed the design documents, process and capacity studies, and operations information for the plant, conducted interviews with the Algonquin engineers, managers, and operations staff, talked to previous engineers and employees familiar with the history of the facilities, and consulted with manufacturers and process equipment experts. While none of the challenges presented below appear to be preventing the successful operation of the facility, they do show target areas where improvements could be made to enhance the overall operation, reliability, and cost effectiveness of the plant. The following subsections provide a summary of the challenge areas identified for the facility.

3.1 Headworks and Influent Systems

According to the Algonquin staff and a review of the design, there are a number of challenges with the Headworks and Influent systems for the facility. The following paragraphs describe some of these challenges.

3.1.1 Lack of Influent Flow Equalization

Regarding the influent system, there is no flow equalization upstream of the influent pump station. Therefore when the SBR system is not ready to take a new batch, equalization must occur in the collection system, potentially resulting in sewer surcharging during peak flows. In addition, this condition restricts the flexibility of the operations staff to extend batch cycles if the process is not performing optimally.

3.1.2 Influent Metering and Sampling Locations

Another challenge with the influent system is that the current location of the influent meter is upstream of the influent pump station wetwell, while the influent sampling point (for BOD, TSS, etc.) is downstream of the influent pump station, and the return flows from the filter backwash, filter sludge, and dewatering centrate are in between. This means that the measured influent flows do not contain the return flows yet the loading concentrations (from the sampling) include the contribution of the return streams. This configuration makes it very difficult to measure or calculate the actual influent loading or the loading to the biological system. According to Algonquin staff they are currently planning to install

a new flow meter downstream of the influent pump station, and this solution should alleviate the situation considerably.

3.1.3 Blinding and Solids Bypassing of the Influent Screening Process

The first treatment process after the influent pump station is influent screening. According to Algonquin staff the 6-millimeter auger screens have been problematic for a number of reasons. First, the brushes on the auger that are designed to clean the screens have had wear issues and are very difficult and time consuming to replace; second, the augers tend to bind when large solids get into the screen; and third whenever the brushes are worn or the augers bind, the screens tend to blind or clog. When the screens blind or clog (either partially or fully) the wastewater is able to flow over the rubber shroud and significant flows of unscreened wastewater can bypass the process. Because there is no grinder or comminuter upstream of the screens, the solids that get into the secondary process can be quite large.

Apparently since these screens have been in operation there has been a significant amount of bypassing of unscreened wastewater, resulting in large solids and debris entering the SBR process with no way to remove it. This is especially problematic because large solids can easily clog the jet-mixing nozzles, and there is at least some evidence of clogging in all of the process basins. It also appears that the solid material in the process basins may be a contributing factor to the impeller wear issues for the submersible motive pumps.

3.1.4 Fats Oils and Grease (FOGs)

There is currently no process or means for reducing or removing fats, oils and grease (FOGs) in the headworks or anywhere else in the facility treatment train. This is a problem because FOGs can cause foaming, increase odor problems, reduce the efficiency of (or even blind) the tertiary filters, and create performance problems in the UV disinfection system. Based on operator input each one of these problems has been experienced at the plant.

3.1.5 Moisture and Corrosives Passing through Open Grating in Headworks Room

The Headworks Building was constructed with open grating over a 107x4-foot opening in the floor of the room right above the process basins. Due to the process air flow and the configuration of the odor control system, the air from the process tanks is drawn directly into the headworks room. The moisture and corrosive constituents in the air have had an obviously detrimental affect on the equipment in the headworks room, not to mention creating an uncomfortable working environment for the operators.

This condition is made worse by the fact that the electrical equipment in the room is apparently not NFPA Class 1 – Division 1 and as a result the equipment has experienced notable deterioration, and according to the operators multiple failures have occurred. The Algonquin staff has taken measures to

improve the condition, including using checker plating and foam sealant to try to block the opening. In addition, plans have been made to relocate all the critical electrical equipment outside of the headworks room. However, it does not appear that these measures will completely alleviate the problem.

3.2 Secondary Treatment System

The secondary treatment system includes the Anoxic Reactor, the SBR Basins, and the Process Air Blowers. The challenges identified with these systems are as follows:

3.2.1 Sludge Wasting from Anoxic Reactor

The plant was designed and constructed to waste sludge (WAS) from the bottom of the Anoxic Reactor. However, because the Anoxic Reactor received the initial influent flows, the operations staff found that the WAS stream contained a significant amount of raw wastewater with a very high volatile component. This resulted in high odors, inefficient thickening, and stress on the aerobic digestion process. To counter this problem, the wasting system was reconfigured by Algonquin to draw from the SBR basins, and it appears that this solution has improved the process.

3.2.2 Clogging of Jet-Mixer Nozzles with No Back-Flush Capability

As a result of flow bypassing the influent screens, it appears that a significant amount of large solids and debris has been introduced into the process basins. Once in the process basins, the large solids can be drawn through the motive pumps and conveyed into the jet-aeration headers. The nozzle openings for the jet-aeration headers are small enough to be clogged by large solids in the mixed liquor, reducing mixing/aeration capacity and straining the motive pumps. Based on field observation by the operations staff and MES, it appears that significant clogging has occurred, especially in the Anoxic Reactor.

In many jet-aeration-type biological systems there is some way to back-flush the nozzles to remove clogged material. This is usually done through either an air-lift pipe that uses the process air to reverse the flow through the nozzles, or a dedicated pump that is used to draw flow (and often WAS) back through the header. In the Palm Valley system, however, the pump and piping configuration provides no means for back-flushing.

3.2.3 Constant Speed Blowers and DO Control

There are eight constant speed process blowers in the plant with no variable adjustment or inlet control valves. Five blowers, located in the blower room adjacent to the headworks, are dedicated for the secondary treatment process air; the remaining three blowers, located in the solids dewatering room, are for the digesters. According to the operations staff, the only way to control the total amount of air flow is to turn the blowers on and off (manually or on timers), and the only way to control the individual air

flow to any of the process basins is through modulating or manual valves on the headers to each tank. Any adjustments made to control dissolved oxygen (DO) levels must be done manually.

The manual controls and lack of flexibility is a challenge for the plant because it restricts the ability to optimize the biological performance through control of the oxygen levels. In addition, inefficient on-off cycles of the air flow can create more odors than would otherwise be produced, and almost certainly results in significantly higher power costs.

3.2.4 Fixed Decanters Passing Solids and Floatable Material

The SBR tanks are equipped with fixed decanters that draw the supernatant out of the tank until the water level falls below the decanter openings. According to Algonquin personnel and MES field observations, the operation of the fixed decanters in this manner results in direct passing of all floatable materials on to the tertiary filters. In addition, by allowing the decanters to draw air at the end of the decant cycle, air space is created inside the decant pipe that can be filled by the mixed liquor on the fill cycle and then drawn to the filters in the first part of the next decant cycle.

Another challenge that has been identified by the Algonquin staff is the passing of mixed liquor through the decanter valves due to a failure to completely close. Moreover, if mixed liquor is leaked through the decanters, the problem is exacerbated by the fact that there is no way to return a bad batch to the head of the plant once it reaches the surge tank.

3.3 Tertiary Filtration System

The tertiary filtration system consists of the surge tank, the filter feed pumps, and the cloth-media disk filters, including the filter sludge and backwash return. The following items have been identified as challenge areas for this system:

3.3.1 Surge Tank Sizing

According to the design documents, the equalization capacity of the surge tank is approximately 250,000 gallons, whereas the volume of one decant batch is approximately 425,000 gallons. While this sizing of the tank is adequate to prevent hydraulic overloading of the filters, it is not large enough to provide flexibility for significant cycle changes in the SBR process, for isolation of a bad batch, for downtime if the filters blind, or for maintenance of the tank itself. Any of these events, if needed, require process shutdowns that can back up the wastewater flow all the way into the collection system.

3.3.2 Surge Tank Serpentine and Sediment Removal Difficulties

The surge tank is baffled in such a way that the flow travels through a serpentine configuration from the influent point to the filter feed pumps. Because there is no chlorine or filter aid addition in the tank, the

serpentine configuration appears to be unnecessary. It also makes the removal of sediments or floatables/FOGs difficult because access to the tank is only provided at one end and there is no sloping of the floor to move sediments to the accessible area.

3.3.3 Lack of Secondary Effluent Return Line from Surge Tank

The way the plant is currently configured, any secondary effluent that flows into the surge tank must be processed through the filters. There is no means to return the secondary effluent from the surge tank back to the headworks or the process tanks. This configuration can be a challenge because if mixed liquor, a large load of FOGs, or other solids come through the decanters, there is no way to divert the flow back to the plant to avoid overloading or stressing the filters.

3.3.4 FOG Blinding of the Cloth Media Filters

According to the Algonquin staff, there have been occasions where heavy FOG loads from the SBRs have blinded the cloth media of the disk filters, requiring extensive manual cleaning to restore filtration effectiveness. Even during the field visit for this report significant FOG's were observed floating in the filtration and surge tanks and built up along the backwash arms of the filters.

3.3.5 Filter Sludge Pump Failures and Valve Clogging

Another challenge with the filtration system that has been noted by the plant operations staff is the numerous failures of the filter sludge pump and the frequent clogging of the sludge valves and lines. It was suggested that larger lines and valves and a stockier pump for the sludge system would improve the maintenance issues.

3.4 Effluent Pumping and Disinfection System

The effluent pumping and disinfection system consists of an effluent clear well tank, effluent discharge pumps, a tablet chlorination system, the ultra-violet (UV) disinfection system, and the effluent meter. The following items have been identified as challenge areas for this combined system:

3.4.1 Clear Well Tank Sizing

According to the design documents, the differential storage capacity of the clear well tank is approximately 175,000 gallons. Like the post-equalization surge tank, the sizing of the tank is adequate to prevent hydraulic overloading downstream (in this case the UV reactors), but it is not large enough to provide flexibility for significant cycle changes in the SBR process, for isolation of a bad batch, for downtime if the UV system fails, or for maintenance of the tank itself. Any of these events, if needed, require process shutdowns that can back up the wastewater flow all the way into the collection system.

3.4.2 In-Line UV System Effectiveness and Maintenance Issues

Based on feedback from the operations staff, the inline ultra-violet reactors have had multiple performance and maintenance problems, and obtaining parts from the overseas manufacturer has been cumbersome. They indicate that there also have been fouling problems and extended periods where the disinfection effectiveness has not achieved the design levels. To help improve the fouling problems the Algonquin staff installed a system to periodically soak the reactors in citric acid.

3.5 Sludge Digestion and Dewatering System

The sludge digestion and dewatering system consists of the WAS wasting line, the rotary sludge thickeners, the ATAD and aerobic digesters, and the sludge dewatering and storage system. The following items have been identified as challenge areas for this combined system:

3.5.1 Sludge Wasting from Anoxic Tank

Based on a review of the design, the WAS system was configured to bleed WAS flow off of the jet-mixing line in the anoxic tank, fed by a single motive pump located within the basin. According to the operations staff this has created a problem due to the heavy percentage of raw wastewater that is introduced into that basin. The high volatile content and low mixed liquor TSS has apparently presented operational challenges to the digestion and dewatering processes downstream. To remedy this problem, the Algonquin staff made changes to enable the WAS flow to be drawn from the SBR tanks, and this appears to have improved the situation.

3.5.2 (Former) ATAD Process Odors and Foaming

The plant was designed to utilize a two-stage sludge digestion process, with the first stage being an Autothermal Thermophilic Aerobic Digestion (ATAD) process and the second stage being traditional aerobic digestion. According to the operations staff, the ATAD system has been problematic, with significant foaming problems and high odor generation. In addition, the process is sensitive to DO levels, which are difficult to maintain given the low flexibility of the constant speed blower system. Even manufacturers of ATAD systems acknowledge the drawbacks, as indicated in the following statement from the website of Thermal Process Systems, an ATAD equipment manufacturer:

> "Various anaerobic and aerobic digestion processes are in use today. But each has its limitations. For example, natural aerobic digestion processes release heat, as well as water and carbon dioxide - all desired results. However, at typical mesophilic operating temperatures, roughly 20-45°C (68-113°F), the process is inefficient, resulting in instability with minimal pathogen kill and little solids reduction.
>
> Results improved significantly with the introduction of Autothermal Thermophilic Aerobic Digestion (ATAD) several years ago. ATAD takes advantage of highly efficient thermophilic organisms naturally present in wastewater, optimizing the environment for them to proliferate and dominate. This increases the temperature of the

sludge as the thermophiles feed on other microorganisms. At these higher temperatures the cell walls of the activated sludge rupture, releasing the now-dead mesophilic contents and providing a feast for the thermophiles. The metabolism of the thermophiles is extremely high, yet the net yield is low, resulting in a significant reduction of volatile solids to produce a pathogen-free end product. On the downside, due to their inherent inflexibility, traditional ATAD processes often produce excess foam and unacceptable odors."

The ATAD system that was designed and constructed at the Palm Valley WRF was apparently included at the request of the original owner and is not typically a process installed by the design-builder of the plant. Therefore, it appears that many of the controls and optimization features for an ATAD system are not available to the operations staff, exacerbating the inherent difficulties in running such a process. To rectify the problems, the Algonquin staff decided to convert the ATAD basins to traditional aerobic digestion and equalization for the second stage digesters. While this has improved the situation, the operations staff indicates that these converted basins are still very difficult to control and often slip back into periods of varying pH, heavy foaming, and excessive odors.

3.5.3 High Centrifuge Maintenance Costs

The sludge from the second stage aerobic digesters is dewatered using a centrifuge system. According to the operations staff the equipment produces an adequate biosolids cake when functioning properly. However, the equipment has been extremely unreliable, costing many man-hours for maintenance and significant funds for replacement parts which are not readily obtained.

3.5.4 Insufficient Plant Sewer Sizing for Return Flows

The return flows from the disk filters, the centrifuge, the sludge thickeners, and the seal water/floor drains in the sludge dewatering room are all routed through an 8-inch plant sewer line back to the anoxic basin. Based on the experience of the operations staff, this line is significantly undersized and will back up during heavy backwash or dewatering periods. In addition, there is no flow meter or sampling point in the line to determine the overall loading of the plant from the return flows.

3.6 Odor Control System

The odor control system originally consisted of two three-stage wet chemical scrubbers, one 10,000-cfm unit for the Headworks Building and Process Basins, and one 6,000-cfm unit for the Solids Dewatering Building and Digester Basins. Due to performance issues resulting in public complaints, in early 2007 a 16,000-scfm carbon media scrubber was added to polish the exhaust streams of the two original scrubbers. The following items have been identified as remaining challenge areas for this odor control system:

3.6.1 Inadequate Sizing of the Odor Control Units

Based on the air space volumes in the odor-controlled buildings and tanks, it appears that the system was designed to provide approximately 10 to 12 air changes per hour for each of the odor-controlled equipment rooms. The design appears to be based on drawing air in series from the process and digester basins *through* the odor-controlled rooms; but since input air can be drawn from various areas (e.g., the process air blowers, the evaporative cooling units, and incidental openings in each building), the entire volume of all air space is actually drawn through the system in parallel, significantly reducing the air changes per hour. Therefore the effective air change rate for the system as a whole appears to be *less than one* air change per hour. In addition, there are no apparent automatic or manual dampers on either the odor control duct lines or the buildings, which would mean there is no way of balancing the air in and out of the system.

3.6.2 Corrosion from Drawing Process Air from the Basins through the Buildings

Because the odor control system draws air from the process basins through the odor-controlled rooms, the equipment and fixtures in the rooms are exposed to moisture-laden air with highly corrosive constituents. The effects of this can be readily observed in the Headworks room, where a layer of corrosion coats most of the susceptible equipment and condensed moisture is visible on the windows and most hard surfaces. In addition, drawing the air from the process basins through the rooms creates a poor environment for operators working within the rooms.

3.6.3 Rotary Thickeners Not Individually Odor-Controlled

In the solids dewatering room the most noticeable generator of strong odors is the rotary thickening system. Although the two Rotary Thickener units are enclosed and appear to have a flange for attaching an odor-control duct, the ducts in the room are not connected to them. Instead the odors linger in the room until they make their way to the duct openings or an opening in the building. As a result, the room itself is quite odorous, creating an uncomfortable work environment and (because of the inefficiently balanced air flow) allowing odors to escape whenever a rollup or access door is opened.

4.0 POTENTIAL IMPROVEMENTS AT PALM VALLEY WRF

Based on the investigations conducted for this study, input from Algonquin staff, and the analysis detailed above, there are a number of potential improvements at the Palm Valley WRF that MES would recommend for further study and consideration. These potential improvements listed in this section are intended to be considered for the short-term to potentially alleviate immediate challenges. Potential improvements for the longer term and future expansions are provided in the next section.

While many challenge areas were identified in Section 3, there are four main improvement areas that if addressed could have an immediate positive impact on plant operations:

- Removing Large Solids from the Treatment Train
- Unclogging the Jet-Aeration Nozzles
- Minimizing Fats, Oils and Grease (FOGs)
- Reconfiguring and Augmenting the Odor Control System

These four items are discussed in detail below, along with suggestions for measures that could be taken in the short term to accomplish the improvements. After the analysis of these four areas, this section also provides a list of potential considerations for improvement of the other identified challenge areas for the Palm Valley facility.

4.1 Removing Large Solids from the Treatment Train

Many of the challenge areas listed in Section 3 are a direct result of, or are related to, the presence of large solids and debris in the treatment train. These include:

- Clogging of the jet-aeration nozzles in all process tanks
- Impeller wear in the submersible motive pumps
- Seating problems with the SBR decant valves
- Clogging of the filter sludge lines and valves
- Maintenance issues with the filter sludge pumps

Because of these challenges (and perhaps others not identified) that have to do with large solids and debris in the system, it is clear that influent screening is a critical process in the treatment train for this facility. Therefore we believe that Algonquin should implement measures to eliminate the potential for raw wastewater to bypass the influent screens and consider alternatives for re-screening the mixed liquor already in the system.

4.1.1 Suggestions for Further Review

Some potential mitigation measures that might be considered for further investigation include:

- Mixed Liquor Re-Screening – One means of removing large solids and debris that have already bypassed into the mixed liquor would be to install a temporary screening unit to take flow from the SBR-feed header and re-screen it for several weeks. We do not recommend re-screening the mixed liquor by routing it through the existing auger screens because it would potentially increase the maintenance, blinding, and bypass problems already observed with these screens.

- Screen Augmentation/Replacement – The current auger screens, while they may be adequate for another application, are not a good fit for a plant that has no upstream coarse screens or grinder and cannot bear occasional bypasses. Because adding upstream coarse screens or a grinder would be extremely difficult given the existing space and piping configuration, we recommend that Algonquin consider replacing these screens with 6-millimeter reciprocating stair screens, which are highly reliable, have low maintenance requirements, and require no upstream coarse screen.

  We believe that the new screens could be cost-effectively integrated into the facility by re-using the existing screens as by-pass (or peak-flow) units. If new screens were installed to eliminate any unscreened wastewater bypassing, the mixed liquor could then be re-screened without the temporary unit. Alternately, a self-contained reciprocating stair screen could be utilized as the temporary re-screening unit and then installed as a permanent primary-screen replacement after the re-screening is complete.

4.2 Unclogging the Jet-Aeration Nozzles

As stated in Section 3, the nozzle openings for the jet-aeration headers are small enough to be clogged by large solids in the mixed liquor, and it appears that significant clogging has occurred in many of the jet-aeration headers, especially in the Anoxic Reactor. In many jet-aeration-type biological systems there is some way to back-flush the nozzles to remove clogged material, either an air-lift pipe that uses the process air to reverse the flow through the nozzles, or a dedicated pump that is used to draw flow back through the header. In the Palm Valley WRF jet-mix headers, however, the current piping configuration provides no means of back-flushing.

In the longer term, when the plant is expanded and the existing basins can be taken out of service, it is recommended that a back-flushing header be added to each basin and piped to a dedicated back-flushing pump. In the meantime however, an alternate means should be sought to back-flush or otherwise unclog the nozzles.

4.2.1 Suggestions for Further Review

Some potential mitigation measures that might be considered for further investigation include:

- Reverse-Flow Submersible Pump – based on discussions with Flygt, it appears that the manufacturer has in the past provided pumps configured to ***reverse*** the flow through the submersible. Assuming this is the case, one such pump configured for reverse flow could be used to flush the headers one by one on a periodic basis until a permanent back-flushing system can be installed. Although the manufacturer warned that such a pump will have a low efficiency, the benefits would far outweigh this drawback because there is no other way to easily back-flush

the nozzles. We recommend that Algonquin work with Flygt and an engineer to determine the feasibility of this approach.

- One-Time Cleaning – the nozzles could also be cleared by utilizing a diver with a cleaning rod and a high-pressure hose. However, because the high costs involved would make such cleanings impractical on a regular basis some means of preventing re-clogging would be needed, such as installing high-grade chopper pumps in place of the existing motive pumps. If the reverse-flow pump approach turns out to be infeasible, we recommend that a one-time cleaning and chopper pumps be considered until all the mixed liquor can be properly re-screened.

4.3 Minimizing Fats, Oils and Grease (FOGs)

Like the challenges posed by large solids, the challenges created by FOGs have an impact on many areas of the plant. The FOGs can cause foaming, increase odor problems, reduce the efficiency of (or even blind) the tertiary filters, and create performance problems in the UV disinfection system. Currently there is no process or means for reducing or removing FOGs anywhere in the facility treatment train.

In the longer term, when the plant is expanded and the existing basins can be taken out of service, it is recommended that a scum collection system be installed in the Anoxic and SBR basins. In the meantime however, alternate means should be sought to minimize and remove FOGs from the process.

4.3.1 Suggestions for Further Review

Some potential mitigation measures that might be considered for further investigation include:

- FOG-Reducing Additives – There are a number of chemical and biological additives on the market that are designed to reduce FOGs in the biological process. Products such as BioCope ERI and Advanced BioCatalytics Accell are additives that have been found to significantly reduce FOG accumulation by enhancing the ability of the biological system to break down FOG compounds. (BioCope is currently being used by Algonquin at its Boulder Drive facility.) Because the cost of temporary trials is relatively low and the benefit potentially high, it is recommended that FOG-reducing additive testing be initiated as soon as possible.
- SBR Minimum-Level Adjustment – According to the operations staff the SBRs are decanted until the decanters draw air. To prevent FOGs and other floatables from passing though to the filters, it is recommended that the minimum level in the SBRs be set to at least 3 to 6 inches above the decanter openings. This will allow the biological process to have more time to break down the FOGs and also prevent any mixed liquor from filling the annular space in the decanters during the other cycles.

- Skimming Return Cycle – Another controls adjustment that could help the biological system break down the FOGs might be to utilize the RAS troughs as skimmers during the mix and settle cycles by setting the level just above the trough weir for some period of time to skim the FOGs and floatables and return them to the anoxic basin. However, the controls would have to be configured such that the overall RAS rates still provide optimal treatment.
- Surge Tank Baffle – One way to reduce the floatables and FOGs that get into the surge tank would be to install an underflow baffle at the upstream end of the serpentine. Such a baffle could enable periodic manual removal by temporarily trapping a portion of the FOGs and floatables in an area accessible by the operators.

4.4 Reconfiguring and Augmenting the Odor Control System

As stated in Section 3, the odor control design appears to be based on drawing air from the process and digester basins *through* the odor-controlled rooms, but since input air can be drawn from various areas, the entire volume of all air space is drawn through the system in parallel, significantly reducing the air change per hour. Moreover, there are no apparent automatic or manual dampers on either the odor control duct lines or the buildings, which would mean there is no way of balancing the air into the system. While the new polishing unit should be effective on removing constituents that are not removed by the existing units, it will not increase the air changes or improve the environment in the odor-controlled rooms.

4.4.1 Suggestions for Further Review

Some potential mitigation measures that might be considered for further investigation include:

- Separating the Basins from the Rooms – One possibility for improving the system would be to seal off the basins from the equipment rooms and dedicate the existing scrubber system to the basins alone. As that is done, a room-dedicated system could be installed to provide the full 12 air changes per hour for the headworks and solids dewatering rooms. A significant benefit of this alternative would be that the wet and corrosive air from the tanks would not be drawn through the equipment rooms.

  It is recommended that an ion-exchange system by IONstein Air Technologies be considered as the treatment unit for the equipment room. This type of unit treats the air in the room, as opposed to drawing it out of the room for treatment, and would have the advantage of improving the environment in the room and reducing the possibility of odors escaping through an open door. It is possible that the manufacturer would be willing to pilot such a unit prior to purchase to demonstrate successful performance.

- Direct Ducting to Carbon Scrubber – Along with separating the equipment rooms from the basins, a great deal of flexibility could be added to the system by installing new ductwork to allow the new carbon scrubber to draw directly from the equipment rooms. This would enable the new scrubber to increase the air changes in the rooms if necessary or be switched back to polish the exhaust of the existing scrubbers. It would also enable the equipment rooms to be separated from the basins during the transition if a new system is piloted or installed for the equipment rooms.
- Air Balancing – If, instead of the suggestions listed above, Algonquin decides to proceed with the more expensive option of replacing the existing scrubbers with much larger units, it is highly recommended that the air system be redesigned to seal off unintended air inlets and enable balancing of the air flow with automatic louvers and dampers.

5.0 CHALLENGES FOR FUTURE TREATMENT CAPACITY

In addition to all the facility challenges with the Palm Valley facility, LPSCO is challenged with a situation where influent flows that are increasing at an advanced pace. According to the operations staff the current facility, designed for an average flow of 4.1 mgd, has insufficient peaking or redundant capacity to accommodate the expected flows.

5.1 Timing of Future Expansions

According to Algonquin, the existing plan for accommodating future flows is to expand the Palm Valley WRF to its designed build-out capacity of 8.2 mgd, and to construct a new WRF facility at the Sarival site with an initial capacity of 1 to 2 mgd expandable to 8.2 mgd. However, at this stage is it unlikely that Algonquin will be able to design and construct either the second phase of the Palm Valley WRF or the first phase of the Sarival WRF before the current treatment capacity is exceeded. A contingent plan is being developed whereby a connection to the collection system for the City of Goodyear would be constructed to accommodate excess flows; however Algonquin has indicated that they would prefer to treat all of the wastewater from their service area if possible.

5.2 Expansion Area and Setback Limitations at Palm Valley WRF

The planned Phase 2 expansion of the Palm Valley WRF will face a number of challenges based on the layout of the original facility plan because the WRF was built on an extremely limited footprint area. There is virtually no room to add any equipment or structures that were not planned for in the original build-out expansion facility plan, let alone for adding additional equipment or structures that were not planned. (Actually, even with the original facility plan, finding room for construction equipment and material lay-down areas during construction will be a severe challenge.) It may also be problematic that

the Phase 2 expansion area is located on the east side of the facility, closer to the commercial center that has been the source of most of the odor complaints since the construction of the first phase. And, making matters worse, residential homes have been built inside the intended odor easement north of the facility in recent months.

6.0 NEAR-TERM TREATMENT CAPACITY ALTERNATIVES

Based on the flow rates currently being experienced at the plant it appears that the facility is quickly reaching its maximum hydraulic and biological treatment capacity. This will present an all-encompassing challenge to the LPSCO wastewater treatment facilities that eclipses those identified in Section 3 because, even with alternative procurement methods such as design-build or CM@Risk, it is unlikely that the Phase 2 expansion of the plant could be designed and constructed in time to accommodate the peak flows starting in November or December of 2007.

However, based on the analysis by MES developed for this study, it appears that there are a few alternatives that would serve to expand redundant capacity in the near term without jeopardizing future capacity expansions while staying within the existing planned footprints for both the Palm Valley and Sarival sites. These include the following:

- Installing a temporary package plant at the Sarival site and reversing the flow in the force main from the Sarival Pump Station to convey excess flow from the Palm Valley WRF
- Using a pre-engineered submerged membrane filtration system to increase the redundant capacity at the Palm Valley WRF by eliminating the decant cycle and possibly running at higher MLSS concentrations
- Increasing the peaking and redundant capacity of the existing Palm Valley WRF by converting the digester tanks to SBR tanks and producing non-Class B dewatered biosolids for landfill disposal.

6.1 Temporary Package Plant at the Sarival Site

One possibility to relieve the Palm Valley WRF of peak flows in the near term would be to install a temporary package plant at the Sarival site and use the existing force main from the Sarival Lift Station to convey flow from the Palm Valley WRF to the Sarival package plant. This would relieve the peak flows from the Palm Valley WRF and allow time for Phase 1 of the (permanent) Sarival WRF and Phase 2 of the Palm Valley WRF to be designed and constructed.

To be able to reliable accommodate excess flows for the period required, the size of the package plant would need have a treatment capacity of between 0.5 and 1.0 mgd at an approximate cost of $5M to

$10M. The main drawbacks of this alternative are that the costs of the package system would be difficult to recoup once the permanent facility was brought on line, and it is not certain whether or not the package facility could be permitted, designed, and constructed at the site before the end of 2007.

6.2 Pre-Engineered Submerged Membrane Filtration System

One way to expand the treatment capacity at the existing Palm Valley WRF would be to add a skid-mounted, pre-engineered submerged membrane filtration system to the process. Such a system would increase the capacity of the SBRs by eliminating the decant cycles and enabling operation at significantly higher MLSS concentrations. Based on preliminary calculations, adding a membrane system could increase the capacity of the plant by approximately 15-20 percent, or 0.6 to 0.8 mgd, at a cost of approximately $5M for the membrane equipment alone. Other upgrades such as aeration capacity and MLR pumps would also be required. In addition, because the membranes are sensitive to abrasive materials and fibers, this alternative would absolutely require re-screening of the mixed liquor and installation of fine screens with openings as small as 2 millimeters.

Based on a review of the Palm Valley site plan, it appears that the only feasible location for the addition of such a system would be at the south end of the existing SBR basins, the current location of the visitor parking lot. While there are areas available to the east, it seems likely that locating the membrane filtration system in this area would interfere with the Phase 2 expansion of the facility.

Aside from the capital costs and the loss of the parking area, the main drawback of this alternative would be the cost and complexity of maintaining a submerged membrane filtration system, including the membrane cleaning and chemical systems, power costs, and membrane replacement costs.

6.3 Conversion of Digester Tanks to SBR Tanks

Another way to expand the peaking and redundant treatment capacity of the Palm Valley WRF would be to convert the existing digester tanks to SBR process basins. This would be a fairly straight-forward conversion because the digester tanks are already configured similar to the SBR tanks, with jet-aeration headers and submersible motive pumps. Based on a cursory review of the plans, as a minimum the following items would need to be modified to make the conversion:

- Configure the influent piping and controls from the anoxic tank to feed the additional SBR basins
- Add jet-aeration headers and blower capacity to increase the aeration in the new tanks
- Install decanters and piping to direct secondary effluent into the surge tank
- Add a return trough and piping back to the anoxic tank
- Increase the capacity of the downstream processes, including the filters and UV system

The existing SBR tanks have a treatment capacity of approximately 4.1 mgd with and operating volume of approximately 3.1 million gallons, indicating a SBR treatment-to-volume ratio of approximately 1.3. If converted, the digester tanks would provide up to about 1.3 million gallons of additional SBR treatment volume, which converts to up to 1.7 MGD of additional redundant/peaking treatment capacity. Even with an allowance factor for unforeseen items in the conversion, ***this alternative could be able to provide up to 1.5 MGD of additional plant capacity for peaking or redundancy purposes***. Based on the assumed requirements for the conversion, it is expected that the design and construction could be completed within about 9 months under a CM@Risk procurement structure.

An additional benefit of this alternative would be that it would have little to no effect on the construction, operation or capacity of the Phase 2 expansion. Of course, removing the digester tanks from the solids handling process would mean that the facility could no longer produce Class B biosolids. However, if the ATAD tanks are used strictly for aerated sludge storage and equalization, the sludge could still be dewatered on-site to meet the paint-filter-test standard for landfill disposal. Alternatively, all solids handling could be removed from the Palm Valley plant and the sludge could be transported to the Sarival WRF by way of the existing force main (in reverse) once that facility is constructed and brought on line.

6.4 Recommended Near-Term Capacity Expansion Alternative

Although each of the three alternatives describe above have the potential of providing a solution to the near-term redundant/peaking wastewater treatment capacity shortfall, because of its simplicity, low risk, moderate capital costs, and minimal impact to future expansions, we recommend that the third option, conversion of the digester tanks to SBR process basins, be planned and executed as soon as possible. We recommend that Algonquin commission a feasibility study to determine the precise requirements of the conversion, and then execute a CM@Risk procurement to construct the new facilities for start-up and commissioning before the end of 2007.

7.0 SUMMARY OF RECOMMENDATIONS

To be completed...

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/phoenix/stories/2003/05/19/story5.html

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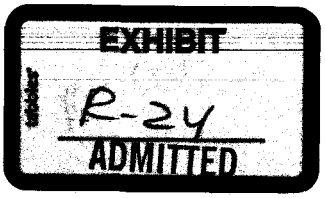

Waste water treatment gets new look

Phoenix Business Journal - by Mike Padgett The Business Journal

From the outside, Brian Cullen's and Steve Owen's stealth-like businesses next to golf courses in metro Phoenix look like places where you might pay your greens fees.

But their Pacific Environmental Resources Corp. offers a new look to solve an age-old issue critical to any new residential development.

The collection, treatment and disposal of residential wastewater is the core of PERC's business, and the company recently started getting its name out to Valley home builders and cities.

So far, PERC has wastewater treatment facilities in Goodyear, called the Palm Valley Water Reclamation Facility, another in El Mirage, and a third in the West Valley for Buckeye Land Management Inc., which will service several home builders in the new Buckeye development called Sundance.

The PERC system takes up less land, releases no odor, and the structures look like single-story office buildings, the owners say. In fact, the buildings and equipment are constructed over the underground treatment equipment, disguising the buildings' purpose.

Conventional treatment facilities often take 30 acres, and because of the odor, wastewater treatment plants usually are not wanted by anyone as neighbors. In comparison, PERC's facilities take about 6 acres.

"In Palm Valley, we get people knocking on the door wanting to know where to pay their greens fees," said Cullen, PERC president.

In 2002, the Palm Valley facility won an environmental excellence award from Valley Forward Association and Salt River Project. The PERC treatment process "made it possible to locate the facility essentially in the center of SunCor's Palm Valley master-planned community, which is generally not possible with standard wastewater treatment plants," according to the award.

"It's a high-tech process and it's a well-known process, but we deliver it in a different manner," Cullen said.

The Palm Valley facility serves the Goodyear area north of Interstate 10, Litchfield Park, and part of Avondale.

Owen, vice president of business development, said the company has caught the attention of developers in Peoria, Pinal County and Tucson, as well as near Stockton, Sacramento and San Jose, Calif. The company already has facilities in place in other areas in California and in New Mexico.

Owen said the Palm Valley facility has been toured by wastewater treatment officials from Sweden and other nations. A few weeks ago, city of Los Angeles officials toured the plant to study equipment they are considering for one of their facilities.

The end product, sludge, is treated to a level safe enough for disposal in landfills. The treated water can be used for irrigation, which makes it ideal to place the facilities next to golf courses, and for groundwater recharge, Cullen said.

The company recently received a contract to build and operate a treatment facility in Buckeye for the Tartesso development north of Interstate 10 and west of Sun Valley Parkway.

Cullen and Owen also have discussed their facilities with the developers of the 35,000-acre Douglas Ranch and the 8,800-acre Verrado developments, also in Buckeye.

"We're very excited about Buckeye because the growth potential is significant," Cullen said. "It's obviously a very large geographic area."

Cullen said the technology is not new, but his company has modified it so that it fits on a small amount of land and needs less infrastructure.

"What we deliver is a product in which the goal is to provide the highest quality of water, using the lowest footprint available for a very competitive price," he said.

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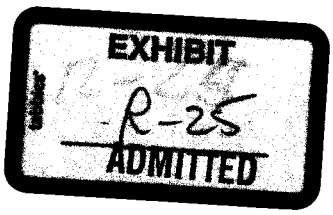
LITCHFIELD PARK SERVICE COMPANY
DOCKET NOS. SW-01428A-09-0103 AND W-01427A-09-0104
RESPONSE TO RUCO'S SECOND SET OF DATA REQUESTS



September 25, 2009

Response provided by: Gerald Tremblay

Title: Director of Finance

Company Name: Algonquin Power Income Fund

Address: 2845 Bristol Circle
Oakville, Ontario Canada L6H 7H7

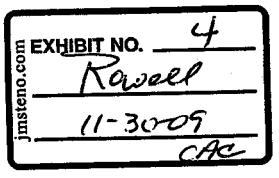
Company Response Number: MJR 2.4

Q. Please provide a narrative description of how affiliate costs are allocated to the utilities.

RESPONSE: Algonquin Water Services (now Liberty Water and formerly New Spring) in all years allocated costs in the following manner. Day to day operating costs of the utility were charged out at a fixed rate per month. Customer service and administration costs where billed out at a dollar rate per customer. Engineering labor was charged out at market hourly rates on a job by job basis.

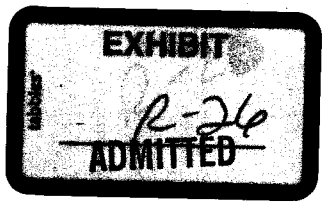
It was determined that, for the test year, a change in allocation method was in order. This new method was used to allocate all expenses on a cost recovery basis and eliminate any profit component obtained by AWS. The new method of allocation is to charge all direct operations labor costs related to LPSCO via timesheets. All customer service and finance related costs are allocated based on customer counts to all AWS-operated utilities, and all administration costs are allocated based on a 4 factor formula to all Algonquin-owned utilities. This allocation is based on a weighted average of rate base, customer counts, wages, and operating expenses for all our utilities. Engineering services have remained allocating their time via the job costing timesheet process but have moved from market chargeable rates to cost recovery rates. This process was initiated after the test year, thus a reconciliation was performed to adjust the test year results to this new process.

If any engineering services from Algonquin Power Systems are needed, all labor is charged out at standard rates to recoup the cost of labor, burden, and administration



overhead costs. Algonquin Power Trust charges a fixed fee to all the utilities based on the number of facilities in the Algonquin group to recoup its administration costs. The utility group then apportions its share of APT costs to each facility via customer count.

All affiliated profit has been eliminated.

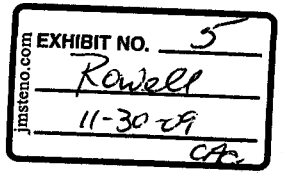


Corporate Cost Allocation
Based on 2008 Budget

Infrastructure allocation for the Utility Division

	Total Cost	Allocation %	Allocated Cost	*Allocation % to LPSCO	Amount Allocated to Litchfield Park 518,441	Nature of the Expense
Rent	430,739	26.98%	116,231	49%	56,523	Rent for the Office in Oakville Ontario Canada
Audit	507,000	26.98%	136,810	49%	66,531	Audit fees and Quarterly Reviews relating to the entire Income Fund- This is essential as we are publicly traded with access to the capital markets
Tax Services	265,000	26.98%	71,508	49%	34,774	Tax services, Tax provision calculations, tax return preperation and support in order to remain tax compliant
Legal - General	300,000	26.98%	80,952	49%	39,367	Council for review of audited financial statements, annual information form, SEDAR filings, review of contracts with credit facility-BLAKES listed in our annual report as prime legal council
Other Professional Services	455,000	26.98%	122,778	49%	59,707	These services mainly relate to maintenance on our ERP system, payroll system, 401k services, and Health and Benefit services. The allocated cost to LPSCO is essential because LPSCO must utilize the ERP system for proper record keeping as well as an upgraded payroll system to pay the operators.
Management Fee - Salaries	636,619	26.98%	171,786	49%	83,540	provide management services including strategic advice and consultation concerning business planning, support, guidance and policy making and general services. These expenses are critical to ensure the on going health and sustainability of the Income Fund and thus LPSCO
Unit Holder Communications	314,100	26.98%	84,757	49%	41,218	The Income Fund is a publicly traded entity on the Toronto Stock Exchange. We are obligated under securities law to report regularly on the Funds financial condition to our unit holders. Communication costs are associated with the issuance of the quarterly and annual reporting, as well as the annual information form, the management discussion and analysis, and press releases. As a publicly traded entity these costs are essential in order for the Income Fund to have access to the capital markets. LPSCO benefits from this because it ensures that capital is available for its ongoing capital needs.
Trustee Fees	204,000	26.98%	55,048	49%	26,770	The board of Trustees representitives of the Unit Holders- approve strategic direction of the Income Fund, approve financial statements, corporate governance, part of the audit committee and oversee the strategic direction and health of the Income Fund on behalf of all of our Unit Holders. This board is required as a publicly traded entity.
Office Costs	254,100	26.98%	68,567	49%	33,344	These costs are associated with the day to day operating activities such as maintenance, development and purchasing for our computer systems, stationary materials, property maintenance, service awards, and other add hoc costs. LPSCO requires the use of our systems and support from corporate office.
Licenses/Fees & Permits	305,000	26.98%	82,302	49%	40,023	TSE (Toronto Stock Exchange), SEDAR Filing fees, Standard and Poors fees for rating-- Standard costs associated with Publicly traded entities. Some of these costs are related to donations and as a good corporate citizen, it is the companies policy to give back to society.
Escrow & Transfer Agent Fees	75,000	26.98%	20,238	49%	9,842	CIBC Trust company is the agent that performs all our distributions to our unit holders and convertible debenture holders. As a publicly traded entity this is a cost that must be incurred in order to have access to the capital markets. LPSCO benefits from the Income Fund having access to the capital markets
Depreciation Expense	204,242	26.98%	55,113	49%	26,801	Computer Equipment, Server Equipment, Software, Shelving Units, Office Furniture, Office Security System- All related to the Oakville Office located in Canada
Total	3,950,800		1,066,089 CAD		518,441	
Based on December 2007 Bank of Canada Average Rate			1.00 Rate			
			1,066,089 USD			

* Please see APT OH ALLOCATION Utilities tab



LITCHFIELD PARK SERVICE COMPANY

DOCKET NO. SW-01428A-09-0103

DOCKET NO. W-01427A-09-0104

DIRECT TESTIMONY

OF

WILLIAM A. RIGSBY, CRRA

ON BEHALF OF

THE

RESIDENTIAL UTILITY CONSUMER OFFICE

NOVEMBER 4, 2009

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INTRODUCTION

Q. Please state your name, occupation, and business address.

A. My Name is William A. Rigsby. I am a Public Utilities Analyst V employed by the Residential Utility Consumer Office ("RUCO") located at 1110 W. Washington, Suite 220, Phoenix, Arizona 85007.

Q. Please describe your qualifications in the field of utilities regulation and your educational background.

A. I have been involved with utilities regulation in Arizona since 1994. During that period of time I have worked as a utilities rate analyst for both the Arizona Corporation Commission ("ACC" or "Commission") and for RUCO. I hold a Bachelor of Science degree in the field of finance from Arizona State University and a Master of Business Administration degree, with an emphasis in accounting, from the University of Phoenix. I have been awarded the professional designation, Certified Rate of Return Analyst ("CRRA") by the Society of Utility and Regulatory Financial Analysts ("SURFA"). The CRRA designation is awarded based upon experience and the successful completion of a written examination. Appendix I, which is attached to my direct testimony on the cost of capital issues in the case, further describes my educational background and also includes a list of the rate cases and regulatory matters that I have been involved with.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present recommendations that are based on RUCO's analysis of Litchfield Park Service Company's ("LPSCO" or the "Company") application for a permanent rate increase ("Application) for the Company's water and wastewater operations in Maricopa County. LPSCO filed the Application with the Arizona Corporation Commission ("ACC" or "Commission") on March 6, 2009. The Company has chosen the operating period ended September 30, 2008 for the test year ("Test Year") in this proceeding.

Q. Please explain your role in RUCO's analysis of LPSCO's Application.

A. I reviewed LPSCO's Application and analyzed the Company's requested level of required revenue as it relates to excess capacity issues and have worked in cooperation with RUCO consultants Matthew J. Rowell and Sonn S. Rowell of Desert Analytical Services PLLC on the remaining required revenue issues. I have also filed, under separate cover, direct testimony on the cost of capital issues associated with the case.

Q. What issues will you address in your testimony?

A. I will address excess capacity issues associated with LPSCO's Palm Valley Water Reclamation Facility ("PVWRF").

SUMMARY OF TESTIMONY AND RECOMMENDATIONS

Q. Briefly summarize how your direct testimony is organized.

A. My direct testimony is organized into four sections. First, the introduction I have just presented and second, a summary of my testimony that I am about to give. Third, I will present the findings of RUCO's audit in regards to excess capacity. Fourth, I will discuss RUCO's recommendations on this specific issue.

Q. Please summarize the recommendations and adjustments that you will address in your testimony.

A. Based on the results of RUCO's analysis of LPSCO, RUCO is making the following recommendations:

Expansion Design Costs – RUCO is recommending that the Commission deny the inclusion of $36,500 in rate base for design costs associated the expansion of the PVWRF.

EXCESS CAPACITY FINDINGS

Q. Has RUCO reviewed the September 30, 2008 Aquifer Protection Permit ("APP") for the PVWRF issued by ADEQ?

A. Yes. The APP authorizes the PVWRF to operate with a capacity of 4.1 mgd (based on maximum average monthly flow.) Section 2.2.1 of the

APP also indicates that an expansion of the PVWRF to 8.2 mgd has been approved as designed.

Q. Is the Company seeking to recover costs associated with the design of the expansion of the PVWRF to an 8.2 mgd capacity?

A. Yes. Section 2.2.1 of the APP states that "A WRF[1] expansion to 8.2 mgd ***was designed*** and shall be constructed as per the design report prepared by Pacific Advanced Civil Engineers, Inc. dated August 2004." (**emphasis added**) Invoices from Pacific Advanced Civil Engineers, Inc. ("PACE") are included in the back-up provided by LPSCO for their 2004 and 2006 plant additions. So it is clear that the Company is attempting to add the costs associated with designing the plant expansion to rate base.

Q. Is it appropriate to add these design costs to rate base?

A. No. This design work does not benefit current customers and is not necessary to serve current customers. Design work on the plant expansion serves only to benefit potential future customers. Therefore, these costs should be excluded from rate base.

...

[1] Water Reclamation Facility

Q. How much did the Company spend on the design of the PVWRF expansion?

A. The invoices relating to the plant expansion indicate that PACE charged LPSCO $36,500 for its work on the design report. In its 6th set of data requests RUCO requested the Company disclose the total amount spent on the design work and any construction work associated therewith for the expansion of PVWRF from 4.1 mgd to 8.2 mgd. The Company objected to the relevant questions in that data request and has not provided the total amount spent on the design or construction work. In its 6th set of data request, RUCO also requested copies of any and all engineering reports associated with the expansion from 4.1mgd to 8.2 mgd. In response, the Company indicated that the engineering reports, including the PACE report dated August 2004 were not in their records and thus could not be provided to RUCO.

Q. Please summarize RUCO's rationale for the disallowance of the design costs discussed in your testimony.

A. At a minimum, RUCO believes that the $36,500 paid for the August 2004 PACE design report should be disallowed. Because the August 2004 report relates to the expansion of the PVWRF and the Company cannot find the design report, it is clearly not benefitting current ratepayers. RUCO also believes that any other additional sums spent on expansion of the plant from 4.1 mgd to 8.2 mgd should also be disallowed.

RUCO'S RECOMMENDATIONS

Q. What does RUCO recommend regarding the aforementioned design work costs associated with the PVWRF expansion 4.1mgd to 8.2 mgd?

A. RUCO is recommending that the Commission deny recovery of the costs described above. RUCO believes that current customers should not be burdened with the expense of designing plant expansions, which will only benefit future customers or 100% of the risk of future development. Because LPSCO has objected to the relevant parts of our 6th set of data requests we cannot be certain what portion of the Company's plant additions are associated with the expansion design or construction work. At a minimum, we believe this is an issue that the Commission should decide. The issue should not be decided by default because LPSCO has not provided the necessary information. RUCO is therefore recommending that the Commission deny rate base treatment for the costs associated with LPSCO's expenditure on the design or construction of the expansion of the PVWRF from 4.1 mgd to 8.2 mgd.

Q. Has RUCO made the appropriate accounting adjustments to remove the aforementioned dollar amounts from rate base?

A. Yes. As to those costs, which are known, I have made an adjustment in the direct testimony schedules of RUCO witness Sonn S. Rowell, removing the $36,500 paid for the August 2004 PACE engineering design

report. To the extent other design or construction costs are discovered, if any, RUCO will address and adjust for those dollar amounts in surrebuttal.

Q. Does your silence on any of the issues, matters or findings addressed in the testimony of any of the witness for LPSCO constitute your acceptance of their positions on such issues, matters or findings?

A. No, it does not.

Q. Does this conclude your direct testimony on LPSCO?

A. Yes, it does.

LITCHFIELD PARK SERVICE COMPANY

DOCKET NO. SW-01428A-09-0103

DOCKET NO. W-01427A-09-0104

DIRECT TESTIMONY
ON COST OF CAPITAL

OF

WILLIAM A. RIGSBY, CRRA

ON BEHALF OF

THE

RESIDENTIAL UTILITY CONSUMER OFFICE

NOVEMBER 4, 2009

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SCHEDULES WAR-1 THROUGH WAR-9

INTRODUCTION

Q. Please state your name, occupation, and business address.

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Q. Please describe your qualifications in the field of utilities regulation and your educational background.

A. I have been involved with utilities regulation in Arizona since 1994. During that period of time I have worked as a utilities rate analyst for both the Arizona Corporation Commission ("ACC" or "Commission") and for RUCO. I hold a Bachelor of Science degree in the field of finance from Arizona State University and a Master of Business Administration degree, with an emphasis in accounting, from the University of Phoenix. I have been awarded the professional designation, Certified Rate of Return Analyst ("CRRA") by the Society of Utility and Regulatory Financial Analysts ("SURFA"). The CRRA designation is awarded based upon experience and the successful completion of a written examination. Appendix I, which is attached to my direct testimony, further describes my educational background and also includes a list of the rate cases and regulatory matters that I have been involved with.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present recommendations that are based on my analysis of Litchfield Park Service Company's ("LPSCO" or the "Company") application for a permanent rate increase ("Application) for the Company's water and wastewater operations in Maricopa County. LPSCO filed the Application with the Arizona Corporation Commission ("ACC" or "Commission") on March 6, 2009. The Company has chosen the operating period ended September 30, 2008 for the test year ("Test Year") in this proceeding. Furthermore, LPSCO has not performed a reconstruction cost new study and has elected to treat the Company's original cost rate base as the fair value rate base in this case. Consequently there is no need to calculate a separate fair value rate of return to be applied to the Company's fair value rate base.

Q. Briefly describe LPSCO.

A. LPSCO[1] is a wholly owned subsidiary of Algonquin Water Resources of America, which is a wholly owned subsidiary of the Algonquin Power Income Fund ("Algonquin Fund" or "Parent"), a mutual fund, or trust, which is listed on the Toronto Stock Exchange (ticker symbol APF.UN). The

[1] Based on documents provided by the Company, LPSCO officially changed its name to Liberty Water on April 27, 2009. According to the Company response to ACC Staff 's data request JMM 7.3, dated October 23, 2009, the name change was actually the registration of Litchfield Park Service Company dba Liberty Water. The holding company for LPSCO, Algonquin Water Resources of America, Inc., did actually change its name to Liberty Water Co. There was no sale of stock or assets involved. In order to maintain consistency with the Company's Application, RUCO will continue to refer to the Company as LPSCO and its holding company and parent under the Algonquin monicker.

Company serves customers in Litchfield Park, Avondale and parts of Glendale on the west side of the Phoenix metro area. The Algonquin Fund also owns and operates six other ACC regulated utilities: Black Mountain Sewer Corporation, serving the Town of Carefree north of Scottsdale; Gold Canyon Sewer Company, located east of Apache Junction; Rio Rico Utilities, Inc., located just north of Nogales on the border between Arizona and Mexico; Bella Vista Water Company, Northern Sunrise Water Company and Southern Sunrise Water Company located in or near Sierra Vista. The Algonquin Fund also owns Algonquin Water Services, which directly oversees the daily operations of the aforementioned Arizona public service companies.

Q. What is a mutual fund?

A. A mutual fund is a type of investment vehicle that generally provides investors with the opportunity to place their funds into a professionally managed portfolio of financial instruments such as stocks or bonds. In the case of a stock mutual fund, the fund's manager will buy and sell on the basis of how well a stock meets the fund's investment criteria, such as providing a specific level of dividend income and/or achieving projected levels of capital appreciation. Unlike the price of a stock or bond, the value of a mutual fund is expressed as its net asset value ("NAV"). Fund managers generally realize a profit from management fees, which are normally collected as a fixed percentage, typically between 0.5 percent

and 2.00 percent a year, of the fund's NAV. Management fees are normally deducted from shareholder's assets on an annual basis. Closed-ended funds have a fixed number of shares that are bought and sold on securities exchanges in the same manner as individual stocks and bonds. Open-ended funds, on the other hand, offer new shares and redeem existing shares on a continual basis.

Q. How is the Algonquin Fund structured?

A. The Algonquin Fund is an open-ended fund with an investment portfolio comprised of utilities involved in the production of electricity and the provision of water and wastewater services. These individual utilities make up the Algonquin Fund's Hydroelectric, Cogeneration, Alternative Fuels and Infrastructure Divisions. Instead of a collection of stocks or bonds, the fund is comprised of utilities that are bought, held and sold in the hope of achieving desired returns on investment. In this respect, the Algonquin fund is no different than a utility holding company whose shares are publicly traded in the financial markets. Shares of the funds are referred to as units and shareholders are referred to as unitholders. As I explained above, the Algonquin Fund's managers derive their income from management fees.

...

Q. Is this form of ownership common for utilities operating in Arizona?

A. No, most investor owned utilities operating in Arizona are either closely held corporate entities, are owned by a utility holding company or, as in the case of many water and wastewater utilities, are owned by a firm that is engaged in land development.

Q. Please explain your role in RUCO's analysis of LPSCO's Application.

A. I reviewed LPSCO's Application and performed a cost of capital analysis to determine a fair rate of return on the Company's invested capital. In addition to my recommended hypothetical capital structure, my direct testimony will present my recommended costs of common equity (LPSCO has no preferred stock) and my recommended cost of hypothetical debt. The recommendations contained in this testimony are based on information obtained from Company responses to data requests, the Company's Application and from market-based research that I conducted during my analysis.

Q. Were you also responsible for conducting an analysis on the Company's proposed revenue level, rate base and rate design?

A. I have filed, under separate cover, direct testimony on the excess capacity issues associated LPSCO's wastewater facilities. RUCO consultants Matthew J. Rowell and Sonn S. Rowell of Desert Mountain Analytical

Services PLLC will address those aspects of the case except for excess capacity issues.

Q. What areas will you address in your testimony?

A. I will address the cost of capital issues associated with the case.

Q. Please identify the exhibits that you are sponsoring.

A. I am sponsoring Schedules WAR-1 through WAR-9.

SUMMARY OF TESTIMONY AND RECOMMENDATIONS

Q. Briefly summarize how your cost of capital testimony is organized.

A. My cost of capital testimony is organized into six sections. First, the introduction I have just presented and second, a summary of my testimony that I am about to give. Third, I will present the findings of my cost of equity capital analysis, which utilized both the discounted cash flow ("DCF") method, and the capital asset pricing model ("CAPM"). These are the two methods that RUCO and ACC Staff have consistently used for calculating the cost of equity capital in rate case proceedings in the past, and are the methodologies that the ACC has given the most weight to in setting allowed rates of returns for utilities that operate in the Arizona jurisdiction. In this third section I will also provide a brief overview of the current economic climate within which LPSCO is operating. Fourth, I will discuss my recommended capital structure, my recommended cost of

long-term debt and my recommended weighted average cost of capital. Sixth, I will comment on LPSCO's cost of capital testimony. Schedules WAR-1 through WAR-9 will provide support for my cost of capital analysis.

Q. Please summarize the recommendations and adjustments that you will address in your testimony.

A. Based on the results of my analysis of LPSCO, I am making the following recommendations:

Cost of Equity Capital – I am recommending an 8.01 percent cost of equity capital. This 8.01 percent figure is based on the results that I obtained in my cost of equity analysis, which employed both the DCF and CAPM methodologies. My 8.01 percent cost of equity capital is 449 basis points lower than the 12.50 percent cost of equity capital being proposed by the Company.

Capital Structure – I am recommending that the Commission adopt the Company-proposed capital structure which is comprised of 17.83 percent long-term debt and 82.17 percent common equity. My recommended capital structure takes into consideration the Company's actual third party debt which eliminated the need for a hypothetical capital structure in this particular case.

Cost of Long-Term Debt – I am recommending that the Commission adopt the Company-proposed cost of long-term debt of 6.39 percent, which is the weighted average cost of LPSCO's two industrial development authority bond issuances which were used to finance utility plant in service.

Weighted Average Cost of Capital – Based on the results of my recommended capital structure, I am recommending a 7.72 percent cost of capital for LPSCO, which is the weighted cost of my recommended costs of long-term debt and common equity. My 8.01 percent weighted average cost of capital is 369 basis points lower than the Company-proposed 11.41 percent weighted cost of capital.

Q. Why do you believe that your recommended 7.72 percent weighted average cost of capital is an appropriate rate of return for LPSCO to earn on its invested capital?

A. The 7.72 percent weighted average cost of capital figure that I am recommending meets the criteria established in the landmark Supreme Court cases of Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia (262 U.S. 679, 1923) and Federal Power Commission v. Hope Natural Gas Company (320 U.S. 391, 1944). Simply stated, these two cases affirmed that a public utility that is efficiently and economically managed is entitled to a return on investment

that instills confidence in its financial soundness, allows the utility to attract capital, and also allows the utility to perform its duty to provide service to ratepayers. The rate of return adopted for the utility should also be comparable to a return that investors would expect to receive from investments with similar risk.

The Hope decision allows for the rate of return to cover both the operating expenses and the "capital costs of the business" which includes interest on debt and dividend payment to shareholders. This is predicated on the belief that, in the long run, a company that cannot meet its debt obligations and provide its shareholders with an adequate rate of return will not continue to supply adequate public utility service to ratepayers.

Q. Do the Bluefield and Hope decisions indicate that a rate of return sufficient to cover all operating and capital costs is guaranteed?

A. No. Neither case *guarantees* a rate of return on utility investment. What the Bluefield and Hope decisions *do allow*, is for a utility to be provided with the *opportunity* to earn a reasonable rate of return on its investment. That is to say that a utility, such as LPSCO, is provided with the opportunity to earn an appropriate rate of return if the Company's management exercises good judgment and manages its assets and resources in a manner that is both prudent and economically efficient.

COST OF EQUITY CAPITAL

Q. What is your final recommended cost of equity capital for LPSCO?

A. I am recommending a cost of equity of 8.01 percent. My recommended 8.01 percent cost of equity figure is the mean average of the results of my DCF and CAPM analyses, which utilized both a sample of publicly traded water providers and a sample of publicly traded natural gas local distribution companies ("LDC"). This calculation is exhibited on page 3 of my Schedule WAR-1.

Discounted Cash Flow (DCF) Method

Q. Please explain the DCF method that you used to estimate LPSCO's cost of equity capital.

A. The DCF method employs a stock valuation model known as the constant growth valuation model, that bears the name of Dr. Myron J. Gordon (i.e. the Gordon model), the professor of finance who was responsible for its development. Simply stated, the DCF model is based on the premise that the current price of a given share of common stock is determined by the present value of all of the future cash flows that will be generated by that share of common stock. The rate that is used to discount these cash flows back to their present value is often referred to as the investor's cost of capital (i.e. the cost at which an investor is willing to forego other investments in favor of the one that he or she has chosen).

Another way of looking at the investor's cost of capital is to consider it from the standpoint of a company that is offering its shares of stock to the investing public. In order to raise capital, through the sale of common stock, a company must provide a required rate of return on its stock that will attract investors to commit funds to that particular investment. In this respect, the terms "cost of capital" and "investor's required return" are one in the same. For common stock, this required return is a function of the dividend that is paid on the stock. The investor's required rate of return can be expressed as the percentage of the dividend that is paid on the stock (dividend yield) plus an expected rate of future dividend growth. This is illustrated in mathematical terms by the following formula:

$$k = \frac{D_1}{P_0} + g$$

where: k = the required return (cost of equity, equity capitalization rate),

$\frac{D_1}{P_0}$ = the dividend yield of a given share of stock calculated by dividing the expected dividend by the current market price of the given share of stock, and

g = the expected rate of future dividend growth

This formula is the basis for the standard growth valuation model that I used to determine LPSCO' cost of equity capital.

Q. In determining the rate of future dividend growth for LPSCO, what assumptions did you make?

A. There are two primary assumptions regarding dividend growth that must be made when using the DCF method. First, dividends will grow by a constant rate into perpetuity, and second, the dividend payout ratio will remain at a constant rate. Both of these assumptions are predicated on the traditional DCF model's basic underlying assumption that a company's earnings, dividends, book value and share growth all increase at the same constant rate of growth into infinity. Given these assumptions, if the dividend payout ratio remains constant, so does the earnings retention ratio (the percentage of earnings that are retained by the company as opposed to being paid out in dividends). This being the case, a company's dividend growth can be measured by multiplying its retention ratio (1 - dividend payout ratio) by its book return on equity. This can be stated as g = b x r.

Q. Would you please provide an example that will illustrate the relationship that earnings, the dividend payout ratio and book value have with dividend growth?

A. RUCO consultant Stephen Hill illustrated this relationship in a Citizens Utilities Company 1993 rate case by using a hypothetical utility.[2]

[2] Citizens Utilities Company, Arizona Gas Division, Docket No. E-1032-93-111, Prepared Testimony, dated December 10, 1993, p. 25.

Table I

	Year 1	Year 2	Year 3	Year 4	Year 5	Growth
Book Value	$10.00	$10.40	$10.82	$11.25	$11.70	4.00%
Equity Return	10%	10%	10%	10%	10%	N/A
Earnings/Sh.	$1.00	$1.04	$1.082	$1.125	$1.170	4.00%
Payout Ratio	0.60	0.60	0.60	0.60	0.60	N/A
Dividend/Sh	$0.60	$0.624	$0.649	$0.675	$0.702	4.00%

Table I of Mr. Hill's illustration presents data for a five-year period on his hypothetical utility. In Year 1, the utility had a common equity or book value of $10.00 per share, an investor-expected equity return of ten percent, and a dividend payout ratio of sixty percent. This results in earnings per share of $1.00 ($10.00 book value x 10 percent equity return) and a dividend of $0.60 ($1.00 earnings/sh. x 0.60 payout ratio) during Year 1. Because forty percent (1 - 0.60 payout ratio) of the utility's earnings are retained as opposed to being paid out to investors, book value increases to $10.40 in Year 2 of Mr. Hill's illustration. Table I presents the results of this continuing scenario over the remaining five-year period.

The results displayed in Table I demonstrate that under "steady-state" (i.e. constant) conditions, book value, earnings and dividends all grow at the same constant rate. The table further illustrates that the dividend growth rate, as discussed earlier, is a function of (1) the internally generated funds or earnings that are retained by a company to become new equity,

and (2) the return that an investor earns on that new equity. The DCF dividend growth rate, expressed as g = b x r, is also referred to as the internal or sustainable growth rate.

Q. If earnings and dividends both grow at the same rate as book value, shouldn't that rate be the sole factor in determining the DCF growth rate?

A. No. Possible changes in the expected rate of return on either common equity or the dividend payout ratio make earnings and dividend growth by themselves unreliable. This can be seen in the continuation of Mr. Hill's illustration on a hypothetical utility.

Table II

	Year 1	Year 2	Year 3	Year 4	Year 5	Growth
Book Value	$10.00	$10.40	$10.82	$11.47	$12.158	5.00%
Equity Return	10%	10%	15%	15%	15%	10.67%
Earnings/Sh	$1.00	$1.04	$1.623	$1.720	$1.824	16.20%
Payout Ratio	0.60	0.60	0.60	0.60	0.60	N/A
Dividend/Sh	$0.60	$0.624	$0.974	$1.032	$1.094	16.20%

In the example displayed in Table II, a sustainable growth rate of four percent[3] exists in Year 1 and Year 2 (as in the prior example). In Year 3, Year 4 and Year 5, however, the sustainable growth rate increases to six

[3] [(Year 2 Earnings/Sh – Year 1 Earnings/Sh) ÷ Year 1 Earnings/Sh] = [($1.04 - $1.00) ÷ $1.00] = [$0.04 ÷ $1.00] = 4.00%

percent.[4] If the hypothetical utility in Mr. Hill's illustration were expected to earn a fifteen-percent return on common equity on a continuing basis, then a six percent long-term rate of growth would be reasonable. However, the compound growth rate for earnings and dividends, displayed in the last column, is 16.20 percent. If this rate was to be used in the DCF model, the utility's return on common equity would be expected to increase by fifty percent every five years, [(15 percent ÷ 10 percent) – 1]. This is clearly an unrealistic expectation.

Although it is not illustrated in Mr. Hill's hypothetical example, a change in only the dividend payout ratio will eventually result in a utility paying out more in dividends than it earns. While it is not uncommon for a utility in the real world to have a dividend payout ratio that exceeds one hundred percent on occasion, it would be unrealistic to expect the practice to continue over a sustained long-term period of time.

Q. Other than the retention of internally generated funds, as illustrated in Mr. Hill's hypothetical example, are there any other sources of new equity capital that can influence an investor's growth expectations for a given company?

A. Yes, a company can raise new equity capital externally. The best example of external funding would be the sale of new shares of common stock. This would create additional equity for the issuer and is often the

[4] [(1 – Payout Ratio) x Rate of Return] = [(1 - 0.60) x 15.00%] = 0.40 x 15.00% = 6.00%

case with utilities that are either in the process of acquiring smaller systems or providing service to rapidly growing areas.

Q. How does external equity financing influence the growth expectations held by investors?

A. Rational investors will put their available funds into investments that will either meet or exceed their given cost of capital (i.e. the return earned on their investment). In the case of a utility, the book value of a company's stock usually mirrors the equity portion of its rate base (the utility's earning base). Because regulators allow utilities the opportunity to earn a reasonable rate of return on rate base, an investor would take into consideration the effect that a change in book value would have on the rate of return that he or she would expect the utility to earn. If an investor believes that a utility's book value (i.e. the utility's earning base) will increase, then he or she would expect the return on the utility's common stock to increase. If this positive trend in book value continues over an extended period of time, an investor would have a reasonable expectation for sustained long-term growth.

Q. Please provide an example of how external financing affects a utility's book value of equity.

A. As I explained earlier, one way that a utility can increase its equity is by selling new shares of common stock on the open market. If these new

shares are purchased at prices that are higher than those shares sold previously, the utility's book value per share will increase in value. This would increase both the earnings base of the utility and the earnings expectations of investors. However, if new shares sold at a price below the pre-sale book value per share, the after-sale book value per share declines in value. If this downward trend continues over time, investors might view this as a decline in the utility's sustainable growth rate and will have lower expectations regarding growth. Using this same logic, if a new stock issue sells at a price per share that is the same as the pre-sale book value per share, there would be no impact on either the utility's earnings base or investor expectations.

Q. Please explain how the external component of the DCF growth rate is determined.

A. In his book, The Cost of Capital to a Public Utility,[5] Dr. Gordon (the individual responsible for the development of the DCF or constant growth model) identified a growth rate that includes both expected internal and external financing components. The mathematical expression for Dr. Gordon's growth rate is as follows:

[5] Gordon, M.J., The Cost of Capital to a Public Utility, East Lansing, MI: Michigan State University, 1974, pp. 30-33.

$$g = (br) + (sv)$$

where: g = DCF expected growth rate,
b = the earnings retention ratio,
r = the return on common equity,
s = the fraction of new common stock sold that accrues to a current shareholder, and
v = funds raised from the sale of stock as a fraction of existing equity.

and $v = 1 - [(BV) \div (MP)]$

where: BV = book value per share of common stock, and
MP = the market price per share of common stock.

Q. Did you include the effect of external equity financing on long-term growth rate expectations in your analysis of expected dividend growth for the DCF model?

A. Yes. The external growth rate estimate (sv) is displayed on Page 1 of Schedule WAR-4, where it is added to the internal growth rate estimate (br) to arrive at a final sustainable growth rate estimate.

...

Q. Please explain why your calculation of external growth on page 2 of Schedule WAR-4, is the current market-to-book ratio averaged with 1.0 in the equation [(M ÷ B) + 1] ÷ 2.

A. The market price of a utility's common stock will tend to move toward book value, or a market-to-book ratio of 1.0, if regulators allow a rate of return that is equal to the cost of capital (one of the desired effects of regulation). As a result of this situation, I used [(M ÷ B) + 1] ÷ 2 as opposed to the current market-to-book ratio by itself to represent investor's expectations that, in the future, a given utility will achieve a market-to-book ratio of 1.0.

Q. Has the Commission ever adopted a cost of capital estimate that included this assumption?

A. Yes. In a prior Southwest Gas Corporation rate case[6], the Commission adopted the recommendations of ACC Staff's cost of capital witness, Stephen Hill, who I noted earlier in my testimony. In that case, Mr. Hill used the same methods that I have used in arriving at the inputs for the DCF model. His final recommendation for Southwest Gas Corporation was largely based on the results of his DCF analysis, which incorporated the same valid market-to-book ratio assumption that I have used consistently in the DCF model as a cost of capital witness for RUCO.

[6] Decision No. 68487, Dated February 23, 2006 (Docket No. G-01551A-04-0876)

Q. How did you develop your dividend growth rate estimate?

A. I analyzed data on two separate proxy groups. A water company proxy group comprised of three publicly traded water companies and a natural gas proxy group consisting of ten natural gas local distribution companies ("LDC") that have similar operating characteristics to water providers.

Q. Why did you use a proxy group methodology as opposed to a direct analysis of LPSCO?

A. One of the problems in performing this type of analysis is that the utility applying for a rate increase is not always a publicly traded company, as is the case with LPSCO itself. Consequently it was necessary to create a proxy by analyzing publicly traded water companies and LDC's with similar risk characteristics.

Q. In determining your dividend growth rate estimates, both you and the Company's witness analyzed the data on publicly traded water utilities. Why did you and the Company witness analyze only publicly traded water utilities as opposed to firms that provide wastewater service?

A. The use of water utilities was necessitated by the fact that there is a lack of financial and market information available on stand-alone wastewater utilities. This in itself is not a problem, given the fact that both water and wastewater utilities share similar risk characteristics. Both types of utilities

provide a basic service for which there are no substitutes and are also subject to strict federal and state regulations.

Q. Are there any other advantages to the use of a proxy?

A. Yes. As I noted earlier, the U.S. Supreme Court ruled in the Hope decision that a utility is entitled to earn a rate of return that is commensurate with the returns on investments of other firms with comparable risk. The proxy technique that I have used derives that rate of return. One other advantage to using a sample of companies is that it reduces the possible impact that any undetected biases, anomalies, or measurement errors may have on the DCF growth estimate.

Q. What criteria did you use in selecting the companies that make up your water company proxy for LPSCO?

A. Three of the four water companies used in the proxy are publicly traded on the New York Stock Exchange ("NYSE") and one of them, Southwest Water Company, is traded over the counter through the National Association of Securities Dealers Automated Quotation System ("NASDAQ"). All four water companies are followed by The Value Line Investment Survey ("Value Line") and are the same companies that comprise Value Line's large capitalization Water Utility Industry segment of the U.S. economy (Attachment A contains Value Line's October 23,

2009 update of the water utility industry and evaluations of the water companies used in my proxy).

Q. Are these the same water utilities that you have used in prior rate case proceedings?

A. Yes.

Q. Please describe the companies that comprise your water company proxy group.

A. My water company proxy group includes American States Water Co. (stock ticker symbol "AWR"), California Water Service Group ("CWT"), Southwest Water Company ("SWWC") and Aqua America, Inc. ("WTR"). Each of these water companies face the same types of risk that LPSCO faces. For the sake of brevity, I will refer to each of these companies by their appropriate stock ticker symbols henceforth.

Q. Briefly describe the areas served by the companies in your water company sample proxy.

A. In addition to providing water service to residents of Fountain Hills, Arizona through its wholly owned subsidiary Chaparral City Water Company, AWR also serves communities located in Los Angeles, Orange and San Bernardino counties in California. CWT provides service to customers in seventy-five communities in California, New Mexico and

Washington. CWT's principal service areas are located in the San Francisco Bay area, the Sacramento, Salinas and San Joaquin Valleys and parts of Los Angeles. SWWC owns and manages regulated systems in California, New Mexico, Oklahoma and Texas. WTR is a holding company for a large number of water and wastewater utilities operating in nine different states including Pennsylvania, Ohio, New Jersey, Illinois, Maine, North Carolina, Texas, Florida and Kentucky.

Q. Are these the same water companies that LPSCO used in its application?

A. LPSCO's cost of equity witness, Mr. Thomas J. Bourassa, used all of the water companies included in my water proxy with the exception of SWWC. Mr. Bourassa also used three other water companies in his cost of capital analysis[7] which are included in Value Line's Small and Mid Cap Edition.

Q. Why did you exclude the water companies that are followed in Value Line's Small and Mid Cap Edition?

A. Value Line does not provide the same type of forward-looking information (i.e. long-term estimates on return on common equity and share growth) on small and mid-cap companies that it provides on the three water companies that I used in my proxy. Consequently, as in the case of

[7] Connecticut Water Service, Inc., Middlesex Water Company and SJW Corp.

Southwest Water Company, these water providers are not as suitable as the ones that I have used in my analysis.

Q. What criteria did you use in selecting the natural gas LDC's included in your proxy for LPSCO?

A. As are the water companies that I just described, each of the natural gas LDC's used in the proxy are publicly traded on a major stock exchange (all ten trade on the NYSE) and are followed by Value Line. Each of the ten LDC's in my sample are tracked in Value Line's natural gas Utility industry segment. All of the companies in the proxy are engaged in the provision of regulated natural gas distribution services. Attachment B of my testimony contains Value Line's most recent evaluation of the natural gas proxy group that I used for my cost of common equity analysis.

Q. What companies are included your natural gas proxy?

A. The ten natural gas LDC's included in my proxy (and their NYSE ticker symbols) are AGL Resources, Inc. ("AGL"), Atmos Energy Corp. ("ATO"), Laclede Group, Inc. ("LG"), New Jersey Resources Corporation ("NJR"), Nicor, Inc. ("GAS"), Northwest Natural Gas Co. ("NWN"), Piedmont Natural Gas Company ("PNY"), South Jersey Industries, Inc. ("SJI") Southwest Gas Corporation ("SWX"), which is the dominant natural gas provider in Arizona, and WGL Holdings, Inc. ("WGL"). These are the

same ten LDC's that I analyzed in the most recent UNS Gas, Inc. proceeding.[8]

Q. Briefly describe the regions of the U.S. served by the ten natural gas LDC's that make up your sample proxy.

A. The ten LDC's listed above provide natural gas service to customers in the Middle Atlantic region (i.e. NJI which serves portions of northern New Jersey, SJI which serves southern New Jersey and WGL which serves the Washington D.C. metro area), the Southeast and South Central portions of the U.S. (i.e. AGL which serves Virginia, southern Tennessee and the Atlanta, Georgia area and PNY which serves customers in North Carolina, South Carolina and Tennessee), the South, deep South and Midwest (i.e. ATO which serves customers in Kentucky, Mississippi, Louisiana, Texas, Colorado and Kansas, GAS which provides service to northern and western Illinois, and LG which serves the St. Louis area), and the Pacific Northwest (i.e. NWN which serves Washington state and Oregon). Portions of Arizona, Nevada and California are served by SWX.

Q. Did the Company's witness also perform a similar analysis using natural gas LDC's?

A. No, he did not.

[8] Docket No. G-04204A-08-0571

Q. Please explain your DCF growth rate calculations for the sample companies used in your proxy.

A. Schedule WAR-5 provides retention ratios, returns on book equity, internal growth rates, book values per share, numbers of shares outstanding, and the compounded share growth for each of the utilities included in the sample for the historical observation period 2004 to 2008 for both the water and LDC industries. Schedule WAR-5 also includes Value Line's projected 2009, 2010 and 2012-14 values for the retention ratio, equity return, book value per share growth rate, and number of shares outstanding for both the water utilities and the LDC's.

Q. Please describe how you used the information displayed in Schedule WAR-5 to estimate each comparable utility's dividend growth rate.

A. In explaining my analysis, I will use AWR as an example. The first dividend growth component that I evaluated was the internal growth rate. I used the "b x r" formula (described on pages 12 and 13) to multiply AWR's earned return on common equity by its earnings retention ratio for each year in the 2004 to 2008 observation period to derive the utility's annual internal growth rates. I used the mean average of this five-year period as a benchmark against which I compared the projected growth rate trends provided by Value Line. Because an investor is more likely to be influenced by recent growth trends, as opposed to historical averages, the five-year mean noted earlier was used only as a benchmark figure. As

shown on Schedule WAR-5, Page 1, AWR's average internal growth rate of 2.62% over the 2004 to 2008 period reflects an up and down pattern of growth that ranged from a low of 1.01% in 2002 to a high of 3.79% during 2007. Value Line is predicting that growth will increase steadily from 3.05% in 2008, to 6.23% by the end of the 2012-14 time frame. After weighing Value Line's projections for internal growth, stable outlook for earnings per share, increased growth for dividends per share and no change in book value per share growth, I believe that a 6.20% rate of internal growth is reasonable for AWR. (Schedule WAR-4, Page 1 of 2).

Q. Please continue with the external growth rate component portion of your analysis.

A. Schedule WAR-5 demonstrates that the pattern of shares outstanding for AWR increased from 16.75 million to 17.30 million from 2004 to 2008. Value Line is predicting that this level will increase from 18.50 million in 2009 to 20.00 million by the end of 2014. Based on this data, I believe that a 5.00 percent growth in shares is not unreasonable for AWR (Page 2 of Schedule WAR-4). My final dividend growth rate estimate for AWR is 9.03 percent (6.20 percent internal + 2.83 percent external) and is shown on Page 1 of Schedule WAR-4.

...

Q. What is your average DCF dividend growth rate estimate for your sample of water utilities?

A. My average DCF dividend growth rate estimate for my water company sample is 7.18 percent as displayed on page 1 of Schedule WAR-4.

Q. Did you use the same approach to determine an average dividend growth rate for the proxy comprised of natural gas LDC's?

A. Yes.

Q. What is your average DCF dividend growth rate estimate for the sample natural gas utilities?

A. My average DCF dividend growth rate estimate is 5.23 percent, which is also displayed on page 1 of Schedule WAR-4.

Q. How does your average dividend growth rate estimates on water companies compare to the growth rate data published by Value Line and other analysts?

A. Schedule WAR-6 compares my sustainable growth estimates with the five-year projections of analysts at both Zacks Investment Research, Inc. ("Zacks") (Attachment C) and Value Line. In the case of the water companies, my 7.18 percent estimate exceeds Zacks' average long-term EPS projection of 6.57 percent and Value Line's growth projection of 3.74 percent (which is an average of EPS, DPS and BVPS). My 7.18 percent

estimate is 313 basis points higher than the 4.05 percent average of Value Line's historical and projected data averaged with the consensus opinions published by Zacks. My 7.18 percent growth estimate is also 595 basis points higher than Value Line's 1.23 percent 5-year compound historical average of EPS, DPS and BVPS. The estimates of analysts at Value Line indicate that investors are expecting somewhat higher performance from the water utility industry in the future given their 7.00 percent to 7.50 percent book return on common equity over the 2009 to 2014 period. On *balance*, I would say my 7.18 percent estimate is an optimistic representation of the growth projections that are available to the investing public.

Q. How do your average dividend growth rate estimates on natural gas LDC's compare to the growth rate data published by Value Line and other analysts?

A. In regard to the natural gas LDC's, my 5.23 percent estimate is 57 basis points lower than the average 5.80 percent long-term EPS consensus projections published by Zacks, and 85 basis points higher than the 4.38 percent Value Line projected estimate (which is an average of EPS, DPS and BVPS). As can also be seen on Schedule WAR-6, the 5.23 percent estimate that I have calculated is 54 basis points lower than the 5.77 percent average of the 5-year historic EPS, DPS and BVPS means of Value Line and 13 basis points lower than the 5.36 percent five-year

compound historical average of Value Line data (on EPS, DPS and BVPS). In fact, my 5.23 percent estimate is 7 basis points higher than the *combined* 5.16 percent Value Line and Zacks averages displayed in Schedule WAR-6. In the case of the LDC's I would say that my 5.23 percent estimate, which is lower than Zack's but higher than Value Line's forecasts, is a fairly good representation of the growth projections presented by securities analysts at this point in time.

Q. How did you calculate the dividend yields displayed in Schedule WAR-3?

A. For both the water companies and the natural gas LDC's I used the estimated annual dividends, for the next twelve-month period, that appeared in Value Line's October 23, 2009 Ratings and Reports water utility industry update and Value Line's September 11, 2009 Ratings and Reports natural gas utility update. I then divided those figures by the eight-week average closing price per share of the appropriate utility's common stock. The eight-week average price is based on the daily adjusted closing stock prices for each of the companies in my proxies for the period August 24, 2009 to October 16, 2009.

...

Q. Based on the results of your DCF analysis, what is your cost of equity capital estimate for the water and natural gas utilities included in your sample?

A. As shown on Schedule WAR-2, the cost of equity capital derived from my DCF analysis is 9.94 percent for the water utilities and 9.50 percent for the natural gas LDC's.

Capital Asset Pricing Model (CAPM) Method

Q. Please explain the theory behind CAPM and why you decided to use it as an equity capital valuation method in this proceeding.

A. CAPM is a mathematical tool that was developed during the early 1960's by William F. Sharpe[9], the Timken Professor Emeritus of Finance at Stanford University, who shared the 1990 Nobel Prize in Economics for research that eventually resulted in the CAPM model. CAPM is used to analyze the relationships between rates of return on various assets and risk as measured by beta.[10] In this regard, CAPM can help an investor to determine how much risk is associated with a given investment so that he or she can decide if that investment meets their individual preferences.

[9] William F. Sharpe, "A Simplified Model of Portfolio Analysis," Management Science, Vol. 9, No. 2 (January 1963), pp. 277-93.

[10] Beta is defined as an index of volatility, or risk, in the return of an asset relative to the return of a market portfolio of assets. It is a measure of systematic or non-diversifiable risk. The returns on a stock with a beta of 1.0 will mirror the returns of the overall stock market. The returns on stocks with betas greater than 1.0 are more volatile or riskier than those of the overall stock market; and if a stock's beta is less than 1.0, its returns are less volatile or riskier than the overall stock market.

Finance theory has always held that as the risk associated with a given investment increases, so should the expected rate of return on that investment and vice versa. According to CAPM theory, risk can be classified into two specific forms: nonsystematic or diversifiable risk, and systematic or non-diversifiable risk. While nonsystematic risk can be virtually eliminated through diversification (i.e. by including stocks of various companies in various industries in a portfolio of securities), systematic risk, on the other hand, cannot be eliminated by diversification. Thus, systematic risk is the only risk of importance to investors. Simply stated, the underlying theory behind CAPM states that the expected return on a given investment is the sum of a risk-free rate of return plus a market risk premium that is proportional to the systematic (non-diversifiable risk) associated with that investment. In mathematical terms, the formula is as follows:

$$k = r_f + [\, ß\, (\, r_m - r_f\,)\,]$$

where:

k	=	the expected return of a given security,
r_f	=	risk-free rate of return,
ß	=	beta coefficient, a statistical measurement of a security's systematic risk,
r_m	=	average market return (e.g. S&P 500), and
$r_m - r_f$	=	market risk premium.

Q. What types of financial instruments are generally used as a proxy for the risk-free rate of return in the CAPM model?

A. Generally speaking, the yields of U.S. Treasury instruments are used by analysts as a proxy for the risk-free rate of return component.

Q. Please explain why U.S. Treasury instruments are regarded as a suitable proxy for the risk-free rate of return?

A. As citizens and investors, we would like to believe that U.S. Treasury securities (which are backed by the full faith and credit of the United States Government) pose no threat of default no matter what their maturity dates are. However, a comparison of various Treasury instruments will reveal that those with longer maturity dates do have slightly higher yields. Treasury yields are comprised of two separate components,[11] a real rate of interest (believed to be approximately 2.00 percent) and an inflationary expectation. When the real rate of interest is subtracted from the total treasury yield, all that remains is the inflationary expectation. Because increased inflation represents a potential capital loss, or risk, to investors, a higher inflationary expectation by itself represents a degree of risk to an investor. Another way of looking at this is from an opportunity cost standpoint. When an investor locks up funds in long-term T-Bonds,

[11] As a general rule of thumb, there are three components that make up a given interest rate or rate of return on a security: the real rate of interest, an inflationary expectation, and a risk premium. The approximate risk premium of a given security can be determined by simply subtracting a 91-day T-Bill rate from the yield on the security.

compensation must be provided for future investment opportunities foregone. This is often described as maturity or interest rate risk and it can affect an investor adversely if market rates increase before the instrument matures (a rise in interest rates would decrease the value of the debt instrument). As discussed earlier in the DCF portion of my testimony, this compensation translates into higher rates of returns to the investor.

Q. What security did you use for a risk-free rate of return in your CAPM analysis?

A. I used an eight-week average of the yield on a 5-year U.S. Treasury instrument. The yields were published in Value Line's Selection and Opinion publication dated September 4, 2009 through October 23, 2009 (Attachment D). This resulted in a risk-free (r_f) rate of return of 2.46 percent.

Q. Why did you use the yield on a 5-year year U.S. Treasury instrument as opposed to a short-term T-Bill?

A. While a shorter term instrument, such as a 91-day T-Bill, presents the lowest possible total risk to an investor, a good argument can be made that the yield on an instrument that matches the investment period of the asset being analyzed in the CAPM model should be used as the risk-free rate of return. Since utilities in Arizona generally file for rates every three

to five years, the yield on a 5-year U.S. Treasury Instrument closely matches the investment period or, in the case of regulated utilities, the period that new rates will be in effect.

Q. How did you calculate the market risk premium used in your CAPM analysis?

A. I used both a geometric and an arithmetic mean of the historical total returns on the S&P 500 index from 1926 to 2008 as the proxy for the market rate of return (r_m). For the risk-free portion of the risk premium component (r_f), I used the geometric mean of the total returns of intermediate-term government bonds for the same eighty-two year period. The market risk premium (r_m - r_f) that results by using the geometric mean of these inputs is 4.20 percent (9.60% - 5.40% = 4.20%). The market risk premium that results by using the arithmetic mean calculation is 6.10 percent (11.70% - 5.60% = 6.10%).

Q. How did you select the beta coefficients that were used in your CAPM analysis?

A. The beta coefficients (ß), for the individual utilities used in both my proxies, were calculated by Value Line and were current as of October 23, 2009 for the water companies and September 11, 2009 for the natural gas LDC's. Value Line calculates its betas by using a regression analysis between weekly percentage changes in the market price of the security

being analyzed and weekly percentage changes in the NYSE Composite Index over a five-year period. The betas are then adjusted by Value Line for their long-term tendency to converge toward 1.00. The beta coefficients for the service providers included in my water company sample ranged from 0.65 to 1.10 with an average beta of 0.83. The beta coefficients for the LDC's included in my natural gas sample ranged from 0.60 to 0.75 with an average beta of 0.67.

Q. What are the results of your CAPM analysis?

A. As shown on pages 1 and 2 of Schedule WAR-7, my CAPM calculation using a geometric mean to calculate the risk premium results in an average expected return of 5.92 percent for the water companies and 5.25 percent for the natural gas LDC's. My calculation using an arithmetic mean results in an average expected return of 7.49 percent for the water companies and 6.51 percent for the natural gas LDC's.

Q. Please summarize the results derived under each of the methodologies presented in your testimony.

A. The following is a summary of the cost of equity capital derived under each methodology used:

METHOD	RESULTS
DCF (Water Sample)	9.94%
DCF (Natural Gas Sample)	9.50%
CAPM (Water Sample)	5.92% – 7.49%
CAPM (Natural Gas)	5.25% – 6.51%

Based on these results, my best estimate of an appropriate range for a cost of common equity for LPSCO is 5.25 percent to 9.94 percent. My final recommended cost of common equity figure is 8.01 percent.

Q How did you arrive at your final recommended 8.01 percent cost of common equity?

A. My recommended 8.01 percent cost of common equity is the mean average of my DCF and CAPM results. The calculation of my 8.01 percent cost of common equity can be seen on Schedule WAR-1, Page 2 of 2.

Q. How does your recommended cost of equity capital compare with the cost of equity capital proposed by the Company?

A. The 12.50 percent cost of equity capital proposed by the Company is 449 basis points higher than the 8.01 percent OCRB cost of equity capital that I am recommending.

Current Economic Environment

Q. Please explain why it is necessary to consider the current economic environment when performing a cost of equity capital analysis for a regulated utility.

A. Consideration of the economic environment is necessary because trends in interest rates, present and projected levels of inflation, and the overall state of the U.S. economy determine the rates of return that investors earn on their invested funds. Each of these factors represent potential risks that must be weighed when estimating the cost of equity capital for a regulated utility and are, most often, the same factors considered by individuals who are also investing in non-regulated entities.

Q. Please discuss your analysis of the current economic environment.

A. My analysis includes a brief review of the economic events that have occurred since 1990. Schedule WAR-8 displays various economic indicators and other data that I will refer to during this portion of my testimony.

In 1991, as measured by the most recently revised annual change in gross domestic product ("GDP"), the U.S. economy experienced a rate of growth of negative 0.20 percent. This decline in GDP marked the beginning of a mild recession that ended sometime before the end of the first half of 1992. Reacting to this situation, the Federal Reserve Board

("Federal Reserve" or "Fed"), then chaired by noted economist Alan Greenspan, lowered its benchmark federal funds rate[12] in an effort to further loosen monetary constraints - an action that resulted in lower interest rates.

During this same period, the nation's major money center banks followed the Federal Reserve's lead and began lowering their interest rates as well. By the end of the fourth quarter of 1993, the prime rate (the rate charged by banks to their best customers) had dropped to 6.00 percent from a 1990 level of 10.01 percent. In addition, the Federal Reserve's discount rate on loans to its member banks had fallen to 3.00 percent and short-term interest rates had declined to levels that had not been seen since 1972.

Although GDP increased in 1992 and 1993, the Federal Reserve took steps to increase interest rates beginning in February of 1994, in order to keep inflation under control. By the end of 1995, the Federal discount rate had risen to 5.21 percent. Once again, the banking community followed the Federal Reserve's moves. The Fed's strategy, during this period, was to engineer a "soft landing." That is to say that the Federal Reserve wanted to foster a situation in which economic growth would be stabilized without incurring either a prolonged recession or runaway inflation.

[12] This is the interest rate charged by banks with excess reserves at a Federal Reserve district bank to banks needing overnight loans to meet reserve requirements. The federal funds rate is the most sensitive indicator of the direction of interest rates, since it is set daily by the market, unlike the prime rate and the discount rate, which are periodically changed by banks and by the Federal Reserve Board, respectively.

Q. Did the Federal Reserve achieve its goals during this period?

A. Yes. The Fed's strategy of decreasing interest rates to stimulate the economy worked. The annual change in GDP began an upward trend in 1992. A change of 4.50 percent and 4.20 percent were recorded at the end of 1997 and 1998 respectively. Based on daily reports that were presented in the mainstream print and broadcast media during most of 1999, there appeared to be little doubt among both economists and the public at large that the U.S. was experiencing a period of robust economic growth highlighted by low rates of unemployment and inflation. Investors, who believed that technology stocks and Internet company start-ups (with little or no history of earnings) had high growth potential, purchased these types of issues with enthusiasm. These types of investors, who exhibited what former Chairman Greenspan described as "irrational exuberance," pushed stock prices and market indexes to all time highs from 1997 to 2000.

Q. What has been the state of the economy since 2001?

A. The U.S. economy entered into a recession near the end of the first quarter of 2001. The bullish trend, which had characterized the last half of the 1990's, had already run its course sometime during the third quarter of 2000. Economic data released since the beginning of 2001 had already been disappointing during the months preceding the September 11, 2001 terrorist attacks on the World Trade Center and the Pentagon. Slower

growth figures, rising layoffs in the high technology manufacturing sector, and falling equity prices (due to lower earnings expectations) prompted the Fed to begin cutting interest rates as it had done in the early 1990's. The now infamous terrorist attacks on New York City and Washington D.C. marked a defining point in this economic slump and prompted the Federal Reserve to continue its rate cutting actions through December 2001. Prior to the 9/11 attacks, commentators, reporting in both the mainstream financial press and various economic publications including Value Line, believed that the Federal Reserve was cutting rates in the hope of avoiding a recession.

Despite several intervals during 2002 and 2003 in which the Federal Open Market Committee ("FOMC") decided not to change interest rates – moves which indicated that the worst may be over and that the recession might have bottomed out during the last quarter of 2001 – a lackluster economy persisted. The continuing economic malaise and even fears of possible deflation prompted the FOMC to make a thirteenth rate cut on June 25, 2003. The quarter point cut reduced the federal funds rate to 1.00 percent, the lowest level in forty-five years.

Even though some signs of economic strength, mainly attributed to consumer spending, began to crop up during the latter part of 2002 and into 2003, Chairman Greenspan appeared to be concerned with sharp declines in capital spending in the business sector.

During the latter part of 2003, the FOMC went on record as saying that it intended to leave interest rates low "for a considerable period." After its two-day meeting that ended on January 28, 2004, the FOMC announced "that with inflation 'quite low' and plenty of excess capacity in the economy, policy-makers 'can be patient in removing its policy accommodation.'[13]

Q. What actions has the Federal Reserve taken in terms of interest rates since the beginning of 2001?

A. As noted earlier, from January 2001 to June 2003 the Federal Reserve cut interest rates a total of thirteen times. During this period, the federal funds rate fell from 6.50 percent to 1.00 percent. The FOMC reversed this trend on June 29, 2004 and raised the federal funds rate 25 basis points to 1.25 percent. From June 29, 2004 to January 31, 2006, the FOMC raised the federal funds rate thirteen more times to a level of 4.50 percent.

The FOMC's January 31, 2006 meeting marked the final appearance of Alan Greenspan, who had presided over the rate setting body for a total of eighteen years. On that same day, Greenspan's successor, Ben Bernanke, the former chairman of the President's Council of Economic Advisers and a former Fed governor under Greenspan from 2002 to 2005, was confirmed by the U.S. Senate to be the new Federal Reserve chief.

[13] Wolk, Martin, "Fed holds interest rates steady," MSNBC, January 28, 2004.

As expected by Fed watchers, Chairman Bernanke picked up where his predecessor left off and increased the federal funds rate by 25 basis points during each of the next three FOMC meetings for a total of seventeen consecutive rate increases since June 2004, and raising the federal funds rate to a level of 5.25 percent. The Fed's rate increase campaign finally came to a halt at the FOMC meeting held on August 8, 2006, when the FOMC decided not to raise rates.

Q. What was the reaction in the financial community to the Fed's decision not to raise interest rates?

A. As in the past, banks followed the Fed's lead once again and held the prime rate to a level of 8.25 percent, or 300 basis points higher than the federal funds rate of 5.25 percent established on June 29, 2006.

Q. How did analysts view the Fed's actions between January 2001 and August 2006?

A. According to an article that appeared in the December 2, 2004 edition of The Wall Street Journal, the FOMC's decision to begin raising rates two years ago was viewed as a move to increase rates from emergency lows in order to avoid creating an inflation problem in the future as opposed to slowing down the strengthening economy.[14] In other words, the Fed was

[14] McKinnon, John D. and Greg IP, "Fed Raises Rates by a Quarter Point," The Wall Street Journal, September 22, 2004.

trying to head off inflation *before* it became a problem. During the period following the August 8, 2006 FOMC meeting, the Fed's decisions not to raise rates were viewed as a gamble that a slower U.S. economy would help to cap growing inflationary pressures.[15]

Q. Was the Fed attempting to engineer another "soft landing", as it did in the mid-nineties, by holding interest rates steady?

A. Yes, however, as pointed out in an August 2006 article in The Wall Street Journal by E.S. Browning, soft landings – like the one that the Fed managed to pull off during the 1994-95 time frame, in which a recession or a bear market were avoided – rarely happen[16]. Since it began increasing the federal funds rate in June 2004, the Fed had assured investors that it would increase rates at a "measured" pace. Many analysts and economists interpreted this language to mean that former Chairman Greenspan would be cautious in increasing interest rates too quickly in order to avoid what is considered to be one of the Fed's few blunders during Greenspan's tenure – a series of increases in 1994 that caught the financial markets by surprise after a long period of low rates. The rapid rise in rates contributed to the bankruptcy of Orange County, California

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[15] Ip, Greg, "Fed Holds Interest Rates Steady As Slowdown Outweighs Inflation," The Wall Street Journal Online Edition, August 8, 2006.

[16] Browning, E.S, "Not Too Fast, Not Too Slow...," The Wall Street Journal Online Edition, August 21, 2006.

and the Mexican peso crisis[17]. According to Mr. Browning, at the time that his article was published, the hope was that Chairman Bernanke would succeed in slowing the economy "just enough to prevent serious inflation, but not enough to choke off growth." In other words, "a 'Goldilocks economy,' in which growth is not too hot and not too cold."

Q. Was the Fed's attempt to engineer a soft landing successful during the period that followed the August 8, 2006 FOMC meeting?

A. It would appear so. Articles published in the mainstream financial press were generally upbeat on the economy during that period. An example of this is an article written by Nell Henderson that appeared in the January 30, 2007 edition of The Washington Post. According to Ms. Henderson, "a year into [Fed Chairman] Bernanke's tenure, the [economic] picture has turned considerably brighter. Inflation is falling; unemployment is low; wages are rising; and the economy, despite continued problems in housing, is growing at a brisk clip."[18]

Q. What has been the state of the economy over the past two years?

A. Reports in the mainstream financial press during the majority of 2007 reflected the view that the U.S. economy was slowing as a result of a

[17] Associated Press (AP), "Fed begins debating interest rates" USA Today, June 29, 2004.

[18] Henderson, Nell, "Bullish on Bernanke" The Washington Post, January 30, 2007.

worsening situation in the housing market and higher oil prices. The overall outlook for the economy was one of only moderate growth at best. Also during this period the Fed's key measure of inflation began to exceed the rate setting body's comfort level.

On August 7, 2007, the FOMC decided not to increase or decrease the federal funds rate for the ninth straight time and left its target rate unchanged at 5.25 percent.[19] At the time of the Fed's decision, analysts speculated that a rate cut over the next several months was unlikely given the Fed's concern that inflation would fail to moderate. However, during this same period, evidence of an even slower economy and a possible recession was beginning to surface. Within days of the Fed's decision to stand pat on rates, a borrowing crisis rooted in a deterioration of the market for subprime mortgages and securities linked to them, forced the Fed to inject $24 billion in funds (raised through open market operations) into the credit markets.[20] By Friday, August 17, 2007, after a turbulent week on Wall Street, the Fed made the decision to lower its discount rate (i.e. the rate charged on direct loans to banks) by 50 basis points, from 6.25 percent to 5.75 percent, and took steps to encourage banks to borrow from the Fed's discount window in order to provide liquidity to

[19] Ip, Greg, "Markets Gyrate As Fed Straddles Inflation, Growth" The Wall Street Journal, August 8, 2007

[20] Ip, Greg, "Fed Enters Market To Tamp Down Rate" The Wall Street Journal, August 9, 2007

lenders. According to an article that appeared in the August 18, 2007 edition of The Wall Street Journal, [21] the Fed had used all of its tools to restore normalcy to the financial markets. If the markets failed to settle down, the Fed's only weapon left was to cut the Federal Funds rate – possibly before the next FOMC meeting scheduled on September 18, 2007.

Q. Did the Fed cut rates as a result of the subprime mortgage borrowing crises?

A. Yes. At its regularly scheduled meeting on September 18, 2007, the FOMC surprised the investment community and cut both the federal funds rate and the discount rate by 50 basis points (25 basis points more than what was anticipated). This brought the federal funds rate down to a level of 4.75 percent. The Fed's action was seen as an effort to curb the aforementioned slowdown in the economy. Over the course of the next four months, the FOMC reduced the Federal funds rate by a total 175 basis points to a level of 3.00 percent – mainly as a result of concerns that the economy was slipping into a recession. This included a 75 basis point reduction that occurred one week prior to the FOMC's meeting on January 29, 2008.

[21] Ip, Greg, Robin Sidel and Randall Smith, "Fed Offers Banks Loans Amid Crises" The Wall Street Journal, August 9, 2007

Q. What actions has the Fed taken in regard to interest rates since the beginning of 2008?

A. The Fed made two more rate cuts which included a 75 basis point reduction in the federal funds rate on March 18, 2008 and an additional 25 basis point reduction on April 30, 2008. The Fed's decision to cut rates was based on its belief that the slowing economy was a greater concern than the current rate of inflation (which the majority of FOMC members believed would moderate during the economic slowdown).[22] As a result of the Fed's actions, the federal funds rate was reduced to a level of 2.00 percent. From April 30, 2008 through September 16, 2008, the Fed took no further action on its key interest rate. However, the days before and after the Fed's September 16, 2008 meeting saw longstanding Wall Street firms such as Lehman Brothers, Merrill Lynch and AIG failing as a result of their subprime holdings. By the end of the week, the Bush administration had announced plans to deal with the deteriorating financial condition which had now become a worldwide crisis. The administrations actions included former Treasury Secretary Henry Paulson's request to Congress for $700 billion to buy distressed assets as part of a plan to halt what has been described as the worst financial crisis since the 1930's[23]. Amidst this turmoil, the Fed made the decision to cut the federal funds rate by another

[22] Ip, Greg, "Credit Worries Ease as Fed Cuts, Hints at More Relief" The Wall Street Journal, March 19, 2008

[23] Soloman, Deborah, Michael R. Crittenden and Damian Paletta, "U.S. Bailout Plan Calms Markets, But Struggle Looms Over Details" The Wall Street Journal, September 20, 2008

50 basis points in a coordinated move with foreign central banks on October 8, 2008. This was followed by another 50 basis point cut during the regular FOMC meeting on October 29, 2008. At the time of this writing, the federal funds target rate now stands at 0.25 percent, the result of a 75 basis point cut announced on December 16, 2008. After FOMC meetings in January, March April, June, August and September of 2009, the Fed elected not to make any changes in the federal funds rate, stating in January that the rate would remain low "for some time."[24] Presently, the Fed's discount rate is at 0.50 percent, a level not seen since the 1940s.[25] Based on data released during the early part of December 2008, the U.S. has officially been in a recession since December of 2007.

Q. Putting this all into perspective, how have the Fed's actions since 2000 affected benchmark rates?

A. U.S. Treasury instruments are for the most part still at historically low levels. As can be seen on the first page of Attachment D, the previously mentioned federal discount rate (the rate charged to the Fed's member banks), has fallen to 0.50 percent from 1.75 percent in 2008.

[24] Hilsenrath, Jon and Liz Rappaport, "Fed Weighs Idea of Buying Treasurys as Focus Shifts" The Wall Street Journal, January 29, 2009

[25] Hilsenrath, Jon, "Fed Cuts Rates Near Zero to Battle Slump" The Wall Street Journal, December 17, 2008

Q. What has been the trend in other leading interest rates over the last year?

A. As of October 14, 2009, all of the leading interest rates, with the exception of the 30-year constant maturity and 30-year Zero rates, have dropped from levels that existed a year ago (Attachment D, Value Line Selection & Opinion page 3253). The prime rate has fallen from 4.50 percent a year ago to 3.25 percent. The benchmark federal funds rate, just discussed, has decreased from 1.50 percent, in October 2008, to a level of 0.00 - 0.25 percent (as a result of the December 16, 2008 rate cut discussed above). The yields on all of the non-inflation protected maturities of U.S. Treasury instruments exhibited in my Attachment C have also decreased over the past year. A previous trend, described by former Chairman Greenspan as a "conundrum"[26], in which long-term rates fell as short-term rates increased, thus creating a somewhat inverted yield curve that existed as late as June 2007, is completely reversed and a more traditional yield curve (one where yields increase as maturity dates lengthen) presently exists (Attachment D). The 5-year Treasury yield, used in my CAPM analysis, has fallen from 2.82 percent, in October 2008, to 2.33 percent as of October 14, 2009. As noted above, the 30-Year Treasury constant maturity rate increased from 4.19 percent over the past year to 4.26 percent. These current yields are considerably lower than

[26] Wolk, Martin, "Greenspan wrestling with rate 'conundrum'," MSNBC, June 8, 2005

corresponding yields that existed during the early nineties and at the beginning of the current decade (as can be seen on Schedule WAR-8).

Q. What is the current outlook for the economy?

A. Value Line's analysts have become increasingly optimistic in their outlook on the economy as of late and had this to say in the October 23, 2009 edition of Value Line's Selection and Opinion publication:

> **The economy remains a good news, bad news story.** Clearly, the business outlook is improving. In fact, much of the data — covering a range of consumer and industrial sectors — now affirm that the recession ended in the second quarter and an upturn began over the summer. What is less clear is the strength of that revival, as most reports being issued are consistent only in being inconsistent.

Value Line's analysts went on to state

> **Investors are smiling again**, after dramatic stock market gains this year. Now, the challenge will be to extend that positive momentum. This will not be an easy task given the ever-richer P/E ratios, which are now present, following the market's steep rise.

Q. How are water utilities faring in the current economic environment?

A. Although there are some concerns regarding long-term infrastructure requirements, water utilities still appear to a good investment according to Value Line analyst Andre J. Costanza. In the October 23, 2009 quarterly update on the water utility industry Mr. Costanza stated the following:

> This industry is a good place for cautious investors looking to park themselves until a sustained market recovery is evident. Water utility stocks are historically more recession proof than the broader market, with their steady dividend growth reducing turbulence in share price and padding returns

Q. After weighing the economic information that you've just discussed, do you believe that the 8.01 percent cost of equity capital that you have estimated is reasonable for LPSCO?

A. I believe that my recommended 8.01 percent cost of equity will provide LPSCO with a reasonable rate of return on the Company's invested capital when economic data on interest rates (that are low by historical standards), the current situation in new housing construction, and the Fed's ability to keep inflation in check are all taken into consideration. As I noted earlier, the Hope decision determined that a utility is entitled to earn a rate of return that is commensurate with the returns it would make on other investments with comparable risk. I believe that my cost of equity analysis, which is an average of the results of both the DCF and CAPM models, has produced such a return.

CAPITAL STRUCTURE AND COST OF DEBT

Q. Have you reviewed LPSCO's testimony regarding the Company's proposed capital structure?

A. Yes, I have.

Q. Please describe the Company's proposed capital structure.

A. The Company is proposing a capital structure comprised of 17.83 percent long-term debt and 82.17 percent common equity.

Q. Is LPSCO's proposed capital structure in line with industry averages?

A. No. LPSCO's capital structure is much heavier in common equity as opposed to the capital structures of the other water and natural gas companies included in my cost of capital analysis (Schedule WAR-9). The capital structures for those utilities averaged approximately 47.8 percent long-term debt and 52.2 percent equity, that is displayed on Schedule WAR-9 of my direct testimony.

Q. In terms of risk, how does LPSCO's capital structure compare to the water utilities in your sample?

A. The water utilities in my sample would be perceived as having a higher level of financial risk (i.e. the risk associated with debt repayment) because of their higher levels of debt. The additional financial risk due to debt leverage is embedded in the cost of equities derived for those companies through the DCF analysis. Thus, the cost of equity derived in my DCF analysis is applicable to companies that are more leveraged and, theoretically speaking, riskier than a utility such as LPSCO. In the case of a publicly traded company, like those included in my proxy, a company with LPSCO's level of equity would be perceived as having much lower financial risk and would therefore also have a lower expected return on common equity.

Q. Are you recommending a hypothetical capital structure for LPSCO in this case?

A. No. Although LPSCO's capital structure is heavier in common equity than the utilities in my water and natural gas samples, I am recommending that the Commission adopt the Company-proposed capital structure since it is comprised of actual industrial development authority ("IDA") debt.

Q. Haven't you recommended hypothetical capital structures in the past for other Algonquin-owned utilities?

A. Yes, however those utilities had imprudent capital structures comprised of 100 percent common equity. To correct that situation, I recommended hypothetical capital structures comprised of sixty percent debt and forty percent equity.

Q. Have you made any downward adjustment to your cost of equity recommendation as a result of the lower level of risk attributable to LPSCO's equity rich capital structure?

A. No, I have not. I am comfortable with my unadjusted 8.01 percent cost of equity capital given the current state of the economy and the most recent Value Line projections on the water utility industry.

Q. What is the Company-proposed cost of long-term debt?

A. The Company-proposed cost of long-term debt is 6.39 percent.

Q. Are you in agreement with the Company-proposed cost of long-term debt?

A. Yes. I am recommending that the Commission adopt the Company-proposed 6.39 percent cost of long-term IDA debt.

Q. How does the Company's proposed weighted cost of capital compare with your recommendation?

A. LPSCO has proposed a weighted average cost of capital of 11.41 percent which reflects the aforementioned levels of long-term debt and common equity in the Company-proposed capital structure. The Company-proposed 11.41 percent weighted average cost of capital is 369 basis points higher than the 7.72 percent weighted cost that I am recommending. This is the result of the higher Company-proposed 12.50 percent cost of common equity.

COMMENTS ON LPSCO'S COST OF EQUITY CAPITAL TESTIMONY

Q. How does your recommended cost of equity capital compare with the cost of equity capital proposed by the Company?

A. The Company's cost of capital witness, Mr. Bourassa is recommending a cost of common equity of 12.50 percent. His 12.50 percent cost of equity capital is 449 basis points higher than the 8.01 percent cost of equity capital that I have calculated.

Q. What methods did Mr. Bourassa use to arrive at his cost of common equity for LPSCO?

A. Mr. Bourassa used both the DCF and CAPM methods. His DCF analysis relies on two constant growth versions of the DCF model that are similar to the model that I have used. His first constant growth model relies only on earnings growth estimates for the "g" component of the model while his second constant growth model relies on sustainable growth estimates for the "g" component. Mr. Bourassa also uses a two-stage growth version of the DCF model. The results of his DCF analyses range from 8.30 percent to 13.60 percent and produce a mean average of 11.70 percent. Mr. Bourassa's CAPM analysis uses the same model that I have used but he obtains two different results: one obtained by using an historical risk premium and the other by using a current market risk premium. His CAPM analysis produces results of 9.30 percent using an historical risk premium and 23.50 percent using a current market risk premium. His average CAPM result is 16.4 percent.

Q. What are the main reasons for the difference in the results that you obtained from your DCF analysis and the results that Mr. Bourassa obtained from his DCF analysis using the constant growth model?

A. Mr. Bourassa conducted his analysis in February of 2009 and consequently much of the data that he used in his analysis is now stale. This can be seen in a price comparison of three of the water company

stocks that we both used in our samples: The difference between the average adjusted closing stock prices used in my DCF model and spot prices used by Mr. Bourassa in his DCF models are as follows:

	Rigsby	Bourassa	Difference
AWR	$35.29	$33.91	$1.38
CWT	$38.22	$40.30	- $2.08
WTR	$16.96	$18.79	- $1.83

Q. What is the main difference between your constant growth DCF results and Mr. Bourassa's first constant growth model which relied strictly on earnings growth?

A. In respect to Mr. Bourassa's first constant growth model, which relied strictly on earnings growth, there is only a 4 basis point difference between the average dividend yields of the three water utilities that our samples have in common; his 3.00 percent to my 3.04 percent. However, there is a 100 basis point difference between his 8.17 percent average growth estimate ("g") for the three common utilities (i.e. AWR, CWT, and WTR) as opposed to my 7.17 percent estimate which also takes into account other growth estimates on dividends and book value. Subsequently Mr. Bourassa's DCF estimate, relying only on earnings growth, is 9.05 percent as opposed to my estimate of 7.18 percent which takes into account more recent data on stock prices and growth

projections for earnings, dividends and book value on the three water utilities our samples have in common.

Q. Please explain the main difference between your constant growth DCF results and Mr. Bourassa's second constant growth model which relied on sustainable growth?

A. The same 4 basis point difference between our estimated dividend yields exists in Mr. Bourassa's sustainable growth version of the constant growth model. However, his estimate for the "g" component is seriously flawed. As I noted earlier in my testimony, Value Line does not provide long-term projections on earnings, dividends and book value on the other three water utilities used by Mr. Bourassa in his sample. Consequently, Mr. Bourassa uses an unfounded 7.01 percent averaging derived from his growth estimates for AWR, CWT and WTR and applied it to the other three water utilities. This has the effect of increasing his DCF model's median average estimate by 40 basis points.

Q. Did you conduct a two-stage DCF analysis like the one conducted by Mr. Bourassa?

A. No. Primarily because the growth rate component that I estimated for my single-stage model already takes into consideration both the near-term and long-term growth rate projections that Mr. Bourassa averaged in his

multi-stage model. This being the case, I saw no need to conduct a separate DCF analysis.

Q. What are the main differences between your CAPM results and Mr. Bourassa's CAPM results?

A. The differences between our CAPM results is attributable to the selection of U.S. Treasury instruments used as inputs for the risk-free rate of return and the time period that has expired since Mr. Bourassa filed his direct testimony. Mr. Bourassa's average beta of 0.93 has also fallen since his testimony was filed, and his market risk premiums of 7.5 percent to 21.30 percent are simply not realistic when compared with the market risk premiums, ranging from 4.20 percent to 6.10 percent, that I obtained from Morningstar's 2009 SBBI Yearbook.

Q. Please explain the differences in your risk free rates of return.

A. I relied on a 5-year treasury rate whereas Mr. Bourassa relied on an average of 5, 7, and 10-year Treasury rates in his historical risk premium CAPM Analysis, and a 30-year Treasury rate in his current market risk premium CAPM analysis. Consequently his risk free rate of return is higher due to the inclusion of longer-term Treasury yields. Mr. Bourassa's reliance on maturities that are greater than five years is unfounded when one takes into account that utilities generally file for new rates every three to five years.

Q. What would be Mr. Bourassa's updated CAPM inputs using current data instead of the stale data used in the Company's testimony?

A. Yes. Based on data for the week ended October 23, 2009 (obtained in a Federal Reserve Statistical Release dated October 26, 2009), the average yield of the 5, 7 and 10-year U.S. treasury instruments, that Mr. Bourassa used as the risk free rate in his historical market risk premium CAPM model, was 2.94 percent as opposed to the average yield of 2.30 percent that he relied on. The yield on the 30-year rate was 4.22 percent as opposed to the 3.70 percent rate that Mr. Bourassa used in his current market risk premium CAPM model. Although his selected Treasury yields increased since February of 2009, the average beta used in his CAPM analyses has dropped from an average of 0.98 to an average of 0.80. Holding his higher market risk premium inputs constant produces an historical market risk premium result of 8.94 percent as opposed to his 9.30 percent, and a current market risk premium result of 21.26 percent as opposed to his 23.50 percent. However, as I stated earlier, Mr. Bourassa's market risk premium inputs are clearly excessive and should not be given any weight.

...

Q. What would Mr. Bourassa's CAPM models produce if you substituted a 5.15 percent average of your market risk premiums?

A. Mr. Bourassa's historical market risk premium model would produce an expected return of 7.06 percent and his current market risk premium model would produce an expected return of 8.34 percent.

Q. How did Mr. Bourassa arrive at his final 12.50 percent cost of common equity for LPSCO?

A. Mr. Bourassa's final estimate of 12.50 percent is based upon his review of the results of his various DCF and CAPM models, along with the application of his "expertise and informed judgment."

Q. Is there any merit in the rationale used by Mr. Bourassa in regard to size on page 18 of his direct testimony?

A. No. As I stated earlier in my testimony, LPSCO is a wholly owned subsidiary of Algonquin Power Income Fund, a large publicly traded mutual fund that has direct access to the capital markets. In addition to this, to the best of my knowledge, the Commission has never granted a higher cost of common equity based on company size.

...

Q. Does your cost of capital recommendation take into consideration any perceived business risks that LPSCO might face?

A. Yes. I believe that the large amount of equity contained in my recommended capital structure would mitigate any perceived business that investors might think LPSCO faces.

Q. Does your silence on any of the issues, matters or findings addressed in the testimony of Mr. Bourassa or any other witness for LPSCO constitute your acceptance of their positions on such issues, matters or findings?

A. No, it does not.

Q. Does this conclude your testimony on LPSCO?

A. Yes, it does.

Qualifications of William A. Rigsby, CRRA

EDUCATION:

University of Phoenix
Master of Business Administration, Emphasis in Accounting, 1993

Arizona State University
College of Business
Bachelor of Science, Finance, 1990

Mesa Community College
Associate of Applied Science, Banking and Finance, 1986

Society of Utility and Regulatory Financial Analysts
38th Annual Financial Forum and CRRA Examination
Georgetown University Conference Center, Washington D.C.
Awarded the Certified Rate of Return Analyst designation
after successfully completing SURFA's CRRA examination.

Michigan State University
Institute of Public Utilities
N.A.R.U.C. Annual Regulatory Studies Program, 1997 &1999

Florida State University
Center for Professional Development & Public Service
N.A.R.U.C. Annual Western Utility Rate School, 1996

EXPERIENCE:

Public Utilities Analyst V
Residential Utility Consumer Office
Phoenix, Arizona
April 2001 – Present

Senior Rate Analyst
Accounting & Rates - Financial Analysis Unit
Arizona Corporation Commission, Utilities Division
Phoenix, Arizona
July 1999 – April 2001

Senior Rate Analyst
Residential Utility Consumer Office
Phoenix, Arizona
December 1997 – July 1999

Utilities Auditor II and III
Accounting & Rates – Revenue Requirements Analysis Unit
Arizona Corporation Commission, Utilities Division
Phoenix, Arizona
October 1994 – November 1997

Tax Examiner Technician I / Revenue Auditor II
Arizona Department of Revenue
Transaction Privilege / Corporate Income Tax Audit Units
Phoenix, Arizona
July 1991 – October 1994

RESUME OF RATE CASE AND REGULATORY PARTICIPATION

Utility Company	Docket No.	Type of Proceeding
ICR Water Users Association	U-2824-94-389	Original CC&N
Rincon Water Company	U-1723-95-122	Rate Increase
Ash Fork Development Association, Inc.	E-1004-95-124	Rate Increase
Parker Lakeview Estates Homeowners Association, Inc.	U-1853-95-328	Rate Increase
Mirabell Water Company, Inc.	U-2368-95-449	Rate Increase
Bonita Creek Land and Homeowner's Association	U-2195-95-494	Rate Increase
Pineview Land & Water Company	U-1676-96-161	Rate Increase
Pineview Land & Water Company	U-1676-96-352	Financing
Montezuma Estates Property Owners Association	U-2064-96-465	Rate Increase
Houghland Water Company	U-2338-96-603 et al	Rate Increase
Sunrise Vistas Utilities Company – Water Division	U-2625-97-074	Rate Increase
Sunrise Vistas Utilities Company – Sewer Division	U-2625-97-075	Rate Increase
Holiday Enterprises, Inc. dba Holiday Water Company	U-1896-97-302	Rate Increase
Gardener Water Company	U-2373-97-499	Rate Increase
Cienega Water Company	W-2034-97-473	Rate Increase
Rincon Water Company	W-1723-97-414	Financing/Auth. To Issue Stock
Vail Water Company	W-01651A-97-0539 et al	Rate Increase
Bermuda Water Company, Inc.	W-01812A-98-0390	Rate Increase
Bella Vista Water Company	W-02465A-98-0458	Rate Increase
Pima Utility Company	SW-02199A-98-0578	Rate Increase

RESUME OF RATE CASE AND REGULATORY PARTICIPATION (Cont.)

Utility Company	Docket No.	Type of Proceeding
Pineview Water Company	W-01676A-99-0261	WIFA Financing
I.M. Water Company, Inc.	W-02191A-99-0415	Financing
Marana Water Service, Inc.	W-01493A-99-0398	WIFA Financing
Tonto Hills Utility Company	W-02483A-99-0558	WIFA Financing
New Life Trust, Inc. dba Dateland Utilities	W-03537A-99-0530	Financing
GTE California, Inc.	T-01954B-99-0511	Sale of Assets
Citizens Utilities Rural Company, Inc.	T-01846B-99-0511	Sale of Assets
MCO Properties, Inc.	W-02113A-00-0233	Reorganization
American States Water Company	W-02113A-00-0233	Reorganization
Arizona-American Water Company	W-01303A-00-0327	Financing
Arizona Electric Power Cooperative	E-01773A-00-0227	Financing
360networks (USA) Inc.	T-03777A-00-0575	Financing
Beardsley Water Company, Inc.	W-02074A-00-0482	WIFA Financing
Mirabell Water Company	W-02368A-00-0461	WIFA Financing
Rio Verde Utilities, Inc.	WS-02156A-00-0321 et al	Rate Increase/ Financing
Arizona Water Company	W-01445A-00-0749	Financing
Loma Linda Estates, Inc.	W-02211A-00-0975	Rate Increase
Arizona Water Company	W-01445A-00-0962	Rate Increase
Mountain Pass Utility Company	SW-03841A-01-0166	Financing
Picacho Sewer Company	SW-03709A-01-0165	Financing
Picacho Water Company	W-03528A-01-0169	Financing
Ridgeview Utility Company	W-03861A-01-0167	Financing
Green Valley Water Company	W-02025A-01-0559	Rate Increase
Bella Vista Water Company	W-02465A-01-0776	Rate Increase
Arizona Water Company	W-01445A-02-0619	Rate Increase

RESUME OF RATE CASE AND REGULATORY PARTICIPATION (Cont.)

Utility Company	Docket No.	Type of Proceeding
Arizona-American Water Company	W-01303A-02-0867 et al.	Rate Increase
Arizona Public Service Company	E-01345A-03-0437	Rate Increase
Rio Rico Utilities, Inc.	WS-02676A-03-0434	Rate Increase
Qwest Corporation	T-01051B-03-0454	Renewed Price Cap
Chaparral City Water Company	W-02113A-04-0616	Rate Increase
Arizona Water Company	W-01445A-04-0650	Rate Increase
Tucson Electric Power	E-01933A-04-0408	Rate Review
Southwest Gas Corporation	G-01551A-04-0876	Rate Increase
Arizona-American Water Company	W-01303A-05-0405	Rate Increase
Black Mountain Sewer Corporation	SW-02361A-05-0657	Rate Increase
Far West Water & Sewer Company	WS-03478A-05-0801	Rate Increase
Gold Canyon Sewer Company	SW-02519A-06-0015	Rate Increase
Arizona Public Service Company	E-01345A-05-0816	Rate Increase
Arizona-American Water Company	W-01303A-06-0014	Rate Increase
Arizona-American Water Company	W-01303A-05-0718	Transaction Approval
Arizona-American Water Company	W-01303A-05-0405	ACRM Filing
UNS Gas, Inc.	G-04204A-06-0463	Rate Increase
Arizona-American Water Company	W-01303A-07-0209	Rate Increase
Tucson Electric Power	E-01933A-07-0402	Rate Increase
Southwest Gas Corporation	G-01551A-07-0504	Rate Increase
Chaparral City Water Company	W-02113A-07-0551	Rate Increase
Arizona-American Water Company	W-01303A-08-0227 et al.	Rate Increase
Far West Water & Sewer Company	WS-03478A-08-0608	Interim Rate Increase
Johnson Utilities, LLC	WS-02987A-08-0180	Rate Increase
UNS Gas, Inc.	G-04204A-08-0571	Rate Increase
Arizona Water Company	W-01445A-08-0440	Rate Increase

RESUME OF RATE CASE AND REGULATORY PARTICIPATION (Cont.)

Utility Company	Docket No.	Type of Proceeding
Black Mountain Sewer Corporation	SW-02361A-08-0609	Rate Increase
Global Utilities	SW-02445A-09-0077	Rate Increase

ATTACHMENT A

There has not been much change in the Water Utility Industry since our last review in July. Providers continued to reap the benefits of an increasingly favorable regulatory backing, with most in the group posting solid top- and bottom-line growth in the second quarter (September results were not out as of the date this issue was published).

However, the industry has fallen well into the bottom half of our *Survey* for Timeliness, as share-price gains paled in comparison to those enjoyed by the seemingly revitalized broader market. We suspect that water utility stocks will continue to lose some of their shine in the months ahead for similar reasons, as hopes of economic stability prompt many to look outside this relative safe-haven in hopes of securing wider gains. Making matter worse, earnings growth is likely to slow in the second half of the year and remain weak thereafter, due to tougher comparisons and burgeoning operating costs.

Longer-term growth prospects are not much better either. Despite the brighter regulatory landscape, infrastructure costs are expected to continue ramping up due to aging water systems, geographic expansion, and increasingly stringent EPA regulations. These, along with the subsequent financing expenses, will offset most of the aforementioned help, and thus limit appreciation potential going forward. As a result, most of the stocks in this segment offer minimal 3-to 5-year appeal.

Bright Demand Picture

These utilities have the ultimate job security. Water is a necessity, a fact that cannot be changed no matter what. Recognizing that a community's well being is closely tied to a providers health, many state regulatory bodies that were once antagonists, have changed their tune and taken on a more business approach. These authorities, which were put in place to help maintain a balance of power between customers and providers and to ensure fair business practices, are now handing down more favorable rulings. Responsible for reviewing and ruling on general rate requests made by utilities to help recover costs, they hold tremendous power and can potentially make or break a company. The recent about face in demeanor creates a far more favorable climate

INDUSTRY TIMELINESS: 72 (of 98)

and augurs well for providers.

Alarming Costs

That said, the water utility industry has some issues to contend with. Infrastructures are getting older and becoming inadequate in many cases. Some will require heavy investment in order to make the necessary repairs, while EPA standards get tougher due to the potential threat of bioterrorism. In all, infrastructure costs are estimated to amount to hundreds of millions of dollars over the next decade. Unfortunately, most operating in this space are laden with debt and strapped for cash. They will be forced to seek outside financing in order to meet the growing capital outlays, with the higher interest rate costs and greater share counts thwarting shareholder returns. Note, however, that, as a result of the industry's capital intensive nature, consolidation is white hot. Those with the flexibility to meet its commitments have ample opportunity to make deals and grow their customer base.

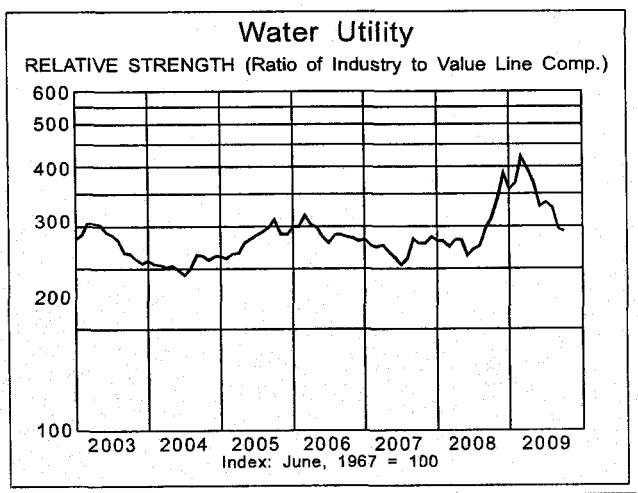
Conclusion

This industry is a good place for cautious investors looking to park themselves until a sustained market recovery is evident. Water utility stocks are historically more recession proof than the broader market, with their steady dividend growth reducing turbulence in share price and padding returns. However, those with a penchant for growth will probably want to take a pass, opting for an area with more upside. There are a couple of issues here that stand out for 3- to 5-year appreciation potential, namely *Aqua America* and *Southwest Water Company*, but the latter's Below Average (4) Safety rank and poor Financial Strength rating may evoke some apprehension. Meanwhile, *Aqua*'s dependence on an aggressive acquisition tendency to drive gains may well need to be tempered if finances continue to deteriorate. *American Water Works* is another interesting option, but its short trading history and lack of performance indicators should scare off most. As always, we advise potential investors to read the individual reports of each stock before making a financial commitment.

Andre J. Costanza

Composite Statistics: Water Utility Industry

2005	2006	2007	2008	2009	2010		12-14
1256.9	3454.1	3702.5	3913.8	*4180*	*4475*	Revenues ($mill)	*5425*
148.2	d5.8	d183.0	352.7	*425*	*485*	Net Profit ($mill)	*625*
40.5%	NMF	NMF	37.0%	*38.0%*	*39.0%*	Income Tax Rate	*40.0%*
1.1%	NMF	NMF	6.5%	*8.0%*	*10.0%*	AFUDC % to Net Profit	*15.0%*
50.4%	54.0%	51.0%	52.6%	*54.0%*	*52.5%*	Long-Term Debt Ratio	*50.0%*
49.5%	45.9%	49.0%	47.4%	*46.0%*	*47.5%*	Common Equity Ratio	*50.0%*
3053.8	12113.9	12985.9	12629.1	*13600*	*14125*	Total Capital ($mill)	*16250*
4200.7	13308.3	14315.2	15356.1	*16180*	*16950*	Net Plant ($mill)	*19375*
6.3%	1.6%	.2%	4.3%	*5.0%*	*5.0%*	Return on Total Cap'l	*6.0%*
9.8%	NMF	NMF	5.9%	*7.0%*	*7.0%*	Return on Shr. Equity	*7.5%*
9.8%	NMF	NMF	5.9%	*7.0%*	*7.0%*	Return on Com Equity	*7.5%*
3.7%	NMF	NMF	2.9%	*3.0%*	*3.5%*	Retained to Com Eq	*4.5%*
62%	NMF	NMF	51%	*65%*	*62%*	All Div'ds to Net Prof	*60%*
29.4	NMF	NMF				Avg Ann'l P/E Ratio	*22.0*
1.57	NMF	NMF		*Bold figures are Value Line estimates*		Relative P/E Ratio	*1.45*
2.1%	2.0%	2.3%				Avg Ann'l Div'd Yield	*2.5%*



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AMER. STATES WATER NYSE-AWR

RECENT PRICE 36.04 | P/E RATIO 18.8 (Trailing: 22.4 Median: 22.0) | RELATIVE P/E RATIO 1.08 | DIV'D YLD 2.8% | VALUE LINE

TIMELINESS 3 Lowered 6/5/09
SAFETY 3 New 2/4/00
TECHNICAL 3 Raised 10/23/09
BETA .80 (1.00 = Market)

2012-14 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	60	(+65%)	16%
Low	40	(+10%)	6%

Insider Decisions

	N	D	J	F	M	A	M	J	J
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	1	2	0	0	1	0	0	0	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	64	55	66
to Sell	52	66	53
Hld's(000)	8980	9283	10578

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
High:	19.5	26.5	25.3	26.4	29.0	29.0	26.8	34.6	43.8	46.1	42.0	38.8								
Low:	14.1	14.8	16.7	19.0	20.3	21.6	20.8	24.3	30.3	33.6	27.0	29.8								
Revenues per sh	9.27	10.43	11.03	11.37	11.44	11.02	12.91	12.17	13.06	13.78	13.98	13.61	14.06	15.76	17.49	18.42	*18.90*	*19.75*	Revenues per sh	*21.75*
"Cash Flow" per sh	1.67	1.68	1.75	1.75	1.85	2.04	2.26	2.20	2.53	2.54	2.08	2.23	2.64	2.89	3.31	3.37	*3.80*	*3.95*	"Cash Flow" per sh	*4.60*
Earnings per sh A	1.11	.95	1.03	1.13	1.04	1.08	1.19	1.28	1.35	1.34	.78	1.05	1.32	1.33	1.62	1.55	*1.90*	*2.05*	Earnings per sh A	*2.60*
Div'd Decl'd per sh B■	.79	.80	.81	.82	.83	.84	.85	.86	.87	.87	.88	.89	.90	.91	.96	1.00	*1.02*	*1.08*	Div'd Decl'd per sh B■	*1.25*
Cap'l Spending per sh	1.90	2.43	2.19	2.40	2.58	3.11	4.30	3.03	3.18	2.68	3.76	5.03	4.24	3.91	2.89	4.45	*4.00*	*4.25*	Cap'l Spending per sh	*5.00*
Book Value per sh	9.95	10.07	10.29	11.01	11.24	11.48	11.82	12.74	13.22	14.05	13.97	15.01	15.72	16.64	17.53	17.95	*16.55*	*19.45*	Book Value per sh	*22.00*
Common Shs Outst'g C	11.71	11.77	11.77	13.33	13.44	13.44	13.44	15.12	15.12	15.18	15.21	16.75	16.80	17.05	17.23	17.30	*18.50*	*18.75*	Common Shs Outst'g C	*20.00*
Avg Ann'l P/E Ratio	13.4	12.8	11.6	12.6	14.5	15.5	17.1	15.9	16.7	18.3	31.9	23.2	21.9	27.7	24.0	22.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*20.0*
Relative P/E Ratio	.79	.84	.78	.79	.84	.81	.97	1.03	.86	1.00	1.82	1.23	1.17	1.50	1.27	1.37			Relative P/E Ratio	*1.35*
Avg Ann'l Div'd Yield	5.3%	6.6%	6.7%	5.8%	5.5%	5.0%	4.2%	4.2%	3.9%	3.6%	3.5%	3.6%	3.1%	2.5%	2.5%	2.9%			Avg Ann'l Div'd Yield	2.5%
Revenues ($mill)							173.4	184.0	197.5	209.2	212.7	228.0	236.2	268.6	301.4	318.7	*350*	*370*	Revenues ($mill)	*435*
Net Profit ($mill)							16.1	18.0	20.4	20.3	11.9	16.5	22.5	23.1	28.0	26.8	*35.0*	*39.0*	Net Profit ($mill)	*52.0*
Income Tax Rate							46.0%	45.7%	43.0%	38.9%	43.5%	37.4%	47.0%	40.5%	42.6%	37.8%	*35.5%*	*37.0%*	Income Tax Rate	*40.0%*
AFUDC % to Net Profit							--	--	--	--	--	--	--	12.2%	8.5%	6.9%	*5.0%*	*5.0%*	AFUDC % to Net Profit	*5.0%*
Long-Term Debt Ratio							51.0%	47.5%	54.9%	52.0%	52.0%	47.7%	50.4%	48.6%	46.9%	46.2%	*46.5%*	*46.0%*	Long-Term Debt Ratio	*46.5%*
Common Equity Ratio							48.4%	51.9%	44.7%	48.0%	48.0%	52.3%	49.6%	51.4%	53.1%	53.8%	*53.5%*	*54.0%*	Common Equity Ratio	*53.5%*
Total Capital ($mill)							328.2	371.1	447.6	444.4	442.3	480.4	532.5	551.6	569.4	577.0	*665*	*675*	Total Capital ($mill)	*825*
Net Plant ($mill)							449.6	509.1	539.8	563.3	602.3	664.2	713.2	750.6	776.4	825.3	*870*	*925*	Net Plant ($mill)	*1025*
Return on Total Cap'l							6.6%	6.4%	6.1%	6.5%	4.6%	5.2%	5.4%	6.0%	6.7%	6.4%	*7.0%*	*7.5%*	Return on Total Cap'l	*8.5%*
Return on Shr. Equity							10.0%	9.2%	10.1%	9.5%	5.6%	6.6%	8.5%	8.1%	9.3%	8.6%	*10.0%*	*10.5%*	Return on Shr. Equity	*12.0%*
Return on Com Equity							10.1%	9.3%	10.1%	9.5%	5.6%	6.6%	8.5%	8.1%	9.3%	8.6%	*10.0%*	*10.5%*	Return on Com Equity	*12.0%*
Retained to Com Eq							2.9%	3.0%	3.6%	3.3%	NMF	1.0%	2.8%	2.7%	3.9%	3.1%	*5.0%*	*5.5%*	Retained to Com Eq	*6.0%*
All Div'ds to Net Prof							72%	68%	65%	65%	113%	84%	67%	67%	58%	64%	*56%*	*52%*	All Div'ds to Net Prof	*48%*

3-for-2

% TOT. RETURN 9/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	-3.3	12.6
3 yr.	2.5	5.1
5 yr.	67.2	36.4

CAPITAL STRUCTURE as of 6/30/09
Total Debt $317.8 mill. **Due in 5 Yrs** $12.0 mill.
LT Debt $306.3 mill. **LT Interest** $22.0 mill.
(LT interest earned: 4.8x; total interest coverage: 4.4x) (46% of Cap'l)

Leases, Uncapitalized: Annual rentals $2.9 mill.

Pension Assets-12/08 $54.2 mill.
Oblig. $94.5 mill.

Pfd Stock None.

Common Stock 18,499,423 shs.
as of 8/5/09
MARKET CAP: $675 million (Small Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	1.7	7.3	9.8
Other	43.7	66.9	87.6
Current Assets	63.1	90.6	97.4
Accts Payable	29.1	36.6	39.6
Debt Due	37.8	75.3	11.5
Other	27.4	25.5	37.8
Current Liab.	94.3	137.4	88.9
Fix. Chg. Cov.	314%	293%	440%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	4.5%	5.0%	*4.0%*
"Cash Flow"	5.5%	6.0%	*6.5%*
Earnings	3.5%	5.5%	*9.5%*
Dividends	1.5%	2.0%	*4.5%*
Book Value	4.5%	5.0%	*4.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2006	64.3	63.0	75.0	66.3	268.6
2007	72.3	79.3	75.8	74.0	301.4
2008	68.9	80.3	85.3	84.2	318.7
2009	79.6	93.6	*91.8*	*85.0*	*350*
2010	*83.0*	*99.0*	*98.0*	*90.0*	*370*

Calendar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2006	.35	.36	.32	.30	1.33
2007	.40	.42	.44	.35	1.62
2008	.30	.53	.26	.43	1.55
2009	.28	.64	*.56*	*.42*	*1.90*
2010	*.30*	*.65*	*.60*	*.50*	*2.05*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.225	.225	.225	.225	.90
2006	.225	.225	.225	.235	.91
2007	.235	.235	.235	.250	.96
2008	.250	.250	.250	.250	1.00
2009	.250	.250	.250		

BUSINESS: American States Water Co. operates as a holding company. Through its principal subsidiary, Golden State Water Company, it supplies water to more than 250,000 customers in 75 communities in 10 counties. Service areas include the greater metropolitan areas of Los Angeles and Orange Counties. The company also provides electric utility services to nearly 23,250 customers in the city of Big Bear Lake and in areas of San Bernardino County. Acquired Chaparral City Water of Arizona (10/00). Has roughly 675 employees. Officers & directors own 2.5% of common stock (4/09 Proxy). Chairman: Lloyd Ross. President & CEO: Floyd Wicks. Inc: CA. Addr.: 630 East Foothill Boulevard, San Dimas, CA 91773. Tele.: 909-394-3600. Internet: www.aswater.com.

Recent regulatory changes are fueling strength at American States Water. The water utility provider posted earnings of $0.64 a share in the second quarter, 21% better than last year, as a more business friendly approach by the California Public Utilities Commission helped sales improve 17%, to $94 million, despite a decrease in water consumption. Specifically, the adoption of a water rate adjustment mechanism and a modified cost balancing account were $2.2 million accretive to the top line and boosted share earnings by $0.07. We suspect that third-quarter results were probably even more impressive, with the bottom line nearly doubling from last year's weak tally. As a result, we've raised our full-year earnings estimate by 12% to $1.90.

We think there could be some hurdles ahead, however. Comparisons get much tougher beginning with the December quarter and are likely to remain so henceforth. Meanwhile, operating costs appear to be on the rise, with infrastructure and maintenance expenses continuing to mount due to aging water systems. Thus, we look for growth to slow considerably in the fourth quarter and 2010.

Finances remain a major concern. Although management paid down roughly $45 million in debt in the June quarter, it was forced to issue shares to do so. Further debt reduction is highly unlikely going forward, with ongoing financing likely to be used to meet capital requirements. In fact, we look for AWR to tap debt and equity markets in the future in order to comply with increasingly stringent EPA regulations and improve infrastructures. The increased interest rate expense and greater share count that will accompany such maneuverings are likely to dilute future gains, though.

Growth-minded investors can find better options. AWR does not stand out for Timeliness or 3- to 5-year appreciation potential, as infrastructure costs mire future growth rates. Although income-minded investors may be hesitant to jump aboard, given that there has yet to be an announcement about a dividend increase, we are not concerned and suspect that a raise is on the horizon, thus maintaining the history of annual dividend growth.

Andre J. Costanza *October 23, 2009*

(A) Primary earnings. Excludes nonrecurring gains/(losses): '04, 14¢; '05, 25¢; '06, 6¢; '08, (27¢). Next earnings report due early Nov. May not add due to rounding.

(B) Dividends historically paid in early March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions, adjusted for split.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	70
Earnings Predictability	70

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CALIFORNIA WATER NYSE-CWT

RECENT PRICE 39.52 | P/E RATIO 18.7 (Trailing: 18.7 Median: 22.0) | RELATIVE P/E RATIO 1.07 | DIV'D YLD 3.0% | VALUE LINE

TIMELINESS 3 Lowered 7/3/09
SAFETY 3 Lowered 7/27/07
TECHNICAL 4 Raised 10/23/09
BETA .75 (1.00 = Market)

2012-14 PROJECTIONS

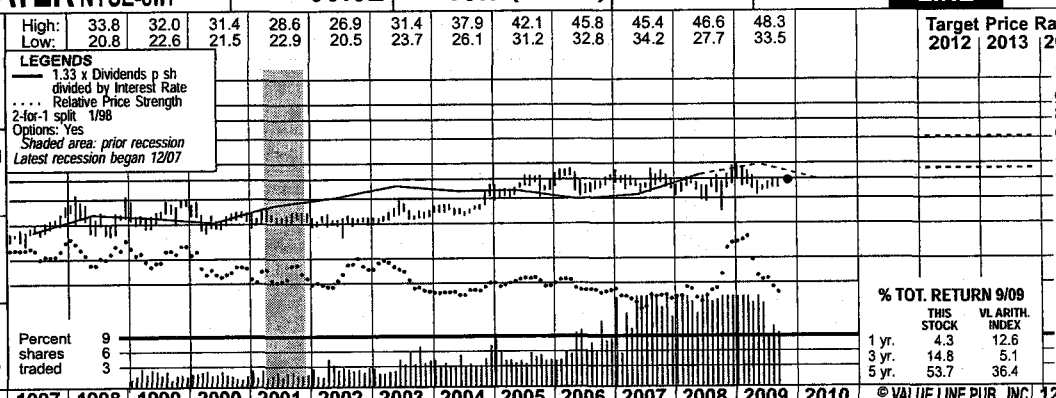
	Price	Gain	Ann'l Total Return
High	65	(+65%)	15%
Low	45	(+15%)	6%

Insider Decisions

	N	D	J	F	M	A	M	J	J
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	1	0	0	0	0	0	0	0	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	107	83	76
to Sell	46	81	85
Hld's(000)	9799	10000	10018



% TOT. RETURN 9/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	4.3	12.6
3 yr.	14.8	5.1
5 yr.	53.7	36.4

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
13.34	12.59	13.17	14.48	15.48	14.76	15.96	16.16	16.26	17.33	16.37	17.18	17.44	16.20	17.76	19.80	*21.45*	*21.85*	Revenues per sh	*24.45*
2.25	2.02	2.07	2.50	2.92	2.60	2.75	2.52	2.20	2.65	2.51	2.83	3.03	2.71	3.12	3.72	*4.15*	*4.20*	"Cash Flow" per sh	*4.65*
1.35	1.22	1.17	1.51	1.83	1.45	1.53	1.31	.94	1.25	1.21	1.46	1.47	1.34	1.50	1.90	*2.10*	*2.20*	Earnings per sh A	*2.65*
.96	.99	1.02	1.04	1.06	1.07	1.09	1.10	1.12	1.12	1.12	1.13	1.14	1.15	1.16	1.17	*1.18*	*1.19*	Div'd Decl'd per sh B ■	*1.34*
2.53	2.26	2.17	2.83	2.61	2.74	3.44	2.45	4.09	5.82	4.39	3.73	4.01	4.28	3.68	4.82	*5.00*	*5.00*	Cap'l Spending per sh	*5.00*
10.90	11.56	11.72	12.22	13.00	13.38	13.43	12.90	12.95	13.12	14.44	15.66	15.79	18.15	18.50	19.44	*19.75*	*20.45*	Book Value per sh C	*22.20*
11.38	12.49	12.54	12.62	12.62	12.62	12.94	15.15	15.18	15.18	16.93	18.37	18.39	20.66	20.67	20.72	*21.00*	*21.50*	Common Shs Outst'g D	*22.50*
13.6	14.1	13.7	11.9	12.6	17.8	17.8	19.6	27.1	19.8	22.1	20.1	24.9	29.2	26.1	19.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*21.0*
.80	.92	.92	.75	.73	.93	1.01	1.27	1.39	1.08	1.26	1.06	1.33	1.58	1.39	1.20			Relative P/E Ratio	*1.40*
5.2%	5.8%	6.4%	5.8%	4.6%	4.2%	4.0%	4.3%	4.4%	4.5%	4.2%	3.9%	3.1%	2.9%	3.0%	3.1%			Avg Ann'l Div'd Yield	*2.4%*
206.4	244.8	246.8	263.2	277.1	315.6	320.7	334.7	367.1	410.3	*450*	*470*	Revenues ($mill) E	*550*
19.9	20.0	14.4	19.1	19.4	26.0	27.2	25.6	31.2	39.8	*45.0*	*47.0*	Net Profit ($mill)	*60.0*
37.9%	42.3%	39.4%	39.7%	39.9%	39.6%	42.4%	37.4%	39.9%	37.7%	*38.5%*	*38.5%*	Income Tax Rate	*39.0%*
--	--	--	--	10.3%	3.2%	3.3%	10.6%	8.3%	8.6%	*8.5%*	*10.0%*	AFUDC % to Net Profit	*10.0%*
46.9%	48.9%	50.3%	55.3%	50.2%	48.6%	48.3%	43.5%	42.9%	41.6%	*48.5%*	*47.0%*	Long-Term Debt Ratio	*45.0%*
52.0%	50.2%	48.8%	44.0%	49.1%	50.8%	51.1%	55.9%	56.6%	58.4%	*51.5%*	*53.0%*	Common Equity Ratio	*55.0%*
333.8	388.8	402.7	453.1	498.4	565.9	568.1	670.1	674.9	690.4	*800*	*825*	Total Capital ($mill)	*950*
515.4	582.0	624.3	697.0	759.5	800.3	862.7	941.5	1010.2	1112.4	*1175*	*1240*	Net Plant ($mill)	*1425*
7.8%	6.8%	5.3%	5.9%	5.6%	6.1%	6.3%	5.2%	5.9%	7.1%	*7.0%*	*7.0%*	Return on Total Cap'l	*8.0%*
11.2%	10.0%	7.2%	9.4%	7.8%	8.9%	9.3%	6.8%	8.1%	9.9%	*11.5%*	*10.5%*	Return on Shr. Equity	*12.0%*
11.4%	10.1%	7.2%	9.5%	7.9%	9.0%	9.3%	6.8%	8.1%	9.9%	*11.5%*	*10.5%*	Return on Com Equity	*12.0%*
3.5%	1.8%	NMF	1.0%	.7%	2.1%	2.1%	1.0%	1.8%	3.8%	*5.0%*	*5.0%*	Retained to Com Eq	*6.0%*
70%	82%	119%	90%	91%	77%	78%	86%	77%	61%	*55%*	*54%*	All Div'ds to Net Prof	*50%*

CAPITAL STRUCTURE as of 6/30/09
Total Debt $398.2 mill. **Due in 5 Yrs** $39.8 mill.
LT Debt $383.5 mill. **LT Interest** $24.0 mill.

(LT interest earned: 4.7x; total int. cov.: 4.3x)

Pension Assets-12/08 $66.9 mill.
Oblig. $192.9 mill.

Pfd Stock None

Common Stock 20,744,952 shs.
as of 8/3/09

MARKET CAP: $825 million (Small Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	6.7	13.9	41.5
Other	53.3	65.9	83.0
Current Assets	60.0	79.8	124.5
Accts Payable	36.7	45.1	48.3
Debt Due	2.7	42.8	14.7
Other	30.3	35.3	38.2
Current Liab.	69.7	123.2	101.2
Fix. Chg. Cov.	333%	398%	432%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	2.0%	1.5%	5.5%
"Cash Flow"	2.0%	5.5%	6.5%
Earnings	--	7.0%	9.0%
Dividends	1.0%	0.5%	2.5%
Book Value	4.0%	6.5%	3.0%

Calendar	QUARTERLY REVENUES ($ mill.) E Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	65.2	81.1	107.8	80.6	334.7
2007	71.6	95.8	113.8	85.9	367.1
2008	72.9	105.6	131.7	100.1	410.3
2009	*86.7*	*116.7*	*138.6*	*108*	*450*
2010	*90.0*	*120*	*145*	*115*	*470*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	.04	.31	.68	.31	1.34
2007	.07	.37	.67	.39	1.50
2008	.01	.48	1.06	.35	1.90
2009	*.12*	*.58*	*1.04*	*.36*	*2.10*
2010	*.13*	*.60*	*1.08*	*.39*	*2.20*

Calendar	QUARTERLY DIVIDENDS PAID B ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.285	.285	.285	.285	1.14
2006	.2875	.2875	.2875	.2875	1.15
2007	.290	.290	.290	.290	1.16
2008	.293	.293	.293	.293	1.17
2009	.295	.295	.295		

BUSINESS: California Water Service Group provides regulated and nonregulated water service to roughly 463,600 customers in 83 communities in California, Washington, New Mexico, and Hawaii. Main service areas: San Francisco Bay area, Sacramento Valley, Salinas Valley, San Joaquin Valley & parts of Los Angeles. Acquired Rio Grande Corp; West Hawaii Utilities (9/08). Revenue breakdown, '08: residential, 69%; business, 18%; public authorities, 5%; industrial, 5%; other, 3%. '08 reported depreciation rate: 2.4%. Has roughly 929 employees. Chairman: Robert W. Foy. President & CEO: Peter C. Nelson (4/09 Proxy). Inc.: Delaware. Address: 1720 North First Street, San Jose, California 95112-4598. Telephone: 408-367-8200. Internet: www.calwatergroup.com.

An improved regulatory environment has created a more favorable backdrop for California Water Service Group. Indeed, the water utility provider exceeded high expectations in the second quarter, reporting earnings of $0.58 a share, 21% better than last year. The top line advanced 11%, to $116 million, with rate increases adding $19.2 million and offsetting lower usage by existing customers. We expect the top line to continue benefiting from ongoing progress on this front, particularly the California Public Utilities Commission's recent adoption of a water revenue adjustment mechanism, the implementation of a modified cost balancing account, and tiered rates. The company filed a general rate case seeking an additional $70.6 million in 2011, with requests of roughly $25 million for 2012 and 2013. Interim cases, meanwhile, should add nearly $9 million annually.

Nevertheless, we suspect that growth hit a speed bump in the September period . . . (Results were not out when we went to press with this issue.) Although we look for demand to remain healthy, tough comparisons probably resulted in a modest share-net shortfall. Plus, we expect that operating costs did not abate.

. . . and will remain moderate going forward. Even though tough comps ought to subside a bit over the next few quarters, profitability will likely be limited by rising infrastructure costs. Maintenance expenses should continue to rise as many pipelines and wells are in need of serious attention. Meanwhile, the additional finance commitments that will have to be assumed, given CWT's weak balance sheet and high costs of doing business, are expected to limit bottom-line growth for the foreseeable future.

This stock is not for everybody. Its growth prospects are dull, given the growing infrastructure costs that we envision being required over the next couple of years. The issue may, however, interest those looking to take shelter from the economic uncertainty that has resulted in recent broad market volatility. Indeed, CWT's steady dividend growth makes an attractive component in today's market and may well appeal to risk-averse investors seeking a low-risk alternative.

Andre J. Costanza *October 23, 2009*

(A) Basic EPS. Excl. nonrecurring gain (loss): '00, (7¢); '01, 4¢; '02, 8¢. Next earnings report due late February.

(B) Dividends historically paid in mid-Feb., May, Aug., and Nov. ■ Div'd reinvestment plan available.

(C) Incl. deferred charges. In '08: $3.9 mill., $.19/sh.
(D) In millions, adjusted for split.
(E) Excludes non-reg. rev.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	70
Earnings Predictability	75

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SOUTHWEST WATER NDQ-SWWC

RECENT PRICE 5.50 | P/E RATIO 30.6 (Trailing: 50.0 Median: 29.0) | RELATIVE P/E RATIO 1.76 | DIV'D YLD 1.8% | VALUE LINE

TIMELINESS 4 New 10/23/09
SAFETY 4 New 10/23/09
TECHNICAL 2 Raised 9/25/09
BETA 1.10 (1.00 = Market)

2012-14 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	16	190%	31%
Low	9	65%	13%

Insider Decisions

	N	D	J	F	M	A	M	J	J
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	0	0	0	0	0	0	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	33	39	42
to Sell	42	38	39
Hld's(000)	11260	11007	11107

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
High:	5.6	9.2	8.3	10.2	12.4	11.2	14.3	15.2	19.1	16.4	13.4	5.9								
Low:	3.5	3.6	5.1	6.9	7.6	8.1	10.3	9.0	10.8	11.5	2.7	3.1								
	4.03	4.20	4.84	5.31	5.61	5.63	6.16	7.49	8.15	9.12	10.70	9.23	9.10	9.42	8.96	8.87	*8.60*	*8.80*	Revenues per sh	*10.40*
	.38	.38	.44	.46	.53	.59	.65	.76	.87	.86	.91	.67	.78	.85	.69	.66	*1.00*	*1.20*	"Cash Flow" per sh	*1.55*
	.08	.09	.12	.15	.21	.25	.31	.38	.42	.39	.44	.23	.34	.40	.31	.04	*.15*	*.30*	Earnings per sh [A]	*.50*
	.14	.08	.08	.09	.09	.10	.11	.13	.14	.15	.16	.18	.20	.21	.23	.24	*.01*	*.01*	Div'd Decl'd per sh [B]	*.05*
	.60	.72	.84	.95	.74	.79	.53	.55	1.06	1.78	1.14	1.26	1.66	1.87	1.70	1.35	*1.70*	*1.75*	Cap'l Spending per sh	*1.90*
	2.31	2.31	2.45	2.40	2.52	2.70	3.05	3.44	3.84	4.27	4.90	6.17	6.49	6.98	6.54	4.55	*4.70*	*4.90*	Book Value per sh [D]	*6.05*
	11.97	12.13	11.74	12.45	12.65	12.83	13.12	13.99	14.17	14.35	16.17	20.36	22.33	23.80	24.27	24.90	*25.00*	*25.50*	Common Shs Outst'g [C]	*26.50*
	35.8	22.3	14.6	16.5	16.9	17.2	19.6	17.0	19.8	24.8	21.2	51.6	35.5	34.8	42.1	NMF			Avg Ann'l P/E Ratio	*25.0*
	2.11	1.46	.98	1.03	.97	.89	1.12	1.11	1.01	1.35	1.21	2.73	1.89	1.88	2.23	NMF			Relative P/E Ratio	*1.65*
	4.7%	4.2%	4.7%	3.4%	2.7%	2.3%	1.8%	2.0%	1.7%	1.5%	1.7%	1.5%	1.6%	1.5%	1.8%	2.4%			Avg Ann'l Div'd Yield	*1.2%*
							80.9	104.7	115.5	130.8	173.0	188.0	203.2	224.2	217.3	220.9	*215*	*225*	Revenues ($mill)	*275*
							4.2	5.4	6.2	6.0	7.2	4.5	7.3	9.3	5.1	1.0	*3.5*	*7.5*	Net Profit ($mill)	*13.0*
							39.0%	37.0%	36.0%	34.9%	35.9%	36.1%	36.0%	35.0%	56.0%	NMF	*NMF*	*NMF*	Income Tax Rate	*NMF*
							--	--	14.4%	3.2%	--	11.0%	9.5%	--	12.5%	10.0%	*14.0%*	*13.5%*	AFUDC % to Net Profit	*12.0%*
							45.2%	48.8%	51.4%	56.7%	47.9%	47.9%	44.7%	43.6%	47.7%	62.6%	*60.5%*	*57.5%*	Long-Term Debt Ratio	*48.5%*
							54.1%	50.7%	48.2%	42.9%	51.8%	52.0%	55.1%	56.3%	52.1%	37.2%	*39.5%*	*42.5%*	Common Equity Ratio	*51.5%*
							73.9	95.0	113.0	142.8	152.8	242.0	262.9	295.2	304.5	304.4	*300*	*295*	Total Capital ($mill)	*310*
							113.7	157.8	171.1	203.9	219.5	302.6	344.8	389.6	417.9	429.3	*460*	*480*	Net Plant ($mill)	*525*
							7.6%	7.6%	7.6%	5.8%	6.2%	3.1%	4.1%	4.5%	2.9%	1.8%	*2.5%*	*3.5%*	Return on Total Cap'l	*5.0%*
							10.3%	11.1%	11.4%	9.7%	9.0%	3.6%	5.0%	5.6%	3.2%	.9%	*3.0%*	*6.0%*	Return on Shr. Equity	*8.0%*
							10.4%	11.1%	11.4%	9.7%	9.1%	3.6%	5.0%	5.6%	3.2%	.8%	*3.0%*	*6.0%*	Return on Com Equity	*8.0%*
							7.0%	7.8%	7.8%	6.3%	5.8%	.8%	2.1%	2.6%	NMF	NMF	*1.0%*	*4.0%*	Retained to Com Eq	*6.5%*
							33%	31%	32%	36%	36%	78%	58%	54%	112%	NMF	*85%*	*42%*	All Div'ds to Net Prof	*31%*

Bold figures are Value Line estimates

LEGENDS
2.50 x Dividends p sh divided by Interest Rate
Relative Price Strength
6-for-5 split 12/96
5-for-4 split 10/98
3-for-2 split 10/99
5-for-4 split 1/01
4-for-3 split 1/04
Options: No
Shaded area: prior recession
Latest recession began 12/07

Target Price Range 2012 | 2013 | 2014

% TOT. RETURN 9/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	-60.8	12.6
3 yr.	-57.5	5.1
5 yr.	-54.1	36.4

CAPITAL STRUCTURE as of 6/30/09
Total Debt $152.0 mill. **Due in 5 Yrs** $149.8 mill.
LT Debt $149.8 mill. **LT Interest** $6.6 mill.
(Total interest coverage: 2.7x) (48% of Cap'l)

Leases, Uncapitalized: Annual rentals $5.5 mill.
Pension Liability None

Pfd Stock $.458 mill. **Pfd Div'd** $.020 mill.
Common Stock 24,888,745 shs.
as of 8/31/09

MARKET CAP: $125 million (Small Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	2.9	1.1	1.6
Receivables	26.0	29.7	31.7
Inventory (Avg Cst)	--	--	--
Other	32.7	26.9	24.5
Current Assets	61.6	57.7	57.8
Accts Payable	14.9	16.1	13.7
Debt Due	1.9	2.2	2.2
Other	29.4	28.4	18.6
Current Liab.	46.2	46.7	34.5

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	5.0%	-0.5%	*2.5%*
"Cash Flow"	3.5%	-3.5%	*13.5%*
Earnings	2.0%	-10.0%	*12.0%*
Dividends	9.5%	8.5%	*-22.5%*
Book Value	9.0%	7.0%	*Nil*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2006	50.8	55.4	60.1	57.9	224.2
2007	48.1	55.0	57.4	56.8	217.3
2008	49.6	56.9	60.4	54.0	220.9
2009	50.1	52.4	*57.0*	*55.5*	*215*
2010	*52.0*	*55.0*	*60.0*	*58.0*	*225*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2006	.03	.08	.16	.13	.40
2007	.03	.09	.09	.11	.31[E]
2008	d.04	.03	d.02	.07	.04
2009	.03	.03	*.04*	*.05*	*.15*
2010	*.06*	*.06*	*.08*	*.10*	*.30*

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.048	.048	.048	.052	.20
2006	.052	.052	.052	.058	.21
2007	.058	.058	.058	.058	.23
2008	.06	.06	.06	.06	.24
2009	.025	.025	.025	.025	

BUSINESS: SouthWest Water Company provides a broad range of services including water production, treatment and distribution; wastewater collection and treatment; utility billing and collection; and utility infrastructure. It operates four groups, Utility, 32% of 2008 revenues; Texas Utility, 16%; O&M Services, 18%; Texas MUD Services, 34%. Utility and Texas Utility own and manage rate-regulated public water utilities in California, Alabama, Oklahoma, and Texas. O&M and Texas MUD Services maintain projects on a contract and fee basis. Off./dir. own 6.4% of com. shs.; Stein Roe IC, 9.2% (4/08 proxy). CEO/Chrmn: Mark Swatek. Inc.: DE. Addr.: One Wilshire Building, 624 S. Grand Ave. Ste. 2900, Los Angeles, CA 90017. Tel.: 213-929-1800. Internet: www.swwc.com.

SouthWest Water Company finally released its first- and second-quarter 10-Qs for 2009. The company has been delinquent in filing a number of its reports over the past few quarters because of the discovery of mistakes made reporting depreciation rates of assets gained through acquisitions, and accounting issues for revenues and related costs associated with the installation of water and sewer taps. Also, year-over-year revenue and earnings comparisons for the first two quarters are skewed by SouthWest's restatement of its financial reports for those periods. Meanwhile, the company is poised to have a lackluster year as the slowdown in the economy has impacted business over the past few quarters, and should continue to do so.

SouthWest's future growth will likely be achieved through acquisitions and rate increases. To this extent, the company has put in for a number of rate increase cases in California, Texas, and Alabama. It is also positioning itself to make 2010 a "test year" to establish its position for future petitions. SWWC may look to buy a utility to replace the one lost because of an eminent domain lawsuit in New Mexico (sold for a net total of nearly $54 million during the June interim).

This stock is untimely. SouthWest will likely be burdened by a number of charges over the next few quarters related to the late filings. Also, the recession has weighed down housing starts and limits potential new customers.

The recovery potential for this equity is offset by its risk. While we expect the top and bottom lines to recover out to 2012-2014 as the economy picks up, there is a degree of risk associated with these advances. This is reflected by SWWC's low rank for Financial Strength (C++), as well as mediocre scores for Earnings Predictability and Stock Price Stability. Another mark against the appeal of this equity is the reduced dividend payout, lowered 60% from the prior year. Overall, investors should look elsewhere at this time.

John D. Burke *October 23, 2009*

CASH POSITION	5-Year Av'g	6/30/09
Current Assets to Current Liabilities:	125%	168%
Cash & Equiv's to Current Liabilities:	10%	5%
Working Capital to Sales:	5%	11%

Company's Financial Strength	C++
Stock's Price Stability	45
Price Growth Persistence	40
Earnings Predictability	45

(A) Diluted earnings. Excludes nonrecurring gains (losses): '00, (3¢); '01, (5¢); '02, 1¢; '05, (23¢); '07, (54¢); '08, ($1.35); 1Q '09 (24¢); 2Q '09, (54¢). Next earnings report late November.
(B) Dividends historically paid in late January, April, July, and October.
(C) In millions, adjusted for splits.
(D) Includes intangibles. In 2008: $19.3 million, $0.83/share.
(E) Earnings may not add due to rounding.

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AQUA AMERICA NYSE-WTR

RECENT PRICE 16.65 | P/E RATIO 20.1 (Trailing: 22.2 Median: 25.0) | RELATIVE P/E RATIO 1.16 | DIV'D YLD 3.5% | VALUE LINE

TIMELINESS 3 Lowered 6/26/09
SAFETY 3 Lowered 8/1/03
TECHNICAL 4 Raised 10/16/09
BETA .65 (1.00 = Market)

2012-14 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	40	(+140%)	26%
Low	25	(+50%)	13%

Insider Decisions

	N	D	J	F	M	A	M	J	J
to Buy	0	0	0	0	0	0	0	0	0
Options	0	1	0	1	0	0	0	0	0
to Sell	0	1	0	0	0	0	0	0	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	131	130	117
to Sell	131	134	136
Hld's(000)	60996	63551	61341

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
High:	11.5	11.5	12.0	14.8	15.0	16.8	18.5	29.2	29.8	26.6	22.0	21.5								
Low:	7.2	7.6	6.3	9.4	9.6	11.8	14.2	17.5	20.1	18.9	12.2	16.1								
	1.70	1.82	1.84	1.86	2.02	2.09	2.41	2.46	2.70	2.85	2.97	3.48	3.85	4.03	4.52	4.63	*5.00*	*5.30*	Revenues per sh	*6.50*
	.42	.42	.47	.50	.56	.61	.72	.76	.86	.94	.96	1.09	1.21	1.26	1.37	1.42	*1.55*	*1.65*	"Cash Flow" per sh	*2.10*
	.24	.26	.29	.30	.34	.40	.42	.47	.51	.54	.57	.64	.71	.70	.71	.73	*.82*	*.90*	Earnings per sh A	*1.25*
	.21	.21	.22	.23	.24	.26	.27	.28	.30	.32	.35	.37	.40	.44	.48	.51	*.54*	*.56*	Div'd Decl'd per sh B■	*.65*
	.47	.46	.52	.48	.58	.82	.90	1.16	1.09	1.20	1.32	1.54	1.84	2.05	1.79	1.98	*2.10*	*2.20*	Cap'l Spending per sh	*2.75*
	2.29	2.41	2.46	2.69	2.84	3.21	3.42	3.85	4.15	4.36	5.34	5.89	6.30	6.96	7.32	7.82	*8.05*	*8.35*	Book Value per sh	*10.60*
	59.40	59.77	63.74	65.75	67.47	72.20	106.80	111.82	113.97	113.19	123.45	127.18	128.97	132.33	133.40	135.37	*136.00*	*136.50*	Common Shs Outst'g C	*138.00*
	14.4	13.5	12.0	15.6	17.8	22.5	21.2	18.2	23.6	23.6	24.5	25.1	31.8	34.7	32.0	24.9	*Bold figures are*		Avg Ann'l P/E Ratio	*25.0*
	.85	.89	.80	.98	1.03	1.17	1.21	1.18	1.21	1.29	1.40	1.33	1.69	1.87	1.70	1.50	*Value Line*		Relative P/E Ratio	*1.65*
	5.9%	6.0%	6.2%	4.9%	3.9%	2.9%	3.0%	3.3%	2.5%	2.5%	2.5%	2.3%	1.8%	1.8%	2.1%	2.8%	*estimates*		Avg Ann'l Div'd Yield	*2.0%*
							257.3	275.5	307.3	322.0	367.2	442.0	496.8	533.5	602.5	627.0	*680*	*730*	Revenues ($mill)	*900*
							45.0	50.7	58.5	62.7	67.3	80.0	91.2	92.0	95.0	97.9	*115*	*125*	Net Profit ($mill)	*170*
							38.4%	38.9%	39.3%	38.5%	39.3%	39.4%	38.4%	39.6%	38.9%	39.7%	*39.0%*	*39.0%*	Income Tax Rate	*39.0%*
							--	--	--	--	--	--	--	--	2.9%	3.1%	*3.5%*	*3.2%*	AFUDC % to Net Profit	*2.5%*
							52.9%	52.0%	52.2%	54.2%	51.4%	50.0%	52.0%	51.6%	55.4%	54.1%	*54.0%*	*54.0%*	Long-Term Debt Ratio	*49.0%*
							46.7%	47.8%	47.7%	45.8%	48.6%	50.0%	48.0%	48.4%	44.6%	45.9%	*46.0%*	*46.0%*	Common Equity Ratio	*51.0%*
							782.7	901.1	990.4	1076.2	1355.7	1497.3	1690.4	1904.4	2191.4	2306.6	*2385*	*2470*	Total Capital ($mill)	*2865*
							1135.4	1251.4	1368.1	1490.8	1824.3	2069.8	2280.0	2506.0	2792.8	2997.4	*3150*	*3300*	Net Plant ($mill)	*3600*
							7.6%	7.4%	7.8%	7.6%	6.4%	6.7%	6.9%	6.4%	5.9%	5.7%	*6.5%*	*6.5%*	Return on Total Cap'l	*6.5%*
							12.2%	11.7%	12.3%	12.7%	10.2%	10.7%	11.2%	10.0%	9.7%	9.3%	*10.5%*	*11.0%*	Return on Shr. Equity	*11.5%*
							12.3%	11.7%	12.4%	12.7%	10.2%	10.7%	11.2%	10.0%	9.7%	9.3%	*10.5%*	*11.0%*	Return on Com Equity	*11.5%*
							4.3%	4.7%	5.1%	5.2%	4.2%	4.6%	4.9%	3.7%	3.2%	2.8%	*4.0%*	*4.5%*	Retained to Com Eq D	*5.5%*
							65%	60%	59%	59%	59%	57%	56%	63%	67%	70%	*64%*	*61%*	All Div'ds to Net Prof	*53%*

LEGENDS
1.60 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
4-for-3 split 1/98
5-for-4 split 12/00
5-for-4 split 12/01
5-for-4 split 12/03
4-for-3 split 12/05
Options: Yes
Shaded area: prior recession
Latest recession began 12/07

Target Price Range 2012 | 2013 | 2014

Percent shares traded 15 10 5

% TOT. RETURN 9/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	2.1	12.6
3 yr.	-13.3	5.1
5 yr.	18.8	36.4

CAPITAL STRUCTURE as of 6/30/09
Total Debt $1255.4 mill. **Due in 5 Yrs** $245.0 mill.
LT Debt $1227.7 mill. **LT Interest** $65.0 mill.
(LT interest earned: 3.4x; total interest coverage: 3.4x) (54% of Cap'l)

Pension Assets-12/08 $112.2 mill. **Oblig.** $204.7 mill.

Pfd Stock None
Common Stock 135,917,740 shares as of 7/21/09

MARKET CAP: $2.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	14.5	14.9	13.8
Receivables	82.9	84.5	84.9
Inventory (AvgCst)	8.8	9.8	9.7
Other	9.3	11.8	14.1
Current Assets	115.5	121.0	122.5
Accts Payable	45.8	50.0	29.5
Debt Due	80.8	87.9	27.7
Other	56.6	55.3	148.6
Current Liab.	183.2	193.2	205.8
Fix. Chg. Cov.	323%	329%	325%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	8.0%	9.0%	*6.5%*
"Cash Flow"	9.5%	8.0%	*7.5%*
Earnings	7.5%	5.5%	*10.0%*
Dividends	7.0%	8.0%	*5.5%*
Book Value	9.5%	10.0%	*6.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	117.9	131.7	147.0	136.9	533.5
2007	137.3	150.6	165.5	149.1	602.5
2008	139.3	151.0	177.1	159.6	627.0
2009	154.5	167.3	*185*	*173.2*	*680*
2010	*165*	*185*	*195*	*185*	*730*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	.13	.17	.21	.19	.70
2007	.13	.17	.22	.19	.71
2008	.11	.17	.26	.19	.73
2009	.14	.19	*.28*	*.21*	*.82*
2010	*.15*	*.22*	*.30*	*.23*	*.90*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.098	.098	.098	.107	.40
2006	.107	.107	.115	.115	.44
2007	.115	.115	.125	.125	.48
2008	.125	.125	.125	.135	.51
2009	.135	.135	.135		

BUSINESS: Aqua America, Inc. is the holding company for water and wastewater utilities that serve approximately three million residents in Pennsylvania, Ohio, North Carolina, Illinois, Texas, New Jersey, Florida, Indiana, and five other states. Divested three of four non-water businesses in '91; telemarketing group in '93; and others. Acquired AquaSource, 7/03; Consumers Water, 4/99; and others. Water supply revenues '08: residential, 60%; commercial, 14%; industrial & other, 26%. Officers and directors own 1.3% of the common stock (4/09 Proxy). Chairman & Chief Executive Officer: Nicholas DeBenedictis. Incorporated: Pennsylvania. Address: 762 West Lancaster Avenue, Bryn Mawr, Pennsylvania 19010. Telephone: 610-525-1400. Internet: www.aquaamerica.com.

Aqua America completed the second quarter on a good note. Despite unfavorable weather conditions and the slowdown in the home building market, the company registered revenue and earnings growth of nearly 11%. Also, a number of rate increases were approved by the courts, and the year-to-date approval of $27.2 million in upward rate adjustments should help bolster the top and bottom lines over the next few quarters.

The company is likely to build on this momentum in 2010. Indeed, several rate-relief cases should be decided in the latter half of this year, and the more than $9 million request this year would be accretive to revenues and earnings going into 2010, provided the cases are ruled in Aqua's favor. Additional rate increase petitions for upwards of $50 million will also be filed during the next few months, notably in Pennsylvania and New Jersey.

Aqua America will likely remain active on the acquisition front. One of the company's current growth strategies involves purchasing available utilities and making infrastructure improvements in order to procure rate relief judgments. This should benefit WTR's cost structure, as well as expand its customer base.

A focus will also remain on procuring favorable rate increase judgments over the next few years. As a portion of capital spending (currently planned to run up to about $315 million per annum), approximately 10% is earmarked for "compliance spending", which is used for adjustments mandated by regulating agencies. The remaining 90% will likely be used to make improvements to current facilities in order to petition for more rate increases.

The board of directors approved a dividend increase. During its annual strategy session, a 7.4% rise was instituted, and will bring the year-ahead dividend up to $0.58 a share.

This neutrally ranked stock may appeal to conservative investors. The probable steady dividend growth and the worthwhile appreciation potential over the 2012–2014 horizon support the appeal of these shares. Also of note are the high marks for Stock Price Stability and Earnings Predictability.

John D. Burke *October 23, 2009*

(A) Diluted shares. Excl. nonrec. gains (losses): '99, (11¢); '00, 2¢; '01, 2¢; '02, 5¢; '03, 4¢. Excl. gain from disc. operations: '96, 2¢. Next earnings report due early November.

(B) Dividends historically paid in early March, June, Sept. & Dec. ■ Div'd. reinvestment plan available (5% discount).

(C) In millions, adjusted for stock splits.

Company's Financial Strength	B+
Stock's Price Stability	95
Price Growth Persistence	70
Earnings Predictability	100

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ATTACHMENT B

The Natural Gas Utility Industry has lost some ground since our June review. This group now ranks in the middle of our industry spectrum for Timeliness. The economy has shown signs of life in recent months, which has led most investors to look to more-risky plays as opposed to stable picks like natural gas utilities. However, investors should note that these equities typically offer attractive dividend yields that are backed by steady cash flows.

INDUSTRY TIMELINESS: 46 (of 98)

Economic Environment

No doubt, this sector has been pressured by the dour economic climate. The weakness in the housing market has particularly weighed on results for natural gas utilities. Usage has moderated as customers have curbed their consumption in an effort to rein in expenses. What's more, customer growth has been a concern in recent months. These businesses have also been having a tougher time collecting bills of late, which can also hurt results. Therefore, we suggest interested investors watch these trends in the months ahead as they will probably influence this group's performance.

Regulation

Rate cases are a key theme for companies in this sector. These businesses are regulated by state commissions that determine the return on equity these utilities can achieve. As a result, the performance of these equities remains tied to the current rates these companies have in place. Numerous utilities, at any given time, often have cases pending where they seek better rates from these commissions. Positive or negative news regarding a rate case can have a notable impact on a stock's performance in this industry. Notably, the falling natural gas prices in recent months has helped companies seeking rate relief. Indeed, lower prices favor customers, which makes a new rate for these utilities more palatable. Still, regulatory bodies try to strike a balance between customer and shareholder interests when evaluating a rate case. Interested investors should keep a close eye on stocks that have cases pending when reading the following pages.

Business Strategy

Weather is another element to consider when evaluating this industry's performance. Warmer or colder-than-expected weather can lead to volatile results. Thus, most of these utilities use weather-adjusted rate mechanisms to hedge against this risk. As such, we suggest conservative investors look for stocks that utilize this strategy. Many companies have also been increasingly investing in nonregulated businesses. These ventures are free from the regulatory bodies, and as a result, come with greater risk and reward tradeoff. On point, the utilities with nonregulated operations have generally been feeling the effects of the lower energy prices more so than these competitors without such operations. Also, of note, these nonregulated businesses provide another avenue for these utilities to diversify their income. All told, we expect these ventures to continue to be an important opportunity for this sector over the long term. Another strategy in this industry is conservation. Some governments have been offering these utilities incentives to participate in energy conservation programs. This approach allows these companies to adjust to market conditions without sacrificing profitability.

Conclusion

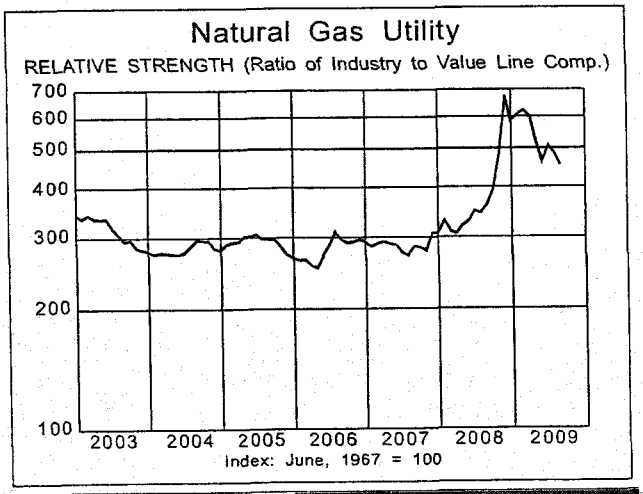
As a group, natural gas utilities will likely remain under pressure in the months ahead due to unfavorable gas prices. As a result, this industry is ranked near the midpoint of our Timeliness spectrum. Still, risk-averse investors may want to consider this group if the economic recovery stalls. Natural gas utilities tend to be a solid defensive play when the stock market is faltering. However, this sector's long-term prospects are uninspiring. Therefore, we recommend patient investors look elsewhere.

All told, investors should study these reports carefully and limit their investments to equities that appear well positioned to weather the difficult operating environment. Additionally, these utilities offer dividend yields that are above the *Value Line* median. Therefore, income-oriented accounts may find stocks with yields that are above the industry average (4.3%) of interest.

Richard Gallagher

Composite Statistics: Natural Gas Utility

2005	2006	2007	2008	2009	2010		12-14
36075	38273	38528	44207	*45500*	*47000*	Revenues ($mill)	*52750*
1386.0	1553.3	1562.4	1694.2	*1775*	*1850*	Net Profit ($mill)	*2150*
36.0%	35.3%	33.9%	35.7%	*36.0%*	*36.0%*	Income Tax Rate	*36.0%*
3.8%	4.0%	4.1%	3.8%	*3.9%*	*3.9%*	Net Profit Margin	*4.1%*
51.3%	51.2%	50.4%	50.6%	*51.0%*	*51.0%*	Long-Term Debt Ratio	*52.0%*
48.4%	48.7%	49.5%	49.4%	*48.0%*	*48.0%*	Common Equity Ratio	*46.0%*
29218	30847	32263	32729	*33250*	*34750*	Total Capital ($mill)	*40000*
30894	32543	33936	35342	*36750*	*38500*	Net Plant ($mill)	*46250*
6.5%	6.6%	6.5%	6.8%	*6.5%*	*6.5%*	Return on Total Cap'l	*7.0%*
9.7%	10.2%	9.8%	10.5%	*10.0%*	*10.5%*	Return on Shr. Equity	*11.0%*
9.8%	10.2%	9.8%	10.5%	*10.0%*	*10.5%*	Return on Com Equity	*11.0%*
3.5%	4.0%	3.7%	4.3%	*4.0%*	*4.5%*	Retained to Com Eq	*5.0%*
65%	61%	62%	59%	*60%*	*62%*	All Div'ds to Net Prof	*65%*
17.1	15.6	16.6	13.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*13.0*
.91	.84	.88	.83			Relative P/E Ratio	*.85*
3.8%	3.9%	3.7%	4.2%			Avg Ann'l Div'd Yield	*4.6%*
315%	327%	336%	358%	*375%*	*375%*	Fixed Charge Coverage	*400%*



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RECENT PRICE 33.35 | P/E RATIO 13.1 (Trailing: 10.9 Median: 14.0) | RELATIVE P/E RATIO 0.81 | DIV'D YLD 5.2% | VALUE LINE

TIMELINESS 3 Lowered 6/12/09
SAFETY 2 New 7/27/90
TECHNICAL 5 Lowered 9/11/09
BETA .75 (1.00 = Market)

2012-14 PROJECTIONS

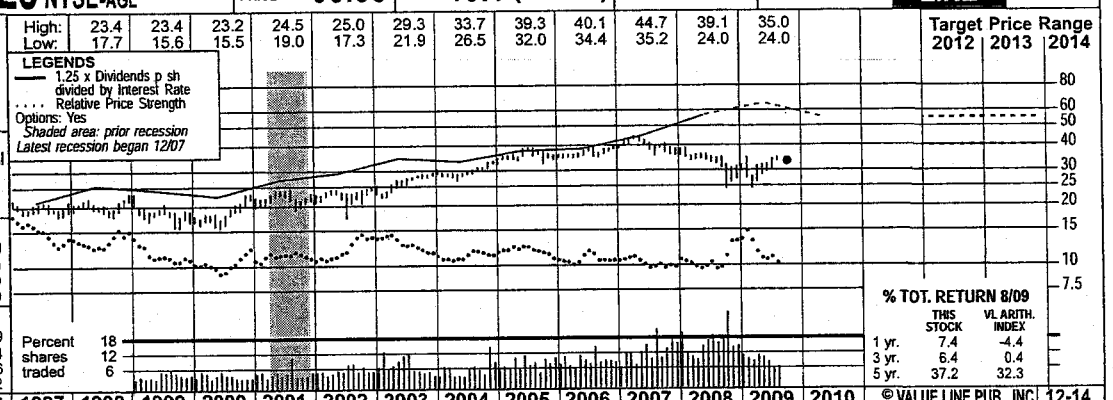
	Price	Gain	Ann'l Total Return
High	55	(+65%)	17%
Low	40	(+20%)	10%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	0	0	0	0	0
Options	0	2	1	0	2	0	0	1	0
to Sell	0	3	1	0	1	0	0	2	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	107	110	124
to Sell	111	107	96
Hld's(000)	46113	45714	45662



% TOT. RETURN 8/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	7.4	-4.4
3 yr.	6.4	0.4
5 yr.	37.2	32.3

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
22.73	23.59	19.32	21.91	22.75	23.36	18.71	11.25	19.04	15.32	15.25	23.89	34.98	33.73	32.64	36.41	*32.20*	*34.50*	Revenues per sh [A]	*38.80*
2.25	2.24	2.33	2.49	2.42	2.65	2.29	2.86	3.31	3.39	3.47	3.29	4.20	4.50	4.65	4.68	*4.70*	*4.95*	"Cash Flow" per sh	*5.40*
1.08	1.17	1.33	1.37	1.37	1.41	.91	1.29	1.50	1.82	2.08	2.28	2.48	2.72	2.72	2.71	*2.70*	*2.90*	Earnings per sh [A B]	*3.30*
1.04	1.04	1.04	1.06	1.08	1.08	1.08	1.08	1.08	1.08	1.11	1.15	1.30	1.48	1.64	1.68	*1.72*	*1.76*	Div'ds Decl'd per sh [C■]	*1.88*
2.49	2.37	2.17	2.37	2.59	2.05	2.51	2.92	2.83	3.30	2.46	3.44	3.44	3.26	3.39	4.84	*5.15*	*5.30*	Cap'l Spending per sh	*5.60*
9.90	10.19	10.12	10.56	10.99	11.42	11.59	11.50	12.19	12.52	14.66	18.06	19.29	20.71	21.74	21.48	*23.10*	*23.40*	Book Value per sh [D]	*23.55*
49.72	50.86	55.02	55.70	56.60	57.30	57.10	54.00	55.10	56.70	64.50	76.70	77.70	77.70	76.40	76.90	*78.00*	*79.00*	Common Shs Outst'g [E]	*85.00*
17.9	15.1	12.6	13.8	14.7	13.9	21.4	13.6	14.6	12.5	12.5	13.1	14.3	13.5	14.7	12.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*15.0*
1.06	.99	.84	.86	.85	.72	1.22	.88	.75	.68	.71	.69	.76	.73	.78	.74			Relative P/E Ratio	*1.00*
5.4%	5.9%	6.2%	5.6%	5.4%	5.5%	5.5%	6.2%	4.9%	4.7%	4.3%	3.9%	3.7%	4.0%	4.1%	5.0%			Avg Ann'l Div'd Yield	*3.8%*
1068.6	607.4	1049.3	868.9	983.7	1832.0	2718.0	2621.0	2494.0	2800.0	*2510*	*2725*	Revenues ($mill) [A]	*3300*
52.1	71.1	82.3	103.0	132.4	153.0	193.0	212.0	211.0	207.6	*155*	*160*	Net Profit ($mill)	*180*
33.1%	34.3%	40.7%	36.0%	35.9%	37.0%	37.7%	37.8%	37.6%	40.5%	*35.0%*	*38.0%*	Income Tax Rate	*38.0%*
4.9%	11.7%	7.8%	11.9%	13.5%	8.4%	7.1%	8.1%	8.5%	7.4%	*8.4%*	*8.4%*	Net Profit Margin	*8.5%*
45.3%	45.9%	61.3%	58.3%	50.3%	54.0%	51.9%	50.2%	50.2%	50.3%	*48.0%*	*45.0%*	Long-Term Debt Ratio	*43.0%*
49.2%	48.3%	38.7%	41.7%	49.7%	46.0%	48.1%	49.8%	49.8%	49.7%	*52.0%*	*55.0%*	Common Equity Ratio	*57.0%*
1345.8	1286.2	1736.3	1704.3	1901.4	3008.0	3114.0	3231.0	3335.0	3327.0	*3475*	*3350*	Total Capital ($mill)	*3500*
1598.9	1637.5	2058.9	2194.2	2352.4	3178.0	3271.0	3436.0	3566.0	3816.0	*4000*	*4150*	Net Plant ($mill)	*4400*
5.7%	7.4%	6.5%	8.1%	8.9%	6.3%	7.9%	8.0%	7.7%	7.4%	*7.5%*	*8.0%*	Return on Total Cap'l	*9.0%*
7.1%	10.2%	12.3%	14.5%	14.0%	11.0%	12.9%	13.2%	12.7%	12.6%	*11.5%*	*12.5%*	Return on Shr. Equity	*14.0%*
7.9%	11.5%	12.3%	14.5%	14.0%	11.0%	12.9%	13.2%	12.7%	12.6%	*11.5%*	*12.5%*	Return on Com Equity	*14.0%*
NMF	3.2%	4.2%	7.0%	6.6%	5.6%	6.2%	6.3%	5.3%	5.1%	*4.0%*	*5.0%*	Retained to Com Eq	*6.0%*
101%	72%	65%	52%	53%	49%	52%	52%	58%	60%	*64%*	*60%*	All Div'ds to Net Prof	*57%*

CAPITAL STRUCTURE as of 6/30/09
Total Debt $2093.0 mill. Due in 5 Yrs $962.0 mill.
LT Debt $1675.0 mill. LT Interest $90.0 mill.
(Total interest coverage: 3.9x)

Leases, Uncapitalized Annual rentals $30.0 mill.
Pension Assets-12/08 $242.0 mill.
Oblig. $442.0 mill.

Pfd Stock None

Common Stock 77,278,942 shs.
as of 7/24/09
MARKET CAP: $2.6 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	21.0	16.0	12.0
Other	1790.0	2026.0	1304.0
Current Assets	1811.0	2042.0	1316.0
Accts Payable	172.0	202.0	167.0
Debt Due	580.0	866.0	418.0
Other	893.0	915.0	696.0
Current Liab.	1645.0	1983.0	1281.0
Fix. Chg. Cov.	391%	416%	527%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	4.0%	15.5%	*2.0%*
"Cash Flow"	6.0%	6.5%	*2.5%*
Earnings	7.0%	8.5%	*3.5%*
Dividends	4.0%	8.0%	*2.5%*
Book Value	7.0%	10.0%	*1.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	1044	436	434	707	2621
2007	973	467	369	685	2494
2008	1012	*444*	539	805	2800
2009	995	377	*440*	*698*	*2510*
2010	*1020*	*450*	*480*	*775*	*2725*

Calendar	EARNINGS PER SHARE [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	1.41	.25	.46	.60	2.72
2007	1.29	.40	.17	.86	2.72
2008	1.16	.30	.28	.97	2.71
2009	1.55	.26	*.20*	*.69*	*2.70*
2010	*1.40*	*.30*	*.30*	*.90*	*2.90*

Calendar	QUARTERLY DIVIDENDS PAID [C■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.31	.31	.31	.37	1.30
2006	.37	.37	.37	.37	1.48
2007	.41	.41	.41	.41	1.64
2008	.42	.42	.42	.42	1.68
2009	.43	.43	.43		

BUSINESS: AGL Resources Inc. is a public utility holding company. Its distribution subsidiaries include Atlanta Gas Light, Chattanooga Gas, Elizabethtown Gas and Virginia Natural Gas. The utilities have more than 2.2 million customers in Georgia, Virginia, Tennessee, New Jersey, Florida, and Maryland. Engaged in non-regulated natural gas marketing and other allied services. Deregulated subsidiaries: Georgia Natural Gas markets natural gas at retail. Sold Utilipro, 3/01. Acquired Compass Energy Services, 10/07. Franklin Resources owns 7.7% of common stock; off./dir., less than 1.0% (3/09 Proxy). Pres. & CEO: John W. Somerhalder II. Inc.: GA. Addr.: Ten Peachtree Place N.E., Atlanta, GA 30309. Telephone: 404-584-4000. Internet: www.aglresources.com.

We do not expect 2009 to be a banner year for AGL Resources. The company reported healthy results in the first quarter. However, performance was less favorable in the recent interim. The Wholesale services business posted an operating loss of $11 million, while the Retail Energy Operations and Energy Investments units reported lower earnings. On the bright side, the Distribution Operations business posted moderate growth in operating earnings. This was primarily due to higher fees to marketers in Georgia for the storage of natural gas inventory and greater pipeline replacement revenues at Atlanta Gas Light. Overall, revenues and share earnings declined in the June period. Looking forward, comparisons will likely also prove unfavorable for the second half of the year. Thus, we anticipate lower revenues and relatively flat share earnings for full-year 2009.

Subsidiary Atlanta Gas Light has announced a system infrastructure investment project. This $400 million program will be completed over a 10-year period. Infrastructure improvements include upgrading the utility's distribution system and its liquefied natural gas facilities. This project will improve system reliability, increase operational flexibility, and allow Atlanta Gas Light to meet its forecasted growth objectives.

Elizabethtown Gas has modified its rate case filing. It had originally requested a $25 million rate hike, but has since lowered this amount to $17 million. The proposed increase would become effective at the beginning of 2010. Meanwhile, Atlanta Gas Light has requested to postpone a rate case filing, which had originally been scheduled for November 1st of this year. However, it does plan to file sometime after that (June 1, 2010 at the latest). Virginia Natural Gas and Chattanooga Gas also intend to file rate cases in 2010.

We anticipate higher revenues and share earnings at the company by 2012-2014, on better operating conditions. Moreover, AGL has a healthy dividend yield and earns high marks for Safety, Price Stability, and Earnings Predictability. From the present quotation, **this issue features decent risk-adjusted total return potential.**

Michael Napoli, CPA *September 11, 2009*

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	75
Earnings Predictability	90

(A) Fiscal year ends December 31st. Ended September 30th prior to 2002.
(B) Diluted earnings per share. Excl. nonrecurring gains (losses): '95, ($0.83); '99, $0.39; '00, $0.13; '01, $0.13; '03, ($0.07); '08, $0.13. Next earnings report due late October. (C) Dividends historically paid early March, June, Sept., and Dec. ■ Div'd reinvest. plan available. (D) Includes intangibles. In 2008: $418 million, $5.44/share. (E) In millions.

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ATMOS ENERGY CORP. NYSE-ATO

RECENT PRICE 27.06 | P/E RATIO 12.1 (Trailing: 11.9 Median: 16.0) | RELATIVE P/E RATIO 0.75 | DIV'D YLD 5.0% | VALUE LINE

TIMELINESS 3 Lowered 9/11/09
SAFETY 2 Raised 12/16/05
TECHNICAL 4 Lowered 9/4/09
BETA .65 (1.00 = Market)

2012-14 PROJECTIONS

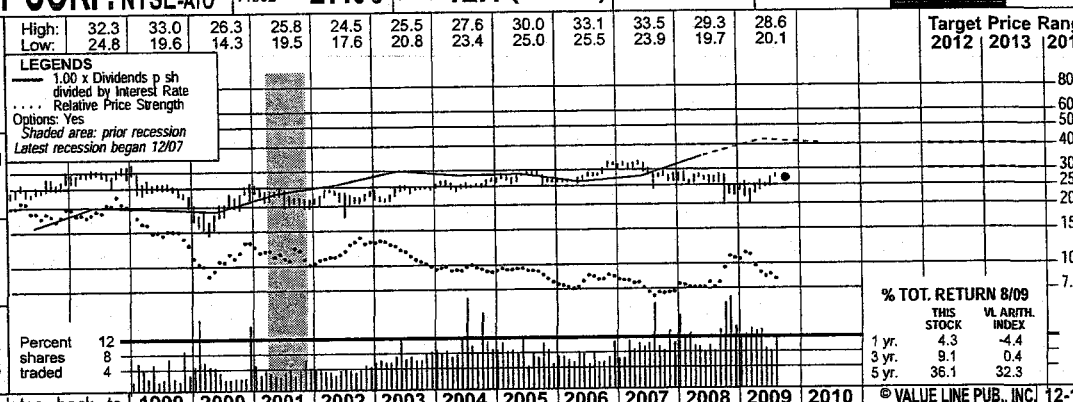
	Price	Gain	Ann'l Total Return
High	40	(+50%)	14%
Low	30	(+10%)	7%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	1	0	0	0	1	0	0	0
Options	0	0	0	0	1	0	0	0	0
to Sell	0	1	1	0	1	0	0	0	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	141	108	107
to Sell	103	122	115
Hld's(000)	53678	53874	54285



% TOT. RETURN 8/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	4.3	-4.4
3 yr.	9.1	0.4
5 yr.	36.1	32.3

Atmos Energy's history dates back to 1906 in the Texas Panhandle. Over the years, through various mergers, it became part of Pioneer Corporation, and, in 1981, Pioneer named its gas distribution division Energas. In 1983, Pioneer organized Energas as a separate subsidiary and distributed the outstanding shares of Energas to Pioneer shareholders. Energas changed its name to Atmos in 1988. Atmos acquired Trans Louisiana Gas in 1986, Western Kentucky Gas Utility in 1987, Greeley Gas in 1993, United Cities Gas in 1997, and others.

CAPITAL STRUCTURE as of 6/30/09
Total Debt $2169.5 mill. **Due in 5 Yrs** $1360.0 mill.
LT Debt $2169.4 mill. **LT Interest** $115.0 mill.
(LT interest earned: 2.9x; total interest coverage: 2.8x)
Leases, Uncapitalized Annual rentals $18.4 mill.
Pfd Stock None
Pension Assets-9/08 $341.4 mill.
Oblig. $337.6 mill.
Common Stock 92,272,478 shs.
as of 7/31/09
MARKET CAP: $2.5 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	60.7	46.7	125.7
Other	1008.2	1238.4	670.3
Current Assets	1068.9	1285.1	796.0
Accts Payable	355.3	395.4	222.0
Debt Due	154.4	351.3	.1
Other	410.0	460.4	422.2
Current Liab.	919.7	1207.1	644.3
Fix. Chg. Cov.	405%	450%	446%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	9.5%	14.5%	3.0%
"Cash Flow"	3.5%	5.5%	2.5%
Earnings	2.5%	5.0%	4.0%
Dividends	2.5%	1.5%	1.5%
Book Value	6.5%	7.5%	4.0%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) A Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2006	2283.8	2033.8	863.2	971.6	6152.4
2007	1602.6	2075.6	1218.2	1002.0	5898.4
2008	1657.5	2484.0	1639.1	1440.7	7221.3
2009	1716.3	1821.4	780.8	*701.5*	*5020*
2010	*1465*	*2435*	*1345*	*1155*	*6400*

Fiscal Year Ends	EARNINGS PER SHARE A B E Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2006	.88	1.10	d.22	.25	2.00
2007	.97	1.20	d.15	d.05	1.94
2008	.82	1.24	d.07	.02	2.00
2009	.83	1.29	.02	*d.04*	*2.10*
2010	*.90*	*1.35*	*d.04*	*d.01*	*2.20*

Cal-endar	QUARTERLY DIVIDENDS PAID C■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.31	.31	.31	.315	1.25
2006	.315	.315	.315	.32	1.27
2007	.32	.32	.32	.325	1.29
2008	.325	.325	.325	.33	1.31
2009	.33	.33	.33		

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
	22.09	26.61	35.36	22.82	54.39	46.50	61.75	75.27	66.03	79.52	*54.25*	*68.45*	Revenues per sh A	*86.35*
	2.62	3.01	3.03	3.39	3.23	2.91	3.90	4.26	4.14	4.19	*4.40*	*4.55*	"Cash Flow" per sh	*4.80*
	.81	1.03	1.47	1.45	1.71	1.58	1.72	2.00	1.94	2.00	*2.10*	*2.20*	Earnings per sh A B	*2.50*
	1.10	1.14	1.16	1.18	1.20	1.22	1.24	1.26	1.28	1.30	*1.32*	*1.34*	Div'ds Decl'd per sh C■	*1.40*
	3.53	2.36	2.77	3.17	3.10	3.03	4.14	5.20	4.39	5.20	*5.50*	*5.75*	Cap'l Spending per sh	*6.60*
	12.09	12.28	14.31	13.75	16.66	18.05	19.90	20.16	22.01	22.60	*24.10*	*24.40*	Book Value per sh	*26.90*
	31.25	31.95	40.79	41.68	51.48	62.80	80.54	81.74	89.33	90.81	*92.50*	*93.50*	Common Shs Outst'g D	*110.00*
	33.0	18.9	15.6	15.2	13.4	15.9	16.1	13.5	15.9	13.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*14.0*
	1.88	1.23	.80	.83	.76	.84	.86	.73	.84	.84			Relative P/E Ratio	*.95*
	4.1%	5.9%	5.1%	5.4%	5.2%	4.9%	4.5%	4.7%	4.2%	4.8%			Avg Ann'l Div'd Yield	*4.0%*
	690.2	850.2	1442.3	950.8	2799.9	2920.0	4973.3	6152.4	5898.4	7221.3	*5020*	*6400*	Revenues ($mill) A	*9500*
	25.0	32.2	56.1	59.7	79.5	86.2	135.8	162.3	170.5	180.3	*195*	*205*	Net Profit ($mill)	*275*
	35.0%	36.1%	37.3%	37.1%	37.1%	37.4%	37.7%	37.6%	35.8%	38.4%	*35.0%*	*37.0%*	Income Tax Rate	*40.5%*
	3.6%	3.8%	3.9%	6.3%	2.8%	3.0%	2.7%	2.6%	2.9%	2.5%	*3.9%*	*3.2%*	Net Profit Margin	*3.0%*
	50.0%	48.1%	54.3%	53.9%	50.2%	43.2%	57.7%	57.0%	52.0%	50.8%	*50.0%*	*50.5%*	Long-Term Debt Ratio	*49.0%*
	50.0%	51.9%	45.7%	46.1%	49.8%	56.8%	42.3%	43.0%	48.0%	49.2%	*50.0%*	*49.5%*	Common Equity Ratio	*51.0%*
	755.1	755.7	1276.3	1243.7	1721.4	1994.8	3785.5	3828.5	4092.1	4172.3	*4430*	*4580*	Total Capital ($mill)	*5800*
	965.8	982.3	1335.4	1300.3	1516.0	1722.5	3374.4	3629.2	3836.8	4136.9	*4365*	*4575*	Net Plant ($mill)	*5850*
	5.1%	6.5%	5.9%	6.8%	6.2%	5.8%	5.3%	6.1%	5.9%	5.9%	*6.0%*	*6.0%*	Return on Total Cap'l	*6.0%*
	6.6%	8.2%	9.6%	10.4%	9.3%	7.6%	8.5%	9.8%	8.7%	8.8%	*9.0%*	*9.0%*	Return on Shr. Equity	*9.5%*
	6.6%	8.2%	9.6%	10.4%	9.3%	7.6%	8.5%	9.8%	8.7%	8.8%	*9.0%*	*9.0%*	Return on Com Equity	*9.5%*
	NMF	NMF	2.1%	1.9%	2.8%	1.7%	2.3%	3.6%	3.0%	3.1%	*3.5%*	*3.5%*	Retained to Com Eq	*4.0%*
	NMF	112%	79%	82%	70%	77%	73%	63%	65%	65%	*63%*	*61%*	All Div'ds to Net Prof	*56%*

BUSINESS: Atmos Energy Corporation is engaged primarily in the distribution and sale of natural gas to 3.2 million customers via six regulated natural gas utility operations: Louisiana Division, West Texas Division, Mid-Tex Division, Mississippi Division, Colorado-Kansas Division, and Kentucky/Mid-States Division. Combined 2008 gas volumes: 293 MMcf. Breakdown: 56%, residential; 32%, commercial; 7%, industrial; and 5% other. 2008 depreciation rate 3.5%. Has around 4,560 employees. Officers and directors own approximately 1.9% of common stock (12/08 Proxy). Chairman and Chief Executive Officer: Robert W. Best. Incorporated: Texas. Address: P.O. Box 650205, Dallas, Texas 75265. Telephone: 972-934-9227. Internet: www.atmosenergy.com.

Atmos Energy's core natural gas utility has generated healthy earnings of late. That is largely because of an increase in rates, primarily for the Mid-Tex, Louisiana, and West Texas divisions. But throughput is being constrained some by diminished consumption from residential and commercial customers (reflecting difficult economic conditions).

The pipeline and storage, and regulated transmission and storage units are performing nicely, as well. The former segment is enjoying expanded margins arising from gains from the settlement of financial positions associated with storage and trading activities. Meanwhile, results for the regulated transmission and storage operation are being boosted by higher transportation fees on through-system deliveries, due to favorable market conditions.

It appears that consolidated share net will advance around 5%, to $2.10, in fiscal 2009 (which ends September 30th). Assuming further expansion in operating margins, the bottom line may increase at a similar rate, to $2.20 a share, the following fiscal year.

Finances are in order. An acquisition caused a mid-decade rise in the debt ratio. But the company has whittled that figure back to normal, if at the cost of some dilution from stock issuances. A reduced level of uncollectible accounts, owing to lower gas prices, is another plus these days.

We believe that more steady, though unexciting, profit growth is in store for the company over the next 3 to 5 years. The utility is one of the country's biggest natural gas-only distributors, currently serving customers across 12 states. What is more, the unregulated segments, especially pipelines, possess healthy overall prospects. Excluding future acquisitions, annual share-net gains may be in the mid-single-digit range over 2012-2014.

On a risk-adjusted basis, these good-quality shares offer decent total return potential. The dividend yield is appealing, compared to others in the *Value Line* Natural Gas Utility universe. Future hikes in the payout, though likely to be gradual, as in previous years, should be well covered by earnings. Meanwhile, the stock is ranked 3 (Average) for Timeliness.

Frederick L. Harris, III September 11, 2009

Company's Financial Strength	B+
Stock's Price Stability	100
Price Growth Persistence	50
Earnings Predictability	85

(A) Fiscal year ends Sept. 30th. (B) Diluted shrs. Excl. nonrec. items: '99, d23¢; '00, 12¢; '03, d17¢; '06, d18¢; '07, d2¢; Q2 '09, 12¢. Next egs. rpt. due early Nov. (C) Dividends historically paid in early March, June, Sept., and Dec. ■ Div. reinvestment plan. Direct stock purchase plan avail. (D) In millions. (E) Qtrs may not add due to change in shrs outstanding.

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LACLEDE GROUP NYSE-LG

RECENT PRICE 32.61 | P/E RATIO 13.8 (Trailing: 10.9 Median: 15.0) | RELATIVE P/E RATIO 0.86 | DIV'D YLD 4.8% | VALUE LINE

TIMELINESS 3 Lowered 5/22/09
SAFETY 2 Raised 6/20/03
TECHNICAL 5 Lowered 9/4/09
BETA .60 (1.00 = Market)

2012-14 PROJECTIONS

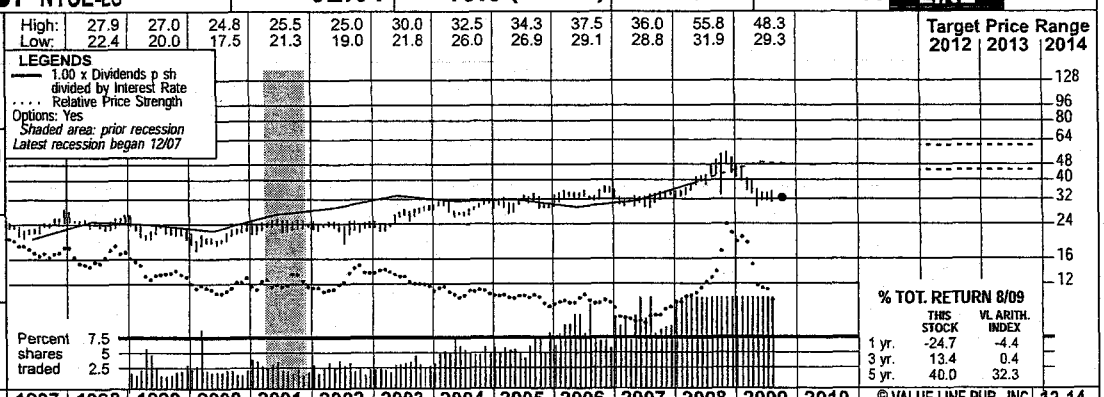
	Price	Gain	Ann'l Total Return
High	60	(+85%)	19%
Low	45	(+40%)	12%

Insider Decisions

	D	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	0	0	0	2	1
Options	0	6	0	0	0	0	0	0	0
to Sell	0	6	0	0	0	0	0	1	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	73	70	71
to Sell	86	81	81
Hld's(000)	11494	11043	10569



% TOT. RETURN 8/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	-24.7	-4.4
3 yr.	13.4	0.4
5 yr.	40.0	32.3

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
32.33	33.43	24.79	31.03	34.33	31.04	26.04	29.99	53.08	39.84	54.95	59.59	75.43	93.51	93.40	100.44	*88.90*	*91.30*	Revenues per sh	*111.55*
2.81	2.65	2.55	3.29	3.32	3.02	2.56	2.68	3.00	2.56	3.15	2.79	2.98	3.81	3.87	4.22	*4.90*	*4.50*	"Cash Flow" per sh	*5.40*
1.61	1.42	1.27	1.87	1.84	1.58	1.47	1.37	1.61	1.18	1.82	1.82	1.90	2.37	2.31	2.64	*2.95*	*2.60*	Earnings per sh [A B]	*3.00*
1.22	1.22	1.24	1.26	1.30	1.32	1.34	1.34	1.34	1.34	1.34	1.35	1.37	1.40	1.45	1.49	*1.53*	*1.57*	Div'ds Decl'd per sh [C ■]	*1.70*
2.62	2.50	2.63	2.35	2.44	2.68	2.58	2.77	2.51	2.80	2.67	2.45	2.84	2.97	2.72	2.57	*2.55*	*2.60*	Cap'l Spending per sh	*3.40*
12.19	12.44	13.05	13.72	14.26	14.57	14.96	14.99	15.26	15.07	15.65	16.96	17.31	18.85	19.79	22.12	*23.65*	*23.55*	Book Value per sh [D]	*28.05*
15.59	15.67	17.42	17.56	17.56	17.63	18.88	18.88	18.88	18.96	19.11	20.98	21.17	21.36	21.65	21.99	*22.50*	*23.00*	Common Shs Outst'g [E]	*26.00*
13.5	16.4	15.5	11.9	12.5	15.5	15.8	14.9	14.5	20.0	13.6	15.7	16.2	13.6	14.2	14.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*17.5*
.80	1.08	1.04	.75	.72	.81	.90	.97	.74	1.09	.78	.83	.86	.73	.75	.89			Relative P/E Ratio	*1.15*
5.6%	5.3%	6.3%	5.6%	5.6%	5.4%	5.8%	6.6%	5.7%	5.7%	5.4%	4.7%	4.4%	4.3%	4.4%	3.9%			Avg Ann'l Div'd Yield	*3.2%*
491.6	566.1	1002.1	755.2	1050.3	1250.3	1597.0	1997.6	2021.6	2209.0	*2000*	*2100*	Revenues ($mill) [A]	*2900*
26.9	26.0	30.5	22.4	34.6	36.1	40.1	50.5	49.8	57.6	*65.0*	*60.0*	Net Profit ($mill)	*80.0*
35.5%	35.2%	32.7%	35.4%	35.0%	34.8%	34.1%	32.5%	33.4%	31.3%	*35.5%*	*35.0%*	Income Tax Rate	*35.0%*
5.5%	4.6%	3.0%	3.0%	3.3%	2.9%	2.5%	2.5%	2.5%	2.6%	*3.3%*	*2.9%*	Net Profit Margin	*2.8%*
41.8%	45.2%	49.5%	47.5%	50.4%	51.6%	48.1%	49.5%	45.3%	44.4%	*42.5%*	*45.0%*	Long-Term Debt Ratio	*47.0%*
57.8%	54.5%	50.2%	52.3%	49.4%	48.3%	51.8%	50.4%	54.6%	55.5%	*57.5%*	*55.0%*	Common Equity Ratio	*53.0%*
488.6	519.2	574.1	546.6	605.0	737.4	707.9	798.9	784.5	876.1	*925*	*985*	Total Capital ($mill)	*1375*
519.4	575.4	602.5	594.4	621.2	646.9	679.5	763.8	793.8	823.2	*865*	*915*	Net Plant ($mill)	*1250*
7.1%	6.7%	6.9%	6.0%	7.4%	6.6%	7.6%	8.4%	8.5%	8.1%	*8.5%*	*7.5%*	Return on Total Cap'l	*7.0%*
9.5%	9.1%	10.5%	7.8%	11.5%	10.1%	10.9%	12.5%	11.6%	11.8%	*12.0%*	*11.0%*	Return on Shr. Equity	*11.0%*
9.5%	9.1%	10.5%	7.8%	11.6%	10.1%	10.9%	12.5%	11.6%	11.8%	*12.0%*	*11.0%*	Return on Com Equity	*11.0%*
1.0%	.2%	1.8%	NMF	3.1%	2.7%	3.1%	5.1%	4.3%	5.2%	*6.0%*	*4.5%*	Retained to Com Eq	*5.0%*
89%	98%	83%	113%	74%	73%	72%	59%	63%	56%	*53%*	*60%*	All Div'ds to Net Prof	*55%*

CAPITAL STRUCTURE as of 6/30/09
Total Debt $522.2 mill. Due in 5 Yrs $90.0 mill.
LT Debt $389.2 mill. LT Interest $25.0 mill.
(Total interest coverage: 3.0x)

Leases, Uncapitalized Annual rentals $.9 mill.
Pension Assets-9/08 $248.3 mill.
Oblig. $308.7 mill.

Pfd Stock None
Common Stock 22,167,303 shs.
as of 7/31/09

MARKET CAP: $725 million (Small Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	52.7	14.9	89.1
Other	414.6	547.0	283.6
Current Assets	467.3	561.9	372.7
Accts Payable	106.8	159.6	79.3
Debt Due	251.6	216.1	133.0
Other	115.3	103.5	87.8
Current Liab.	473.7	479.2	300.1
Fix. Chg. Cov.	282%	377%	370%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	11.5%	14.0%	2.5%
"Cash Flow"	2.0%	6.5%	5.5%
Earnings	3.5%	9.5%	3.5%
Dividends	1.0%	1.5%	2.5%
Book Value	3.5%	5.5%	5.5%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2006	689.2	708.8	330.6	269.0	1997.6
2007	539.6	700.8	457.9	323.3	2021.6
2008	504.0	747.7	505.5	451.8	2209.0
2009	674.3	659.1	309.9	*356.7*	*2000*
2010	*530*	*570*	*520*	*480*	*2100*

Fiscal Year Ends	EARNINGS PER SHARE [A B F] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2006	1.23	1.05	.13	d.04	2.37
2007	.89	.97	.43	.03	2.31
2008	.99	1.39	.41	d.14	2.64
2009	1.42	1.40	.31	*d.18*	*2.95*
2010	*1.03*	*1.21*	*.38*	*d.02*	*2.60*

Calendar	QUARTERLY DIVIDENDS PAID [C ■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.34	.345	.345	.345	1.38
2006	.345	.355	.355	.355	1.41
2007	.365	.365	.365	.365	1.46
2008	.375	.375	.375	.375	1.50
2009	.385	.385	.385		

BUSINESS: Laclede Group, Inc., is a holding company for Laclede Gas, which distributes natural gas in eastern Missouri, including the city of St. Louis, St. Louis County, and parts of 10 other counties. Has roughly 630,000 customers. Purchased SM&P Utility Resources, 1/02; divested, 3/08. Therms sold and transported in fiscal 2008: 1.08 mill. Revenue mix for regulated operations: residential, 62%; commercial and industrial, 24%; transportation, 1%; other, 13%. Has around 1,807 employees. Officers and directors own approximately 7.2% of common shares (1/09 proxy). Chairman, Chief Executive Officer, and President: Douglas H. Yaeger. Incorporated: Missouri. Address: 720 Olive Street, St. Louis, Missouri 63101. Telephone: 314-342-0500. Internet: www.thelacledegroup.com.

It appears that Laclede Group will generate record earnings in fiscal 2009, which ends on September 30th. The non-regulated gas marketing unit, Laclede Energy Resources, is enjoying a healthy rise in volumes. That has been brought about by significantly increased pipeline capacity and expanded margins on sales of natural gas (reflecting a drop in natural gas prices). Unfortunately, the utility, Laclede Gas, has not performed up to par of late, stemming partly from a rise in operational expenses. Furthermore, last year's results included certain previously unrecognized tax benefits (which amounted to about $0.07 a share). Nevertheless, consolidated share net may well advance about 12%, to $2.95 a share, in fiscal 2009.

But fiscal 2010 may be a down year, when measured against the strong profits we anticipate for this year. Moreover, the benefit of sharply lower natural gas prices may not be repeatable.

The company's 3- to 5-year prospects look unspectacular. Annual customer growth for the natural gas distribution unit has been only around 1% for some time, and it appears that trend will continue. This is because the service territory, based in eastern Missouri, is in a mature phase. Laclede Energy Resources has promising expansion possibilities, given its proximity to existing and planned pipelines, as well as opportunities from shale development. But that segment has contributed just a small portion to total profits on a historical basis. A major acquisition could help to offset this, but it appears that such plans are not on management's agenda at this juncture. Consequently, annual earnings-per-share growth could range only between 4% and 5% out to 2012-2014.

Income-oriented accounts may find the dividend yield modestly appealing. Further increases in the payout will probably be gradual, however. That is largely because of Laclede Gas' unexciting expansion prospects.

Total return potential over the 3- to 5-year horizon looks unexciting, based on the stock's current quotation and assuming minimal growth in the distribution.

Frederick L. Harris, III September 11, 2009

(A) Fiscal year ends Sept. 30th. (B) Based on average shares outstanding thru. '97, then diluted. Excludes nonrecurring loss: '06, 7¢. Excludes gain from discontinued operations: '08, 94¢. Next earnings report due late Oct. (C) Dividends historically paid in early January, April, July, and October. ■ Dividend reinvestment plan available. (D) Incl. deferred charges. In '08: $340.4 mill., $15.48/sh. (E) In millions. (F) Qtly. egs. may not sum due to rounding or change in shares outstanding.

Company's Financial Strength	B+
Stock's Price Stability	100
Price Growth Persistence	60
Earnings Predictability	85

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NEW JERSEY RES. NYSE-NJR

RECENT PRICE 36.60 | P/E RATIO 14.2 (Trailing: 17.3 Median: 15.0) | RELATIVE P/E RATIO 0.88 | DIV'D YLD 3.4% | VALUE LINE

TIMELINESS 3 Lowered 5/22/09
SAFETY 1 Raised 9/15/06
TECHNICAL 5 Lowered 9/11/09
BETA .65 (1.00 = Market)

2012-14 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	45	(+25%)	8%
Low	35	(-5%)	2%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	0	0	0	1	0
Options	1	2	3	0	0	1	0	0	0
to Sell	0	1	4	0	1	0	0	0	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	93	87	89
to Sell	73	88	88
Hld's(000)	24319	23324	24695

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
	12.02	12.81	11.36	13.48	17.31	17.73	22.65	29.42	51.22	44.11	62.29	60.89	76.19	79.63	72.62	90.74	65.90	81.40	Revenues per sh [A]	85.00
	1.42	1.54	1.42	1.48	1.63	1.74	1.86	1.99	2.12	2.14	2.38	2.50	2.62	2.73	2.44	3.62	3.35	3.60	"Cash Flow" per sh	3.70
	.76	.84	.86	.92	.99	1.04	1.11	1.20	1.30	1.39	1.59	1.70	1.77	1.87	1.55	2.70	2.45	2.70	Earnings per sh [B]	2.80
	.68	.68	.68	.69	.71	.73	.75	.76	.78	.80	.83	.87	.91	.96	1.01	1.11	1.24	1.28	Div'ds Decl'd per sh [C] ■	1.40
	1.54	1.40	1.18	1.19	1.15	1.07	1.21	1.23	1.10	1.02	1.14	1.45	1.28	1.28	1.46	1.72	1.75	1.75	Cap'l Spending per sh	1.80
	6.54	6.43	6.47	6.73	6.92	7.26	7.57	8.29	8.80	8.71	10.26	11.25	10.60	15.00	15.50	17.28	18.80	20.75	Book Value per sh [D]	27.45
	37.84	38.93	40.03	40.69	40.23	40.07	39.92	39.59	40.00	41.50	40.85	41.61	41.32	41.44	41.61	42.06	42.50	43.00	Common Shs Outst'g [E]	45.00
	15.1	13.0	11.8	13.6	13.5	15.3	15.2	14.7	14.2	14.7	14.0	15.3	16.8	16.1	21.6	12.3	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	14.0
	.89	.85	.79	.85	.78	.80	.87	.96	.73	.80	.80	.81	.89	.87	1.15	.77			Relative P/E Ratio	.95
	5.8%	6.2%	6.7%	5.6%	5.3%	4.6%	4.5%	4.4%	4.2%	3.9%	3.7%	3.3%	3.1%	3.2%	3.0%	3.3%			Avg Ann'l Div'd Yield	3.6%
							904.3	1164.5	2048.4	1830.8	2544.4	2533.6	3148.3	3299.6	3021.8	3816.2	2800	3500	Revenues ($mill) [A]	3825
							44.9	47.9	52.3	56.8	65.4	71.6	74.4	78.5	65.3	113.9	80.0	105	Net Profit ($mill)	125
							36.2%	37.8%	38.0%	38.7%	39.4%	39.1%	39.1%	38.9%	38.8%	37.8%	39.0%	39.0%	Income Tax Rate	40.0%
							5.0%	4.1%	2.6%	3.1%	2.6%	2.8%	2.4%	2.4%	2.2%	3.0%	3.7%	3.3%	Net Profit Margin	3.3%
							48.7%	47.0%	50.1%	50.6%	38.1%	40.3%	42.0%	34.8%	37.3%	38.5%	38.5%	37.0%	Long-Term Debt Ratio	32.0%
							51.2%	52.9%	49.9%	49.4%	61.9%	59.7%	58.0%	65.2%	62.7%	61.5%	61.5%	63.0%	Common Equity Ratio	68.0%
							590.4	620.1	706.2	732.4	676.8	783.8	755.3	954.0	1028.0	1182.1	1300	1415	Total Capital ($mill)	1815
							705.4	730.6	743.9	756.4	852.6	880.4	905.1	934.9	970.9	1017.3	1040	1060	Net Plant ($mill)	1125
							9.0%	9.0%	8.5%	8.7%	10.7%	10.1%	11.2%	9.6%	7.7%	10.7%	9.0%	9.0%	Return on Total Cap'l	8.0%
							14.8%	14.6%	14.8%	15.7%	15.6%	15.3%	17.0%	12.6%	10.1%	15.7%	13.0%	13.0%	Return on Shr. Equity	10.0%
							14.8%	14.6%	14.9%	15.7%	15.6%	15.3%	17.0%	12.6%	10.1%	15.7%	13.0%	13.0%	Return on Com Equity	10.0%
							5.0%	5.4%	6.1%	6.9%	7.7%	7.8%	8.5%	6.3%	3.6%	9.5%	6.5%	7.0%	Retained to Com Eq	5.0%
							67%	63%	59%	56%	51%	49%	50%	50%	64%	40%	50%	47%	All Div'ds to Net Prof	50

CAPITAL STRUCTURE as of 6/30/09
Total Debt $512.3 mill. Due in 5 Yrs $175.6 mill.
LT Debt $457.7 mill. LT Interest $16.9 mill.
Incl. $8.8 mill. capitalized leases.
(LT interest earned: 4.8x; total interest coverage: 4.8x)
Pension Assets-9/08 $80.6 mill. Oblig. $102.4 mill.
Pfd Stock None

Common Stock 42,014,773 shs.
as of 8/4/09
MARKET CAP: $1.5 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	5.1	42.6	77.0
Other	794.8	1067.1	636.5
Current Assets	799.9	1109.7	713.5
Accts Payable	64.4	61.7	49.2
Debt Due	260.8	238.3	54.6
Other	378.1	594.0	475.9
Current Liab.	703.3	894.0	579.7
Fix. Chg. Cov.	461%	450%	450%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	17.5%	9.0%	1.0%
"Cash Flow"	6.0%	6.0%	4.0%
Earnings	7.5%	7.5%	5.5%
Dividends	4.0%	5.0%	5.5%
Book Value	8.5%	11.5%	9.5%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2006	1164	1064	536.1	535.5	3299.6
2007	737.4	1029	662.2	593.2	3021.8
2008	811.1	1178	1000	827.1	3816.2
2009	801.3	937.5	441.1	620.1	2800
2010	845	985	790	880	3500

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2006	.82	1.43	d.09	d.29	1.87
2007	.70	.19	.60	.06	1.55[F]
2008	1.31	1.86	d.10	d.39	2.70
2009	.77	1.71	.03	d.06	2.45
2010	.85	1.75	d.05	.15	2.70

Calendar	QUARTERLY DIVIDENDS PAID [C E] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.227	.227	.227	.227	.91
2006	.24	.24	.24	.24	.96
2007	.253	.253	.253	.253	1.01
2008	.267	.28	.28	.28	1.11
2009	.31	.31	.31		

(A) Fiscal year ends Sept. 30th.
(B) Diluted earnings. Qtly egs may not sum to total due to change in shares outstanding. Next earnings report due late Oct.
(C) Dividends historically paid in early January, April, July, and October. ■ Dividend reinvestment plan available.
(D) Includes regulatory assets in 2008: $340.7 million, $8.09/share.
(E) In millions, adjusted for splits.
(F) Restated.

Company's Financial Strength A
Stock's Price Stability 100
Price Growth Persistence 65
Earnings Predictability 45

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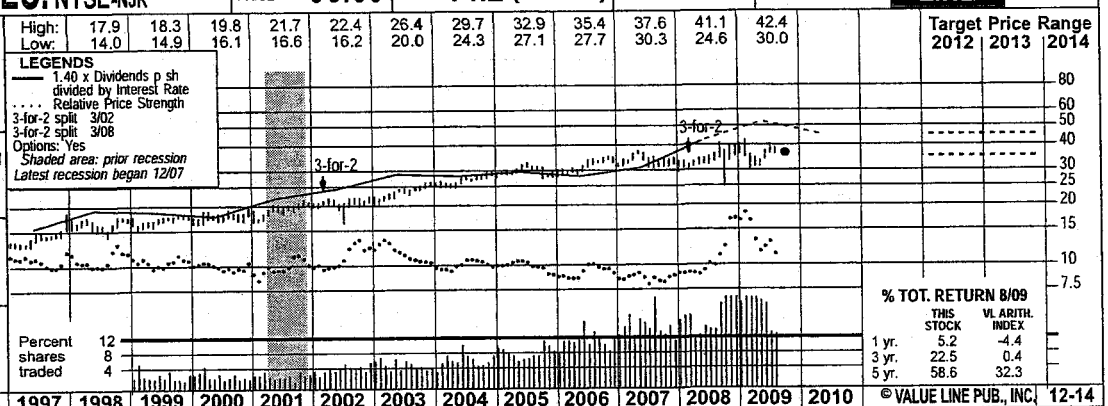

BUSINESS: New Jersey Resources Corp. is a holding company providing retail/wholesale energy svcs. to customers in New Jersey, and in states from the Gulf Coast to New England, and Canada. New Jersey Natural Gas had about 484,000 customers at 9/30/08 in Monmouth and Ocean Counties, and other N.J. Counties. Fiscal 2008 volume: 99.6 bill. cu. ft. (59% firm, 6% interruptible industrial and electric utility, 35% off-system and capacity release). N.J. Natural Energy subsidiary provides unregulated retail/wholesale natural gas and related energy svcs. 2008 dep. rate: 2.9%. Has 854 empls. Off./dir. own about 1.7% of common (12/09 Proxy). Chrmn., CEO, & Pres. : Laurence M. Downes. Inc.: NJ Addr.: 1415 Wyckoff Road, Wall, NJ 07719. Tel.: 732-938-1480. Web: www.njresources.com.

New Jersey Resources' bottom line has been improving despite weaker top-line results. All of the company's operating segments registered lower volumes during the June period. The NJR Energy Services unit, which typically contributes the lion's share of revenues, was hit the hardest on both a dollar-value and percentage basis. Meantime, the Natural Gas Distribution and Retail segments also registered declines well into the double digits. The bulk of that downturn can be attributed to the lower commodity prices compared to last year, and conservation efforts, as consumers continue to real in spending. Still, the customer base continues to widen. The New Jersey Natural Gas division has added almost 4,200 new customer accounts thus far in 2009 and completed more than 450 natural gas heat conversions. All told, the company registered higher-than-expected earnings for the June interim. But,

We do look for September's share net to fall into negative territory. The anticipated loss during the fiscal fourth quarter is related to the seasonal nature of the natural gas business. Nonetheless, economic headwinds have prompted us to trim a nickel off our 2009 earnings estimate to $2.45 a share. This would represent a decline of about 9%. However, we view this largely as a technicality, due to last year's difficult comparison and the fact that NJR continues to improve the fundamentals of its business through the expansion of its mid-stream assets and an ever-widening customer base.

Capital projects and infrastructure programs augur well for longer-term prospects. The Steckman Ridge storage facility has begun accumulating natural gas inventories in preparation for the coming winter. That facility is expected to start making meaningful earnings contributions next year. And the other programs should provide needed jobs, while simultaneously boosting the safety and reliability of the distribution system.

These high-quality shares may appeal to income-oriented accounts. They don't stand out for appreciation potential for the pull to 2012-2014, compared to most utilities. The main appeal here comes from solid dividend growth prospects.

Bryan J. Fong *September 11, 2009*

NICOR, INC. NYSE-GAS

RECENT PRICE 35.65 | P/E RATIO 13.5 (Trailing: 14.0 Median: 15.0) | RELATIVE P/E RATIO 0.84 | DIV'D YLD 5.2% | VALUE LINE

TIMELINESS 3 Raised 12/7/07
SAFETY 3 Lowered 6/17/05
TECHNICAL 4 Lowered 9/4/09
BETA .70 (1.00 = Market)

2012-14 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	60	(+70%)	17%
Low	40	(+10%)	7%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	1	2	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	0	0	0	0	0	0	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	114	92	105
to Sell	126	126	103
Hld's(000)	27287	25772	25968

High:	44.4	42.9	43.9	42.4	49.0	39.3	39.7	43.0	49.9	53.7	52.0	38.1
Low:	37.1	31.2	29.4	34.0	17.3	23.7	32.0	35.5	38.7	37.8	32.3	27.5

LEGENDS
1.30 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
Options: Yes
Shaded area: prior recession
Latest recession began 12/07

Target Price Range 2012 | 2013 | 2014
120 100 80 64 48 32 24 20 16 12 8

% TOT. RETURN 8/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	-17.0	-4.4
3 yr.	-4.9	0.4
5 yr.	27.4	32.3

Percent shares traded 18 12 6

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
	31.02	31.23	29.42	37.39	41.33	30.84	34.45	50.52	57.30	43.11	60.46	62.12	76.00	65.92	69.20	83.68	*70.90*	*72.90*	Revenues per sh	*93.30*
	3.80	4.11	4.19	4.97	5.29	5.21	5.59	6.16	6.41	6.03	5.37	6.00	6.19	6.82	6.96	6.85	*6.05*	*6.70*	"Cash Flow" per sh	*7.85*
	1.97	2.07	1.96	2.42	2.55	2.31	2.57	2.94	3.01	2.88	2.11	2.22	2.27	2.87	2.99	2.63	*2.55*	*2.85*	Earnings per sh [A]	*3.25*
	1.22	1.25	1.28	1.32	1.40	1.48	1.54	1.66	1.76	1.84	*1.86*	1.86	1.86	1.86	1.86	1.86	*1.86*	*1.86*	Div'ds Decl'd per sh [B■]	*1.86*
	2.62	3.34	3.12	2.42	2.34	2.87	3.28	3.48	4.18	4.37	4.12	4.32	4.57	4.17	3.77	5.54	*5.95*	*6.35*	Cap'l Spending per sh	*6.80*
	13.05	13.26	13.67	14.74	15.43	15.97	16.80	15.56	16.39	16.55	17.13	16.99	18.36	19.43	20.58	21.55	*22.10*	*23.10*	Book Value per sh	*26.80*
	53.96	51.54	50.30	49.49	48.22	47.51	46.89	45.49	44.40	44.01	44.04	44.10	44.18	44.90	45.90	45.13	*45.50*	*45.50*	Common Shs Outst'g [C]	*45.50*
	14.1	12.5	13.1	12.5	14.2	17.6	14.6	11.9	12.8	13.1	15.8	15.9	17.3	15.0	15.0	15.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.0*
	.83	.82	.88	.78	.82	.92	.83	.77	.66	.72	.90	.84	.92	.81	.80	.93			Relative P/E Ratio	*1.05*
	4.4%	4.8%	5.0%	4.4%	3.9%	3.6%	4.1%	4.7%	4.6%	4.9%	5.6%	5.3%	4.7%	4.3%	4.2%	4.7%			Avg Ann'l Div'd Yield	*3.9%*
	1615.2	2298.1	2544.1	1897.4	2662.7	2739.7	3357.8	2960.0	3176.3	3776.6	*3225*	*3500*	Revenues ($mill)	*4200*
	121.9	136.4	136.3	128.0	93.1	98.1	101.1	128.3	135.2	119.5	*115*	*130*	Net Profit ($mill)	*150*
	34.7%	34.8%	33.5%	31.0%	35.2%	31.8%	28.3%	26.3%	26.6%	27.0%	*27.0%*	*27.0%*	Income Tax Rate	*27.0%*
	7.5%	5.9%	5.4%	6.7%	3.5%	3.6%	3.0%	4.3%	4.3%	3.2%	*3.6%*	*3.7%*	Net Profit Margin	*3.5%*
	35.5%	32.7%	37.8%	35.1%	39.6%	39.8%	37.4%	36.3%	30.9%	31.5%	*33%*	*30%*	Long-Term Debt Ratio	*26%*
	64.0%	66.7%	61.7%	64.5%	60.3%	60.1%	62.5%	63.7%	69.0%	68.4%	*67%*	*70%*	Common Equity Ratio	*74%*
	1230.1	1061.2	1180.1	1128.9	1251.5	1246.0	1297.7	1370.7	1368.0	1421.1	*1500*	*1500*	Total Capital ($mill)	*1650*
	1735.2	1729.6	1768.6	1796.8	2484.2	2549.8	2659.1	2714.1	2757.3	2858.6	*3000*	*3150*	Net Plant ($mill)	*3600*
	10.9%	13.7%	12.3%	12.2%	8.3%	8.8%	9.4%	10.9%	11.2%	9.7%	*9.0%*	*10.0%*	Return on Total Cap'l	*10.0%*
	15.4%	19.1%	18.6%	17.5%	12.3%	13.1%	12.5%	14.7%	14.3%	12.3%	*11.5%*	*12.5%*	Return on Shr. Equity	*12.0%*
	15.4%	19.2%	18.7%	17.5%	12.3%	13.1%	12.5%	14.7%	14.3%	12.3%	*11.5%*	*12.5%*	Return on Com Equity	*12.0%*
	6.2%	8.5%	7.9%	6.5%	1.5%	2.1%	2.3%	5.2%	5.4%	3.6%	*3.0%*	*4.5%*	Retained to Com Eq	*5.5%*
	60%	56%	58%	63%	88%	84%	81%	65%	62%	71%	*70%*	*65%*	All Div'ds to Net Prof	*57%*

CAPITAL STRUCTURE as of 6/30/09
Total Debt $725.7 mill. Due in 5 Yrs $914.9 mill.
LT Debt $498.7 mill. LT Interest $5.0 mill.
(Total interest coverage: 5.1x)

Pension Assets-12/08 $306.6 mill. Oblig. $270.2 mill.

Pfd Stock $.6 mill. Pfd Div'd None

Common Stock 45,221,593 shares as of 7/24/09
MARKET CAP: $1.6 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	91.9	95.5	116.3
Other	931.9	1243.4	627.0
Current Assets	1023.8	1338.9	743.3
Accts Payable	564.5	411.3	266.1
Debt Due	350.0	789.9	227.0
Other	227.9	466.8	482.9
Current Liab.	1142.4	1668.0	976.0
Fix. Chg. Cov.	543%	461%	449%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	7.0%	6.5%	*4.0%*
"Cash Flow"	3.0%	3.0%	*2.0%*
Earnings	1.5%	1.0%	*2.5%*
Dividends	3.0%	0.5%	*Nil*
Book Value	3.0%	4.0%	*4.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	1319.4	451.3	351.1	838.2	2960.0
2007	1334.7	556.9	365.2	919.5	3176.3
2008	1595.7	699.8	440.3	1040.8	3776.6
2009	1110.8	447.6	*375*	*1291.6*	*3225*
2010	*1150*	*625*	*425*	*1300*	*3500*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	.99	.19	.39	1.30	2.87
2007	1.04	.40	.32	1.22	2.98
2008	.91	.64	.03	1.05	2.63
2009	.96	.50	*.05*	*1.04*	*2.55*
2010	*1.05*	*.50*	*.30*	*1.00*	*2.85*

Calendar	QUARTERLY DIVIDENDS PAID [B■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.465	.465	.465	.465	1.86
2006	.465	.465	.465	.465	1.86
2007	.465	.465	.465	.465	1.86
2008	.465	.465	.465	.465	1.86
2009	.465	.465	.465		

BUSINESS: Nicor Inc. is a holding company with gas distribution as its primary business. Serves over 2.2 million customers in northern and western Illinois. 2008 gas delivered: 498.1 Bcf, incl. 222.6 Bcf from transportation. 2008 gas sales (275.5 bcf): residential, 93%; commercial, 6%; industrial, 1%. Principal supplying pipelines: Natural Gas Pipeline, Horizon Pipeline, and TGPC. Current operations include Tropical Shipping subsidiary and several energy related ventures. Divested oil and gas E&P, 6/93. Has about 3,900 employees. Officers/directors own about 2.2% of common stock (3/09 proxy). Chairman and Chief Executive Officer: Russ Strobel. Incorporated: Illinois. Address: 1844 Ferry Road, Naperville, Illinois 60563. Telephone: 630-305-9500. Internet: www.nicor.com.

Nicor posted mixed results in the second quarter. Both the top and bottom lines fell short of 2008's results due to the challenging macroeconomic environment and lower energy prices. Furthermore, sales of $447.6 million missed our estimate in June ($600 million). However, earnings of $0.50 a share topped our number, thanks to new rates in the natural gas distribution business (discussed below), which offset unfavorable pricing and a weak showing in the shipping operations.

We have lowered our bottom-line estimate for 2009 by a dime, to $2.55 a share. Management reaffirmed its share-net guidance range of $2.54 to $2.74. However, we have pared our target to the low end of management's range, given the tough market conditions for natural gas producers. Most notably, lower usage, coupled with unfavorable pricing, will probably continue to pressure these utilities over the coming months. Therefore, we look for the top line to decline 15% to $3.2 million.

The company requested a rehearing on its rate case. Nicor was approved for a $69 million increase in base revenues at the end of the March period. However, the company is awaiting a decision from the Illinois Commerce Commission regarding a rehearing. Nicor is seeking greater relief than what was approved.

This equity offers a yield that is above average for a natural gas utility. Nicor continues to pay a hearty dividend despite the challenging operating environment. What's more, we think the payout is safe, thanks to the company's strong balance sheet. Thus, income-oriented investors may find this equity's attractive yield (5.2%) of interest.

Shares of Nicor are ranked to mirror the broader market averages over the next six to 12 months, as near-term prospects appear to be limited. Moreover, at the current quotation, this issue has below-average total return potential over the 3- to 5-year pull. Therefore, we recommend most investors look elsewhere. However, risk-averse investors should note this equity is well positioned to weather any volatility (Beta: 70) over the coming years, given its strong finances and stable business (Financial Strength: A).

Richard Gallagher *September 11, 2009*

(A) Based on primary earnings thru. '96, then diluted. Excl. nonrecurring gains/(loss): '97, 6¢; '98, 11¢; '99, 5¢; '00, ($1.96); '01, 16¢; '03, (27¢); '04, (52¢); '05, 80¢; '06, (17¢); '07 (13¢). Excl. items from discontinued ops.: '93, 4¢; '96, 30¢. Next egs. report due early November. (B) Dividends historically paid mid February, May, August, November. ■ Dividend reinvestment plan available. (C) In millions.

Company's Financial Strength	A
Stock's Price Stability	100
Price Growth Persistence	45
Earnings Predictability	80

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N.W. NAT'L GAS NYSE-NWN

RECENT PRICE 41.94 | P/E RATIO 14.7 (Trailing: 15.5 Median: 16.0) | RELATIVE P/E RATIO 0.91 | DIV'D YLD 4.0% | VALUE LINE

TIMELINESS 3 Lowered 7/24/09
SAFETY 1 Raised 3/18/05
TECHNICAL 4 Lowered 9/4/09
BETA .60 (1.00 = Market)

2012-14 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	70	(+65%)	16%
Low	55	(+30%)	10%

Insider Decisions

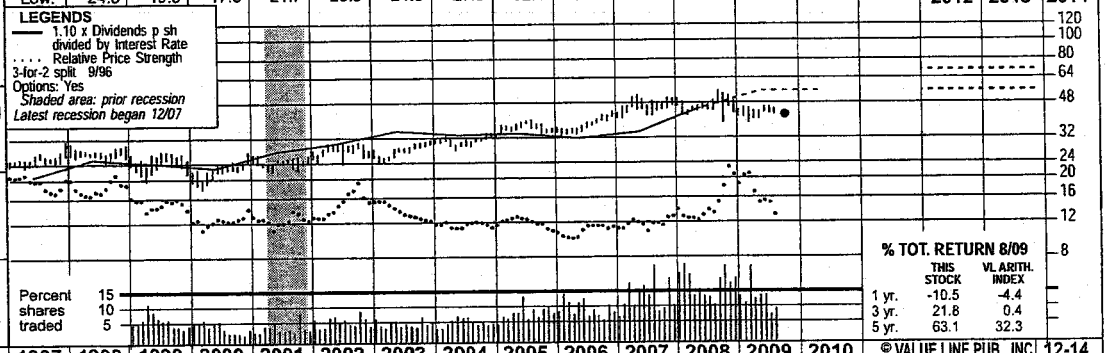
	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	0	2	0	0	0
Options	0	1	0	0	0	0	0	0	0
to Sell	0	2	0	1	0	0	0	1	1

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	82	67	78
to Sell	83	93	69
Hld's(000)	14907	15126	15387

	High:	30.8	27.9	27.5	26.8	30.7	31.3	34.1	39.6	43.7	52.8	55.2	46.1
	Low:	24.3	19.5	17.8	21.7	23.5	24.0	27.5	32.4	32.8	39.8	37.7	37.7

LEGENDS
1.10 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
3-for-2 split 9/96
Options: Yes
Shaded area: prior recession
Latest recession began 12/07



% TOT. RETURN 8/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	-10.5	-4.4
3 yr.	21.8	0.4
5 yr.	63.1	32.3

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
18.15	18.30	16.02	16.86	15.82	16.77	18.17	21.09	25.78	25.07	23.57	25.69	33.01	37.20	39.13	39.16	*39.60*	*41.50*	Revenues per sh	*48.20*
3.74	3.50	3.41	3.86	3.72	3.24	3.72	3.68	3.86	3.65	3.85	3.92	4.34	4.76	5.41	5.31	*5.60*	*5.85*	"Cash Flow" per sh	*6.75*
1.74	1.63	1.61	1.97	1.76	1.02	1.70	1.79	1.88	1.62	1.76	1.86	2.11	2.35	2.76	2.57	*2.85*	*2.85*	Earnings per sh [A]	*3.45*
1.17	1.17	1.18	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27	1.30	1.32	1.39	1.44	1.52	*1.60*	*1.68*	Div'ds Decl'd per sh [B■]	*2.00*
3.61	4.23	3.02	3.70	5.07	4.02	4.78	3.46	3.23	3.11	4.90	5.52	3.48	3.56	4.48	3.92	*4.50*	*4.50*	Cap'l Spending per sh	*4.50*
13.08	13.63	14.55	15.37	16.02	16.59	17.12	17.93	18.56	18.88	19.52	20.64	21.28	22.01	22.52	23.71	*24.90*	*26.10*	Book Value per sh	*30.50*
19.77	20.13	22.24	22.56	22.86	24.85	25.09	25.23	25.23	25.59	25.94	27.55	27.58	27.24	26.41	26.50	*26.50*	*26.50*	Common Shs Outst'g [C]	*28.00*
12.9	13.0	12.9	11.7	14.4	26.7	14.5	12.4	12.9	17.2	15.8	16.7	17.0	15.9	16.7	18.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*18.0*
.76	.85	.86	.73	.83	1.39	.83	.81	.66	.94	.90	.88	.91	.86	.89	1.11			Relative P/E Ratio	*1.20*
5.2%	5.5%	5.7%	5.2%	4.8%	4.5%	5.0%	5.6%	5.1%	4.5%	4.6%	4.2%	3.7%	3.7%	3.1%	3.3%			Avg Ann'l Div'd Yield	*3.2%*
455.8	532.1	650.3	641.4	611.3	707.6	910.5	1013.2	1033.2	1037.9	*1025*	*1125*	Revenues ($mill)	*1350*
44.9	47.8	50.2	43.8	46.0	50.6	58.1	65.2	74.5	68.5	*75.5*	*75.5*	Net Profit ($mill)	*96.5*
35.4%	35.9%	35.4%	34.9%	33.7%	34.4%	36.0%	36.3%	37.2%	36.9%	*37.0%*	*37.0%*	Income Tax Rate	*37.0%*
9.9%	9.0%	7.7%	6.8%	7.5%	7.1%	6.4%	6.4%	7.2%	6.6%	*7.3%*	*6.7%*	Net Profit Margin	*7.2%*
46.0%	45.1%	43.0%	47.6%	49.7%	46.0%	47.0%	46.3%	46.3%	44.9%	*47%*	*47%*	Long-Term Debt Ratio	*47%*
49.9%	50.9%	53.2%	51.5%	50.3%	54.0%	53.0%	53.7%	53.7%	55.1%	*53%*	*53%*	Common Equity Ratio	*53%*
861.5	887.8	880.5	937.3	1006.6	1052.5	1108.4	1116.5	1106.8	1140.4	*1180*	*1225*	Total Capital ($mill)	*1400*
895.9	934.0	965.0	995.6	1205.9	1318.4	1373.4	1425.1	1495.9	1549.1	*1600*	*1660*	Net Plant ($mill)	*1900*
6.8%	6.7%	6.9%	5.9%	5.7%	5.9%	6.5%	7.1%	8.5%	7.7%	*8.0%*	*8.0%*	Return on Total Cap'l	*8.0%*
9.7%	9.8%	10.0%	8.9%	9.1%	8.9%	9.9%	10.9%	12.5%	10.9%	*11.0%*	*11.0%*	Return on Shr. Equity	*11.0%*
9.9%	10.0%	10.2%	8.5%	9.0%	8.9%	9.9%	10.9%	12.5%	10.9%	*11.0%*	*11.0%*	Return on Com Equity	*11.0%*
2.8%	3.1%	3.5%	1.9%	2.6%	2.7%	3.7%	4.5%	6.0%	4.5%	*4.5%*	*4.5%*	Retained to Com Eq	*4.5%*
74%	70%	67%	79%	72%	69%	63%	59%	52%	59%	*56%*	*59%*	All Div'ds to Net Prof	*58%*

CAPITAL STRUCTURE as of 6/30/09
Total Debt $677.6 mill. Due in 5 Yrs $173.8 mill.
LT Debt $587.0 mill. LT Interest $37.0 mill.

(Total interest coverage: 4.0x)

Pension Assets-12/08 $163 mill.
Oblig. $281 mill.
Pfd Stock None

Common Stock 26,513,188 shares
as of 7/31/09
MARKET CAP $1.1 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	6.1	6.9	31.1
Other	268.8	474.1	241.3
Current Assets	274.9	481.0	272.4
Accts Payable	119.7	94.4	50.1
Debt Due	148.1	246.0	90.6
Other	122.1	208.9	148.8
Current Liab.	389.9	551.3	289.5
Fx. Chg. Cov.	408%	393%	NMF

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	9.0%	9.0%	*4.0%*
"Cash Flow"	3.5%	6.5%	*4.5%*
Earnings	5.0%	8.0%	*5.0%*
Dividends	2.0%	3.0%	*5.5%*
Book Value	3.5%	3.5%	*5.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	390.4	171.0	114.9	336.9	1013.2
2007	394.1	183.2	124.2	331.7	1033.2
2008	387.7	191.3	109.7	349.2	1037.9
2009	437.4	149.4	*100*	*338.2*	*1025*
2010	*420*	*215*	*125*	*365*	*1125*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	1.48	.07	d.35	1.15	2.35
2007	1.77	.10	d.22	1.11	2.76
2008	1.62	.08	d.38	1.25	2.57
2009	1.72	.12	*d.31*	*1.32*	*2.85*
2010	*1.72*	*.11*	*d.33*	*1.35*	*2.85*

Calendar	QUARTERLY DIVIDENDS PAID [B■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.325	.325	.325	.345	1.32
2006	.345	.345	.345	.355	1.39
2007	.355	.355	.355	.375	1.44
2008	.375	.375	.375	.395	1.52
2009	.395	.395	.395		

BUSINESS: Northwest Natural Gas Co. distributes natural gas to 90 communities, 662,000 customers, in Oregon (90% of customers) and in southwest Washington state. Principal cities served: Portland and Eugene, OR; Vancouver, WA. Service area population: 2.5 mill. (77% in OR). Company buys gas supply from Canadian and U.S. producers; has transportation rights on Northwest Pipeline system. Owns local underground storage. Rev. breakdown: residential, 55%; commercial, 28%; industrial, gas transportation, and other, 17%. Employs 1,106. Barclays Global owns 6.6% of shares; officers and directors, 1.4% (4/09 proxy). CEO: Gregg S. Kantor. Inc.: Oregon. Address: 220 NW 2nd Ave., Portland, OR 97209. Telephone: 503-226-4211. Internet: www.nwnatural.com.

Northwest Natural's normal-looking first-half results contained some unusual elements. The company shares in either 20% or 10% of the difference between forecast natural gas costs and the actual outlays in Oregon. In this year's first half, very low gas prices led to an $11 million profit from the cost-sharing mechanism, versus a $6 million loss in the prior-year period. The profit, however, was partially offset by considerably higher operating and maintenance expenses, due partly to higher pension expense related to the decline in the stock market and bonuses due to the earnings gain. Meanwhile, the recession cost Northwest 3,000 customers in the June period, dropping its year-to-year customer increase to 0.8%.

Thus, we look for little earnings change through 2010. With natural gas prices likely to rise at least a bit next year, Northwest has opted to share in 10% of the difference between forecast and actual gas costs, likely reducing commodity cost effects. As gas prices are down, however, the company expects that residential rates will drop 15%-20% next year, raising the incentive to convert to gas heat. Moreover, the company plans to pare 50 to 100 jobs, adding to the 175 it eliminated in the last two years.

Northwest should benefit from a new union contract. Under the new five-year agreement, union members (about 60% of the workforce) received a 2.3% raise but will get just 1% more per year for years two through five, plus up to 2% for inflation. The company gains extra flexibility, and new hires will not be eligible for the defined benefit pension plan.

New projects could significantly boost earnings by the end of our time horizon. Northwest owns 75% of the Gill Ranch, CA gas storage project and will invest about $160 million in the project; it should contribute to the bottom line by 2011. The proposed Palomar pipeline would bring a second source of gas to the Portland area; its eastern section could come on line by 2013. NWN's investment would be around $200 million, plus an equal sum if the western half is built.

These top-quality shares offer decent total-return potential, suitable for conservative accounts.

Sigourney B. Romaine September 11, 2009

(A) Diluted earnings per share. Excludes nonrecurring items: '98, $0.15; '00, $0.11; '06, ($0.06); '08, ($0.03); 1Q '09, 6¢. Next earnings report due early November.

(B) Dividends historically paid in mid-February, May, August, and November.
■ Dividend reinvestment plan available.

(C) In millions, adjusted for stock split.

Company's Financial Strength	A
Stock's Price Stability	100
Price Growth Persistence	70
Earnings Predictability	90

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PIEDMONT NAT'L. GAS NYSE-PNY

RECENT PRICE **24.24** | P/E RATIO **14.8** (Trailing: 15.6 Median: 18.0) | RELATIVE P/E RATIO **0.92** | DIV'D YLD **4.5%** | VALUE LINE

TIMELINESS **3** Raised 6/15/07
SAFETY **2** New 7/27/90
TECHNICAL **4** Raised 7/17/09
BETA .65 (1.00 = Market)

2012-14 PROJECTIONS

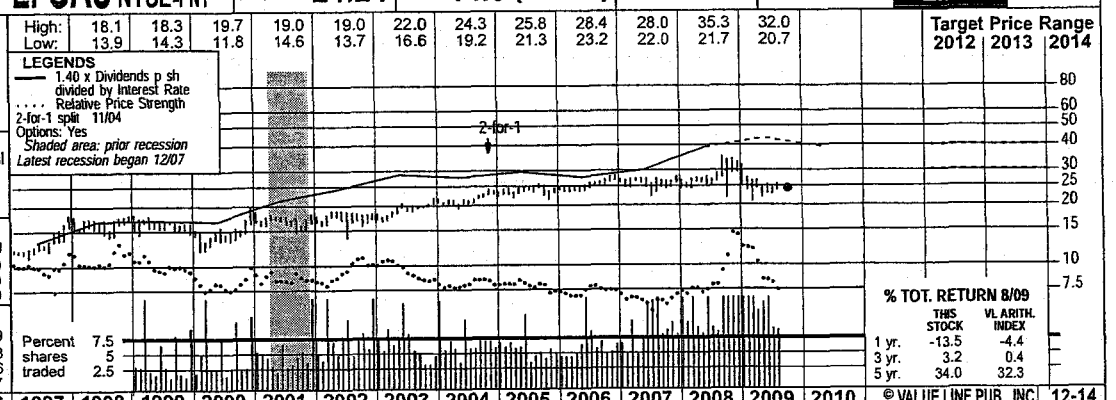
	Price	Gain	Ann'l Total Return
High	40	(+65%)	17%
Low	30	(+25%)	10%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	1	0	1	0	0	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	1	1	0	0	0	0	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	112	75	78
to Sell	93	123	96
Hld's(000)	33160	34611	33567



1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
10.57	10.82	8.76	11.59	12.84	12.45	10.97	13.01	17.06	12.57	18.14	19.95	22.96	25.80	23.37	28.52	*26.45*	*27.25*	Revenues per sh [A]	*30.00*
1.14	1.13	1.25	1.49	1.62	1.72	1.70	1.77	1.81	1.81	2.04	2.31	2.43	2.51	2.64	2.77	*2.85*	*2.95*	"Cash Flow" per sh	*3.15*
.73	.68	.73	.84	.93	.98	.93	1.01	1.01	.95	1.11	1.27	1.32	1.27	1.40	1.49	*1.60*	*1.70*	Earnings per sh [B]	*1.90*
.48	.51	.54	.57	.61	.64	.68	.72	.76	.80	.82	.85	.91	.95	.99	1.03	*1.07*	*1.11*	Div'ds Decl'd per sh [C■]	*1.23*
1.58	1.95	1.72	1.64	1.52	1.48	1.58	1.65	1.29	1.21	1.16	1.85	2.50	2.74	1.85	2.47	*2.40*	*2.10*	Cap'l Spending per sh	*2.25*
5.45	5.68	6.16	6.53	6.95	7.45	7.86	8.26	8.63	8.91	9.36	11.15	11.53	11.83	11.99	12.11	*12.70*	*13.25*	Book Value per sh [D]	*15.05*
52.30	53.15	57.67	59.10	60.39	61.48	62.59	63.83	64.93	66.18	67.31	76.67	76.70	74.61	73.23	73.26	*73.50*	*73.50*	Common Shs Outst'g [E]	*73.00*
15.4	15.7	13.8	13.9	13.6	16.3	17.7	14.3	16.7	18.4	16.7	16.6	17.9	19.2	18.7	18.2	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*18.0*
.91	1.03	.92	.87	.78	.85	1.01	.93	.86	1.01	.95	.88	.95	1.04	.99	1.15			Relative P/E Ratio	*1.50*
4.3%	4.8%	5.4%	4.9%	4.8%	4.0%	4.1%	5.0%	4.5%	4.6%	4.4%	4.1%	3.8%	3.9%	3.8%	3.8%			Avg Ann'l Div'd Yield	*3.6%*
686.5	830.4	1107.9	832.0	1220.8	1529.7	1761.1	1924.7	1711.3	2089.1	*1945*	*2005*	Revenues ($mill) [A]	*2190*
58.2	64.0	65.5	62.2	74.4	95.2	101.3	97.2	104.4	110.0	*115*	*125*	Net Profit ($mill)	*140*
39.7%	34.7%	34.6%	33.1%	34.8%	35.1%	33.7%	34.2%	33.0%	36.4%	*35.0%*	*35.0%*	Income Tax Rate	*35.0%*
8.5%	7.7%	5.9%	7.5%	6.1%	6.2%	5.8%	5.0%	6.1%	5.3%	*6.1%*	*6.3%*	Net Profit Margin	*6.4%*
46.2%	46.1%	47.6%	43.9%	42.2%	43.6%	41.4%	48.3%	48.4%	47.2%	*47.5%*	*48.0%*	Long-Term Debt Ratio	*47.0%*
53.8%	53.9%	52.4%	56.1%	57.8%	56.4%	58.6%	51.7%	51.6%	52.8%	*52.5%*	*52.0%*	Common Equity Ratio	*53.0%*
914.7	978.4	1069.4	1051.6	1090.2	1514.9	1509.2	1707.9	1703.3	1681.5	*1775*	*1875*	Total Capital ($mill)	*2075*
1047.0	1072.0	1114.7	1158.5	1812.3	1849.8	1939.1	2075.3	2141.5	2240.8	*2250*	*2300*	Net Plant ($mill)	*2450*
8.1%	8.3%	7.9%	7.8%	8.6%	7.8%	8.2%	7.2%	7.8%	8.2%	*8.0%*	*8.0%*	Return on Total Cap'l	*8.0%*
11.8%	12.1%	11.7%	10.6%	11.8%	11.1%	11.5%	11.0%	11.9%	12.4%	*12.5%*	*13.0%*	Return on Shr. Equity	*12.5%*
11.8%	12.1%	11.7%	10.6%	11.8%	11.1%	11.5%	11.0%	11.9%	12.4%	*12.5%*	*13.0%*	Return on Com Equity	*12.5%*
3.3%	3.5%	3.0%	1.7%	3.1%	3.7%	3.6%	2.8%	3.5%	3.9%	*4.0%*	*4.5%*	Retained to Com Eq	*4.5%*
72%	71%	75%	83%	74%	66%	68%	74%	70%	69%	*67%*	*65%*	All Div'ds to Net Prof	*65%*

CAPITAL STRUCTURE as of 4/30/09
Total Debt $1029.0 mill. Due in 5 Yrs $150.0 mill.
LT Debt $793.5 mill. LT Interest $55.5 mill.
(LT interest earned: 4.0x; total interest coverage: 3.7x)

Pension Assets-10/08 $150.3 mill.
Oblig. $143.5 mill.

Pfd Stock None

Common Stock 72,959,779 shs.
as of 6/2/09
MARKET CAP: $1.8 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2007	2008	4/30/09
Cash Assets	7.5	7.0	20.7
Other	427.8	593.8	528.0
Current Assets	435.3	600.8	548.7
Accts Payable	143.6	132.3	94.0
Debt Due	195.0	436.5	235.5
Other	75.9	112.7	182.3
Current Liab.	424.5	681.5	511.8
Fix. Chg. Cov.	309%	341%	350%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	7.5%	10.0%	2.5%
"Cash Flow"	5.0%	7.0%	3.0%
Earnings	4.5%	6.5%	5.5%
Dividends	5.0%	4.5%	3.5%
Book Value	5.5%	6.0%	4.0%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Jan.31	Apr.30	Jul.31	Oct.31	Full Fiscal Year
2006	921.4	483.2	237.9	282.2	1924.7
2007	677.2	531.5	224.4	278.2	1711.3
2008	788.5	634.2	354.7	311.7	2089.1
2009	779.6	455.4	*372*	*338*	*1945*
2010	*790*	*470*	*390*	*355*	*2005*

Fiscal Year Ends	EARNINGS PER SHARE [A B] Jan.31	Apr.30	Jul.31	Oct.31	Full Fiscal Year
2006	.94	.57	d.16	d.08	1.27
2007	.94	.69	d.12	d.11	1.40
2008	1.12	.66	d.10	d.18	1.49
2009	1.10	.73	*d.10*	*d.13*	*1.60*
2010	*1.12*	*.75*	*d.08*	*d.09*	*1.70*

Cal-endar	QUARTERLY DIVIDENDS PAID [C■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.215	.23	.23	.23	.91
2006	.23	.24	.24	.24	.95
2007	.24	.25	.25	.25	.99
2008	.25	.26	.26	.26	1.03
2009	.26	.27	.27		

BUSINESS: Piedmont Natural Gas Company is primarily a regulated natural gas distributor, serving over 935,724 customers in North Carolina, South Carolina, and Tennessee. 2008 revenue mix: residential (39%), commercial (24%), industrial (12%), other (25%). Principal suppliers: Transco and Tennessee Pipeline. Gas costs: 73.5% of revenues. '08 deprec. rate: 3.2%. Estimated plant age: 8.7 years. Non-regulated operations: sale of gas-powered heating equipment; natural gas brokering; propane sales. Has about 1,833 employees. Officers & directors own about 1.1% of common stock (1/09 proxy). Chairman, CEO, & President: Thomas E. Skains. Inc.: NC. Address: 4720 Piedmont Row Drive, Charlotte, NC 28210. Telephone: 704-364-3120. Internet: www.piedmontng.com.

Piedmont Natural Gas has posted a mixed bag of financial results thus far in 2009. Quarterly sales in the first half declined, year over year, as the weakened economy continued to weigh on both residential and commercial new construction activities. As a result, PNY's regulated utility segment has been experiencing declining customer growth compounded by rising conservation practices at existing accounts. Nonetheless, margins have been widening, thanks largely to lower natural gas costs, which have more than offset the rise in operating expenses. These trends resulted in a 10.6% hike in the April-period bottom line.

Meantime, slumping demand has put the brakes on many of the company's capital projects. Management has opted to defer its pipeline infrastructure enhancement plans that were scheduled to serve the new gas-fired power generation markets of North Carolina. Moreover, construction of the liquid natural gas storage facility in Robeson County, NC has also been put off. Current customer growth projections in that region indicate this facility may not be necessary for a few more years. As a result, PNY is holding off on construction until 2012, with a potential in-service date of 2015. These moves ought to help the company conserve cash at a time when rising accounts receivable and higher delinquencies are a distinct possibility.

Still, we have raised our earnings estimates for this year and next by a nickel. The main culprit for the dissapointing 2009 revenues can be attributed to the slumping commodity prices. This trend masks Piedmont's continued customer growth, a figure that should register at about 1%-1.5% this year. Meantime, lower gas costs should continue to offset the margin tightening associated with diminished volumes. Consequently, annual earnings gains should persist.

These neutrally ranked shares have some appeal as an income vehicle. Recovery potential for the pull to 2012-2014 is about average for a utility. But the recent dividend hike, and relative stability provided by an ever-increasing customer base, shines a positive light on this good-quality stock.

Bryan J. Fong *September 11, 2009*

(A) Fiscal year ends October 31st.
(B) Diluted earnings. Excl. extraordinary item: '00, 8¢. Excl. nonrecurring charge: '97, 2¢. Next earnings report due early Nov. Quarters may not add to total due to change in shares outstanding.
(C) Dividends historically paid mid-January, April, July, October.
■ Div'd reinvest. plan available; 5% discount.
(D) Includes deferred charges. In 2008: $16.3 million, 22¢/share.
(E) In millions, adjusted for stock split.

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	60
Earnings Predictability	90

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SOUTH JERSEY INDS. NYSE-SJI

RECENT PRICE 34.29 | P/E RATIO 14.3 (Trailing: 14.8 Median: 14.0) | RELATIVE P/E RATIO 0.89 | DIV'D YLD 3.6% | VALUE LINE

TIMELINESS 3 Lowered 8/14/09
SAFETY 2 Lowered 1/4/91
TECHNICAL 5 Lowered 9/11/09
BETA .65 (1.00 = Market)

2012-14 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	50	(+45%)	13%
Low	35	(Nil)	5%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	1	0	0	1	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	2	0	0	0	4	0	1	2

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	75	73	70
to Sell	69	70	78
Hld's(000)	16545	16545	15858

	2012	2013	2014
Target Price Range			

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
	17.03	17.45	16.50	16.52	16.18	20.89	17.60	22.43	35.30	20.69	26.34	29.51	31.78	31.76	32.30	32.36	30.85	31.60	Revenues per sh	36.35
	1.54	1.35	1.65	1.54	1.60	1.44	1.84	1.95	1.90	2.12	2.24	2.44	2.51	3.51	3.20	3.48	3.35	3.60	"Cash Flow" per sh	4.20
	.78	.61	.83	.85	.86	.64	1.01	1.08	1.15	1.22	1.37	1.58	1.71	2.46	2.09	2.27	2.40	2.65	Earnings per sh A	3.10
	.72	.72	.72	.72	.72	.72	.72	.73	.74	.75	.78	.82	.86	.92	1.01	1.11	1.20	1.28	Div'ds Decl'd per sh B ■	1.50
	1.87	1.93	2.08	2.01	2.30	3.06	2.19	2.21	2.82	3.47	2.36	2.67	3.21	2.51	1.88	2.08	2.35	2.40	Cap'l Spending per sh	2.90
	7.17	7.23	7.34	8.03	6.43	6.23	6.74	7.25	7.81	9.67	11.26	12.41	13.50	15.11	16.25	17.33	18.65	19.35	Book Value per sh C	22.75
	19.61	21.43	21.44	21.51	21.54	21.56	22.30	23.00	23.72	24.41	26.46	27.76	28.98	29.33	29.61	29.73	30.00	31.00	Common Shs Outst'g D	33.00
	15.8	16.1	12.2	13.3	13.8	21.2	13.3	13.0	13.6	13.5	13.3	14.1	16.6	11.9	17.2	15.9	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	14.0
	.93	1.06	.82	.83	.80	1.10	.76	.85	.70	.74	.76	.74	.88	.64	.91	.95			Relative P/E Ratio	.95
	5.9%	7.4%	7.2%	6.4%	6.1%	5.3%	5.4%	5.2%	4.7%	4.6%	4.3%	3.7%	3.0%	3.2%	2.8%	3.1%			Avg Ann'l Div'd Yield	3.5%
	392.5	515.9	837.3	505.1	696.8	819.1	921.0	931.4	956.4	962.0	925	980	Revenues ($mill)	1200
	22.0	24.7	26.8	29.4	34.6	43.0	48.6	72.0	61.8	67.7	70.0	80.0	Net Profit ($mill)	100
	42.8%	43.1%	42.2%	41.4%	40.6%	40.9%	41.5%	41.3%	41.9%	47.7%	38.0%	40.0%	Income Tax Rate	40.0%
	5.6%	4.8%	3.2%	5.8%	5.0%	5.2%	5.3%	7.7%	6.5%	7.0%	7.6%	8.2%	Net Profit Margin	8.3%
	53.8%	54.1%	57.0%	53.6%	50.8%	48.7%	44.9%	44.7%	42.7%	39.2%	38.5%	40.0%	Long-Term Debt Ratio	38.0%
	37.0%	37.6%	35.9%	46.1%	49.0%	51.0%	55.1%	55.3%	57.3%	60.8%	61.5%	60.0%	Common Equity Ratio	62.0%
	405.9	443.5	516.2	512.5	608.4	675.0	710.3	801.1	839.0	848.0	910	1000	Total Capital ($mill)	1210
	533.3	562.2	607.0	666.6	748.3	799.9	877.3	920.0	948.9	982.6	1030	1075	Net Plant ($mill)	1250
	7.4%	7.4%	6.9%	7.6%	7.3%	7.9%	8.3%	10.1%	8.6%	8.5%	8.5%	9.0%	Return on Total Cap'l	9.0%
	11.7%	12.1%	12.1%	12.4%	11.5%	12.4%	12.4%	16.3%	12.8%	13.1%	12.5%	13.5%	Return on Shr. Equity	13.5%
	14.6%	14.8%	12.8%	12.5%	11.6%	12.5%	12.4%	16.3%	12.8%	13.1%	12.5%	13.5%	Return on Com Equity	13.5%
	4.2%	4.8%	3.5%	4.7%	5.0%	5.9%	6.2%	10.2%	6.7%	6.7%	6.0%	6.5%	Retained to Com Eq	6.5%
	72%	67%	76%	62%	57%	52%	50%	37%	48%	49%	51%	50%	All Div'ds to Net Prof	50%

High: 15.4 15.4 15.1 17.0 18.3 20.3 26.5 32.4 34.3 41.3 40.6 40.8
Low: 11.0 10.8 12.3 13.8 14.1 15.3 19.7 24.9 25.6 31.2 25.2 32.0

LEGENDS
1.40 x Dividends p sh divided by Interest Rate
Relative Price Strength
2-for-1 split 7/05
Options: Yes
Shaded area: prior recession
Latest recession began 12/07

2-for-1

Percent shares traded 15 10 5

% TOT. RETURN 8/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	0.4	-4.4
3 yr.	31.1	0.4
5 yr.	79.3	32.3

CAPITAL STRUCTURE as of 6/30/09
Total Debt $496.4 mill. Due in 5 Yrs $228.8 mill.
LT Debt $332.7 mill. LT Interest $16.0 mill.
(Total interest coverage: 8.4x)

Pension Assets-12/08 $88.3 mill.
Oblig. $142.7 mill.

Pfd Stock none

Common Stock 29,796,232 common shs.
as of 8/3/09

MARKET CAP: $1.0 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	11.7	5.8	6.0
Other	316.6	429.3	351.4
Current Assets	328.3	435.1	357.4
Accts Payable	101.2	120.2	87.9
Debt Due	118.4	237.6	163.7
Other	108.7	142.1	135.7
Current Liab.	328.3	499.9	387.3
Fix. Chg. Cov.	476%	598%	834%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	6.0%	3.0%	2.0%
"Cash Flow"	8.5%	10.0%	3.5%
Earnings	11.5%	13.0%	5.5%
Dividends	3.5%	6.0%	7.0%
Book Value	9.0%	11.0%	6.0%

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	372.6	153.8	154.7	250.3	931.4
2007	368.4	171.7	156.2	260.1	956.4
2008	348.1	135.8	210.4	267.7	962.0
2009	362.2	134.5	150	278.3	925
2010	365	160	170	285	980

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	1.06	.20	.51	.69	2.46
2007	1.30	.21	d.05	.63	2.09
2008	1.32	.26	.04	.67	2.27
2009	1.46	.15	.05	.74	2.40
2010	1.45	.25	.10	.85	2.65

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	--	.213	.213	.438	.86
2006	--	.225	.225	.470	.92
2007	--	.245	.245	.515	1.01
2008	--	.270	.270	.568	1.11
2009	--	.298	.298		

BUSINESS: South Jersey Industries, Inc. is a holding company. Its subsidiary, South Jersey Gas Co., distributes natural gas to 340,136 customers in New Jersey's southern counties, which covers about 2,500 square miles and includes Atlantic City. Gas revenue mix '08: residential, 46%; commercial, 23%; cogeneration and electric generation, 6%; industrial, 25%. Non-utility operations include: South Jersey Energy, South Jersey Resources Group, Marina Energy, and South Jersey Energy Service Plus. Has 602 employees. Off./dir. control 1.0% of com. shares; Barclays, 7.5%; Keeley Asset Management, 5.6% (3/09 proxy). Chrmn. & CEO: Edward Graham. Incorp.: NJ. Address: 1 South Jersey Plaza, Folsom, NJ 08037. Tel.: 609-561-9000. Internet: www.sjindustries.com.

South Jersey Industries posted a flat top-line comparison and lower share earnings for the second quarter. Earnings declined moderately at subsidiary South Jersey Gas in the recent interim. Lower interest payments were more than offset by higher pension expense and an increase in other operating costs at this business. Meanwhile, significantly cooler temperatures during the period resulted in lower air conditioning demand and reduced earnings at the on-site energy production business, Marina Energy. The Asset Management and Marketing business also posted an earnings decline for the quarter.

The company has attractive prospects for the coming years. Customer growth at South Jersey Gas has continued at a steady clip, despite weakness in the broader economy. Natural gas remains the fuel of choice in the markets served by the utility, and SJG continues to see significant interest in conversions from other fuel sources to natural gas. Its recent gas main extension project, along with aggressive marketing efforts, should benefit the utility going forward. We anticipate solid results from the nonutility operations, as well.

South Jersey Gas has filed with the New Jersey Board of Public Utilities to reduce rates by 20.2%. The approval of the Basic Gas Supply Service (BGSS) petition would allow customers to realize significant savings, and provide an incentive for homeowners to switch from oil to natural gas. The BGSS clause allows South Jersey to pass along increases and decreases in gas costs directly to consumers. The company's ability to secure lower-priced gas has allowed it to provide customers with the lower rates.

Shares of South Jersey Industries have slipped one notch in Timeliness, and are now neutrally ranked for year-ahead performance. Looking further out, we anticipate higher revenues and share earnings at the company by 2012-2014. Moreover, SJI scores high marks for Safety, Price Stability, and Earnings Predictability. But from the present quotation, this issue has below-average, though reasonably well-defined, total return potential for the coming years.

Michael Napoli, CPA *September 11, 2009*

(A) Based on GAAP EPS through 2006, economic earnings thereafter. GAAP EPS: '07, $2.10; '08, $2.58. Excl. nonrecur. gain (loss): '01, $0.13; '08, $0.31. Excl gain (losses) from discont. ops.: '99, ($0.02); '00, ($0.04); '01, ($0.02); '02, ($0.04); '03, ($0.09); '05, ($0.02); '06, ($0.02); '07, $0.01. Earnings may not sum due to rounding. Next egs. report due in November. (B) Div'ds paid early Apr., Jul., Oct., and late Dec. ■ Div. reinvest. plan avail. (C) Incl. regulatory assets. In 2008: $270.4 mill., $9.10 per shr. (D) In millions, adj. for split.

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	90
Earnings Predictability	80

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SOUTHWEST GAS NYSE-SWX

RECENT PRICE 23.98 | P/E RATIO 13.5 (Trailing: 16.3 Median: 19.0) | RELATIVE P/E RATIO 0.84 | DIV'D YLD 4.1% | VALUE LINE

TIMELINESS 3 Raised 5/23/08
SAFETY 3 Lowered 1/4/91
TECHNICAL 4 Lowered 7/24/09
BETA .75 (1.00 = Market)

2012-14 PROJECTIONS

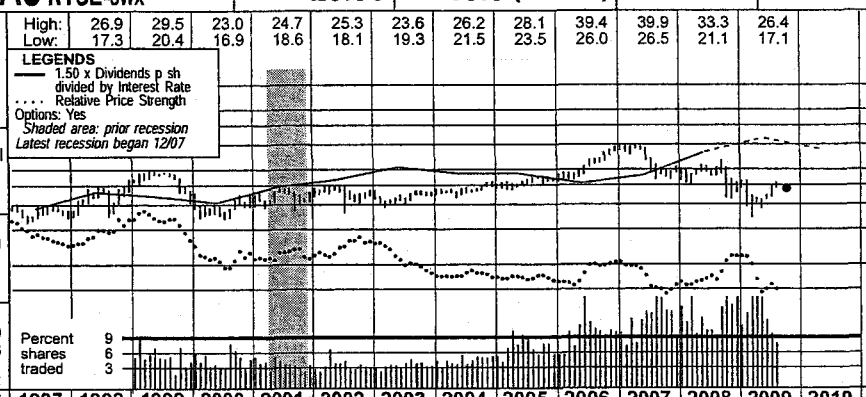
	Price	Gain	Ann'l Total Return
High	40	(+65%)	17%
Low	30	(+25%)	10%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	1	1	0	0	0	3	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	0	0	0	0	0	0	1

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	83	83	86
to Sell	75	71	71
Hld's(000)	32362	32859	32802



Target Price Range 2012 | 2013 | 2014
80 60 50 40 30 25 20 15 10 7.5

% TOT. RETURN 8/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	-16.6	-4.4
3 yr.	-20.7	0.4
5 yr.	20.3	32.3

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
25.68	28.16	23.03	24.09	26.73	30.17	30.24	32.61	42.98	39.68	35.96	40.14	43.59	48.47	50.28	48.53	*39.55*	*41.50*	Revenues per sh	*52.00*
3.24	5.09	2.65	3.00	3.85	4.48	4.45	4.57	4.79	5.07	5.11	5.57	5.20	5.97	6.21	5.76	*5.95*	*6.15*	"Cash Flow" per sh	*7.30*
.63	1.22	.10	.25	.77	1.65	1.27	1.21	1.15	1.16	1.13	1.66	1.25	1.98	1.95	1.39	*1.75*	*1.90*	Earnings per sh A	*2.30*
.74	.80	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.86	.90	*.95*	*1.00*	Div'ds Decl'd per sh B■†	*1.15*
5.43	6.64	6.79	8.19	6.19	6.40	7.41	7.04	8.17	8.50	7.03	8.23	7.49	8.27	7.96	6.79	*5.50*	*5.95*	Cap'l Spending per sh	*7.20*
15.96	16.38	14.55	14.20	14.09	15.67	16.31	16.82	17.27	17.91	18.42	19.18	19.10	21.58	22.98	23.49	*25.25*	*26.05*	Book Value per sh	*28.00*
21.00	21.28	24.47	26.73	27.39	30.41	30.99	31.71	32.49	33.29	34.23	36.79	39.33	41.77	42.81	44.19	*45.50*	*47.00*	Common Shs Outst'g C	*50.00*
26.5	14.0	NMF	69.3	24.1	13.2	21.1	16.0	19.0	19.9	19.2	14.3	20.6	15.9	17.3	20.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*15.0*
1.57	.92	NMF	4.34	1.39	.69	1.20	1.04	.97	1.09	1.09	.76	1.10	.86	.92	1.22			Relative P/E Ratio	*1.00*
4.4%	4.7%	5.4%	4.7%	4.4%	3.8%	3.1%	4.2%	3.8%	3.6%	3.8%	3.5%	3.2%	2.6%	2.6%	3.2%			Avg Ann'l Div'd Yield	*3.3%*
936.9	1034.1	1396.7	1320.9	1231.0	1477.1	1714.3	2024.7	2152.1	2144.7	*1800*	*1950*	Revenues ($mill)	*2600*
39.3	38.3	37.2	38.6	38.5	58.9	48.1	80.5	83.2	61.0	*80.0*	*90.0*	Net Profit ($mill)	*115*
35.5%	26.2%	34.5%	32.8%	30.5%	34.8%	29.7%	37.3%	36.5%	40.1%	*38.0%*	*38.0%*	Income Tax Rate	*36.0%*
4.2%	3.7%	2.7%	2.9%	3.1%	4.0%	2.8%	4.0%	3.9%	2.8%	*4.4%*	*4.6%*	Net Profit Margin	*4.4%*
60.3%	60.2%	56.2%	62.5%	66.0%	64.2%	63.8%	60.6%	58.1%	55.3%	*51.0%*	*50.5%*	Long-Term Debt Ratio	*49.0%*
35.5%	35.8%	39.6%	34.1%	34.0%	35.8%	36.2%	39.4%	41.9%	44.7%	*49.0%*	*49.5%*	Common Equity Ratio	*51.0%*
1424.7	1489.9	1417.6	1748.3	1851.6	1968.6	2076.0	2287.8	2349.7	2323.3	*2350*	*2475*	Total Capital ($mill)	*2750*
1581.1	1686.1	1825.6	1979.5	2175.7	2336.0	2489.1	2668.1	2845.3	2983.3	*3050*	*3150*	Net Plant ($mill)	*3600*
4.8%	4.6%	5.1%	4.3%	4.2%	5.0%	4.3%	5.5%	5.5%	4.5%	*5.0%*	*5.5%*	Return on Total Cap'l	*6.0%*
7.0%	6.5%	6.0%	5.9%	6.1%	8.3%	6.4%	8.9%	8.5%	5.9%	*7.0%*	*7.5%*	Return on Shr. Equity	*8.0%*
7.8%	7.2%	6.6%	6.5%	6.1%	8.3%	6.4%	8.9%	8.5%	5.9%	*7.0%*	*7.5%*	Return on Com Equity	*8.0%*
2.8%	2.4%	1.9%	1.9%	1.7%	4.3%	2.2%	5.2%	4.8%	2.1%	*3.0%*	*3.5%*	Retained to Com Eq	*4.0%*
64%	67%	71%	70%	72%	49%	65%	42%	44%	63%	*54%*	*52%*	All Div'ds to Net Prof	*50%*

CAPITAL STRUCTURE as of 6/30/09

Total Debt $1228.0 mill. **Due in 5 Yrs** $566.1 mill.
LT Debt $1222.9 mill. **LT Interest** $85.0 mill.
(Total interest coverage: 2.2x)
Leases, Uncapitalized Annual rentals $6.0 mill.
Pension Assets-12/08 $342.9 mill.
Oblig. $558.9 mill.
Pfd Stock None

Common Stock 44,822,466 shs.
as of 7/30/09

MARKET CAP: $1.1 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	32.0	26.4	26.8
Other	470.5	411.7	232.5
Current Assets	502.5	438.1	259.3
Accts Payable	220.7	191.4	68.0
Debt Due	47.1	62.8	5.1
Other	260.1	255.7	303.0
Current Liab.	527.9	509.9	376.1
Fix. Chg. Cov.	229%	224%	233%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	6.0%	4.5%	*1.0%*
"Cash Flow"	4.5%	3.5%	*3.5%*
Earnings	7.0%	9.0%	*4.5%*
Dividends	0.5%	1.0%	*5.0%*
Book Value	4.5%	5.0%	*3.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	676.9	430.9	351.8	565.1	2024.7
2007	793.7	426.6	371.5	560.3	2152.1
2008	813.6	447.3	374.4	509.4	2144.7
2009	689.9	387.6	*275*	*447.5*	*1800*
2010	*730*	*410*	*310*	*500*	*1950*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2006	1.11	.02	d.26	1.11	1.98
2007	1.17	d.01	d.22	1.01	1.95
2008	1.14	d.06	d.38	.71	1.39
2009	1.12	d.01	*d.35*	*.99*	*1.75*
2010	*1.15*	*Nil*	*d.30*	*1.05*	*1.90*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.205	.205	.205	.205	.82
2006	.205	.205	.205	.205	.82
2007	.205	.215	.215	.215	.85
2008	.215	.225	.225	.225	.89
2009	.225	.238	.238		

BUSINESS: Southwest Gas Corporation is a regulated gas distributor serving approximately 1.8 million customers in sections of Arizona, Nevada, and California. Comprised of two business segments: natural gas operations and construction services. 2008 margin mix: residential and small commercial, 86%; large commercial and industrial, 5%; transportation, 9%. Total throughput: 2.4 billion therms. Sold PriMerit Bank, 7/96. Has 4,732 employees. Off. & Dir. own 2.0% of common stock; T. Rowe Price Associates, Inc., 7.0%; Barclays Global Investors, 6.8%; GAMCO Investors, Inc., 6.4% (3/09 Proxy). Chairman: James J. Kropid. CEO: Jeffrey W. Shaw. Inc.: CA. Address: 5241 Spring Mountain Road, Las Vegas, Nevada 89146. Telephone: 702-876-7237. Internet: www.swgas.com.

Southwest Gas reported unfavorable top-line performance for the second quarter. The recent recession stymied customer growth and resulted in lower usage. On the bright side, rate relief in Arizona and California (discussed below) supported results. Consequently, the company's share loss of $0.01 compared favorably with the prior-year tally. Losses are common during the second and third quarters, owing to the seasonal nature of the business. Looking forward, we expect lower revenue and a normal-sized share loss for the third quarter. Earnings comparisons ought to improve in the fourth quarter, assuming a better operating environment and greater cost control. Overall, we anticipate lower revenue and higher share earnings for Southwest in full-year 2009. Bottom-line growth may well continue next year.

The company is awaiting a rate case decision from the state of Nevada. Southwest is seeking a $30.5 million rate increase to compensate it for higher operating costs in that state. The request asks that the new rates take effect at the beginning of November. The company is also seeking an improvement in rate design. Specifically, SWX wants to implement a decoupled rate structure that would allow it more freedom in pursuing customer conservation opportunities. This follows recent prior rate case settlements in California and Arizona.

Investors should be mindful of several caveats. Warmer-than-normal temperatures during the winter months can hurt performance at Southwest Gas. In addition, the company will probably incur greater operating costs as it continues to expand, and profitability may suffer if rate relief cannot keep up with rising expenses.

The pace of customer growth should pick up in the future. That's assuming economic conditions in Southwest's service areas improve in the coming years. As a result, we anticipate higher revenues and share earnings at the company by 2012-2014. Moreover, income-oriented investors may find the stock's prospects for dividend growth attractive. But from the present quotation, this neutrally ranked equity features about-average total return potential for a utility.

Michael Napoli, CPA *September 11, 2009*

(A) Based on avg. shares outstand. thru. '96, then diluted. Excl. nonrec. gains (losses): '93, 8¢; '97, 16¢; '02, (10¢); '05, (11¢); '06, 7¢. Incl. asset writedown: '93, 44¢. Excl. loss from disc. ops.: '95, 75¢. Totals may not sum due to rounding. Next egs. report due early November. (B) Dividends historically paid early March, June, September, December. ■† Div'd reinvestment and stock purchase plan avail. (C) In millions.

Company's Financial Strength	B
Stock's Price Stability	100
Price Growth Persistence	65
Earnings Predictability	70

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WGL HOLDINGS NYSE-WGL

RECENT PRICE 33.30 | P/E RATIO 13.2 (Trailing: 13.1 / Median: 15.0) | RELATIVE P/E RATIO 0.82 | DIV'D YLD 4.4% | VALUE LINE

TIMELINESS 3 Lowered 6/5/09
SAFETY 1 Raised 4/2/93
TECHNICAL 5 Lowered 9/11/09
BETA .65 (1.00 = Market)

2012-14 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	45	(+35%)	12%
Low	35	(+5%)	6%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	0	0	0	0	0
Options	0	4	0	0	1	0	0	0	0
to Sell	0	4	0	0	4	1	0	2	0

Institutional Decisions

	4Q2008	1Q2009	2Q2009
to Buy	94	97	85
to Sell	95	96	98
Hld's(000)	31580	30919	31333

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	© VALUE LINE PUB., INC.	12-14
	21.55	21.69	19.30	22.19	24.16	23.74	20.92	22.19	29.80	32.63	42.45	42.93	44.94	53.96	53.51	52.65	*53.20*	*54.25*	Revenues per sh [A]	*57.60*
	2.25	2.43	2.51	2.93	3.02	2.79	2.74	3.20	3.24	2.63	4.00	3.87	3.97	3.89	3.89	4.34	*4.40*	*4.45*	"Cash Flow" per sh	*4.70*
	1.31	1.42	1.45	1.85	1.85	1.54	1.47	1.79	1.88	1.14	2.30	1.98	2.13	1.94	2.10	2.44	*2.50*	*2.55*	Earnings per sh [B]	*2.70*
	1.09	1.11	1.12	1.14	1.17	1.20	1.22	1.24	1.26	1.27	1.28	1.30	1.32	1.35	1.37	1.41	*1.47*	*1.51*	Div'ds Decl'd per sh [C] ■	*1.63*
	2.43	2.84	2.63	2.85	3.20	3.62	3.42	2.67	2.68	3.34	2.65	2.33	2.32	3.27	3.33	2.70	*3.00*	*3.00*	Cap'l Spending per sh	*2.50*
	11.04	11.51	11.95	12.79	13.48	13.86	14.72	15.31	16.24	15.78	16.25	16.95	17.80	18.86	19.83	20.99	*22.00*	*23.05*	Book Value per sh [D]	*26.20*
	41.50	42.19	42.93	43.70	43.70	43.84	46.47	46.47	48.54	48.56	48.63	48.67	48.65	48.89	49.45	49.92	*50.00*	*50.00*	Common Shs Outst'g [E]	*50.00*
	15.6	14.0	12.7	11.5	12.7	17.2	17.3	14.6	14.7	23.1	11.1	14.2	14.7	15.5	15.6	13.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*15.0*
	.92	.92	.85	.72	.73	.89	.99	.95	.75	1.26	.63	.75	.78	.84	.82	.85			Relative P/E Ratio	*1.00*
	5.3%	5.6%	6.1%	5.4%	5.0%	4.5%	4.8%	4.8%	4.6%	4.8%	5.0%	4.6%	4.2%	4.5%	4.2%	4.2%			Avg Ann'l Div'd Yield	*4.0%*
							972.1	1031.1	1446.5	1584.8	2064.2	2089.6	2186.3	2637.9	2646.0	2628.2	*2660*	*2715*	Revenues ($mill) [A]	*2880*
							68.8	84.6	89.9	55.7	112.3	98.0	104.8	96.0	102.9	122.9	*125*	*130*	Net Profit ($mill)	*135*
							36.0%	36.1%	39.6%	34.0%	38.0%	38.2%	37.4%	39.0%	39.1%	37.1%	*37.0%*	*37.0%*	Income Tax Rate	*38.0%*
							7.1%	8.2%	6.2%	3.5%	5.4%	4.7%	4.8%	3.6%	3.9%	4.7%	*4.7%*	*4.8%*	Net Profit Margin	*4.7%*
							41.5%	43.1%	41.7%	45.7%	43.8%	40.9%	39.5%	37.8%	37.9%	35.9%	*36.5%*	*35.5%*	Long-Term Debt Ratio	*34.0%*
							56.1%	54.8%	56.3%	52.4%	54.3%	57.2%	58.6%	60.4%	60.3%	62.4%	*62.0%*	*63.0%*	Common Equity Ratio	*64.5%*
							1218.5	1299.2	1400.8	1462.5	1454.9	1443.6	1478.1	1526.1	1625.4	1679.5	*1780*	*1830*	Total Capital ($mill)	*2040*
							1402.7	1460.3	1519.7	1606.8	1874.9	1915.6	1969.7	2067.9	2150.4	2208.3	*2325*	*2420*	Net Plant ($mill)	*2720*
							7.1%	7.9%	7.9%	5.3%	9.1%	8.2%	8.5%	7.6%	7.6%	8.5%	*8.0%*	*8.0%*	Return on Total Cap'l	*8.0%*
							9.7%	11.4%	11.0%	7.0%	13.7%	11.5%	11.7%	10.1%	10.2%	11.4%	*11.5%*	*11.0%*	Return on Shr. Equity	*10.5%*
							9.9%	11.7%	11.2%	7.2%	14.0%	11.7%	12.0%	10.3%	10.4%	11.6%	*12.0%*	*11.5%*	Return on Com Equity	*11.0%*
							1.8%	3.7%	3.8%	NMF	6.2%	4.1%	4.6%	3.2%	3.5%	5.0%	*4.5%*	*4.5%*	Retained to Com Eq	*4.0%*
							82%	69%	67%	112%	56%	65%	62%	69%	66%	57%	*59%*	*59%*	All Div'ds to Net Prof	*60%*

CAPITAL STRUCTURE as of 6/30/09
Total Debt $728.7 mill. Due in 5 Yrs $264.5 mill.
LT Debt $624.1 mill. LT Interest $37.4 mill.
(LT interest earned: 5.9x; total interest coverage: 5.2x)
Pension Assets-9/08 $588.2 mill. Oblig. $590.5 mill.
Preferred Stock $28.2 mill. Pfd. Div'd $1.3 mill.

Common Stock 50,141,229 shs.
as of 7/31/09

MARKET CAP: $1.7 billion (Mid Cap)

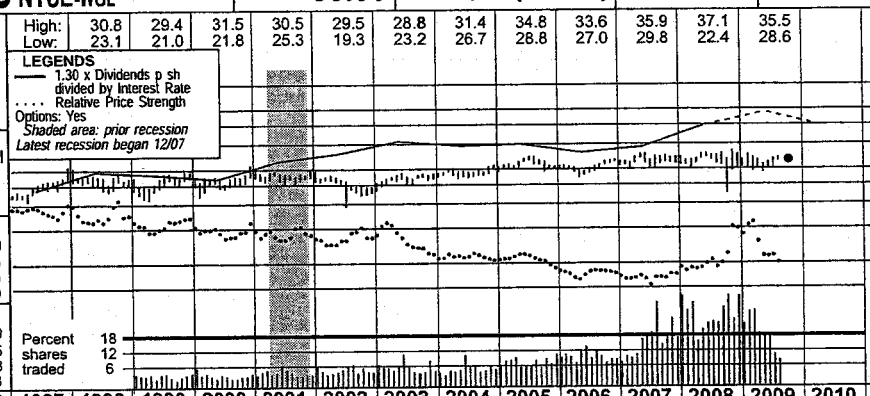
CURRENT POSITION ($MILL.)	2007	2008	6/30/09
Cash Assets	4.9	6.2	41.6
Other	568.8	736.1	553.2
Current Assets	573.7	742.3	594.8
Accts Payable	216.9	243.1	202.8
Debt Due	205.4	347.0	104.6
Other	134.8	158.4	202.1
Current Liab.	557.1	748.5	509.5
Fix. Chg. Cov.	432%	490%	500%

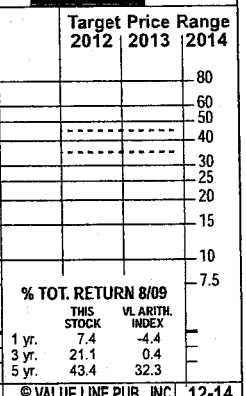
ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '06-'08 to '12-'14
Revenues	8.5%	9.0%	*1.5%*
"Cash Flow"	3.5%	4.0%	*2.5%*
Earnings	2.0%	4.0%	*4.0%*
Dividends	1.5%	1.5%	*3.0%*
Book Value	4.0%	4.5%	*4.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2006	902.9	1064.5	346.9	323.6	2637.9
2007	732.9	1119.9	467.5	325.7	2646.0
2008	751.6	1020.0	464.7	391.9	2628.2
2009	821.5	1040.9	427.0	*370.6*	*2660*
2010	*830*	*1050*	*445*	*390*	*2715*

Fiscal Year Ends	EARNINGS PER SHARE [A] [B] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2006	.93	1.17	d.01	d.15	1.94
2007	.92	1.27	.22	d.31	2.10
2008	.96	1.66	.06	d.24	2.44
2009	1.03	1.65	.11	*d.29*	*2.50*
2010	*1.04*	*1.66*	*.12*	*d.27*	*2.55*

Calendar	QUARTERLY DIVIDENDS PAID [C] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2005	.325	.333	.333	.333	1.32
2006	.333	.338	.338	.338	1.34
2007	.34	.34	.34	.34	1.36
2008	.34	.36	.36	.36	1.42
2009	.36	.37	.37		





% TOT. RETURN 8/09

	THIS STOCK	VL ARITH. INDEX
1 yr.	7.4	-4.4
3 yr.	21.1	0.4
5 yr.	43.4	32.3

BUSINESS: WGL Holdings, Inc. is the parent of Washington Gas Light, a natural gas distributor in Washington, D.C. and adjacent areas of VA and MD to resident'l and comm'l users (1,053,032 meters). Hampshire Gas, a federally regulated sub., operates an underground gas-storage facility in WV. Non-regulated subs.: Wash. Gas Energy Svcs. sells and delivers natural gas and provides energy related products in the D.C. metro area; Wash. Gas Energy Sys. designs/installs comm'l heating, ventilating, and air cond. systems. American Century Inv. own 7.1% of common stock; Off./dir. less than 1% (1/09 proxy). Chrmn. & CEO: J.H. DeGraffenreidt. Inc.: D.C. and VA. Addr.: 1100 H St., N.W., Washington, D.C. 20080. Tel.: 202-624-6410. Internet: www.wglholdings.com.

WGL Holdings posted a mixed bag of financial results for the off-peak June period. Top-line volumes fell approximately 8% over that time frame. This stemmed from weakness at the regulated utility segment, which has been dealing with lower natural gas consumption and some equipment cost issues. On a brighter note, the retail energy marketing division got a boost to its revenues and earnings contributions from higher natural gas and electricity margins. On the efficiency front, management has been performing well. Operating expenses declined 90 basis points versus the year-ago period. This stemmed from lower labor and benefits expenses. All told, the bottom line advanced nicely.

We look for the company to register a mid-single-digit earnings hike this year. The decent gains experienced earlier in 2009 will probably be offset by a larger share deficit in the fiscal fourth quarter. Despite the widening margins and solid performance from the retail energy and design build segments, demand at the mainstay regulated utility business may be soft. Also, the September period is historically and seasonally slow for WGL. Nonetheless, considering all that happened in the past year, the company appears to be in solid shape.

The LNG peaking facility is going to take longer than expected to be completed and put into service. That project will be used to support customer growth and maintain the pressure requirements of the distribution system in Chillum, MD. It was planned to be in service by the 2012-2013 winter heating season, but due to regulatory and legal issues, the following year is more likely.

These top-quality shares may appeal to income-oriented accounts, as they offer an attractive dividend yield. Typically, too, they proved much less volatile than the broader market during the recent turmoil. This partly stems from WGL's large government business in the DC metro area, which has been less affected by the economic downturn. These benefits are evident in the equity's top-notch Safety rank, and high mark for Price Stability. But appreciation potential is subpar for the pull to 2012-2014.

Bryan J. Fong *September 11, 2009*

(A) Fiscal years end Sept. 30th.
(B) Based on diluted shares. Excludes nonrecurring losses: '01, (13¢); '02, (34¢); '07, (4¢) discontinued operations: '06, (15¢). Qtly egs. may not sum to total, due to change in shares outstanding. Next earnings report due late Oct.
(C) Dividends historically paid early February, May, August, and November. ■ Dividend reinvestment plan available.
(D) Includes deferred charges and intangibles. '08: $291.3 million, $5.81/sh.
(E) In millions, adjusted for stock split.

Company's Financial Strength	A
Stock's Price Stability	100
Price Growth Persistence	50
Earnings Predictability	80

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Scottrade

AWR	35.93	-0.15	(-0.42%)	Vol. 52,852	16:01 ET

American States is a public utility company engaged principally in thepurchase, production, distribution and sale of water. The company alsodistributes electricity in some communities. In the customer service areas for both water and electric, rates and operations are subject to the jurisdiction of the California Public Utilities Commission.

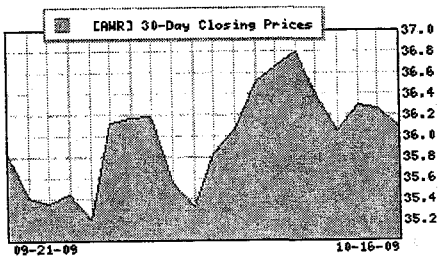
General Information

AMER STATES WTR
630 East Foothill Boulevard
San Dimas, CA 91773-1212
Phone: 909 394-3600
Fax: 909 394-0711
Web: www.gswater.com
Email: investorinfo@aswater.com

Industry	UTIL-WATER SPLY
Sector:	Utilities
Fiscal Year End	December
Last Reported Quarter	09/30/09
Next EPS Date	11/05/2009

Price and Volume Information

Zacks Rank	2
Yesterday's Close	36.08
52 Week High	38.79
52 Week Low	27.00
Beta	0.36
20 Day Moving Average	55,833.50
Target Price Consensus	40.33



% Price Change		% Price Change Relative to S&P 500	
4 Week	-0.28	4 Week	-2.05
12 Week	-1.23	12 Week	-11.08
YTD	9.40	YTD	-9.15

Share Information		Dividend Information	
Shares Outstanding (millions)	18.50	Dividend Yield	2.77%
		Annual Dividend	$1.00
Market Capitalization (millions)	667.44	Payout Ratio	0.00
		Change in Payout Ratio	0.00
Short Ratio	6.71	Last Dividend Payout / Amount	08/07/2009 / $0.25
Last Split Date	06/10/2002		

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	0.55	Current (1=Strong Buy, 5=Strong Sell)	1.67
Current Year EPS Consensus Estimate	1.82	30 Days Ago	1.67
Estimated Long-Term EPS Growth Rate	4.00	60 Days Ago	2.33
Next EPS Report Date	11/05/2009	90 Days Ago	1.67

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	19.85	vs. Previous Year	18.52%	vs. Previous Year	16.49%
Trailing 12 Months:	21.10	vs. Previous Quarter	128.57%	vs. Previous Quarter:	17.52%
PEG Ratio	4.96				

Price Ratios		ROE		ROA	
Price/Book	1.87	09/30/09	-	09/30/09	-

Price/Cash Flow	9.59	06/30/09	9.40	06/30/09	2.83
Price / Sales	-	03/31/09	9.02	03/31/09	2.68
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	1.10	06/30/09	1.08	06/30/09	8.83
03/31/09	0.82	03/31/09	0.80	03/31/09	8.51
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	10.59	06/30/09	10.59	06/30/09	19.31
03/31/09	9.75	03/31/09	9.75	03/31/09	18.01
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	51.08	06/30/09	0.87	06/30/09	46.39
03/31/09	52.72	03/31/09	0.98	03/31/09	49.56

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CALIFORNIA WTR SVC GROUP (NYSE)

Scottrade

CWT	40.11	▲0.55	(1.39%)	Vol. 144,240	16:02 ET

California Water Service Company's business, which is carried on through its operating subsidiaries, consists of the production, purchase, storage, purification, distribution and sale of water for domestic, industrial, public and irrigation uses, and for fire protection. It also provides water related services under agreements with municipalities and other private companies. The nonregulated services include full water system operation, and billing and meter reading services.

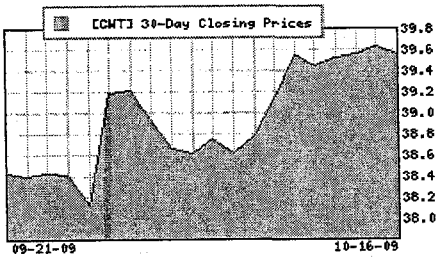
General Information

CALIF WATER SVC
1720 North First Street
San Jose, CA 95112
Phone: 408 367-8200
Fax: 408 437-9185
Web: www.calwatergroup.com
Email: klichtenberg@calwater.com

Industry	UTIL-WATER SPLY
Sector:	Utilities
Fiscal Year End	December
Last Reported Quarter	09/30/09
Next EPS Date	10/28/2009

Price and Volume Information

Zacks Rank	
Yesterday's Close	39.56
52 Week High	48.28
52 Week Low	29.13
Beta	0.47
20 Day Moving Average	99,815.65
Target Price Consensus	47



% Price Change		% Price Change Relative to S&P 500	
4 Week	1.57	4 Week	-0.24
12 Week	5.07	12 Week	-5.40
YTD	-14.80	YTD	-29.24

Share Information		Dividend Information	
Shares Outstanding (millions)	20.75	Dividend Yield	2.98%
		Annual Dividend	$1.18
Market Capitalization (millions)	820.67	Payout Ratio	0.00
Short Ratio	5.48	Change in Payout Ratio	0.00
Last Split Date	01/26/1998	Last Dividend Payout / Amount	08/06/2009 / $0.29

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	1.05	Current (1=Strong Buy, 5=Strong Sell)	2.00
Current Year EPS Consensus Estimate	2.10	30 Days Ago	2.00
Estimated Long-Term EPS Growth Rate	8.20	60 Days Ago	2.00
Next EPS Report Date	10/28/2009	90 Days Ago	1.83

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	18.86	vs. Previous Year	20.83%	vs. Previous Year	10.50%
Trailing 12 Months:	18.75	vs. Previous Quarter	383.33%	vs. Previous Quarter:	34.70%
PEG Ratio	2.31				

Price Ratios		ROE		ROA	
Price/Book	2.02	09/30/09	-	09/30/09	-
Price/Cash Flow	10.25	06/30/09	10.94	06/30/09	3.12
Price / Sales	-	03/31/09	10.58	03/31/09	3.14
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	1.23	06/30/09	1.18	06/30/09	10.12
03/31/09	0.56	03/31/09	0.52	03/31/09	9.92
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	16.26	06/30/09	16.26	06/30/09	19.56
03/31/09	15.95	03/31/09	15.95	03/31/09	19.28
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	38.87	06/30/09	0.95	06/30/09	48.59
03/31/09	36.94	03/31/09	0.72	03/31/09	41.82

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SOUTHWEST WATER CO (NASD)

Scottrade

SWWC	5.41	▲0.02	(0.37%)	Vol. 48,024	16:00 ET

Southwest Water Company provides a broad range of utility and utility management services and serves people from coast to coast. Through its various subsidiaries, Southwest operates and manages water and wastewater treatment facilities along with providing utility submetering and billing and collection services.

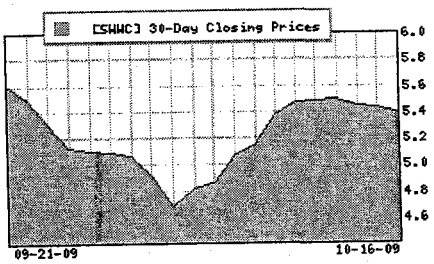
General Information

SOUTHWEST WATER
One Wilshire Building 624 South Grand Avenue
Suite 2900
Los Angeles, CA 90017-3782
Phone: 213 929-1800
Fax: 626-915-1558
Web: www.southwestwater.com
Email: swwc@swwc.com

Industry	UTIL-WATER
Sector:	SPLY Utilities
Fiscal Year End	December
Last Reported Quarter	09/30/09
Next EPS Date	12/19/2009

Price and Volume Information

Zacks Rank	2
Yesterday's Close	5.39
52 Week High	9.96
52 Week Low	2.67
Beta	0.60
20 Day Moving Average	125,904.65
Target Price Consensus	8.25



% Price Change		% Price Change Relative to S&P 500	
4 Week	-4.77	4 Week	-6.47
12 Week	2.86	12 Week	-7.39
YTD	67.39	YTD	39.01

Share Information		Dividend Information	
Shares Outstanding (millions)	24.88	Dividend Yield	1.86%
Market Capitalization (millions)	134.09	Annual Dividend	$0.10
Short Ratio	3.17	Payout Ratio	0.00
Last Split Date	12/28/2005	Change in Payout Ratio	0.00
		Last Dividend Payout / Amount	07/23/2009 / $0.03

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	0.08	Current (1=Strong Buy, 5=Strong Sell)	2.20
Current Year EPS Consensus Estimate	0.17	30 Days Ago	2.50
Estimated Long-Term EPS Growth Rate	-	60 Days Ago	2.50
Next EPS Report Date	12/19/2009	90 Days Ago	2.50

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	31.10	vs. Previous Year	-25.00%	vs. Previous Year	-8.15%
Trailing 12 Months:	-	vs. Previous Quarter	-%	vs. Previous Quarter:	0.05%
PEG Ratio	-				

Price Ratios	ROE	ROA

Price/Book	1.20	09/30/09	-	09/30/09	-
Price/Cash Flow	3.06	06/30/09	-27.86	06/30/09	-6.36
Price / Sales	-	03/31/09	-25.95	03/31/09	-6.30
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	-	06/30/09	-	06/30/09	-15.64
03/31/09	1.33	03/31/09	1.33	03/31/09	-15.27
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	-	06/30/09	-	06/30/09	-
03/31/09	-20.42	03/31/09	-20.42	03/31/09	4.48
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	-	06/30/09	-	06/30/09	-
03/31/09	-	03/31/09	1.78	03/31/09	63.88

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AQUA AMERICA INC (NYSE)

Scottrade

WTR	16.70	▲ 0.05	(0.30%)	Vol. 1,076,433	16:00 ET

Aqua America is the largest publicly-traded U.S.-based water utility serving residents in Pennsylvania, Ohio, Illinois, Texas, New Jersey, Indiana, Virginia, Florida, North Carolina, Maine, Missouri, New York, South Carolina and Kentucky. The company has been committed to the preservation and improvement of the environment throughout its history, which spans more than 100 years.

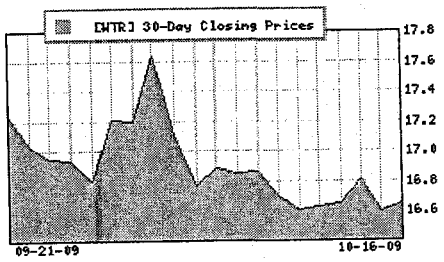
General Information

AQUA AMER INC
762 W Lancaster Avenue
Bryn Mawr, PA 19010-3489
Phone: 610 527-8000
Fax: 610-645-1061
Web: www.suburbanwater.com
Email: ir.aquaamerica.com

Industry	UTIL-WATER SPLY
Sector:	Utilities
Fiscal Year End	December
Last Reported Quarter	09/30/09
Next EPS Date	11/04/2009

Price and Volume Information

Zacks Rank	2
Yesterday's Close	16.65
52 Week High	22.00
52 Week Low	14.00
Beta	0.15
20 Day Moving Average	922,590.00
Target Price Consensus	22.14



% Price Change		% Price Change Relative to S&P 500	
4 Week	-3.81	4 Week	-5.53
12 Week	-7.71	12 Week	-16.91
YTD	-19.14	YTD	-32.85

Share Information		Dividend Information	
Shares Outstanding (millions)	135.92	Dividend Yield	3.24%
		Annual Dividend	$0.54
Market Capitalization (millions)	2,263.03	Payout Ratio	0.00
Short Ratio	22.71	Change in Payout Ratio	0.00
Last Split Date	12/02/2005	Last Dividend Payout / Amount	08/13/2009 / $0.14

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	0.26	Current (1=Strong Buy, 5=Strong Sell)	1.80
Current Year EPS Consensus Estimate	0.81	30 Days Ago	1.80
Estimated Long-Term EPS Growth Rate	7.50	60 Days Ago	1.80
Next EPS Report Date	11/04/2009	90 Days Ago	1.89

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	20.63	vs. Previous Year	11.76%	vs. Previous Year	11.00%
Trailing 12 Months:	21.35	vs. Previous Quarter	35.71%	vs. Previous Quarter:	8.32%
PEG Ratio	2.75				

Price Ratios	ROE	ROA

Price/Book	2.10	09/30/09	-	09/30/09	-
Price/Cash Flow	11.68	06/30/09	9.95	06/30/09	3.04
Price / Sales	-	03/31/09	9.77	03/31/09	2.99
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	0.60	06/30/09	0.55	06/30/09	15.97
03/31/09	0.60	03/31/09	0.55	03/31/09	15.87
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	26.47	06/30/09	26.47	06/30/09	7.94
03/31/09	26.37	03/31/09	26.37	03/31/09	7.86
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	39.75	06/30/09	1.14	06/30/09	53.25
03/31/09	31.95	03/31/09	1.15	03/31/09	53.52

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AGL RESOURCES INC (NYSE)

Scottrade

AGL	37.27	+0.41	(1.11%)	Vol. 181,647	16:03 ET

AGL Resources principal business is the distribution of natural gas to customers in central, northwest, northeast and southeast Georgia and the Chattanooga, Tennessee area through its natural gas distribution subsidiary. AGL's major service area is the ten county metropolitan Atlanta area.

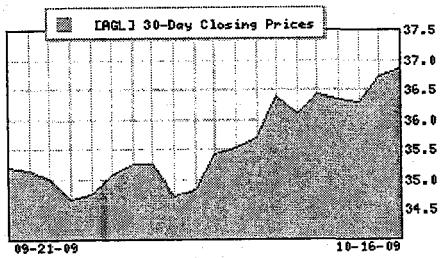
General Information

AGL RESOURCES
Ten Peachtree Place NE
Atlanta, GA 30309
Phone: 404 584-4000
Fax: 404 584-3945
Web: www.aglresources.com
Email: scave@aglresources.com

Industry	UTIL-GAS DISTR
Sector:	Utilities
Fiscal Year End	December
Last Reported Quarter	09/30/09
Next EPS Date	10/29/2009

Price and Volume Information

Zacks Rank	2
Yesterday's Close	36.86
52 Week High	37.29
52 Week Low	24.02
Beta	0.41
20 Day Moving Average	254,161.84
Target Price Consensus	36.29



% Price Change		% Price Change Relative to S&P 500	
4 Week	4.98	4 Week	3.11
12 Week	8.00	12 Week	-2.77
YTD	17.58	YTD	-2.36

Share Information		Dividend Information	
Shares Outstanding (millions)	77.28	Dividend Yield	4.67%
		Annual Dividend	$1.72
Market Capitalization (millions)	2,848.50	Payout Ratio	0.00
Short Ratio	3.66	Change in Payout Ratio	0.00
Last Split Date	12/04/1995	Last Dividend Payout / Amount	08/12/2009 / $0.43

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	0.22	Current (1=Strong Buy, 5=Strong Sell)	2.20
Current Year EPS Consensus Estimate	2.70	30 Days Ago	2.20
Estimated Long-Term EPS Growth Rate	4.70	60 Days Ago	2.20
Next EPS Report Date	10/29/2009	90 Days Ago	2.20

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	13.65	vs. Previous Year	-13.33%	vs. Previous Year	-15.09%
Trailing 12 Months:	12.05	vs. Previous Quarter	-83.23%	vs. Previous Quarter:	-62.11%
PEG Ratio	2.93				

Price Ratios		ROE		ROA	
Price/Book	1.62	09/30/09	-	09/30/09	-
Price/Cash Flow		06/30/09		06/30/09	

	7.87			13.60	3.68
Price / Sales	-	03/31/09		13.92	03/31/09	3.66
Current Ratio		**Quick Ratio**			**Operating Margin**	
09/30/09	-	09/30/09		-	09/30/09	-
06/30/09	1.03	06/30/09		0.61	06/30/09	8.63
03/31/09	1.06	03/31/09		0.80	03/31/09	8.53
Net Margin		**Pre-Tax Margin**			**Book Value**	
09/30/09	-	09/30/09		-	09/30/09	-
06/30/09	17.12	06/30/09		17.12	06/30/09	22.79
03/31/09	14.84	03/31/09		14.84	03/31/09	22.87
Inventory Turnover		**Debt-to-Equity**			**Debt to Capital**	
09/30/09	-	09/30/09		-	09/30/09	-
06/30/09	3.70	06/30/09		0.95	06/30/09	48.78
03/31/09	3.45	03/31/09		0.95	03/31/09	48.72

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ATMOS ENERGY CORP (NYSE)

Scottrade

ATO	29.30	▲0.40	(1.38%)	Vol. 447,120	16:00 ET

Atmos Energy Corporation distributes and sells natural gas to residential, commercial, industrial, agricultural and other customers. Atmos operates through five divisions in cities, towns and communities in service areas located in Colorado, Georgia, Illinois, Iowa, Kansas, Kentucky, Louisiana, Missouri, South Carolina, Tennessee, Texas and Virginia. The Company has entered into an agreement to sell all of its natural gas utility operations in South Carolina. The Company also transports natural gas for others through its distribution system.

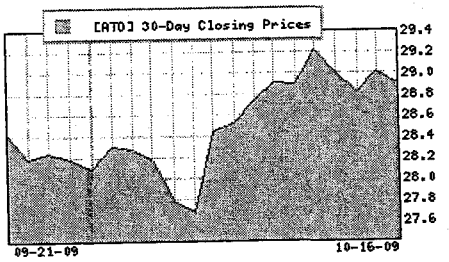
General Information

ATMOS ENERGY CP
Three Lincoln Centre 5430 Lbj Freeway
Suite 1800
Dallas, TX 75240
Phone: 972-934-9227
Fax: 972-855-3040
Web: www.atmosenergy.com
Email: InvestorRelations@atmosenergy.com

Industry	UTIL-GAS DISTR
Sector:	Utilities
Fiscal Year End	September
Last Reported Quarter	09/30/09
Next EPS Date	11/10/2009

Price and Volume Information

Zacks Rank	2
Yesterday's Close	28.90
52 Week High	29.50
52 Week Low	20.07
Beta	0.52
20 Day Moving Average	1,292,367.25
Target Price Consensus	29.2



% Price Change		% Price Change Relative to S&P 500	
4 Week	1.37	4 Week	-0.44
12 Week	7.08	12 Week	-3.60
YTD	21.94	YTD	1.26

Share Information		Dividend Information	
Shares Outstanding (millions)	92.27	Dividend Yield	4.57%
		Annual Dividend	$1.32
Market Capitalization (millions)	2,666.66	Payout Ratio	0.00
		Change in Payout Ratio	0.00
Short Ratio	2.98		
Last Split Date	05/17/1994	Last Dividend Payout / Amount	08/21/2009 / $0.33

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	-0.08	Current (1=Strong Buy, 5=Strong Sell)	2.83
Current Year EPS Consensus Estimate	2.11	30 Days Ago	2.57
Estimated Long-Term EPS Growth Rate	5.00	60 Days Ago	2.57
Next EPS Report Date	11/10/2009	90 Days Ago	2.57

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	13.33	vs. Previous Year	14.29%	vs. Previous Year	-52.37%
Trailing 12 Months:	13.63	vs. Previous Quarter	-104.51%	vs. Previous Quarter:	-57.13%
PEG Ratio	2.67				

Price Ratios		ROE		ROA	
Price/Book	1.21	09/30/09	-	09/30/09	-
Price/Cash Flow	6.88	06/30/09	9.14	06/30/09	2.99
Price / Sales	-	03/31/09	9.16	03/31/09	2.93
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	1.24	06/30/09	0.74	06/30/09	3.37
03/31/09	1.15	03/31/09	0.90	03/31/09	2.91
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	5.55	06/30/09	5.55	06/30/09	23.82
03/31/09	4.61	03/31/09	4.61	03/31/09	23.70
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	11.62	06/30/09	0.99	06/30/09	49.75
03/31/09	11.66	03/31/09	1.00	03/31/09	49.89

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LACLEDE GROUP INC (NYSE)

Scottrade

LG	32.37	▲0.12	(0.37%)	Vol. 98,711	16:02 ET

The Laclede Group, Inc. is a public utility engaged in the retail distribution and transportation of natural gas. The Company, which is subject to the jurisdiction of the Missouri Public Service Commission, serves the City of St. Louis, St. Louis County, the City of St. Charles, St. Charles County, the town of Arnold, and parts of Franklin, Jefferson, St. Francois, Ste. Genevieve, Iron, Madison and Butler Counties, all in Missouri.

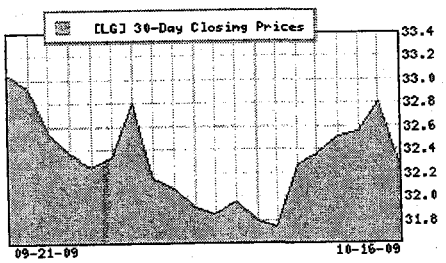
General Information

LACLEDE GRP INC
720 Olive Street
St. Louis, MO 63101
Phone: 314-342-0500
Fax: 314-421-1979
Web: www.thelacledegroup.com
Email: mkullman@lacledegas.com

Industry	UTIL-GAS DISTR
Sector:	Utilities
Fiscal Year End	September
Last Reported Quarter	09/30/09
Next EPS Date	10/22/2009

Price and Volume Information

Zacks Rank	2
Yesterday's Close	32.25
52 Week High	55.81
52 Week Low	29.26
Beta	0.02
20 Day Moving Average	91,660.35
Target Price Consensus	35



% Price Change		% Price Change Relative to S&P 500	
4 Week	-2.89	4 Week	-4.62
12 Week	-6.82	12 Week	-16.11
YTD	-31.15	YTD	-42.82

Share Information		Dividend Information	
Shares Outstanding (millions)	22.17	Dividend Yield	4.78%
Market Capitalization (millions)	714.89	Annual Dividend	$1.54
Short Ratio	2.51	Payout Ratio	0.00
Last Split Date	03/08/1994	Change in Payout Ratio	0.00
		Last Dividend Payout / Amount	09/09/2009 / $0.38

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	-0.18	Current (1=Strong Buy, 5=Strong Sell)	3.25
Current Year EPS Consensus Estimate	2.89	30 Days Ago	3.25
Estimated Long-Term EPS Growth Rate	3.00	60 Days Ago	3.25
Next EPS Report Date	10/22/2009	90 Days Ago	3.25

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	12.90	vs. Previous Year	-26.19%	vs. Previous Year	-38.68%
Trailing 12 Months:	10.79	vs. Previous Quarter	-77.86%	vs. Previous Quarter:	-52.97%
PEG Ratio	4.30				

Price Ratios		ROE		ROA	
Price/Book	1.35	09/30/09	-	09/30/09	-

Price/Cash Flow	7.50	06/30/09	12.78	06/30/09	3.71
Price / Sales	-	03/31/09	13.53	03/31/09	3.89
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	1.24	06/30/09	0.98	06/30/09	3.14
03/31/09	1.17	03/31/09	0.99	03/31/09	2.97
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	4.81	06/30/09	4.81	06/30/09	23.97
03/31/09	4.46	03/31/09	4.46	03/31/09	24.11
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	10.99	06/30/09	0.73	06/30/09	42.30
03/31/09	11.65	03/31/09	0.73	03/31/09	42.17

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NEW JERSEY RES (NYSE)

Scottrade

NJR	36.84	▲0.41	(1.13%)	Vol. 122,499	16:01 ET

NJ RESOURCES is an exempt energy svcs holding company providing retail & wholesale natural gas & related energy services to customers from the Gulf Coast to New England. Subsidiaries include: (1) N J Natural Gas Co, a natural gas distribution company that provides regulated energy & appliance services to residential, commercial & industrial customers in central & northern N J. (2) NJR Energy Holdings Corp formerly NJR Energy Svcs Corp & (3) NJR Development Corp, a sub-holding company of NJR, which includes the Company's remaining unregulated operating subsidiaries.

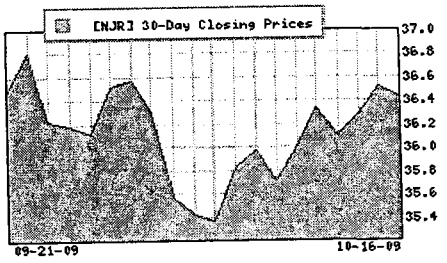
General Information

NJ RESOURCES
1415 Wyckoff Road
Wall, NJ 07719
Phone: 732-938-1489
Fax: 732 938-3154
Web: www.njresources.com
Email: investcont@njresources.com

Industry	UTIL-GAS DISTR
Sector:	Utilities
Fiscal Year End	September
Last Reported Quarter	09/30/09
Next EPS Date	11/05/2009

Price and Volume Information

Zacks Rank	
Yesterday's Close	36.43
52 Week High	42.37
52 Week Low	29.95
Beta	0.13
20 Day Moving Average	200,753.91
Target Price Consensus	42



% Price Change		% Price Change Relative to S&P 500	
4 Week	-1.09	4 Week	-2.85
12 Week	-8.19	12 Week	-17.34
YTD	-7.42	YTD	-23.12

Share Information		Dividend Information	
Shares Outstanding (millions)	42.01	Dividend Yield	3.40%
		Annual Dividend	$1.24
Market Capitalization (millions)	1,530.61	Payout Ratio	0.00
		Change in Payout Ratio	0.00
Short Ratio	9.89		
Last Split Date	03/04/2008	Last Dividend Payout / Amount	09/11/2009 / $0.31

EPS Information

Current Quarter EPS Consensus Estimate	-0.12
Current Year EPS Consensus Estimate	2.39
Estimated Long-Term EPS Growth Rate	6.50
Next EPS Report Date	11/05/2009

Consensus Recommendations

Current (1=Strong Buy, 5=Strong Sell)	1.50
30 Days Ago	1.50
60 Days Ago	1.67
90 Days Ago	1.67

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	14.21	vs. Previous Year	130.00%	vs. Previous Year	-55.91%
Trailing 12 Months:	17.35	vs. Previous Quarter	-98.24%	vs. Previous Quarter:	-52.96%
PEG Ratio	2.19				

Price Ratios		ROE		ROA	
Price/Book	2.13	09/30/09	-	09/30/09	-
Price/Cash Flow	11.50	06/30/09	12.20	06/30/09	3.58
Price / Sales	-	03/31/09	11.73	03/31/09	3.25
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	1.23	06/30/09	0.88	06/30/09	2.98
03/31/09	1.17	03/31/09	1.07	03/31/09	2.37
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	5.66	06/30/09	5.66	06/30/09	17.11
03/31/09	5.26	03/31/09	5.26	03/31/09	17.90
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	9.78	06/30/09	0.63	06/30/09	38.82
03/31/09	10.09	03/31/09	0.61	03/31/09	37.74

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NICOR INC (NYSE)					Scottrade
GAS	38.91	▲0.58	(1.51%)	Vol. 245,400	16:01 ET

Nicor Inc. is a holding company and is a member of the Standard & Poor's 500 Index. Its primary business is Nicor Gas, one of the nation's largest natural gas distribution companies. Nicor owns Tropical Shipping, a containerized shipping business serving the Caribbean region and the Bahamas. In addition, the company owns and has an equity interest in several energy-related businesses.

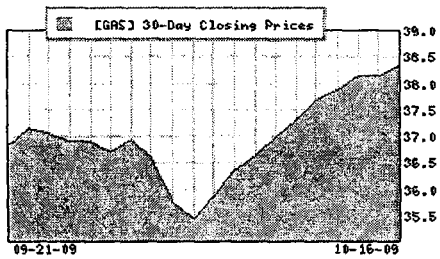
General Information

NICOR INC
1844 Ferry Road
Naperville, IL 60563-9600
Phone: 630-305-9500
Fax: 630-983-9328
Web: www.nicor.com
Email: None

Industry	UTIL-GAS DISTR
Sector:	Utilities
Fiscal Year End	December
Last Reported Quarter	09/30/09
Next EPS Date	11/09/2009

Price and Volume Information

Zacks Rank	
Yesterday's Close	38.33
52 Week High	47.60
52 Week Low	27.50
Beta	0.34
20 Day Moving Average	305,082.34
Target Price Consensus	38.75



% Price Change		% Price Change Relative to S&P 500	
4 Week	3.29	4 Week	1.45
12 Week	4.13	12 Week	-6.25
YTD	10.33	YTD	-8.37

Share Information		Dividend Information	
Shares Outstanding (millions)	45.22	Dividend Yield	4.85%
		Annual Dividend	$1.86
Market Capitalization (millions)	1,733.36	Payout Ratio	0.00
Short Ratio	5.75	Change in Payout Ratio	0.00
Last Split Date	04/27/1993	Last Dividend Payout / Amount	09/28/2009 / $0.47

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	0.09	Current (1=Strong Buy, 5=Strong Sell)	2.67
Current Year EPS Consensus Estimate	2.57	30 Days Ago	2.67
Estimated Long-Term EPS Growth Rate	4.20	60 Days Ago	3.00
Next EPS Report Date	11/09/2009	90 Days Ago	3.00

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	14.90	vs. Previous Year	-21.87%	vs. Previous Year	-36.04%
Trailing 12 Months:	15.09	vs. Previous Quarter	-47.92%	vs. Previous Quarter:	-59.70%
PEG Ratio	3.52				

Price Ratios		ROE		ROA	
Price/Book	1.72	09/30/09	-	09/30/09	-

Price/Cash Flow	5.60	06/30/09	11.78	06/30/09	2.59
Price / Sales	-	03/31/09	12.46	03/31/09	2.67
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	0.76	06/30/09	0.73	06/30/09	3.81
03/31/09	0.78	03/31/09	0.77	03/31/09	3.70
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	5.46	06/30/09	5.46	06/30/09	22.25
03/31/09	5.21	03/31/09	5.21	03/31/09	22.16
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	14.05	06/30/09	0.50	06/30/09	33.12
03/31/09	15.05	03/31/09	0.45	03/31/09	30.91

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NORTHWEST NAT GAS CO (NYSE)

Scottrade

NWN	44.47	▲1.08	(2.49%)	Vol. 111,785	16:03 ET

NW Natural is principally engaged in the distribution of natural gas.The Oregon Public Utility Commission (OPUC) has allocated to NW Natural as its exclusive service area a major portion of western Oregon, including the Portland metropolitan area, most of the fertile Willamette Valley and the coastal area from Astoria to Coos Bay. NW Natural also holds certificates from the Washington Utilities and Transportation Commission (WUTC) granting it exclusive rights to serve portions of three Washington counties bordering the Columbia River.

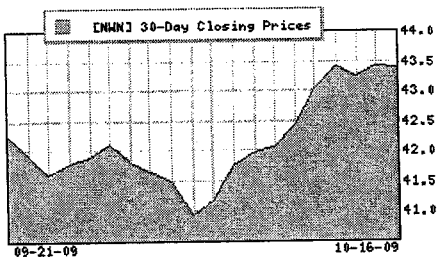
General Information

NORTHWEST NAT G
220 NW Second Avenue
Portland, OR 97209
Phone: 503 226-4211
Fax: 503 273-4824
Web: www.nwnatural.com
Email: Bob.Hess@nwnatural.com

Industry	UTIL-GAS DISTR
Sector:	Utilities
Fiscal Year End	December
Last Reported Quarter	09/30/09
Next EPS Date	11/03/2009

Price and Volume Information

Zacks Rank	
Yesterday's Close	43.39
52 Week High	52.39
52 Week Low	37.71
Beta	0.25
20 Day Moving Average	123,685.30
Target Price Consensus	51.25



% Price Change		% Price Change Relative to S&P 500	
4 Week	1.90	4 Week	0.09
12 Week	-4.24	12 Week	-13.78
YTD	-1.90	YTD	-18.53

Share Information		Dividend Information	
Shares Outstanding (millions)	26.51	Dividend Yield	3.64%
		Annual Dividend	$1.58
Market Capitalization (millions)	1,150.40	Payout Ratio	0.00
Short Ratio	14.44	Change in Payout Ratio	0.00
Last Split Date	09/09/1996	Last Dividend Payout / Amount	07/29/2009 / $0.40

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	-0.36	Current (1=Strong Buy, 5=Strong Sell)	1.50
Current Year EPS Consensus Estimate	2.70	30 Days Ago	1.50
Estimated Long-Term EPS Growth Rate	6.00	60 Days Ago	1.50
Next EPS Report Date	11/03/2009	90 Days Ago	1.50

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	16.06	vs. Previous Year	0.00%	vs. Previous Year	-22.06%
Trailing 12 Months:	15.61	vs. Previous Quarter	-93.30%	vs. Previous Quarter:	-65.92%
PEG Ratio	2.68				

Price Ratios	ROE	ROA

Price/Book	1.75	09/30/09	-	09/30/09	-
Price/Cash Flow	8.10	06/30/09	11.51	06/30/09	3.26
Price / Sales	-	03/31/09	11.69	03/31/09	3.37
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	0.94	06/30/09	0.67	06/30/09	7.03
03/31/09	1.03	03/31/09	0.80	03/31/09	6.78
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	11.19	06/30/09	11.19	06/30/09	24.80
03/31/09	10.81	03/31/09	10.81	03/31/09	25.05
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	8.96	06/30/09	0.89	06/30/09	47.18
03/31/09	10.10	03/31/09	0.88	03/31/09	46.93

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PIEDMONT NAT GAS INC (NYSE)

Scottrade

PNY	24.62	▲0.43	(1.78%)	Vol. 318,583	16:02 ET

Piedmont Natural Gas Co, Inc., is an energy and services company engaged in the transportation and sale of natural gas and the sale of propane to residential, commercial and industrial customers in North Carolina, South Carolina and Tennessee. The Company is the second-largest natural gas utility in the southeast. The Company and its non-utility subsidiaries and divisions are also engaged in acquiring, marketing and arranging for the transportation and storage of natural gas for large-volume purchasers, and in the sale of propane to customers in the Company's three-state service area.

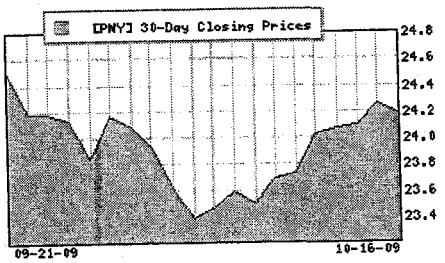
General Information

PIEDMONT NAT GA
4720 Piedmont Row Drive
Charlotte, NC 28210
Phone: 704 364-3120
Fax: 704-365-3849
Web: www.piedmontng.com
Email: investorrelations@piedmontng.com

Industry	UTIL-GAS DISTR
Sector:	Utilities
Fiscal Year End	October
Last Reported Quarter	07/31/09
Next EPS Date	01/04/2010

Price and Volume Information

Zacks Rank	
Yesterday's Close	24.19
52 Week High	34.19
52 Week Low	20.68
Beta	0.18
20 Day Moving Average	370,152.69
Target Price Consensus	27.42



% Price Change		% Price Change Relative to S&P 500	
4 Week	-1.06	4 Week	-2.83
12 Week	-3.20	12 Week	-12.85
YTD	-23.62	YTD	-36.57

Share Information		Dividend Information	
Shares Outstanding (millions)	73.11	Dividend Yield	4.46%
		Annual Dividend	$1.08
Market Capitalization (millions)	1,768.56	Payout Ratio	0.00
Short Ratio	7.66	Change in Payout Ratio	0.00
Last Split Date	11/01/2004	Last Dividend Payout / Amount	09/22/2009 / $0.27

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	-0.14	Current (1=Strong Buy, 5=Strong Sell)	2.20
Current Year EPS Consensus Estimate	1.58	30 Days Ago	2.20
Estimated Long-Term EPS Growth Rate	7.00	60 Days Ago	2.33
Next EPS Report Date	01/04/2010	90 Days Ago	2.00

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	15.35	vs. Previous Year	0.00%	vs. Previous Year	-49.20%
Trailing 12 Months:	-	vs. Previous Quarter	-113.70%	vs. Previous Quarter:	-60.43%
PEG Ratio	2.19				

Price Ratios		ROE		ROA	
Price/Book	1.86	07/31/09	12.13	07/31/09	3.64
Price/Cash Flow	8.55	04/30/09	12.17	04/30/09	3.66
Price / Sales	1.02	01/31/09	11.70	01/31/09	3.55
Current Ratio		**Quick Ratio**		**Operating Margin**	
07/31/09	0.99	07/31/09	0.76	07/31/09	6.59
04/30/09	1.07	04/30/09	0.88	04/30/09	5.97
01/31/09	0.99	01/31/09	0.76	01/31/09	5.22
Net Margin		**Pre-Tax Margin**		**Book Value**	
07/31/09	12.89	07/31/09	12.89	07/31/09	12.99
04/30/09	11.58	04/30/09	11.58	04/30/09	13.20
01/31/09	8.66	01/31/09	8.66	01/31/09	12.98
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
07/31/09	10.20	07/31/09	0.84	07/31/09	45.54
04/30/09	10.05	04/30/09	0.82	04/30/09	45.00
01/31/09	10.50	01/31/09	0.83	01/31/09	45.46

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SOUTH JERSEY INDS INC (NYSE)

Scottrade

SJI	37.42	▲0.51	(1.38%)	Vol. 190,790	16:03 ET

South Jersey Inds Inc. is engaged in the business of operating, through subsidiaries, various business enterprises. The company's most significant subsidiary is South Jersey Gas Company (SJG). SJG is a public utility company engaged in the purchase, transmission and sale of natural gas for residential, commercial and industrial use. SJG also makes off-system sales of natural gas on a wholesale basis to various customers on the interstate pipeline system and transports natural gas.

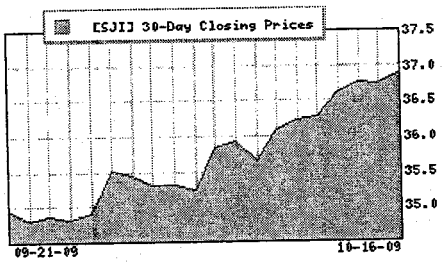
General Information

SOUTH JERSEY IN
1 South Jersey Plaza
Folsom, NJ 08037
Phone: 609 561-9000
Fax: 609 561-8225
Web: www.sjindustries.com
Email: investorrelations@sjindustries.com

Industry	UTIL-GAS DISTR
Sector:	Utilities
Fiscal Year End	December
Last Reported Quarter	09/30/09
Next EPS Date	11/05/2009

Price and Volume Information

Zacks Rank	2
Yesterday's Close	36.91
52 Week High	40.78
52 Week Low	29.27
Beta	0.22
20 Day Moving Average	173,099.16
Target Price Consensus	45.2



% Price Change		% Price Change Relative to S&P 500	
4 Week	5.16	4 Week	3.28
12 Week	-0.03	12 Week	-9.99
YTD	-7.38	YTD	-23.08

Share Information		Dividend Information	
Shares Outstanding (millions)	29.80	Dividend Yield	3.22%
Market Capitalization (millions)	1,099.77	Annual Dividend	$1.19
Short Ratio	4.85	Payout Ratio	0.00
Last Split Date	07/01/2005	Change in Payout Ratio	0.00
		Last Dividend Payout / Amount	09/08/2009 / $0.30

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	0.06	Current (1=Strong Buy, 5=Strong Sell)	1.60
Current Year EPS Consensus Estimate	2.40	30 Days Ago	1.60
Estimated Long-Term EPS Growth Rate	9.60	60 Days Ago	1.75
Next EPS Report Date	11/05/2009	90 Days Ago	2.40

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	15.36	vs. Previous Year	-42.31%	vs. Previous Year	-1.00%
Trailing 12 Months:	15.91	vs. Previous Quarter	-89.73%	vs. Previous Quarter:	-62.87%
PEG Ratio	1.60				

Price Ratios	ROE	ROA

Price/Book	2.04	09/30/09	-	09/30/09	-
Price/Cash Flow	10.62	06/30/09	13.17	06/30/09	4.06
Price / Sales	-	03/31/09	14.14	03/31/09	4.30
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	0.92	06/30/09	0.64	06/30/09	7.13
03/31/09	0.93	03/31/09	0.74	03/31/09	7.43
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	17.54	06/30/09	17.54	06/30/09	18.11
03/31/09	14.51	03/31/09	14.51	03/31/09	18.20
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	5.74	06/30/09	0.62	06/30/09	38.14
03/31/09	5.73	03/31/09	0.61	03/31/09	38.07

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SOUTHWEST GAS CORP (NYSE)

Scottrade

SWX	25.41	▲0.05	(0.20%)	Vol. 255,762	16:01 ET

SOUTHWEST GAS CORP. is principally engaged in the business of purchasing,transporting, and distributing natural gas in portions of Arizona, Nevada,and California. The Company also engaged in financial services activities,through PriMerit Bank, Federal Savings Bank (PriMerit or the Bank), a wholly owned subsidiary.

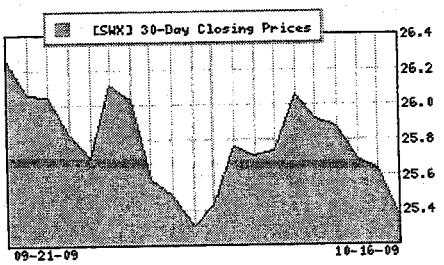
General Information

SOUTHWEST GAS
5241 Spring Mountain Road
P.O. Box 98510
Las Vegas, NV 89193-8510
Phone: 702 876-7237
Fax: 702-876-7037
Web: www.swgas.com
Email: None

Industry	UTIL-GAS DISTR
Sector:	Utilities
Fiscal Year End	December
Last Reported Quarter	09/30/09
Next EPS Date	11/04/2009

Price and Volume Information

Zacks Rank	
Yesterday's Close	25.36
52 Week High	26.84
52 Week Low	17.08
Beta	0.70
20 Day Moving Average	175,584.09
Target Price Consensus	28.25



% Price Change		% Price Change Relative to S&P 500	
4 Week	-3.65	4 Week	-5.36
12 Week	6.33	12 Week	-4.27
YTD	0.56	YTD	-16.50

Share Information

Shares Outstanding (millions)	44.82
Market Capitalization (millions)	1,136.69
Short Ratio	5.56
Last Split Date	N/A

Dividend Information

Dividend Yield	3.75%
Annual Dividend	$0.95
Payout Ratio	0.00
Change in Payout Ratio	0.00
Last Dividend Payout / Amount	08/13/2009 / $0.24

EPS Information

Current Quarter EPS Consensus Estimate	-0.36
Current Year EPS Consensus Estimate	1.84
Estimated Long-Term EPS Growth Rate	7.00
Next EPS Report Date	11/04/2009

Consensus Recommendations

Current (1=Strong Buy, 5=Strong Sell)	2.60
30 Days Ago	2.60
60 Days Ago	2.60
90 Days Ago	2.60

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	13.78	vs. Previous Year	116.67%	vs. Previous Year	-13.34%
Trailing 12 Months:	17.37	vs. Previous Quarter	-99.11%	vs. Previous Quarter:	-43.81%
PEG Ratio	1.97				

Price Ratios		ROE		ROA	
Price/Book	1.05	09/30/09	-	09/30/09	-

Price/Cash Flow	4.30	06/30/09	5.70	06/30/09	1.63
Price / Sales	-	03/31/09	5.45	03/31/09	1.56
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	0.69	06/30/09	0.69	06/30/09	3.07
03/31/09	0.82	03/31/09	0.82	03/31/09	2.81
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	5.35	06/30/09	5.35	06/30/09	24.16
03/31/09	5.09	03/31/09	5.09	03/31/09	24.40
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	-	06/30/09	1.04	06/30/09	50.97
03/31/09	-	03/31/09	1.05	03/31/09	51.33

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WGL HLDGS INC (NYSE)

Scottrade

WGL	34.35	▲0.45	(1.33%)	Vol. 242,795	16:00 ET

WASHINGTON GAS LIGHT CO is a public utility that delivers and sells natural gas to metropolitan Washington, D.C. and adjoining areas in Maryland and Virginia. A distribution subsidiary serves portions of Virginia and West Virginia. The Company has four wholly-owned active subsidiaries that include: Shenandoah Gas Company (Shenandoah) is engaged in the delivery and sale of natural gas at retail in the Shenandoah Valley, including Winchester, Middletown, Strasburg, Stephens City and New Market, Virginia, and Martinsburg, West Virginia.

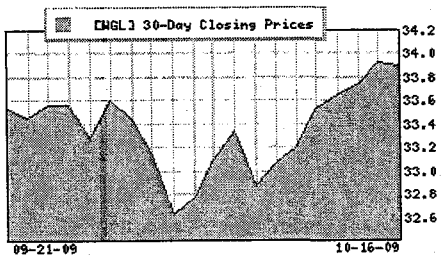
General Information

WGL HLDGS INC
101 Constitution Avenue NW
Washington, DC 20080
Phone: 703 750-2000
Fax: 703 750-4828
Web: www.wglholdings.com
Email: madams@washgas.com

Industry	UTIL-GAS DISTR
Sector:	Utilities
Fiscal Year End	September
Last Reported Quarter	09/30/09
Next EPS Date	11/05/2009

Price and Volume Information

Zacks Rank	2
Yesterday's Close	33.90
52 Week High	37.08
52 Week Low	25.34
Beta	0.21
20 Day Moving Average	247,161.59
Target Price Consensus	35.5



% Price Change		% Price Change Relative to S&P 500	
4 Week	-0.21	4 Week	-1.98
12 Week	1.62	12 Week	-8.51
YTD	3.70	YTD	-13.88

Share Information		Dividend Information	
Shares Outstanding (millions)	50.14	Dividend Yield	4.34%
		Annual Dividend	$1.47
Market Capitalization (millions)	1,699.78	Payout Ratio	0.00
Short Ratio	12.58	Change in Payout Ratio	0.00
Last Split Date	05/02/1995	Last Dividend Payout / Amount	10/07/2009 / $0.37

EPS Information		Consensus Recommendations	
Current Quarter EPS Consensus Estimate	-0.31	Current (1=Strong Buy, 5=Strong Sell)	2.50
Current Year EPS Consensus Estimate	2.45	30 Days Ago	2.50
Estimated Long-Term EPS Growth Rate	5.00	60 Days Ago	2.50
Next EPS Report Date	11/05/2009	90 Days Ago	2.50

Fundamental Ratios

P/E		EPS Growth		Sales Growth	
Current FY Estimate:	13.89	vs. Previous Year	83.33%	vs. Previous Year	-8.09%
Trailing 12 Months:	13.19	vs. Previous Quarter	-93.33%	vs. Previous Quarter:	-58.97%
PEG Ratio	2.78				

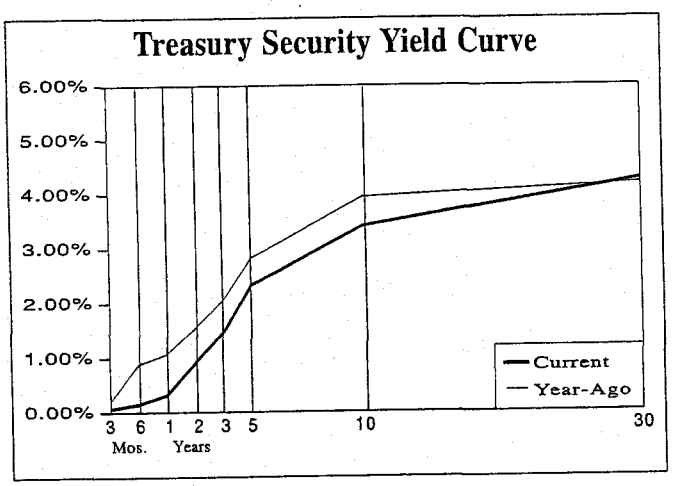
Price Ratios	ROE	ROA

Price/Book	1.50	09/30/09	-	09/30/09	-
Price/Cash Flow	7.87	06/30/09	11.67	06/30/09	3.84
Price / Sales	-	03/31/09	11.60	03/31/09	3.75
Current Ratio		**Quick Ratio**		**Operating Margin**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	1.17	06/30/09	0.82	06/30/09	5.26
03/31/09	1.20	03/31/09	1.04	03/31/09	5.08
Net Margin		**Pre-Tax Margin**		**Book Value**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	7.81	06/30/09	7.81	06/30/09	22.56
03/31/09	7.58	03/31/09	7.58	03/31/09	22.89
Inventory Turnover		**Debt-to-Equity**		**Debt to Capital**	
09/30/09	-	09/30/09	-	09/30/09	-
06/30/09	9.10	06/30/09	0.55	06/30/09	34.99
03/31/09	8.22	03/31/09	0.57	03/31/09	35.81

ATTACHMENT D

Selected Yields

	Recent (10/14/09)	3 Months Ago (7/15/09)	Year Ago (10/15/08)
TAXABLE			
Market Rates			
Discount Rate	0.50	0.50	1.75
Federal Funds	0.00-0.25	0.00-0.25	1.50
Prime Rate	3.25	3.25	4.50
30-day CP (A1/P1)	0.16	0.33	4.47
3-month LIBOR	0.28	0.51	4.55
Bank CDs			
6-month	0.39	0.58	1.73
1-year	0.63	0.85	2.27
5-year	2.24	1.92	3.48
U.S. Treasury Securities			
3-month	0.07	0.18	0.21
6-month	0.15	0.27	0.88
1-year	0.32	0.47	1.07
5-year	2.33	2.51	2.82
10-year	3.41	3.60	3.95
10-year (inflation-protected)	1.46	1.85	3.07
30-year	4.26	4.49	4.19
30-year Zero	4.39	4.60	4.04
Mortgage-Backed Securities			
GNMA 6.5%	3.65	3.41	6.06
FHLMC 6.5% (Gold)	2.47	2.75	5.96
FNMA 6.5%	2.21	2.59	5.91
FNMA ARM	2.56	2.98	3.87
Corporate Bonds			
Financial (10-year) A	5.45	6.62	8.19
Industrial (25/30-year) A	5.48	6.12	7.03
Utility (25/30-year) A	5.65	5.97	6.67
Utility (25/30-year) Baa/BBB	6.22	7.19	7.03
Foreign Bonds (10-Year)			
Canada	3.53	3.49	3.76
Germany	3.23	3.37	4.12
Japan	1.31	1.34	1.59
United Kingdom	3.50	3.80	4.71
Preferred Stocks			
Utility A	5.96	5.95	6.57
Financial A	7.00	7.67	7.33
Financial Adjustable A	5.49	5.49	5.49



	Recent (10/14/09)	3 Months Ago (7/15/09)	Year Ago (10/15/08)
TAX-EXEMPT			
Bond Buyer Indexes			
20-Bond Index (GOs)	4.06	4.71	5.47
25-Bond Index (Revs)	4.69	5.70	5.97
General Obligation Bonds (GOs)			
1-year Aaa	0.37	0.40	2.15
1-year A	0.80	1.10	2.25
5-year Aaa	1.90	2.07	3.70
5-year A	2.10	3.47	3.75
10-year Aaa	3.05	2.98	4.86
10-year A	3.45	4.50	5.06
25/30-year Aaa	4.10	4.59	5.99
25/30-year A	4.65	6.10	6.37
Revenue Bonds (Revs) (25/30-Year)			
Education AA	4.90	5.95	6.17
Electric AA	4.95	6.00	6.12
Housing AA	5.40	6.40	6.60
Hospital AA	5.60	6.35	6.65
Toll Road Aaa	5.00	5.95	6.15

Federal Reserve Data

BANK RESERVES

(Two-Week Period; in Millions, Not Seasonally Adjusted)

	Recent Levels			Average Levels Over the Last...		
	10/7/09	9/23/09	Change	12 Wks.	26 Wks.	52 Wks.
Excess Reserves	918434	854614	63820	796002	800839	706471
Borrowed Reserves	288565	307300	-18735	331341	421671	519593
Net Free/Borrowed Reserves	629869	547314	82555	464661	379168	186878

MONEY SUPPLY

(One-Week Period; in Billions, Seasonally Adjusted)

	Recent Levels			Growth Rates Over the Last...		
	9/28/09	9/21/09	Change	3 Mos.	6 Mos.	12 Mos.
M1 (Currency+demand deposits)	1653.6	1639.8	13.8	0.2%	13.0%	10.9%
M2 (M1+savings+small time deposits)	8357.3	8309.8	47.5	0.4%	0.7%	5.5%

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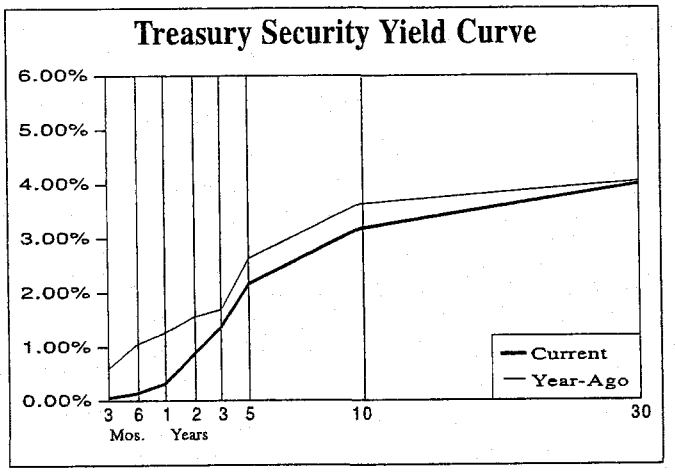
Selected Yields

	Recent (10/07/09)	3 Months Ago (7/08/09)	Year Ago (10/08/08)
TAXABLE			
Market Rates			
Discount Rate	0.50	0.50	1.75
Federal Funds	0.00-0.25	0.00-0.25	1.50
Prime Rate	3.25	3.25	4.50
30-day CP (A1/P1)	0.16	0.36	4.55
3-month LIBOR	0.28	0.53	4.52
Bank CDs			
6-month	0.40	0.65	1.73
1-year	0.64	0.86	2.27
5-year	2.24	1.94	3.48
U.S. Treasury Securities			
3-month	0.06	0.18	0.61
6-month	0.14	0.25	1.05
1-year	0.32	0.44	1.26
5-year	2.17	2.23	2.63
10-year	3.18	3.31	3.64
10-year (inflation-protected)	1.42	1.76	2.66
30-year	4.00	4.19	4.05
30-year Zero	4.10	4.31	3.97
Mortgage-Backed Securities			
GNMA 6.5%	3.44	3.71	5.82
FHLMC 6.5% (Gold)	2.38	2.99	5.70
FNMA 6.5%	2.33	2.83	5.62
FNMA ARM	2.56	2.98	3.84
Corporate Bonds			
Financial (10-year) A	5.46	6.53	7.34
Industrial (25/30-year) A	5.28	5.82	6.66
Utility (25/30-year) A	5.44	5.71	6.58
Utility (25/30-year) Baa/BBB	5.95	6.85	6.93
Foreign Bonds (10-Year)			
Canada	3.29	3.28	3.59
Germany	3.12	3.28	3.80
Japan	1.27	1.30	1.39
United Kingdom	3.39	3.62	4.30
Preferred Stocks			
Utility A	6.29	7.59	6.99
Financial A	6.89	6.57	8.54
Financial Adjustable A	5.48	5.48	5.48



	Recent (10/07/09)	3 Months Ago (7/08/09)	Year Ago (10/08/08)
TAX-EXEMPT			
Bond Buyer Indexes			
20-Bond Index (GOs)	3.94	4.83	5.36
25-Bond Index (Revs)	4.69	5.75	5.69
General Obligation Bonds (GOs)			
1-year Aaa	0.37	0.43	2.18
1-year A	0.87	0.93	2.25
5-year Aaa	1.57	1.96	3.34
5-year A	2.77	2.40	3.44
10-year Aaa	2.57	3.09	4.31
10-year A	3.77	3.45	4.51
25/30-year Aaa	3.81	4.59	5.35
25/30-year A	5.01	5.05	5.70
Revenue Bonds (Revs) (25/30-Year)			
Education AA	4.85	5.55	5.80
Electric AA	4.90	5.65	5.90
Housing AA	5.20	5.80	6.00
Hospital AA	5.20	5.90	6.10
Toll Road Aaa	4.85	5.60	5.95

Federal Reserve Data

BANK RESERVES

(Two-Week Period; in Millions, Not Seasonally Adjusted)

	Recent Levels			Average Levels Over the Last...		
	9/9/09	8/26/09	Change	12 Wks.	26 Wks.	52 Wks.
Excess Reserves	823187	794531	28656	754073	773681	643433
Borrowed Reserves	320295	327647	-7352	369408	467326	513721
Net Free/Borrowed Reserves	502892	466884	36008	384665	306355	129711

MONEY SUPPLY

(One-Week Period; in Billions, Seasonally Adjusted)

	Recent Levels			Growth Rates Over the Last...		
	9/21/09	9/14/09	Change	3 Mos.	6 Mos.	12 Mos.
M1 (Currency+demand deposits)	1639.8	1670.9	-31.1	-6.8%	11.4%	11.3%
M2 (M1+savings+small time deposits)	8310.3	8318.3	-8.0	-3.5%	-1.1%	5.2%

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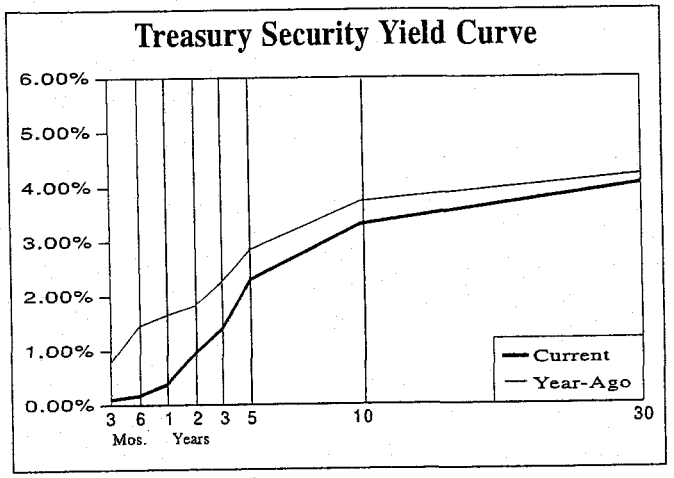
Selected Yields

	Recent (9/30/09)	3 Months Ago (6/30/09)	Year Ago (10/01/08)
TAXABLE			
Market Rates			
Discount Rate	0.50	0.50	2.25
Federal Funds	0.00-0.25	0.00-0.25	2.00
Prime Rate	3.25	3.25	5.00
30-day CP (A1/P1)	0.18	0.41	3.05
3-month LIBOR	0.29	0.60	4.15
Bank CDs			
6-month	0.40	0.65	1.61
1-year	0.64	0.86	2.14
5-year	2.27	1.92	3.77
U.S. Treasury Securities			
3-month	0.11	0.18	0.80
6-month	0.17	0.34	1.45
1-year	0.38	0.48	1.66
5-year	2.31	2.56	2.86
10-year	3.31	3.53	3.74
10-year (inflation-protected)	1.53	1.80	2.25
30-year	4.05	4.33	4.22
30-year Zero	4.13	4.41	4.22
Mortgage-Backed Securities			
GNMA 6.5%	3.63	3.77	5.64
FHLMC 6.5% (Gold)	2.82	3.23	5.63
FNMA 6.5%	2.60	3.07	5.54
FNMA ARM	2.62	2.53	3.88
Corporate Bonds			
Financial (10-year) A	5.61	6.87	7.25
Industrial (25/30-year) A	5.31	5.96	6.52
Utility (25/30-year) A	5.40	5.79	6.46
Utility (25/30-year) Baa/BBB	5.73	6.88	6.61
Foreign Bonds (10-Year)			
Canada	3.31	3.36	3.71
Germany	3.22	3.39	4.00
Japan	1.30	1.36	1.51
United Kingdom	3.59	3.69	4.43
Preferred Stocks			
Utility A	5.77	6.10	6.53
Financial A	6.61	7.75	7.78
Financial Adjustable A	5.48	5.48	5.48



	Recent (9/30/09)	3 Months Ago (6/30/09)	Year Ago (10/01/08)
TAX-EXEMPT			
Bond Buyer Indexes			
20-Bond Index (GOs)	4.04	4.79	5.23
25-Bond Index (Revs)	4.86	5.77	5.56
General Obligation Bonds (GOs)			
1-year Aaa	0.37	0.40	2.10
1-year A	0.80	1.10	2.20
5-year Aaa	1.57	2.07	3.32
5-year A	2.00	3.47	3.37
10-year Aaa	2.57	3.23	4.23
10-year A	2.95	4.75	4.43
25/30-year Aaa	3.92	4.66	5.29
25/30-year A	4.45	6.18	5.67
Revenue Bonds (Revs) (25/30-Year)			
Education AA	4.70	6.05	5.45
Electric AA	4.75	6.10	5.40
Housing AA	5.10	6.50	5.90
Hospital AA	5.25	6.45	5.95
Toll Road Aaa	4.75	6.05	5.40

Federal Reserve Data

BANK RESERVES

(Two-Week Period; in Millions, Not Seasonally Adjusted)

	Recent Levels			Average Levels Over the Last...		
	9/23/09	9/9/09	Change	12 Wks.	26 Wks.	52 Wks.
Excess Reserves	854633	823202	31431	763053	790331	675003
Borrowed Reserves	307300	320295	-12995	347846	444263	518826
Net Free/Borrowed Reserves	547333	502907	44426	415208	346068	156178

MONEY SUPPLY

(One-Week Period; in Billions, Seasonally Adjusted)

	Recent Levels			Growth Rates Over the Last...		
	9/14/09	9/7/09	Change	3 Mos.	6 Mos.	12 Mos.
M1 (Currency+demand deposits)	1668.5	1666.8	1.7	3.0%	13.4%	16.7%
M2 (M1+savings+small time deposits)	8303.3	8307.2	-3.9	-3.9%	-1.4%	7.6%

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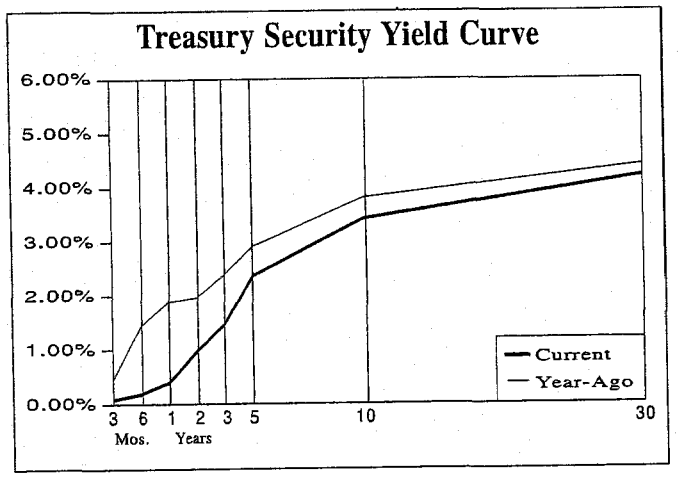
Selected Yields

	Recent (9/23/09)	3 Months Ago (6/24/09)	Year Ago (9/24/08)
TAXABLE			
Market Rates			
Discount Rate	0.50	0.50	2.25
Federal Funds	0.00-0.25	0.00-0.25	2.00
Prime Rate	3.25	3.25	5.00
30-day CP (A1/P1)	0.21	0.44	2.85
3-month LIBOR	0.29	0.60	3.48
Bank CDs			
6-month	0.40	0.65	1.61
1-year	0.64	0.87	2.14
5-year	2.27	1.92	3.77
U.S. Treasury Securities			
3-month	0.09	0.18	0.46
6-month	0.19	0.31	1.43
1-year	0.40	0.46	1.89
5-year	2.37	2.71	2.91
10-year	3.42	3.69	3.81
10-year (inflation-protected)	1.60	1.88	1.99
30-year	4.20	4.43	4.41
30-year Zero	4.30	4.50	4.39
Mortgage-Backed Securities			
GNMA 6.5%	3.77	3.79	5.56
FHLMC 6.5% (Gold)	2.57	3.28	5.43
FNMA 6.5%	2.36	3.06	5.34
FNMA ARM	2.62	2.53	3.86
Corporate Bonds			
Financial (10-year) A	5.68	6.75	7.14
Industrial (25/30-year) A	5.47	6.07	6.53
Utility (25/30-year) A	5.58	5.89	6.50
Utility (25/30-year) Baa/BBB	6.14	7.30	6.74
Foreign Bonds (10-Year)			
Canada	3.42	3.45	3.66
Germany	3.37	3.42	4.16
Japan	1.35	1.39	1.49
United Kingdom	3.75	3.70	4.57
Preferred Stocks			
Utility A	6.08	6.05	6.85
Financial A	6.55	8.21	8.04
Financial Adjustable A	5.47	5.47	5.47



	Recent (9/23/09)	3 Months Ago (6/24/09)	Year Ago (9/24/08)
TAX-EXEMPT			
Bond Buyer Indexes			
20-Bond Index (GOs)	4.20	4.86	5.03
25-Bond Index (Revs)	4.98	5.78	5.44
General Obligation Bonds (GOs)			
1-year Aaa	0.40	0.40	2.15
1-year A	0.90	0.90	2.25
5-year Aaa	1.61	2.17	3.10
5-year A	3.01	2.60	3.20
10-year Aaa	2.65	3.27	4.02
10-year A	4.15	3.63	4.22
25/30-year Aaa	4.03	4.70	5.13
25/30-year A	5.60	5.15	5.45
Revenue Bonds (Revs) (25/30-Year)			
Education AA	5.35	5.80	5.55
Electric AA	5.40	5.90	5.60
Housing AA	5.80	6.10	5.90
Hospital AA	5.80	6.05	5.95
Toll Road Aaa	5.35	5.85	5.65

Federal Reserve Data

BANK RESERVES

(Two-Week Period; in Millions, Not Seasonally Adjusted)

	Recent Levels			Average Levels Over the Last...		
	9/9/09	8/26/09	Change	12 Wks.	26 Wks.	52 Wks.
Excess Reserves	823201	794546	28655	754077	773683	643434
Borrowed Reserves	320295	327647	-7352	369408	467326	513721
Net Free/Borrowed Reserves	502906	466899	36007	384669	306357	129712

MONEY SUPPLY

(One-Week Period; in Billions, Seasonally Adjusted)

	Recent Levels			Growth Rates Over the Last...		
	9/7/09	8/31/09	Change	3 Mos.	6 Mos.	12 Mos.
M1 (Currency+demand deposits)	1667.2	1635.6	31.6	9.2%	11.6%	18.0%
M2 (M1+savings+small time deposits)	8306.2	8293.6	12.6	-3.0%	-0.5%	8.0%

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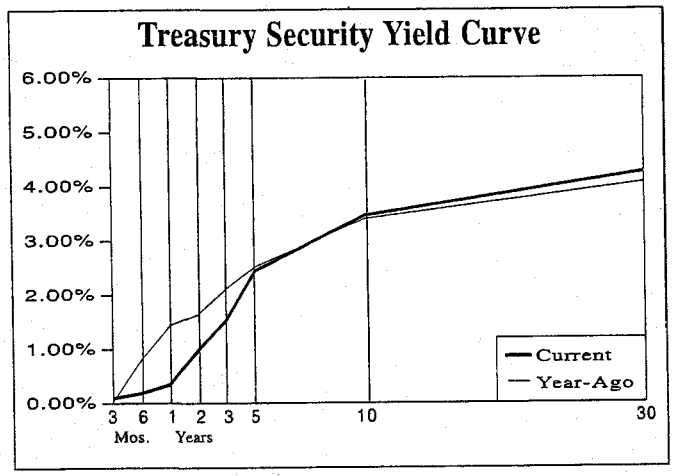
Selected Yields

	Recent (9/16/09)	3 Months Ago (6/17/09)	Year Ago (9/17/08)
TAXABLE			
Market Rates			
Discount Rate	0.50	0.50	2.25
Federal Funds	0.00-0.25	0.00-0.25	2.00
Prime Rate	3.25	3.25	5.00
30-day CP (A1/P1)	0.21	0.42	2.50
3-month LIBOR	0.29	0.61	3.06
Bank CDs			
6-month	0.40	0.66	1.61
1-year	0.65	0.87	2.26
5-year	2.30	1.92	4.10
U.S. Treasury Securities			
3-month	0.10	0.16	0.04
6-month	0.19	0.31	0.81
1-year	0.35	0.47	1.44
5-year	2.44	2.68	2.52
10-year	3.47	3.69	3.41
10-year (inflation-protected)	1.60	1.92	1.74
30-year	4.26	4.51	4.07
30-year Zero	4.37	4.60	4.11



	Recent (9/16/09)	3 Months Ago (6/17/09)	Year Ago (9/17/08)
Mortgage-Backed Securities			
GNMA 6.5%	3.57	4.00	5.43
FHLMC 6.5% (Gold)	2.71	3.13	5.33
FNMA 6.5%	2.47	2.96	5.24
FNMA ARM	2.62	2.53	3.86
Corporate Bonds			
Financial (10-year) A	5.74	6.70	6.79
Industrial (25/30-year) A	5.55	6.13	6.08
Utility (25/30-year) A	5.59	5.95	5.94
Utility (25/30-year) Baa/BBB	6.21	7.54	6.51
Foreign Bonds (10-Year)			
Canada	3.38	3.44	3.44
Germany	3.34	3.48	4.02
Japan	1.33	1.47	1.50
United Kingdom	3.69	3.79	4.41
Preferred Stocks			
Utility A	6.29	5.47	6.56
Financial A	6.73	8.72	8.77
Financial Adjustable A	5.47	5.47	5.47
TAX-EXEMPT			
Bond Buyer Indexes			
20-Bond Index (GOs)	4.33	4.86	4.54
25-Bond Index (Revs)	5.33	5.76	5.09
General Obligation Bonds (GOs)			
1-year Aaa	0.40	0.40	1.73
1-year A	0.90	1.10	1.83
5-year Aaa	1.71	2.25	2.79
5-year A	2.15	3.65	2.84
10-year Aaa	2.78	3.33	3.59
10-year A	3.15	4.85	3.79
25/30-year Aaa	4.10	4.72	4.94
25/30-year A	4.56	6.24	5.32
Revenue Bonds (Revs) (25/30-Year)			
Education AA	4.85	6.30	5.05
Electric AA	4.90	6.35	5.00
Housing AA	5.30	6.65	5.40
Hospital AA	5.35	6.60	5.45
Toll Road Aaa	4.90	6.30	5.00

Federal Reserve Data

BANK RESERVES

(Two-Week Period; in Millions, Not Seasonally Adjusted)

	Recent Levels			Average Levels Over the Last...		
	9/9/09	8/26/09	Change	12 Wks.	26 Wks.	52 Wks.
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Net Free/Borrowed Reserves	502906	466899	36007	384669	306357	129712

MONEY SUPPLY

(One-Week Period; in Billions, Seasonally Adjusted)

	Recent Levels			Growth Rates Over the Last...		
	8/31/09	8/24/09	Change	3 Mos.	6 Mos.	12 Mos.
M1 (Currency+demand deposits)	1635.7	1639.0	-3.3	9.9%	9.6%	17.6%
M2 (M1+savings+small time deposits)	8293.7	8282.4	11.3	-3.4%	0.1%	7.6%

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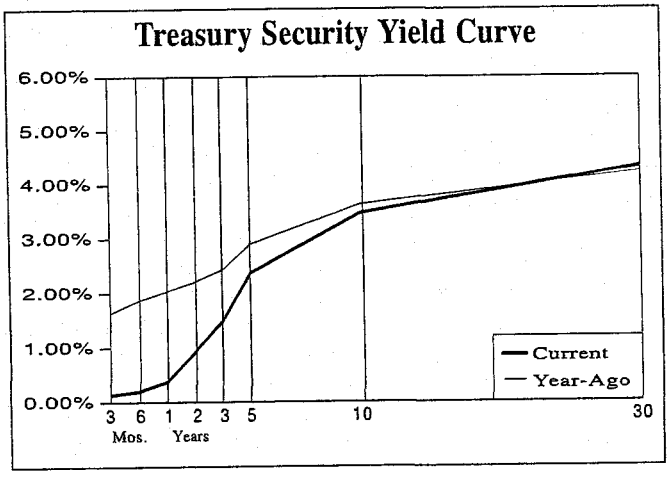
Selected Yields

	Recent (9/02/09)	3 Months Ago (6/10/09)	Year Ago (9/10/08)
TAXABLE			
Market Rates			
Discount Rate	0.50	0.50	2.25
Federal Funds	0.00-0.25	0.00-0.25	2.00
Prime Rate	3.25	3.25	5.00
30-day CP (A1/P1)	0.21	0.34	3.00
3-month LIBOR	0.30	0.64	2.82
Bank CDs			
6-month	0.42	0.66	1.60
1-year	0.72	0.87	2.26
5-year	2.30	1.92	4.15
U.S. Treasury Securities			
3-month	0.14	0.17	1.64
6-month	0.20	0.31	1.86
1-year	0.38	0.53	2.04
5-year	2.37	2.92	2.90
10-year	3.47	3.95	3.63
10-year (inflation-protected)	1.63	1.86	1.61
30-year	4.33	4.76	4.23
30-year Zero	4.46	4.84	4.27
Mortgage-Backed Securities			
GNMA 6.5%	3.77	4.26	5.31
FHLMC 6.5% (Gold)	2.90	3.07	5.36
FNMA 6.5%	2.72	2.91	5.20
FNMA ARM	2.62	2.53	3.86
Corporate Bonds			
Financial (10-year) A	6.04	6.82	6.51
Industrial (25/30-year) A	5.63	6.50	6.08
Utility (25/30-year) A	5.65	6.28	6.04
Utility (25/30-year) Baa/BBB	6.40	7.76	6.49
Foreign Bonds (10-Year)			
Canada	3.42	3.64	3.46
Germany	3.42	3.69	4.07
Japan	1.33	1.55	1.52
United Kingdom	3.76	3.92	4.46
Preferred Stocks			
Utility A	5.84	7.62	6.12
Financial A	6.62	8.63	7.33
Financial Adjustable A	5.54	5.46	5.46



	Recent (9/02/09)	3 Months Ago (6/10/09)	Year Ago (9/10/08)
TAX-EXEMPT			
Bond Buyer Indexes			
20-Bond Index (GOs)	4.37	4.71	4.62
25-Bond Index (Revs)	5.43	5.63	5.15
General Obligation Bonds (GOs)			
1-year Aaa	0.40	0.40	1.58
1-year A	1.10	0.90	1.68
5-year Aaa	1.76	2.14	2.69
5-year A	3.16	2.57	2.79
10-year Aaa	2.88	3.21	3.48
10-year A	4.40	3.57	3.68
25/30-year Aaa	4.21	4.72	4.53
25/30-year A	5.75	5.16	4.77
Revenue Bonds (Revs) (25/30-Year)			
Education AA	5.50	5.85	4.87
Electric AA	5.55	5.95	4.92
Housing AA	6.05	6.25	5.13
Hospital AA	6.05	6.20	5.15
Toll Road Aaa	5.50	6.00	4.95

Federal Reserve Data

BANK RESERVES

(Two-Week Period; in Millions, Not Seasonally Adjusted)

	Recent Levels			Average Levels Over the Last...		
	8/26/09	8/12/09	Change	12 Wks.	26 Wks.	52 Wks.
Excess Reserves	794546	708501	86045	756262	762985	613021
Borrowed Reserves	327647	340534	-12887	394750	486512	508084
Net Free/Borrowed Reserves	466899	367967	98932	361513	276473	104936

MONEY SUPPLY

(One-Week Period; in Billions, Seasonally Adjusted)

	Recent Levels			Growth Rates Over the Last...		
	8/24/09	8/17/09	Change	3 Mos.	6 Mos.	12 Mos.
M1 (Currency+demand deposits)	1639.0	1656.3	-17.3	9.4%	12.4%	18.0%
M2 (M1+savings+small time deposits)	8282.4	8310.5	-28.1	-4.3%	0.5%	7.6%

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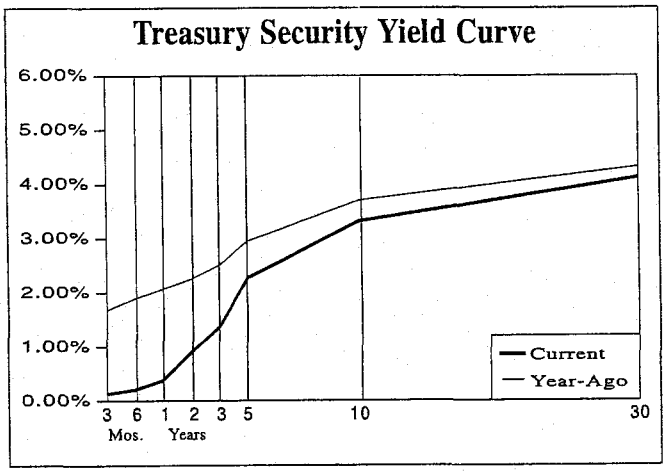
Selected Yields

	Recent (9/02/09)	3 Months Ago (6/3/09)	Year Ago (9/03/08)
TAXABLE			
Market Rates			
Discount Rate	0.50	0.50	2.25
Federal Funds	0.00-0.25	0.00-0.25	2.00
Prime Rate	3.25	3.25	5.00
30-day CP (A1/P1)	0.23	0.28	2.88
3-month LIBOR	0.33	0.64	2.81
Bank CDs			
6-month	0.42	0.70	1.60
1-year	0.72	0.92	2.26
5-year	2.25	1.92	4.15
U.S. Treasury Securities			
3-month	0.13	0.12	1.68
6-month	0.21	0.25	1.90
1-year	0.38	0.44	2.07
5-year	2.27	2.42	2.95
10-year	3.31	3.54	3.70
10-year (inflation-protected)	1.74	1.63	1.64
30-year	4.12	4.45	4.32
30-year Zero	4.22	4.53	4.37
Mortgage-Backed Securities			
GNMA 6.5%	3.92	3.37	5.60
FHLMC 6.5% (Gold)	3.07	2.89	5.67
FNMA 6.5%	2.85	2.78	5.48
FNMA ARM	2.62	2.53	3.89
Corporate Bonds			
Financial (10-year) A	5.79	6.82	6.69
Industrial (25/30-year) A	5.43	6.35	6.11
Utility (25/30-year) A	5.45	6.17	6.13
Utility (25/30-year) Baa/BBB	6.14	7.83	6.54
Foreign Bonds (10-Year)			
Canada	3.33	3.36	3.48
Germany	3.23	3.57	4.14
Japan	1.32	1.55	1.47
United Kingdom	3.55	3.79	4.50
Preferred Stocks			
Utility A	6.37	6.10	6.16
Financial A	5.94	8.35	6.97
Financial Adjustable A	5.53	5.53	5.53



	Recent (9/02/09)	3 Months Ago (6/3/09)	Year Ago (9/03/08)
TAX-EXEMPT			
Bond Buyer Indexes			
20-Bond Index (GOs)	4.53	4.61	4.68
25-Bond Index (Revs)	5.99	5.53	5.17
General Obligation Bonds (GOs)			
1-year Aaa	0.40	0.40	1.58
1-year A	0.90	1.13	1.68
5-year Aaa	1.80	2.02	2.74
5-year A	2.24	3.45	2.84
10-year Aaa	2.93	3.01	3.55
10-year A	3.30	4.55	3.75
25/30-year Aaa	4.36	4.64	4.69
25/30-year A	4.82	6.16	5.07
Revenue Bonds (Revs) (25/30-Year)			
Education AA	5.30	6.20	4.85
Electric AA	5.40	6.25	4.80
Housing AA	5.55	6.55	5.15
Hospital AA	5.60	6.50	5.25
Toll Road Aaa	5.35	6.30	4.80

Federal Reserve Data

BANK RESERVES

(Two-Week Period; in Millions, Not Seasonally Adjusted)

	Recent Levels			Average Levels Over the Last...		
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Borrowed Reserves	327647	340534	-12887	394750	486512	508084
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MONEY SUPPLY

(One-Week Period; in Billions, Seasonally Adjusted)

	Recent Levels			Growth Rates Over the Last...		
	8/17/09	8/10/09	Change	3 Mos.	6 Mos.	12 Mos.
M1 (Currency+demand deposits)	1658.2	1663.6	-5.4	17.9%	13.1%	19.9%
M2 (M1+savings+small time deposits)	8312.4	8318.3	-5.9	-1.5%	1.1%	8.1%

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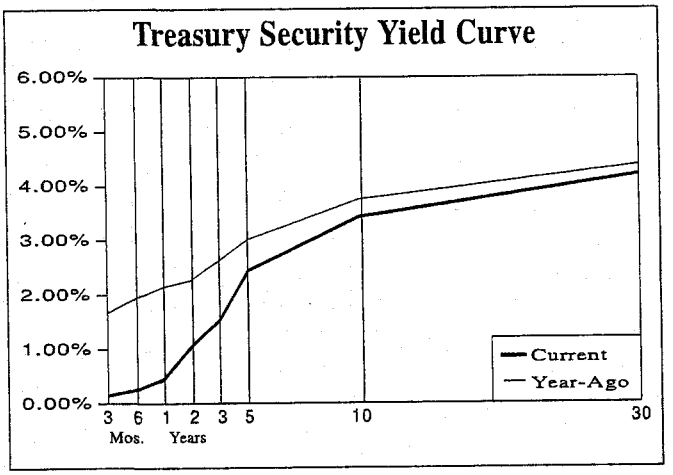
Selected Yields

	Recent (8/26/09)	3 Months Ago (5/27/09)	Year Ago (8/27/08)
TAXABLE			
Market Rates			
Discount Rate	0.50	0.50	2.25
Federal Funds	0.00-0.25	0.00-0.25	2.00
Prime Rate	3.25	3.25	5.00
30-day CP (A1/P1)	0.24	0.31	2.84
3-month LIBOR	0.37	0.67	2.81
Bank CDs			
6-month	0.48	0.69	1.60
1-year	0.72	0.92	2.26
5-year	2.25	1.92	4.15
U.S. Treasury Securities			
3-month	0.15	0.16	1.67
6-month	0.25	0.29	1.94
1-year	0.45	0.47	2.15
5-year	2.44	2.44	3.01
10-year	3.43	3.74	3.76
10-year (inflation-protected)	1.70	1.81	1.51
30-year	4.20	4.63	4.38
30-year Zero	4.29	4.74	4.44



	Recent (8/26/09)	3 Months Ago (5/27/09)	Year Ago (8/27/08)
Mortgage-Backed Securities			
GNMA 6.5%	3.95	3.34	5.62
FHLMC 6.5% (Gold)	2.95	2.61	5.66
FNMA 6.5%	2.73	2.28	5.56
FNMA ARM	2.75	2.78	4.02
Corporate Bonds			
Financial (10-year) A	6.13	7.00	6.60
Industrial (25/30-year) A	5.52	6.61	6.18
Utility (25/30-year) A	5.53	6.44	6.15
Utility (25/30-year) Baa/BBB	6.17	8.01	6.57
Foreign Bonds (10-Year)			
Canada	3.40	3.57	3.53
Germany	3.24	3.63	4.17
Japan	1.32	1.48	1.45
United Kingdom	3.55	3.75	4.51
Preferred Stocks			
Utility A	6.34	6.08	6.16
Financial A	5.99	8.28	7.08
Financial Adjustable A	5.52	5.53	5.53
TAX-EXEMPT			
Bond Buyer Indexes			
20-Bond Index (GOs)	4.58	4.44	4.64
25-Bond Index (Revs)	5.62	5.42	5.15
General Obligation Bonds (GOs)			
1-year Aaa	0.40	0.42	1.56
1-year A	1.10	1.15	1.66
5-year Aaa	1.81	1.87	2.79
5-year A	3.21	3.29	2.89
10-year Aaa	2.96	2.84	3.60
10-year A	4.48	4.40	3.80
25/30-year Aaa	4.54	4.41	4.71
25/30-year A	6.05	5.89	4.95
Revenue Bonds (Revs) (25/30-Year)			
Education AA	5.80	5.94	5.05
Electric AA	5.85	6.04	5.10
Housing AA	6.35	6.34	5.25
Hospital AA	6.35	6.29	5.30
Toll Road Aaa	5.80	6.09	5.10

Federal Reserve Data

BANK RESERVES

(Two-Week Period; in Millions, Not Seasonally Adjusted)

	Recent Levels			Average Levels Over the Last...		
	8/12/09	7/29/09	Change	12 Wks.	26 Wks.	52 Wks.
Excess Reserves	708499	728888	-20389	768051	749904	583661
Borrowed Reserves	340534	347217	-6683	427197	503204	502158
Net Free/Borrowed Reserves	367965	381671	-13706	340854	246700	81504

MONEY SUPPLY

(One-Week Period; in Billions, Seasonally Adjusted)

	Recent Levels			Growth Rates Over the Last...		
	8/10/09	8/3/09	Change	3 Mos.	6 Mos.	12 Mos.
M1 (Currency+demand deposits)	1663.8	1677.2	-13.4	17.9%	12.1%	18.7%
M2 (M1+savings+small time deposits)	8318.3	8323.9	-5.6	-0.7%	1.6%	7.9%

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LITCHFIELD PARK SERVICE COMPANY
DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
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LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
COST OF CAPITAL SUMMARY

DOCKET NO. SW-01428A-09-0103
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WEIGHTED AVERAGE COST OF CAPITAL

LINE NO.	DESCRIPTION	(A) COMPANY PROPOSED	(B) RUCO ADJUSTED	(C) RUCO RECOMMENDED	(D) CAPITAL RATIO	(E) COST RATE	(F) WEIGHTED COST RATE
1	SHORT-TERM DEBT	$ -	$ -	$ -	0.00%	0.00%	
2	LONG-TERM DEBT	11,506,844	-	11,506,844	17.83%	6.39%	1.14%
3	COMMON EQUITY	53,027,765	-	53,027,765	82.17%	8.01%	6.58%
4	TOTAL CAPITALIZATION	$ 64,534,609	$ -	$ 64,534,609	100.00%		
5	**WEIGHTED AVERAGE COST OF CAPITAL**						**7.72%**

REFERENCES:
COLUMN (A): COMPANY SCHEDULE D-1
COLUMN (B): TESTIMONY, WAR
COLUMN (C): COLUMN (A) + COLUMN (B)
COLUMN (D): LINES 1, 2 AND 3 DIVIDED BY LINE 4
COLUMN (E): SCHEDULE WAR-1, PAGES 2 AND 3
COLUMN (F): COLUMN (D) x COLUMN (E)

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
COST OF CAPITAL SUMMARY

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 1, PAGE 2 OF 3

WEIGHTED COST OF DEBT

LINE NO.	SYSTEM	(A) AMOUNT OUTSTANDING	(B) ANNUAL INTEREST	(C) INTEREST RATE	(D) COST RATE	(E) WEIGHTED COST
1	1999 INDUSTRIAL DEVELOPMENT AUTHORITY BONDS	$ 4,283,875	$ 251,892	5.88%	37.23%	2.19%
2	2001 INDUSTRIAL DEVELOPMENT AUTHORITY BONDS	7,222,969	483,939	6.70%	62.77%	4.21%
3	TOTALS	$ 11,506,844	$ 735,831		100.00%	
4	**WEIGHTED COST OF DEBT**					**6.39%**

REFERENCES:
COLUMN (A): COMPANY SCHEDULE D-2
COLUMN (B): COMPANY SCHEDULE D-2
COLUMN (C): COLUMN (A) + COLUMN (B)
COLUMN (D): LINES 1 AND 2 DIVIDED BY LINE 3
COLUMN (E): COLUMN (C) x COLUMN (D)

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
COST OF CAPITAL SUMMARY

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR-1, PAGE 3 OF 3

COST OF COMMON EQUITY CALCULATION

LINE NO.			
1	**DCF METHODOLOGY**		
2	DCF - WATER COMPANY SINGLE-STAGE CONSTANT GROWTH MODEL ESTIMATE	9.94%	SCHEDULE WAR-2, COLUMN (C), LINE 5
3	DCF - NATURAL GAS LDC SINGLE-STAGE CONSTANT GROWTH MODEL ESTIMATE	9.50%	SCHEDULE WAR-2, COLUMN (C), LINE 13
4	**AVERAGE OF DCF ESTIMATES**	**9.72%**	(LINE 2 + LINE 3) ÷ 2
5	**CAPM METHODOLOGY**		
6	CAPM - WATER COMPANY GEOMETRIC MEAN ESTIMATE	5.92%	SCHEDULE WAR-7 PAGE 1, COLUMN (B), LINE 5
7	CAPM - NATURAL GAS LDC GEOMETRIC MEAN ESTIMATE	5.25%	SCHEDULE WAR-7 PAGE 1, COLUMN (B), LINE 13
8	CAPM - WATER COMPANY ARITHMETIC MEAN ESTIMATE	7.49%	SCHEDULE WAR-7 PAGE 2, COLUMN (B), LINE 5
9	CAPM - NATURAL GAS LDC ARITHMETIC MEAN ESTIMATE	6.51%	SCHEDULE WAR-7 PAGE 2, COLUMN (B), LINE 13
10	**AVERAGE OF CAPM ESTIMATES**	**6.29%**	(SUM OF LINES 6 THRU 9) ÷ 4
11	**AVERAGE OF DCF AND CAPM ESTIMATES**	**8.01%**	(SUM OF LINES 4 AND 10) ÷ 2

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
DCF COST OF EQUITY CAPITAL

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 2

LINE NO.	STOCK SYMBOL	COMPANY	(A) DIVIDEND YIELD	+	(B) GROWTH RATE (g)	=	(C) DCF COST OF EQUITY CAPITAL
1	AWR	AMERICAN STATES WATER CO.	2.83%	+	9.03%	=	11.86%
2	CWT	CALIFORNIA WATER SERVICE GROUP	3.09%	+	6.70%	=	9.79%
3	SWWC	SOUTHWEST WATER COMPANY	1.96%	+	7.20%	=	9.16%
4	WTR	AQUA AMERICA, INC.	3.18%	+	5.78%	=	8.96%
5	**WATER COMPANY AVERAGE**						**9.94%**
6	AGL	AGL RESOURCES, INC.	4.93%	+	5.95%	=	10.87%
7	ATO	ATMOS ENERGY CORP.	4.69%	+	4.42%	=	9.10%
8	LG	LACLEDE GROUP, INC.	4.72%	+	5.12%	=	9.84%
9	NJR	NEW JERSEY RESOURCES CORPORATION	3.42%	+	5.68%	=	9.10%
10	GAS	NICOR, INC.	5.10%	+	5.18%	=	10.28%
11	NWN	NORTHWEST NATURAL GAS CO.	3.74%	+	4.95%	=	8.69%
12	PNY	PIEDMONT NATURAL GAS COMPANY	4.51%	+	4.75%	=	9.27%
13	SJI	SOUTH JERSEY INDUSTIES, INC.	3.39%	+	7.88%	=	11.28%
14	SWX	SOUTHWEST GAS CORPORATION	3.76%	+	4.00%	=	7.77%
15	WGL	WGL HOLDINGS, INC.	4.47%	+	4.38%	=	8.85%
16	**NATURAL GAS LDC AVERAGE**						**9.50%**

REFERENCES:
COLUMN (A): SCHEDULE WAR - 3, COLUMN C
COLUMN (B): SCHEDULE WAR - 4, PAGE 1, COLUMN C
COLUMN (C): COLUMN (A) + COLUMN (B)

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
DIVIDEND YIELD CALCULATION

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 3

LINE NO.	STOCK SYMBOL	COMPANY	(A) ESTIMATED DIVIDEND (PER SHARE)		(B) AVERAGE STOCK PRICE (PER SHARE)		(C) DIVIDEND YIELD
1	AWR	AMERICAN STATES WATER CO.	$1.00	÷	$35.29	=	2.83%
2	CWT	CALIFORNIA WATER SERVICE GROUP	1.18	÷	38.22	=	3.09%
3	SWWC	SOUTHWEST WATER COMPANY	0.10	÷	5.11	=	1.96%
4	WTR	AQUA AMERICA, INC.	0.54	÷	16.96	=	3.18%
5	**WATER COMPANY AVERAGE**						**2.77%**
6	AGL	AGL RESOURCES, INC.	$1.72	÷	$34.92	=	4.93%
7	ATO	ATMOS ENERGY CORP.	1.32	÷	28.16	=	4.69%
8	LG	LACLEDE GROUP, INC.	1.54	÷	32.64	=	4.72%
9	NJR	NEW JERSEY RESOURCES CORPORATION	1.24	÷	36.30	=	3.42%
10	GAS	NICOR, INC.	1.86	÷	36.45	=	5.10%
11	NWN	NORTHWEST NATURAL GAS CO.	1.58	÷	42.28	=	3.74%
12	PNY	PIEDMONT NATURAL GAS COMPANY	1.08	÷	23.94	=	4.51%
13	SJI	SOUTH JERSEY INDUSTIES, INC.	1.19	÷	35.11	=	3.39%
14	SWX	SOUTHWEST GAS CORPORATION	0.95	÷	25.29	=	3.76%
15	WGL	WGL HOLDINGS, INC.	1.48	÷	33.10	=	4.47%
16	**NATURAL GAS LDC AVERAGE**						**4.27%**

REFERENCES:
COLUMN (A): ESTIMATED 12 MONTH DIVIDEND REPORTED IN VALUE LINE INVESTMENT SURVEY - RATINGS & REPORTS DATED 10/23/2009 (WATER COMPANIES) AND 09/11/2009 (NATURAL GAS LDC's).
COLUMN (B): EIGHT WEEK AVERAGE OF CLOSING PRICES FROM 08/24/2009 TO 10/16/2009 STOCK QUOTES OBTAINED THROUGH BIG CHARTS WEB SITE - HISTORICAL QUOTES (www.bigcharts.com).
COLUMN (C): COLUMN (A) / COLUMN (B)

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
DIVIDEND GROWTH RATE CALCULATION

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 4, PAGE 1 OF 2

LINE NO.	STOCK SYMBOL	COMPANY	(A) INTERNAL GROWTH (br)	+	(B) EXTERNAL GROWTH (sv)	=	(C) DIVIDEND GROWTH (g)
1	AWR	AMERICAN STATES WATER CO.	6.20%	+	2.83%	=	9.03%
2	CWT	CALIFORNIA WATER SERVICE GROUP	6.00%	+	0.70%	=	6.70%
3	SWWC	SOUTHWEST WATER COMPANY	7.15%	+	0.05%	=	7.20%
4	WTR	AQUA AMERICA, INC.	5.50%	+	0.28%	=	5.78%
5	**WATER COMPANY AVERAGE**						**7.18%**
6	AGL	AGL RESOURCES, INC.	5.50%	+	0.45%	=	5.95%
7	ATO	ATMOS ENERGY CORP.	4.10%	+	0.32%	=	4.42%
8	LG	LACLEDE GROUP, INC.	4.50%	+	0.62%	=	5.12%
9	NJR	NEW JERSEY RESOURCES CORPORATION	5.10%	+	0.58%	=	5.68%
10	GAS	NICOR, INC.	5.10%	+	0.08%	=	5.18%
11	NWN	NORTHWEST NATURAL GAS CO.	4.60%	+	0.35%	=	4.95%
12	PNY	PIEDMONT NATURAL GAS COMPANY	4.75%	+	0.00%	=	4.75%
13	SJI	SOUTH JERSEY INDUSTIES, INC.	7.00%	+	0.88%	=	7.88%
14	SWX	SOUTHWEST GAS CORPORATION	4.00%	+	0.00%	=	4.00%
15	WGL	WGL HOLDINGS, INC.	4.35%	+	0.03%	=	4.38%
16	**NATURAL GAS LDC AVERAGE**						**5.23%**

REFERENCES:
COLUMN (A): TESTIMONY, WAR
COLUMN (B): SCHEDULE WAR - 4, PAGE 2, COLUMN C
COLUMN (C): COLUMN (A) + COLUMN (B)

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
DIVIDEND GROWTH RATE CALCULATION

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 4, PAGE 2 OF 2

LINE NO.	STOCK SYMBOL	COMPANY	(A) SHARE GROWTH		(B)		(C) EXTERNAL GROWTH (sv)
				x	{ [((M + B) + 1) ÷ 2] - 1 }	=	
1	AWR	AMERICAN STATES WATER CO.	5.00%	x	{ [((2.13) + 1) ÷ 2] - 1 }	=	2.83%
2	CWT	CALIFORNIA WATER SERVICE GROUP	1.50%	x	{ [((1.94) + 1) ÷ 2] - 1 }	=	0.70%
3	SWWC	SOUTHWEST WATER COMPANY	1.10%	x	{ [((1.09) + 1) ÷ 2] - 1 }	=	0.05%
4	WTR	AQUA AMERICA, INC.	0.50%	x	{ [((2.11) + 1) ÷ 2] - 1 }	=	0.28%
5	**WATER COMPANY AVERAGE**						**0.96%**
6	AGL	AGL RESOURCES, INC.	1.75%	x	{ [((1.51) + 1) ÷ 2] - 1 }	=	0.45%
7	ATO	ATMOS ENERGY CORP.	3.75%	x	{ [((1.17) + 1) ÷ 2] - 1 }	=	0.32%
8	LG	LACLEDE GROUP, INC.	3.25%	x	{ [((1.38) + 1) ÷ 2] - 1 }	=	0.62%
9	NJR	NEW JERSEY RESOURCES CORPORATION	1.25%	x	{ [((1.93) + 1) ÷ 2] - 1 }	=	0.58%
10	GAS	NICOR, INC.	0.25%	x	{ [((1.65) + 1) ÷ 2] - 1 }	=	0.08%
11	NWN	NORTHWEST NATURAL GAS CO.	1.00%	x	{ [((1.70) + 1) ÷ 2] - 1 }	=	0.35%
12	PNY	PIEDMONT NATURAL GAS COMPANY	0.01%	x	{ [((1.88) + 1) ÷ 2] - 1 }	=	0.00%
13	SJI	SOUTH JERSEY INDUSTIES, INC.	2.00%	x	{ [((1.88) + 1) ÷ 2] - 1 }	=	0.88%
14	SWX	SOUTHWEST GAS CORPORATION	2.50%	x	{ [((1.00) + 1) ÷ 2] - 1 }	=	0.00%
15	WGL	WGL HOLDINGS, INC.	0.10%	x	{ [((1.50) + 1) ÷ 2] - 1 }	=	0.03%
16	**NATURAL GAS LDC AVERAGE**						**0.33%**

REFERENCES:
COLUMN (A): TESTIMONY, WAR
COLUMN (B): VALUE LINE INVESTMENT SURVEY
- RATINGS & REPORTS DATED 10/23/2009 (WATER COMPANIES) AND 09/11/2009 (NATURAL GAS LDC's)
COLUMN (C): COLUMN (A) x COLUMN (B)

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
DIVIDEND GROWTH COMPONENTS

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 5, PAGE 1 OF 4

LINE NO.	STOCK SYMBOL	WATER COMPANY NAME	OPERATING PERIOD	(A) RETENTION RATIO (b)	x	(B) RETURN ON BOOK EQUITY (r)	=	(C) DIVIDEND GROWTH (g)	(D) BOOK VALUE ($/SHARE)	(E) SHARES OUTST. (MILLIONS)	(F) SHARE GROWTH
1	AWR	AMERICAN STATES WATER CO.	2004	0.1524		6.60%		1.01%	15.01	16.75	
2			2005	0.3182		8.50%		2.70%	15.72	16.80	
3			2006	0.3158		8.10%		2.56%	16.64	17.05	
4			2007	0.4074		9.30%		3.79%	17.53	17.23	
5			2008	0.3548		8.60%		3.05%	17.95	17.30	
6			GROWTH 2004 - 2008					2.62%	5.00%		0.81%
7			2009	0.4632		10.00%		4.63%		18.50	6.94%
8			2010	0.4732		10.50%		4.97%		18.75	4.11%
9			2012-14	0.5192		12.00%		6.23%	4.00%	20.00	2.94%
10											
11	CWT	CALIFORNIA WATER SERVICE GROUP	2004	0.2260		9.00%		2.03%	15.66	18.37	
12			2005	0.2245		9.30%		2.09%	15.79	18.39	
13			2006	0.1418		6.80%		0.96%	18.15	20.66	
14			2007	0.2267		8.10%		1.84%	18.50	20.67	
15			2008	0.3842		9.90%		3.80%	19.44	20.72	
16			GROWTH 2004 - 2008					2.15%	6.50%		3.06%
17			2009	0.4381		11.50%		5.04%		21.00	1.35%
18			2010	0.4591		10.50%		4.82%		21.50	1.86%
19			2012-14	0.4943		12.00%		5.93%	3.00%	22.50	1.66%
20											
21	SWWC	SOUTHWEST WATER COMPANY	2004	0.2174		3.60%		0.78%	6.17	20.36	
22			2005	0.4118		5.00%		2.06%	6.49	22.33	
23			2006	0.4750		5.60%		2.66%	6.98	23.80	
24			2007	0.2581		3.20%		0.83%	6.54	24.27	
25			2008	-5.0000		0.80%		NMF	4.55	24.90	
26			GROWTH 2004 - 2008					1.58%	7.00%		5.16%
27			2009	0.9333		3.00%		2.80%		25.00	0.40%
28			2010	0.9667		6.00%		5.80%		25.50	1.20%
29			2012-14	0.9000		8.00%		7.20%	-	26.50	1.25%
30											
31	WTR	AQUA AMERICA, INC.	2004	0.4219		10.70%		4.51%	5.89	127.18	
32			2005	0.4366		11.20%		4.89%	6.30	128.97	
33			2006	0.3714		10.00%		3.71%	6.96	132.33	
34			2007	0.3239		9.70%		3.14%	7.32	133.40	
35			2008	0.3014		9.30%		2.80%	7.82	135.37	
36			GROWTH 2004 - 2008					3.81%	10.00%		1.57%
37			2009	0.3415		10.50%		3.59%		136.00	0.47%
38			2010	0.3778		11.00%		4.16%		136.50	0.42%
39			2012-14	0.4800		11.50%		5.52%	6.50%	138.00	0.39%

REFERENCES:
COLUMNS (A) & (B): VALUE LINE INVESTMENT SURVEY
- RATINGS & REPORTS DATED 10/23/2009
COLUMN (C): COLUMN (A) x COLUMN (B)
COLUMN (C): LINES 6, 16, 26 & 36, SIMPLE AVERAGE GROWTH, 2004 - 2008

COLUMN (D): VALUE LINE INVESTMENT SURVEY
COLUMN (D): LINES 6, 16 & 26, COMPOUND GROWTH RATE
COLUMN (E): VALUE LINE INVESTMENT SURVEY
COLUMN (F): COMPOUND GROWTH RATES OF DATES SHOWN

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
DIVIDEND GROWTH COMPONENTS

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 5, PAGE 2 OF 4

LINE NO.	STOCK SYMBOL	NATURAL GAS LDC NAME	OPERATING PERIOD	(A) RETENTION RATIO (b)	x	(B) RETURN ON BOOK EQUITY (r)	=	(C) DIVIDEND GROWTH (g)	(D) BOOK VALUE ($/SHARE)	(E) SHARES OUTST. (MILLIONS)	(F) SHARE GROWTH
1	AGL	AGL RESOURCES, INC.	2004	0.4956		11.00%		5.45%	18.06	76.70	
2			2005	0.4758		12.90%		6.14%	19.29	77.70	
3			2006	0.4559		13.20%		6.02%	20.71	77.70	
4			2007	0.3971		12.70%		5.04%	21.74	76.40	
5			2008	0.3801		12.60%		4.79%	21.48	76.90	
6			GROWTH 2004 - 2008					5.49%	10.00%		0.07%
7			2009	0.3630		11.50%		4.17%		78.00	1.43%
8			2010	0.3931		12.50%		4.91%		79.00	1.36%
9			2012-14	0.4303		14.00%		6.02%	1.50%	85.00	2.02%
10											
11	ATO	ATMOS ENERGY CORP.	2004	0.2278		7.60%		1.73%	18.05	62.80	
12			2005	0.2791		8.50%		2.37%	19.90	80.54	
13			2006	0.3700		9.80%		3.63%	20.16	81.74	
14			2007	0.3402		8.70%		2.96%	22.01	89.33	
15			2008	0.3500		8.80%		3.08%	22.60	90.81	
16			GROWTH 2004 - 2008					2.75%	7.50%		9.66%
17			2009	0.3714		9.00%		3.34%		92.50	1.86%
18			2010	0.3909		9.00%		3.52%		93.50	1.47%
19			2012-14	0.4400		9.50%		4.18%	4.00%	110.00	3.91%
20											
21	LG	LACLEDE GROUP, INC.	2004	0.2582		10.10%		2.61%	16.96	20.98	
22			2005	0.2789		10.90%		3.04%	17.31	21.17	
23			2006	0.4093		12.50%		5.12%	18.85	21.36	
24			2007	0.3723		11.60%		4.32%	19.79	21.65	
25			2008	0.4356		11.80%		5.14%	22.12	21.99	
26			GROWTH 2004 - 2008					4.04%	5.50%		1.18%
27			2009	0.4814		12.00%		5.78%		22.50	2.32%
28			2010	0.3962		11.00%		4.36%		23.00	2.27%
29			2012-14	0.4333		11.00%		4.77%	5.50%	26.00	3.41%
30											
31	NJR	NEW JERSEY RESOURCES CORPORATION	2004	0.4882		15.30%		7.47%	11.25	41.61	
32			2005	0.4859		17.00%		8.26%	10.60	41.32	
33			2006	0.4866		12.60%		6.13%	15.00	41.44	
34			2007	0.3484		10.10%		3.52%	15.50	41.61	
35			2008	0.5889		15.70%		9.25%	17.28	42.06	
36			GROWTH 2004 - 2008					6.93%	11.50%		0.27%
37			2009	0.4939		13.00%		6.42%		42.50	1.05%
38			2010	0.5259		13.00%		6.84%		43.00	1.11%
39			2012-14	0.5000		10.00%		5.00%	9.50%	45.00	1.36%

REFERENCES:
COLUMNS (A) & (B): VALUE LINE INVESTMENT SURVEY
- RATINGS & REPORTS DATED 09/11/2009
COLUMN (C): COLUMN (A) x COLUMN (B)
COLUMN (C): LINES 6, 16, 26 & 36, SIMPLE AVERAGE GROWTH, 2004 - 2008

COLUMN (D): VALUE LINE INVESTMENT SURVEY
COLUMN (D): LINES 6, 16 & 26, COMPOUND GROWTH RATE
COLUMN (E): VALUE LINE INVESTMENT SURVEY
COLUMN (F): COMPOUND GROWTH RATES OF DATES SHOWN

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
DIVIDEND GROWTH COMPONENTS

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 5, PAGE 3 OF 4

LINE NO.	STOCK SYMBOL	NATURAL GAS LDC NAME	OPERATING PERIOD	(A) RETENTION RATIO (b)	x	(B) RETURN ON BOOK EQUITY (r)	=	(C) DIVIDEND GROWTH (g)	(D) BOOK VALUE ($/SHARE)	(E) SHARES OUTST. (MILLIONS)	(F) SHARE GROWTH
1	GAS	NICOR, INC.	2004	0.1622		13.10%		2.12%	16.99	44.10	
2			2005	0.1806		12.50%		2.26%	18.36	44.18	
3			2006	0.3519		14.70%		5.17%	19.43	44.90	
4			2007	0.3779		14.30%		5.40%	20.58	45.90	
5			2008	0.2928		12.30%		3.60%	21.55	45.13	
6			GROWTH 2004 - 2008					3.71%	4.00%		0.58%
7			2009	0.2706		11.50%		3.11%		45.50	0.82%
8			2010	0.3474		12.50%		4.34%		45.50	0.41%
9			2012-14	0.4277		12.00%		5.13%	4.50%	45.50	0.16%
10											
11	NWN	NORTHWEST NATURAL GAS CO.	2004	0.3011		8.90%		2.68%	20.64	27.55	
12			2005	0.3744		9.90%		3.71%	21.28	27.58	
13			2006	0.4085		10.90%		4.45%	22.01	27.24	
14			2007	0.4783		12.50%		5.98%	22.52	26.41	
15			2008	0.4086		10.90%		4.45%	23.71	26.50	
16			GROWTH 2004 - 2008					4.25%	3.50%		-0.97%
17			2009	0.4386		11.00%		4.82%		26.50	0.00%
18			2010	0.4105		11.00%		4.52%		26.50	0.00%
19			2012-14	0.4203		11.00%		4.62%	5.00%	28.00	1.11%
20											
21	PNY	PIEDMONT NATURAL GAS COMPANY	2004	0.3307		11.10%		3.67%	11.15	76.67	
22			2005	0.3106		11.50%		3.57%	11.53	76.70	
23			2006	0.2520		11.00%		2.77%	11.83	74.61	
24			2007	0.2929		11.90%		3.49%	11.99	73.23	
25			2008	0.3087		12.40%		3.83%	12.11	73.26	
26			GROWTH 2004 - 2008					3.47%	6.00%		-1.13%
27			2009	0.3313		12.50%		4.14%		73.50	0.33%
28			2010	0.3471		13.00%		4.51%		73.50	0.16%
29			2012-14	0.3526		12.50%		4.41%	4.00%	73.00	-0.07%
30											
31	SJI	SOUTH JERSEY INDUSTIES, INC.	2004	0.4810		12.50%		6.01%	12.41	27.76	
32			2005	0.4971		12.40%		6.16%	13.50	28.98	
33			2006	0.6260		16.30%		10.20%	15.11	29.33	
34			2007	0.5167		12.80%		6.61%	16.25	29.61	
35			2008	0.5110		13.10%		6.69%	17.33	29.73	
36			GROWTH 2004 - 2008					7.14%	11.00%		1.73%
37			2009	0.5000		12.50%		6.25%		30.00	0.91%
38			2010	0.5170		13.50%		6.98%		31.00	2.11%
39			2012-14	0.5161		13.50%		6.97%	6.00%	33.00	2.11%

REFERENCES:
COLUMNS (A) & (B): VALUE LINE INVESTMENT SURVEY
- RATINGS & REPORTS DATED 09/11/2009
COLUMN (C): COLUMN (A) x COLUMN (B)
COLUMN (C): LINES 6, 16, 26 & 36, SIMPLE AVERAGE GROWTH, 2004 - 2008

COLUMN (D): VALUE LINE INVESTMENT SURVEY
COLUMN (D): LINES 6, 16 & 26, COMPOUND GROWTH RATE
COLUMN (E): VALUE LINE INVESTMENT SURVEY
COLUMN (F): COMPOUND GROWTH RATES OF DATES SHOWN

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
DIVIDEND GROWTH COMPONENTS

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 5, PAGE 4 OF 4

LINE NO.	STOCK SYMBOL	NATURAL GAS LDC NAME	OPERATING PERIOD	(A) RETENTION RATIO (b)	x	(B) RETURN ON BOOK EQUITY (r)	=	(C) DIVIDEND GROWTH (g)	(D) BOOK VALUE ($/SHARE)	(E) SHARES OUTST. (MILLIONS)	(F) SHARE GROWTH
1	SWX	SOUTHWEST GAS CORPORATION	2004	0.5060		8.30%		4.20%	19.18	36.79	
2			2005	0.3440		6.40%		2.20%	19.10	39.33	
3			2006	0.5859		8.90%		5.21%	21.58	41.77	
4			2007	0.5590		8.50%		4.75%	22.98	42.81	
5			2008	0.3525		5.90%		2.08%	23.49	44.19	
6			GROWTH 2004 - 2008					3.69%	5.00%		4.69%
7			2009	0.4571		7.00%		3.20%		45.50	2.96%
8			2010	0.4737		7.50%		3.55%		47.00	3.13%
9			2012-14	0.5000		8.00%		4.00%	3.50%	50.00	2.50%
10											
11	WGL	WGL HOLDINGS, INC.	2004	0.3434		11.70%		4.02%	16.95	48.67	
12			2005	0.3803		11.70%		4.45%	17.80	48.65	
13			2006	0.3041		10.30%		3.13%	18.86	48.89	
14			2007	0.3476		10.40%		3.62%	19.83	49.45	
15			2008	0.4221		11.60%		4.90%	20.99	49.92	
16			GROWTH 2004 - 2008					4.02%	4.50%		0.64%
17			2009	0.4120		12.00%		4.94%		50.00	0.16%
18			2010	0.4078		11.50%		4.69%		50.00	0.08%
19			2012-14	0.3963		11.00%		4.36%	4.50%	50.00	0.03%

REFERENCES:
COLUMNS (A) & (B): VALUE LINE INVESTMENT SURVEY
- RATINGS & REPORTS DATED 09/11/2009
COLUMN (C): COLUMN (A) x COLUMN (B)
COLUMN (C): LINES 6 & 16, SIMPLE AVERAGE GROWTH, 2004 - 2008

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
GROWTH RATE COMPARISON

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 6

WATER COMPANY SAMPLE:

LINE NO.	STOCK SYMBOL	(A) (br) + (sv)	(B) ZACKS EPS	EPS	(C) VALUE LINE PROJECTED DPS	BVPS	EPS	(D) VALUE LINE HISTORIC DPS	BVPS	(E) VALUE LINE & ZACKS AVGS.	EPS	(F) 5 - YEAR COMPOUND HISTORY DPS	BVPS
1	AWR	9.03%	4.00%	9.50%	4.50%	4.00%	5.50%	2.00%	5.00%	4.93%	10.23%	2.96%	4.57%
2	CWT	6.70%	8.20%	4.75%	2.50%	3.50%	7.00%	0.50%	6.50%	4.71%	6.81%	0.87%	5.55%
3	SWWC	7.20%	-	12.00%	-22.50%	-	######	8.50%	7.00%	-1.00%	-35.42%	7.46%	-7.33%
4	WTR	5.78%	7.50%	10.00%	5.50%	6.50%	5.50%	8.00%	10.00%	7.57%	3.34%	8.35%	7.34%
5				9.06%	-2.50%	4.67%	2.00%	4.75%	7.13%		-3.76%	4.91%	2.53%
6	AVERAGES	7.18%	6.57%		3.74%			4.63%		4.05%		1.23%	

NATURAL GAS LDC SAMPLE:

LINE NO.	STOCK SYMBOL	(A) (br) + (sv)	(B) ZACKS EPS	EPS	(C) VALUE LINE PROJECTED DPS	BVPS	EPS	(D) VALUE LINE HISTORIC DPS	BVPS	(E) VALUE LINE & ZACKS AVGS.	EPS	(F) 5 - YEAR COMPOUND HISTORY DPS	BVPS
1	AGL	5.95%	4.70%	3.50%	2.50%	1.50%	8.50%	8.00%	10.00%	5.53%	4.41%	9.94%	4.43%
2	ATO	4.42%	5.00%	4.00%	1.50%	4.00%	5.00%	1.50%	7.50%	4.07%	6.07%	1.60%	5.78%
3	LG	5.12%	3.00%	3.50%	2.50%	5.50%	9.50%	1.50%	5.50%	4.43%	9.74%	2.50%	6.87%
4	NJR	5.68%	6.50%	5.50%	5.50%	9.50%	7.50%	5.00%	11.50%	7.29%	12.26%	6.28%	11.33%
5	GAS	5.18%	4.20%	2.50%	-	4.50%	1.00%	0.50%	4.00%	2.78%	4.33%	0.00%	6.12%
6	NWN	4.95%	6.00%	5.00%	5.50%	5.00%	8.00%	3.00%	3.50%	5.14%	8.42%	3.99%	3.53%
7	PNY	4.75%	7.00%	5.50%	3.50%	4.00%	6.50%	4.50%	6.00%	5.29%	4.07%	4.92%	2.09%
8	SJI	7.88%	9.60%	5.50%	7.00%	6.00%	13.00%	6.00%	11.00%	8.30%	9.48%	7.86%	8.71%
9	SWX	4.00%	7.00%	4.50%	5.00%	3.50%	9.00%	1.00%	5.00%	5.00%	-4.34%	2.35%	5.20%
10	WGL	4.38%	5.00%	4.00%	3.00%	4.50%	4.00%	1.50%	4.50%	3.79%	5.36%	2.05%	5.49%
11				4.35%	4.00%	4.80%	7.20%	3.25%	6.85%		5.98%	4.15%	5.95%
12	AVERAGES	5.23%	5.80%		4.38%			5.77%		5.16%		5.36%	

REFERENCES:
COLUMN (A): SCHEDULE WAR - 4, PAGE 1, COLUMN C
COLUMN (B): ZACKS INVESTMENT RESEARCH (www.zacks.com)
COLUMN (C): VALUE LINE INVESTMENT SURVEY - RATINGS & REPORTS DATED 10/23/2009 (WATER COMPANIES) AND 09/11/2009 (NATURAL GAS LDC's)
COLUMN (D): VALUE LINE INVESTMENT SURVEY - RATINGS & REPORTS DATED 10/23/2009 (WATER COMPANIES) AND 09/11/2009 (NATURAL GAS LDC's)
COLUMN (E): SIMPLE AVERAGE OF COLUMNS (B) THRU (D) LINES 1 THRU 3 (WATER) AND 1 THRU 10 (NATURAL GAS)
COLUMN (F): 5-YEAR ANNUAL GROWTH RATE CALCULATED WITH DATA COMPILED FROM VALUE LINE INVESTMENT SURVEY
- RATINGS & REPORTS DATED 10/23/2009 (WATER COMPANIES) AND 09/11/2009 (NATURAL GAS LDC's)

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
CAPM COST OF EQUITY CAPITAL

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 7, PAGE 1 OF 2

BASED ON A GEOMETRIC MEAN:

LINE NO.	STOCK SYMBOL	(A) k	=	r_f	+ [	ß	x (	r_m	-	r_f	)] =	(B) EXPECTED RETURN
1	AWR	k	=	2.46%	+ [	0.80	x (	9.60%	-	5.40%	)] =	5.82%
2	CWT	k	=	2.46%	+ [	0.75	x (	9.60%	-	5.40%	)] =	5.61%
3	SWWC	k	=	2.46%	+ [	1.10	x (	9.60%	-	5.40%	)] =	7.08%
4	WTR	k	=	2.46%	+ [	0.65	x (	9.60%	-	5.40%	)] =	5.19%
5	**WATER COMPANY AVERAGE**					0.83						**5.92%**
6	AGL	k	=	2.46%	+ [	0.75	x (	9.60%	-	5.40%	)] =	5.61%
7	ATO	k	=	2.46%	+ [	0.65	x (	9.60%	-	5.40%	)] =	5.19%
8	LG	k	=	2.46%	+ [	0.60	x (	9.60%	-	5.40%	)] =	4.98%
9	NJR	k	=	2.46%	+ [	0.65	x (	9.60%	-	5.40%	)] =	5.19%
10	GAS	k	=	2.46%	+ [	0.70	x (	9.60%	-	5.40%	)] =	5.40%
11	NWN	k	=	2.46%	+ [	0.60	x (	9.60%	-	5.40%	)] =	4.98%
12	PNY	k	=	2.46%	+ [	0.65	x (	9.60%	-	5.40%	)] =	5.19%
13	SJI	k	=	2.46%	+ [	0.65	x (	9.60%	-	5.40%	)] =	5.19%
14	SWX	k	=	2.46%	+ [	0.75	x (	9.60%	-	5.40%	)] =	5.61%
15	WGL	k	=	2.46%	+ [	0.65	x (	9.60%	-	5.40%	)] =	5.19%
16	**NATURAL GAS LDC AVERAGE**					0.67						**5.25%**

REFERENCES:
COLUMN (A): SHARPE LITNER CAPITAL ASSET PRICING MODEL ("CAPM") FORMULA

$$k = r_f + [ß (r_m - r_f)]$$

WHERE: k = THE EXPECTED RETURN ON A GIVEN SECURITY
r_f = RATE OF RETURN ON A RISK FREE ASSET PROXY (a)
ß = THE BETA COEFFICIENT OF A GIVEN SECURITY
r_m = PROXY FOR THE MARKET RATE OF RETURN (b)

COLUMN (B): EXPECTED RATE OF RETURN USING THE CAPM FORMULA

NOTES

(a) AN 8-WEEK AVERAGE OF THE YIELD ON A 5-YEAR U.S. TREASURY INSTRUMENT THAT APPEARED IN VALUE LINE INVESTMENT SURVEY'S "SELECTION & OPINIONS" PUBLICATION FROM 09/04/2009 THROUGH 10/23/2009 WAS USED AS A RISK FREE RATE OF RETURN.

(b) THE RISK PREMIUM (RM - RF) USED THE GEOMETRIC MEAN FOR S&P 500 TOTAL RETURNS OVER THE 1926 - 2008 PERIOD MINUS TOTAL RETURNS ON INTERMEDIATE TREASURIES DURING THE SAME PEI THE DATA WAS OBTAINED FROM MORNINGSTAR'S STOCKS, BONDS, BILLS AND INFLATION: 2009 YEARBOOK.

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
CAPM COST OF EQUITY CAPITAL

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 7, PAGE 2 OF 2

BASED ON AN ARITHMETIC MEAN:

LINE NO.	STOCK SYMBOL						(A)										(B) EXPECTED RETURN
		k	=	r_f	+	[	ß	x	(	r_m	-	r_f	)	]	=	
1	AWR	k	=	2.46%	+	[	0.80	x	(	11.70%	-	5.60%	)	]	=	7.34%
2	CWT	k	=	2.46%	+	[	0.75	x	(	11.70%	-	5.60%	)	]	=	7.03%
3	SWWC	k	=	2.46%	+	[	1.10	x	(	11.70%	-	5.60%	)	]	=	9.17%
4	WTR	k	=	2.46%	+	[	0.65	x	(	11.70%	-	5.60%	)	]	=	6.42%
5	**WATER COMPANY AVERAGE**						0.83									**7.49%**
6	AGL	k	=	2.46%	+	[	0.75	x	(	11.70%	-	5.60%	)	]	=	7.03%
7	ATO	k	=	2.46%	+	[	0.65	x	(	11.70%	-	5.60%	)	]	=	6.42%
8	LG	k	=	2.46%	+	[	0.60	x	(	11.70%	-	5.60%	)	]	=	6.12%
9	NJR	k	=	2.46%	+	[	0.65	x	(	11.70%	-	5.60%	)	]	=	6.42%
10	GAS	k	=	2.46%	+	[	0.70	x	(	11.70%	-	5.60%	)	]	=	6.73%
11	NWN	k	=	2.46%	+	[	0.60	x	(	11.70%	-	5.60%	)	]	=	6.12%
12	PNY	k	=	2.46%	+	[	0.65	x	(	11.70%	-	5.60%	)	]	=	6.42%
13	SJI	k	=	2.46%	+	[	0.65	x	(	11.70%	-	5.60%	)	]	=	6.42%
14	SWX	k	=	2.46%	+	[	0.75	x	(	11.70%	-	5.60%	)	]	=	7.03%
15	WGL	k	=	2.46%	+	[	0.65	x	(	11.70%	-	5.60%	)	]	=	6.42%
16	**NATURAL GAS LDC AVERAGE**						0.67									**6.51%**

REFERENCES:
COLUMN (A): SHARPE LITNER CAPITAL ASSET PRICING MODEL ("CAPM") FORMULA

$$k = r_f + [ß (r_m - r_f)]$$

WHERE: k = THE EXPECTED RETURN ON A GIVEN SECURITY
r_f = RATE OF RETURN ON A RISK FREE ASSET PROXY (a)
ß = THE BETA COEFFICIENT OF A GIVEN SECURITY
r_m = PROXY FOR THE MARKET RATE OF RETURN (b)

COLUMN (B): EXPECTED RATE OF RETURN USING THE CAPM FORMULA

NOTES

(a) AN 8-WEEK AVERAGE OF THE YIELD ON A 5-YEAR U.S. TREASURY INSTRUMENT THAT APPEARED IN VALUE LINE INVESTMENT SURVEYS "SELECTION & OPINIONS" PUBLICATION FROM 09/04/2009 *THROUGH 10/23/2009 WAS USED* AS A RISK FREE RATE OF RETURN.

(b) THE RISK PREMIUM (RM - RF) USED THE GEOMETRIC MEAN FOR S&P 500 TOTAL RETURNS OVER THE 1926 - 2008 PERIOD MINUS TOTAL RETURNS ON INTERMEDIATE TREASURIES DURING THE SAME PER THE DATA WAS OBTAINED FROM MORNINGSTAR'S STOCKS, BONDS, BILLS AND INFLATION: 2009 YEARBOOK.

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
ECONOMIC INDICATORS - 1990 TO PRESENT

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 8

LINE NO.	YEAR	(A) CHANGE IN CPI	(B) CHANGE IN GDP (1996 $)	(C) PRIME RATE	(D) FED. DISC. RATE	(E) FED. FUNDS RATE	(F) 91-DAY T-BILLS	(G) 30-YR T-BONDS	(H) A-RATED UTIL. BOND YIELD	(I) Baa-RATED UTIL. BOND YIELD
1	1990	5.39%	1.90%	10.01%	6.98%	8.10%	7.50%	7.49%	9.86%	10.06%
2	1991	4.25%	-0.20%	8.46%	5.45%	5.69%	5.38%	5.38%	9.36%	9.55%
3	1992	3.03%	3.30%	6.25%	3.25%	3.52%	3.43%	3.43%	8.69%	8.86%
4	1993	2.96%	2.70%	6.00%	3.00%	3.02%	3.00%	3.00%	7.59%	7.91%
5	1994	2.61%	4.00%	7.14%	3.60%	4.21%	4.25%	4.25%	8.31%	8.63%
6	1995	2.81%	2.50%	8.83%	5.21%	5.83%	5.49%	5.49%	7.89%	8.29%
7	1996	2.93%	3.70%	8.27%	5.02%	5.30%	5.01%	5.01%	7.75%	8.17%
8	1997	2.34%	4.50%	8.44%	5.00%	5.46%	5.06%	5.06%	7.60%	8.12%
9	1998	1.55%	4.20%	8.35%	4.92%	5.35%	4.78%	4.78%	7.04%	7.27%
10	1999	2.19%	4.50%	7.99%	4.62%	4.97%	4.64%	4.64%	7.62%	7.88%
11	2000	3.38%	3.70%	9.23%	5.73%	6.24%	5.82%	5.82%	8.24%	8.36%
12	2001	2.83%	0.80%	6.92%	3.41%	3.88%	3.40%	5.95%	7.59%	8.02%
13	2002	1.59%	1.60%	4.67%	1.17%	1.67%	1.61%	5.38%	7.41%	7.98%
14	2003	2.27%	2.50%	4.12%	2.03%	1.13%	1.01%	4.92%	6.18%	6.64%
15	2004	2.68%	3.60%	4.34%	2.34%	1.35%	1.37%	5.03%	5.77%	6.20%
16	2005	3.39%	2.90%	6.16%	4.19%	3.22%	3.15%	4.57%	5.38%	5.78%
17	2006	3.24%	2.80%	7.97%	5.96%	4.97%	4.73%	4.91%	5.94%	6.30%
18	2007	2.85%	2.00%	8.05%	5.86%	5.02%	4.36%	4.84%	6.07%	6.24%
19	2008	3.58%	1.30%	5.09%	2.39%	1.92%	1.37%	4.28%	6.34%	6.64%
20	CURRENT	-1.40%	-1.00%	3.25%	0.50%	0.00% - 0.25%	7.00%	4.26%	5.65%	6.22%

REFERENCES:
COLUMN (A): 1990 - CURRENT, U.S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS WEB SITE
COLUMN (B): 1990 - CURRENT, U.S. DEPARTMENT OF COMMERCE, BUREAU OF ECONOMIC ANALYSIS WEB SITE
COLUMN (C) THROUGH (G): 1990 - 2003, FEDERAL RESERVE BANK OF ST. LOUIS WEB SITE
COLUMN (C) THROUGH (D): CURRENT, THE VALUE LINE INVESTMENT SURVEY, DATED 10/23/2009
COLUMN (F) THROUGH (I): CURRENT, THE VALUE LINE INVESTMENT SURVEY, DATED 10/23/2009
COLUMN (H) THROUGH (I): 1990 - 2000, MOODY'S PUBLIC UTILITY REPORTS
COLUMN (H) THROUGH (I): 2001, MERGENT 2002 PUBLIC UTILITY MANUAL
COLUMN (H) THROUGH (I): 2003 MERGENT NEWS REPORTS

LITCHFIELD PARK SERVICE COMPANY
TEST YEAR ENDED SEPTEMBER 30, 2008
CAPITAL STRUCTURES OF SAMPLE COMPANIES

DOCKET NO. SW-01428A-09-0103
DOCKET NO. W-01427A-09-0104
SCHEDULE WAR - 9

AVERAGE CAPITAL STRUCTURES OF SAMPLE WATER COMPANIES

LINE NO.		AWR	PCT.	CWT	PCT.	SWWC	PCT.	WTR	PCT.	WATER COMPANY AVERAGE	PCT.
1	DEBT	$ 266.5	46.2%	$ 287.5	41.6%	$ 190.6	62.6%	$ 1,248.1	54.1%	$ 498.2	51.4%
2											
3	PREFERRED STOCK	0.0	0.0%	0.0	0.0%	0.5	0.2%	0.0	0.0%	0.1	0.0%
4											
5	COMMON EQUITY	310.5	53.8%	402.9	58.4%	113.3	37.2%	1,058.4	45.9%	471.3	48.6%
6											
7	TOTALS	$ 577.0	100%	$ 690.4	100%	$ 304.4	100%	$ 2,306.5	100%	$ 969.6	100%

AVERAGE CAPITAL STRUCTURES OF SAMPLE NATURAL GAS COMPANIES

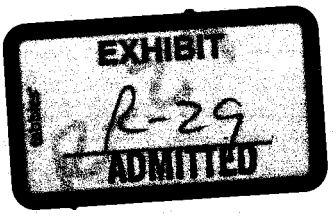
LINE NO.		AGL	PCT.	ATO	PCT.	LG	PCT.	NJR	PCT.	GAS	PCT.
1											
2											
3	DEBT	$ 1,675.0	50.3%	$ 2,119.8	50.8%	$ 389.2	44.4%	$ 455.1	38.5%	$ 448.0	31.5%
4											
5	PREFERRED STOCK	0.0	0.0%	0.0	0.0%	0.5	0.1%	0.0	0.0%	0.6	0.0%
6											
7	COMMON EQUITY	1,652.0	49.7%	2,052.5	49.2%	486.5	55.5%	727.0	61.5%	973.1	68.4%
8											
9	TOTALS	$ 3,327.0	100%	$ 4,172.3	100%	$ 876.2	100%	$ 1,182.1	100%	$ 1,421.7	100%
10											
11											
12		NWN	PCT.	PNY	PCT.	SJI	PCT.	SWX	PCT.	WGL	PCT.
13											
14	DEBT	$ 512.0	44.9%	$ 794.3	47.2%	$ 332.8	39.2%	$ 1,185.5	51.0%	$ 603.7	38.5%
15											
16	PREFERRED STOCK	0.0	0.0%	0.0	0.0%	0.0	0.0%	100.0	4.3%	28.2	1.8%
17											
18	COMMON EQUITY	628.4	55.1%	887.2	52.8%	515.3	60.8%	1,037.8	44.7%	935.1	59.7%
19											
20	TOTALS	$ 1,140.4	100%	$ 1,681.5	100%	$ 848.1	100%	$ 2,323.3	100%	$1,567.0	100%
21											
22											

		NATURAL GAS LDC AVERAGE	PCT.	WATER & LDC AVERAGE	PCT.
23					
24					
25					
26	DEBT	$ 851.5	45.9%	$ 674.9	47.8%
27					
28	PREFERRED STOCK	12.9	0.7%	6.5	0.5%
29					
30	COMMON EQUITY	989.5	53.4%	730.4	51.7%
31					
32	TOTALS	$ 1,854.0	100%	$ 1,411.7	100%

REFERENCE:
MOST RECENT SEC 10-K FILINGS OR ANNUAL REPORTS

LITCHFIELD PARK SERVICE COMPANY

DOCKET NO. SW-01428A-09-0103 et al.



SURREBUTTAL TESTIMONY

OF

WILLIAM A. RIGSBY

ON BEHALF OF

THE

RESIDENTIAL UTILITY CONSUMER OFFICE

DECEMBER 18, 2009

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INTRODUCTION

Q. Please state your name, occupation, and business address.

A. My name is William A. Rigsby. I am a Public Utilities Analyst V employed by the Residential Utility Consumer Office ("RUCO") located at 1110 W. Washington, Suite 220, Phoenix, Arizona 85007.

Q. Please state the purpose of your surrebuttal testimony.

A. The purpose of my testimony is to respond to LPSCO's rebuttal testimony on RUCO's recommended rate of return on invested capital (which includes RUCO's recommended capital structure, cost of long-term debt and cost of common equity) for the Company's water and wastewater operations in Maricopa County, Arizona.

Q. Have you filed any prior testimony in this case on behalf of RUCO?

A. Yes, on November 4, 2009, I filed direct testimony with the Arizona Corporation Commission ("ACC" or "Commission") on RUCO's adjustment which removes $36,500 for design work associated the expansion of the Palm Valley Water Reclamation Facility ("PVWRF"). I also filed, under separate cover, direct testimony the cost of capital issues associated with this case.

...

Q. How is your surrebuttal testimony on cost of capital organized?

A. My surrebuttal testimony contains four parts: the introduction that I have just presented; a summary of LPSCO's rebuttal testimony; a section on the PVWRF adjustment, and a section on the cost of capital.

SUMMARY OF LPSCO's REBUTTAL TESTIMONY

Q. Have you reviewed LPSCO's rebuttal testimony?

A. Yes. I have reviewed the rebuttal testimony of Company witnesses Gregory S. Sorensen and Thomas J. Bourassa, filed on December 2, 2009, which addresses both the PVWRF adjustment that I testified on, and the cost of capital issues in this case.

Q. Please summarize the Company's rebuttal testimony.

A. In his rebuttal testimony, Mr. Sorensen takes issue with RUCO's adjustment which removes $36,500 for design costs associated the expansion of the PVWRF from 4.1 mgd to 8.2 mgd. Mr. Bourassa argues that my cost of equity figure should not be adopted by the Commission. Mr. Bourassa is critical of both the discounted cash flow ("DCF") and CAPM analyses that I conducted in order to arrive at my recommended cost of common equity for LPSCO in this case. Mr. Bourassa takes issue with the growth estimate of my DCF model, my reliance on geometric means, and various inputs that I used in my CAPM model. He also takes issue with my recommended hypothetical capital structure.

PVWRF ADJUSTMENT

Q. Have you reviewed the Company's rebuttal testimony regarding RUCO's $36,500 adjustment which removes design costs associated with the expansion of the PVWRF from 4.1 mgd to 8.2 mgd?

A. Yes. I have reviewed the rebuttal testimony of Company witness Greg Sorensen on this issue. Mr. Sorensen states that the amount in question was for a "preliminary, high level analysis of costs of plant expansion from 4.1 mgd to 8.2 mgd."

Q. Has RUCO made any changes to its recommended adjustment based on the testimony offered by Mr. Sorensen?

A. No. RUCO still believes that its adjustment is appropriate. As I stated in my direct testimony, the $36,500 amount in question is clearly not benefitting current ratepayers and therefore should no be included in rates.

Q. Has RUCO discovered any other additional sums spent on expansion of the plant from 4.1 mgd to 8.2 mgd that should also be disallowed?

A. The Company has not responded to RUCO's request for cost data associated with any expansion of LPSCO plant. However, there does appear to have been some expansions as Mr. McBride indicates he participated in a 1.0. mgd plant expansion of PVWRF. Moreover, in Staff's Compliance Report dated March 21, 2008, filed in docket No. SW-

01428A-09-0444. Staff also indicates the PVWRF being under construction to increase the plant capacity by 1.0 mgd. RUCO reserves the right to supplement its testimony upon receipt of cost data from the Company or other resources.

COST OF CAPITAL

Q. Have you reviewed the rebuttal testimony of Company witness Thomas J. Bourassa?

A. Yes. I have reviewed Mr. Bourassa's rebuttal testimony on the cost of capital issues in this case. The remainder of my testimony will provide a comparison of the cost of capital positions of the various parties in the case and address the arguments raised by Mr. Bourassa.

Capital Structure

Q. Have you made any changes to your recommended capital structure?

A. No. For the reasons explained in my direct testimony, I am still recommending that the Commission adopt my recommended capital structure for LPSCO.

Q. Please compare the capital structure recommendations of LPSCO, ACC Staff and RUCO.

A. The parties to the case are substantially in agreement on their recommended capital structures for LPSCO. A comparison of LPSCO, ACC Staff and RUCO's recommendations are as follows:

	LPSCO	ACC Staff	RUCO
Long-Term Debt	17.86%	17.20%	17.83%
Common Equity	82.14%	82.80%	82.17%

Cost of Debt

Q. Have you made any changes to your recommended hypothetical cost of of long-term debt?

A. No.

Q. Please compare the costs of long-term debt being recommended by LPSCO, ACC Staff and RUCO for LPSCO.

A. LPSCO ACC Staff and RUCO are recommending the following:

LPSCO	6.39%
ACC Staff	6.40%
RUCO	6.39%

Cost of Common Equity Capital

Q. Has RUCO revised its recommended cost of common equity?

A. Yes. I have revised my original cost of common equity estimate upward from 8.01 percent to 9.00 percent.

Q. Please explain why you have revised your original cost of common equity estimate from 8.01 percent to 9.00 percent?

A. My decision to revise my cost of common equity recommendation is based on recent information on the improving state of the economy, a rejuvenated stock market, and reports in the financial press which anticipate Federal Reserve actions to raise interest rates. Value Line analysts recently summed up the improving economic situation in its weekly Economic and Stock Market Commentary in its Selection & Opinion publication dated November 27, 2009:

> **The long recession has faded into history,** brought to an end in the third quarter when the nation's gross domestic product increased by a solid 3.5%. That notable rebound followed four straight quarters of contracting economic activity. The recession was the worst in decades. The third quarter's surge in activity, which was underpinned to some degree by federal programs to assist the troubled auto and housing industries, may not continue to the same degree in the current period. In fact, we expect GDP growth to ease to a level closer to 2.0%-2.5% during the fourth quarter. We think that the evolving expansion will then remain on a similarly subdued path for much of 2010. Thereafter, an increasing level of aggregate demand is likely to develop—with belated help from better employment and housing trends—and push the economy onto a materially faster track by 2011. The 3.0%, or better, pace of economic growth that we see evolving by that time is likely to then continue through the middle years of the coming decade.

Value Line's analysts had this to say about the current state of the stock market:

> Unlike the economy, which has proceeded on an irregular path during the formative stages of its comeback, the stock market, which lost more than half of its value from October, 2007 through March, 2009, has come roaring back. At press time, the Dow Jones Industrial Average was up about 60% from its bear market lows of this past March. However, it was still some 25% below the record highs set in late 2007. The market's revival, which began as the worst fears on the credit and business fronts didn't materialize, has been sustained with an assist from the Federal Reserve, the government's stimulus efforts, and the aforementioned revivals on the economic and profit fronts. Now, with valuations having become a little stretched following eight months of steady market increases, the bulls may have to deliver even more good news to keep the rally going.

In regard to possible Federal Reserve action on interest rates, Wall Street Journal correspondent Jon Hilsenrath recently reported[1] that "Federal Reserve officials are thinking mostly these days about how to unwind the unprecedented stimulus they've pumped into the economy" and that eventually will mean raising interest rates. Mr. Hilsenrath quoted former Fed governor Frederic Mishkin, a former Fed governor who advocated moving rates down swiftly leading up to crises and who says they might someday need to move up swiftly too, as saying "If you move in a very gradual fashion back up when you need to, you'll get behind the curve in terms of tightening fast enough."

[1] Hilsenrath, Jon, "WSJ Fed's Path to Higher Interest Rates Begins to Take Shape" The Wall Street Journal, November 2, 2009

Q. Has the Company revised its recommended cost of common equity?

A. Yes. Mr. Bourassa has revised his original cost of common equity estimate from 12.50 percent to 12.00 percent.

Q. What costs of equity capital are the parties to the case presently recommending?

A. The costs of common equity presently being recommended by LPSCO, ACC Staff and RUCO are as follows:

LPSCO	12.00%
ACC Staff	9.20%
RUCO	9.00%

As can be seen above, the revised Company-proposed cost of common equity is 300 basis points higher than my revised recommended cost of equity of 9.00 percent and 280 basis points higher than ACC Staff's recommended cost of common equity of 9.20 percent.

Q. What are the weighted average costs of capital ("WACC") presently being recommended by the Company, ACC Staff and RUCO?

A. The WACC presently being recommended by the LPSCO, ACC Staff and RUCO are as follows:

LPSCO	11.00%
ACC Staff	8.70%
RUCO	8.54%

As can also be seen above, there is presently a 246 basis point difference between the Company-proposed 11.00 percent WACC and RUCO's recommended WACC of 8.54 percent. The difference between ACC Staff Witness Juan C. Manrique's recommended WACC and my recommendation is 16 basis points.

Q. Has there been any recent activity in regard to interest rates?

A. Yes. On November 4, 2009, the Federal Reserve decided not to increase or decrease the federal funds rate and kept it between zero and 0.25 percent. According to an article[2] that appeared in The Wall Street Journal on Thursday November 5, 2009, the Federal Reserve affirmed its plan to keep interest rates "exceptionally low" for a long time despite signs of economic recovery. But the Fed began to lay rhetorical groundwork for an eventual shift in its stance, suggesting that when the unemployment rate falls or if expectations of inflation turn up, it could change course. "Economic activity has continued to pick up," the Fed said in a statement following a two-day meeting. The article went on to state that, although consumer spending has improved and housing activity has increased,

[2] Hilsenrath, Jon, "Fed to Keep Rates Low Despite Pickup," The Wall Street Journal, November 5, 2009.

businesses were retrenching at a slower pace. The next meeting of the Federal Open Market Committee is scheduled for December 15, 2009.

Q. Do you still believe that your use of a sample of natural gas LDC's is appropriate despite Mr. Bourassa's arguments to the contrary?

A. Yes.

Q. Have other analysts used natural gas LDC's as proxies in water utility rate case proceedings before the ACC?

A. Yes, in the Arizona-American Water Company (Arizona-American) rate case that is now pending before the Commission, the cost of capital witness for Arizona-American also relied on a sample group of natural gas LDCs.

Q. Please explain why you believe it is appropriate to use a sample group of natural gas LDC's to estimate the cost of equity capital in a water utility rate case proceeding.

A. For the most part, natural gas LDC's have very similar operating characteristics with water companies such as LPSCO and are therefore a good proxy for water and wastewater utility cost of capital studies. Their inclusion also provides a larger sample to obtain an estimate from. In a prior Arizona-American Water Company ("Arizona-American") Sun City West Wastewater District Case, Arizona-American's cost of capital

consultant also used a sample of LDC's to arrive at her final cost of equity estimate. In fact, in its initial closing brief in that case, Arizona-American criticized RUCO for relying on its water utility sample DCF results, and for failing to give more weight to the results of RUCO's LDC sample results[3]. Arizona-American stated the following:

> "Mr. Rigsby's base calculation is also flawed. His DCF recommendation equally weighted his DCF evaluations for his water utility samples and his gas utility samples.[152] Unfortunately, his water utility sample only contained four companies.[153] Mr. Rigsby conceded that he "would like to see a broader sample.[154] However, he went ahead and weighted this sample equally with his gas utility sample, which contained 10 companies.[155]
>
> Mr. Rigsby should have excluded the results of his DCF analysis for water utilities. Four companies are just not enough, as he admits. Unusual events at just one company can unduly affect the entire sample, a risk that is smoothed when a larger sample is used. If we just exclude the DCF results for the water-utility sample, Mr. Rigsby's ROE estimate would increase significantly....."

Q. Do you believe that an upward adjustment is needed for your recommended cost of equity given your use of a sample group of LDC's that have a lower average beta than the one calculated for your sample group of water utilities?

A. No. Given the current state of the economy, in which utilities are being viewed by analysts as safe havens for investors, I believe that my recommended 9.00 percent cost of equity is actually generous.

[3] Initial Closing Brief of Arizona-American Water Company, Docket No. WS-01303A-06-0491

Q. Please explain why you believe that your recommended 9.00 percent cost of equity is actually generous.

A. It is no secret that since the current downturn in the economy has occurred there has been a "flight to quality" by investors who have pulled their funds out of the equity markets and have put them into U.S. Treasury instruments, which are yielding next to nothing, in order to avoid any further loss of capital. If investors are willing to accept lower yields on Treasury instruments that are ranging from 0.04 percent, on a 91-day T-bill, to 4.25 percent, on a long-term 30-year Treasury bond (Attachment A), then Mr. Bourassa's proposed 12.00 percent cost of equity figure is clearly excessive given that water utilities and natural gas LDC's are currently being viewed as safe investments.

Q. Can you back up your statement that water utilities and natural gas LDC's are being viewed as safe investments in the current economic environment?

A. Yes. In the most recent Value Line update on the water utility industry, dated October 23, 2009, Value Line analyst Andre J. Costanza had this to say:

> This industry is a good place for cautious investors looking to park themselves until a sustained market recovery is evident. Water utility stocks are historically more recession proof than the broader market, with their steady dividend growth reducing turbulence in share price and padding returns.

Q. What is Value Line's view on natural gas LDC's?

A. Value Line analyst Richard Gallagher had this to say in the September 11, natural gas utility update:

> Still, risk-averse investors may want to consider this group if the economic recovery stalls. Natural gas utilities tend to be a solid defensive play when the stock market is faltering.

Q. Are there other reasons you can cite as to why you think that a higher return is not needed to attract investors?

A. Yes. One has to take into consideration that the investment community at large is well aware of the fact that regulated utilities, such as LPSCO, are indeed different from non-regulated entities in terms of how they recover their costs. This information is taken into account when institutions and individual investors make their decisions on where to place their funds. The best example of this can be seen in an MSN Money/CNBC article[4] authored by Jon D. Markman, a weekly columnist for CNBC (Attachment B). In his article, Mr. Markman pitched his suggestions for investing in what some believe to be a coming global water shortage. In regard to domestic utilities, Markman had this to say:

> "Virtually all of the U.S. water utility stocks are regulated by states and counties, which makes them pretty dull. Governmental entities typically give utilities a monopoly in a geographic region, then set their profit margin a smidge above costs. Just about the only distinguishing factor among them are the growth rates of their regions and their ability to efficiently manage their underground pipe and pumping infrastructure."

[4] Markman, Jon D, "Invest in the Coming Global Water Shortage," MSN.com, January 12, 2005, http://moneycentral.msn.com/content/P102152.asp.

Q. Is Mr. Bourassa correct in his assertion that you did not use the appropriate inputs to calculate a market risk premium in your CAPM model?

A. No. Despite Mr. Bourassa's assertion, I have used an appropriate Treasury instrument to calculate the risk premium in my CAPM model. The risk premium that I have calculated has also been calculated in the same manner by both ACC Staff and other cost of capital witnesses whose cost of capital recommendations have been adopted by the Commission. Mr. Bourassa's assertion that I should not have used total returns in the market risk premium component of the CAPM is unfounded. While it is true that investors are typically attracted to utility stocks for their income needs, it is simply not rational to think that they would not expect some capital gains as well.

Q. Please address Mr. Bourassa's position that your method of averaging your DCF and CAPM estimates for both your water utility and LDC sample companies has produced a depressed cost of equity capital.

A. The mean averaging method that I have used to arrive at my final cost of equity estimate has been adopted by the Commission in a number of rate case proceedings. It is identical to the mean averaging method that has been used by ACC Staff to arrive at final cost of equity estimates. That said, my revised cost of equity of 9.00 percent falls within the high end of

the range of estimates that I derived from the results of my DCF and CAPM analyses.

Q. Please address Mr. Bourrassa's argument regarding your reliance on geometric means in your CAPM analyses.

A. As I stated in my direct testimony there is an on-going debate over which is the better average to rely on. However, it is important to recognize that the information on both means, published by Morningstar, is widely available to the investment community. For this reason alone I believe that the use of both means in a CAPM analysis is appropriate.

Q. Has the Commission authorized rates of return that were derived through the use of both arithmetic and geometric means in prior decisions?

A. Yes, a case that specifically comes to mind involved UNS Gas Inc., in which Decision No. 70011, dated November 27, 2007, stated the following:

> "We agree with the Staff and RUCO witnesses that it is appropriate to consider the geometric returns in calculating a comparable company CAPM because to do otherwise would fail to give recognition to the fact that many investors have access to such information for purposes of making investment decisions."

In the UNS Gas, Inc. case, the ACC Staff witness was Mr. David C. Parcell who, as I do, consistently relies on both arithmetic and geometric means in our CAPM analyses. Also, when he testified in the Arizona

Water case, Mr. Parcell, Staff's expert, acknowledged that he uses both geometric and arithmetic means in his testimony and did so in this case.[5] Mr. Parcell further testified that Value Line calculates both historic and prospective growth rates on a geometric or compound growth rate basis.[6] He further testified that because investors, the Securities & Exchange Commission and this Commission use arithmetic and geometric means, analysts developing cost of capital should too.[7]

Q. Please respond further to Mr. Bourassa's criticism of your reliance on geometric means in the CAPM model.

A. The best argument in favor of the geometric mean is that it provides a truer picture of the effects of compounding on the value of an investment when return variability exists. This is particularly relevant in the case of the return on the stock market, which has had its share of ups and downs over the 1926 to 2008 observation period used in my CAPM analysis.

Q. Can you provide an example to illustrate the differences between the two averages?

A. Yes. The following example may help. Suppose you invest $100 and realize a 20.0 percent return over the course of a year. So at the end of year 1, your original $100 investment is now worth $120. Now let's say

[5] T: 1345-46
[6] Id.
[7] Id.

that over the course of a second year you are not as fortunate and the value of your investment falls by 20.0 percent. As a result of this, the $120 value of your original $100 investment falls to $96. An arithmetic mean of the return on your investment over the two-year period is zero percent calculated as follows:

(year 1 return + year 2 return) ÷ number of periods =

(20.0% + -20.0%) ÷ 2 =

(0.0%) ÷ 2 = 0.0%

The arithmetic mean calculated above would lead you to believe that you didn't gain or lose anything over the two-year investment period and that your original $100 investment is still worth $100. But in reality, your original $100 investment is only worth $96. A geometric mean on the other hand calculates a compound return of negative 2.02 percent as follows:

$$(\text{year 2 value} \div \text{original value})^{1/\text{number of periods}} - 1 =$$

$$(\$96 \div \$100)^{1/2} - 1 =$$

$$(0.96)^{1/2} - 1 =$$

$$(0.9798) - 1 =$$

$$-0.0202 = -2.02\%$$

The geometric mean calculation illustrated above provides a truer picture of what happened to your original $100 over the two-year investment period.

As can be seen in the preceding example, in a situation where return variability exists, a geometric mean will always be lower than an arithmetic mean, which probably explains why utility consultants typically put up a strenuous argument against the use of a geometric mean.

Q. Can you cite any other evidence that supports your use of both a geometric and an arithmetic mean?

A. Yes. In the third edition of their book, Valuation: Measuring and Managing the Value of Companies, authors Tom Copeland, Tim Koller and Jack Murrin ("CKM") make the point that, while the arithmetic mean has been regarded as being more forward-looking in determining market risk premiums, a true market risk premium may lie somewhere between the arithmetic and geometric averages published in Morningstar's SBBI yearbook.

Q. Please explain.

A. In order to believe that the results produced by the arithmetic mean are appropriate, you have to believe that each return possibility included in the calculation is an independent draw. However, research conducted by CKM demonstrates that year-to-year returns are not independent and are

actually auto correlated (i.e. a relationship that exists between two or more returns, such that when one return changes, the other, or others, also change), meaning that the arithmetic mean has less credence. CKM also explains two other factors that would make the Morningstar arithmetic mean too high. The first factor deals with the holding period. The arithmetic mean depends on the length of the holding period and there is no "law" that says that holding periods of one year are the "correct" measure. When longer periods (e.g. 2 years, 3 years etc.) are observed, the arithmetic mean drops about 100 basis points. The second factor deals with a situation known as survivor bias. According to CKM, this is a well-documented problem with the Morningstar historical return series in that it only measures the returns of successful firms. That is, those firms that are listed on stock exchanges. The Morningstar historical return series does not measure the failures, of which there are many. Therefore, the return expectations in the future are likely to be lower than the Morningstar historical averages. After conducting their analysis, CKM conclude that 4.0 percent to 5.5 percent is a reasonable forward-looking market risk premium. Adding my 2.46 percent risk free yield on a 5-year Treasury instrument to these two estimates indicate a cost of equity of 6.46 percent to 7.96 percent which my recommended cost of equity of 9.00 percent falls above. Given the fact that utilities generally exhibit less risk than industrials, a return in the low end of this range could be considered reasonable.

Q. Can you name any other sources that support CKM's conclusion that 4.0 percent to 5.5 percent is a reasonable market risk premium on a forward-looking basis?

A. Yes. During the 39th annual Financial Forum of the Society of Utility and Regulatory Financial Analysts, which was held at Georgetown University in Washington D.C. on April 19 and 20, 2007, I had the opportunity to hear the views of Aswarth Damodaran, Ph. D. and Felicia C. Marston, Ph. D., professors of finance from New York University and the University of Virginia respectively, who have conducted empirical research on this subject. Dr. Damodaran and Dr. Marston supported CKM's 4.0 to 5.5 percent estimates during a panel discussion that provided both professors with the opportunity to explain their research on the equity risk premium and to answer questions from other financial analysts in attendance. Each of the panelists[8] stated that they believed that a reasonable market risk premium fell between 4.0 percent and 5.0 percent when asked to provide estimates based on their research.

[8] Other analysts taking part in the panel discussion included Stephen G. Hill, CRRA, Principal, Hill Associates and moderator Farris M. Maddox, Principal Financial Analyst, Virginia State Corporation Commission.

Q. How does the information you've provided above on equity risk premiums relate to the current market risk premium that Mr. Bourassa has calculated for his CAPM model?

A. If anything it illustrates that the 15.5 percent market risk premium that Mr. Bourassa calculated for his CAPM model is clearly out of line with recent empirical research and should be given no weight in this proceeding.

Q. Does your silence on any of the issues or positions addressed in the rebuttal testimony of the Mr. Bourassa or any of the Company's other witnesses constitute acceptance?

A. No, it does not.

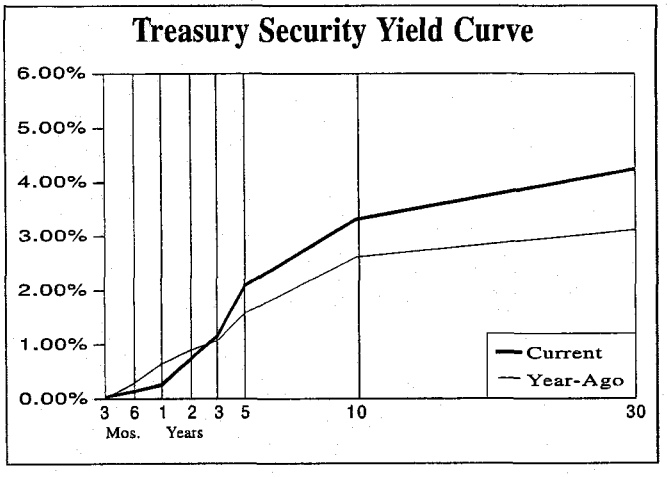
Q. Does this conclude your surrebuttal testimony on LPSCO?

A. Yes, it does.

ATTACHMENT A

Selected Yields

	Recent (12/02/09)	3 Months Ago (9/02/09)	Year Ago (12/03/08)
TAXABLE			
Market Rates			
Discount Rate	0.50	0.50	1.25
Federal Funds	0.00-0.25	0.00-0.25	1.00
Prime Rate	3.25	3.25	4.00
30-day CP (A1/P1)	0.13	0.23	1.50
3-month LIBOR	0.26	0.33	2.20
Bank CDs			
6-month	0.31	0.42	1.57
1-year	0.54	0.72	1.95
5-year	2.21	2.25	3.32
U.S. Treasury Securities			
3-month	0.04	0.13	0.01
6-month	0.14	0.21	0.28
1-year	0.26	0.38	0.64
5-year	2.09	2.27	1.58
10-year	3.31	3.31	2.62
10-year (inflation-protected)	1.10	1.74	2.91
30-year	4.25	4.12	3.12
30-year Zero	4.46	4.22	3.02
Mortgage-Backed Securities			
GNMA 6.5%	3.02	3.92	5.66
FHLMC 6.5% (Gold)	2.06	3.07	5.46
FNMA 6.5%	1.93	2.85	5.26
FNMA ARM	2.41	2.62	4.24
Corporate Bonds			
Financial (10-year) A	5.26	5.79	8.09
Industrial (25/30-year) A	5.58	5.43	6.70
Utility (25/30-year) A	5.58	5.45	6.83
Utility (25/30-year) Baa/BBB	6.25	6.14	7.58
Foreign Bonds (10-Year)			
Canada	3.26	3.33	3.16
Germany	3.16	3.23	3.04
Japan	1.26	1.32	1.39
United Kingdom	3.59	3.55	3.43
Preferred Stocks			
Utility A	5.68	6.37	6.75
Financial A	7.16	5.94	7.75
Financial Adjustable A	5.53	5.53	5.53



	Recent (12/02/09)	3 Months Ago (9/02/09)	Year Ago (12/03/08)
TAX-EXEMPT			
Bond Buyer Indexes			
20-Bond Index (GOs)	4.33	4.53	5.39
25-Bond Index (Revs)	5.03	5.99	6.06
General Obligation Bonds (GOs)			
1-year Aaa	0.34	0.40	1.05
1-year A	1.31	0.90	1.15
5-year Aaa	1.56	1.80	2.95
5-year A	2.77	2.24	3.05
10-year Aaa	3.11	2.93	4.09
10-year A	4.08	3.30	4.29
25/30-year Aaa	4.47	4.36	5.48
25/30-year A	5.46	4.82	5.88
Revenue Bonds (Revs) (25/30-Year)			
Education AA	4.76	5.30	6.05
Electric AA	4.64	5.40	6.10
Housing AA	5.70	5.55	6.25
Hospital AA	5.20	5.60	6.20
Toll Road Aaa	4.79	5.35	6.15

Federal Reserve Data

BANK RESERVES

(Two-Week Period; in Millions, Not Seasonally Adjusted)

	Recent Levels			Average Levels Over the Last...		
	11/18/09	11/4/09	Change	12 Wks.	26 Wks.	52 Wks.
Excess Reserves	1046181	1059258	-13077	926143	847097	792058
Borrowed Reserves	217690	248364	-30674	282156	354676	475956
Net Free/Borrowed Reserves	828491	810894	17597	643988	492421	316102

MONEY SUPPLY

(One-Week Period; in Billions, Seasonally Adjusted)

	Recent Levels			Growth Rates Over the Last...		
	11/16/09	11/9/09	Change	3 Mos.	6 Mos.	12 Mos.
M1 (Currency+demand deposits)	1691.3	1718.8	-27.5	8.7%	13.2%	11.7%
M2 (M1+savings+small time deposits)	8392.1	8389.4	2.7	3.6%	1.2%	5.4%

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ATTACHMENT B

Jon Markman

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Posted 1/12/2005

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Invest in the coming global water shortage

Fresh water's getting scarce, and it has no substitutes. For investors in companies that can supply our increasingly thirsty planet, that spells opportunity.

By Jon D. Markman

Ten years ago next Monday, a massive earthquake rolled under the Japanese city of Kobe at dawn, toppling 140,000 buildings, causing 300 major fires, killing more than 5,000 people and leaving 300,000 homeless.

To help cover the story for the L.A. Times, I left my wife to care for our 10-day-old daughter and 2-year-old son and flew into the city with a small team of Los Angeles-based trauma doctors and nurses. We found a surreal, smoking ruin of a city with roads twisted like coils of rope, high-rises tilted at Dr. Seuss angles and thousands of middle-class families jammed into dingy, ice-cold rooms in the few public buildings left standing.

Just as in the tsunami zone of South Asia this month, the immediate health danger, besides a possible outbreak of disease, was a lack of fresh water. More than 75% of the city's water supply was destroyed when underground pipes fractured. As much as they desired pallets of drugs, food, blankets and tents sent from throughout Japan and abroad, the Kobe survivors coveted -- and needed -- clean, bottled water for cooking, drinking and bathing.

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Both incidents are a stark reminder that water is our most precious resource. Because it is seemingly ubiquitous in the United States, it is taken for granted. Massive snowstorms in California this month have loaded up the snowpack that provides water there, and rains in the Southeast are filling reservoirs in that part of the country.

The rest of the world, however, is not so fortunate.

Not making any more water

There is no more fresh water on Earth today than there was a million years ago. Yet today, 6 billion people share it. Since 1950, the world population has doubled, but water use has tripled, notes John Dickerson, an analyst and fund manager based in San Diego. Unlike petroleum, he adds, no technological innovation can ever replace water.

China, which is undergoing a vast rural-to-urban population migration, is emblematic of the places where water has become scarce. It has about as much

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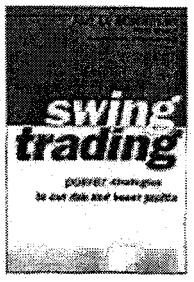

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water as Canada but 100 times more people. Per-capita water reserves are only about a fourth the global average, according to experts. Of its 669 cities, 440 regularly suffer moderate to critical water shortages.

Although not widely appreciated, water has been recognized by conservative investors as an investment opportunity -- and it has rewarded them. Over the past 10 years, the Media General water utilities index is up 133%, double the return of the **Dow Jones Utilities Index** ($UTIL). Over the past five years, water utilities are up 32% -- clobbering the flat returns of both the Dow Jones Utilities and the **Dow Industrials** ($INDU). One of water's key long-term value drivers as an investment, according to Dickerson: Demand is not affected by inflation, recession, interest rates or changing tastes.

Virtually all of the U.S. water utility stocks are regulated by states and counties, which makes them pretty dull. Governmental entities typically give utilities a monopoly in a geographic region, then set their profit margin a smidge above costs. Just about the only distinguishing factor among them are the growth rates of their regions and their ability to efficiently manage their underground pipe and pumping infrastructure. Among the best are **Aqua America** (WTR, news, msgs) of Philadelphia, **Southwest Water** (SWWC, news, msgs) of Los Angeles; **California Water Service Group** (CWT, news, msgs), based in San Jose, Calif.; and **American States Water** (AWR, news, msgs) of San Dimas, Calif.

In a moment, I'll offer a couple of potentially more impactful ways to invest in water, but first let's look a little more broadly at world demand.

Aquifers in India are being sucked dry

The tsunami has focused attention on water demand in South Asia -- and it's a good thing, as it was already reaching critical status in rural areas. Several decades ago, farmers in the Indian state of Gujarat used oxen to haul water in buckets from a few feet below the surface. Now they pump it from 1,000 feet below the surface. That may sound good, but they have been drawing water from the earth to feed a mushrooming population at such a terrific rate that ancient aquifers have been sucked dry -- turning once-fertile fields slowly into sand.

According to New Scientist magazine, farmers using crude oilfield technology in India have drilled 21 million "tube wells" into the strata beneath the fields, and every year millions more wells throughout the region -- all the way to Vietnam -- are being dug to service water-needy crops like rice and sugar cane. The magazine quoted research from the annual Stockholm Water Symposium that the pumps that transformed Indian farming are drawing 200 cubic kilometers of water to the surface each year, while only a fraction is replaced by monsoon

rains. At this rate, the research suggested, groundwater supplies in some areas will be exhausted in five to 10 years, and millions of Indians will see their farmland turned to desert.

In China, the magazine reported, 30 cubic kilometers more water is being pumped to the surface each year than is replaced by rain -- one of the reasons that the country has become dependent on grain imports from the West. This is not just an issue for agriculture. Earlier this year, the Indian state of Kerala ordered the **PepsiCo** (PEP, news, msgs) and **Coca-Cola** (KO, news, msgs) bottling plants closed due to water shortages, costing the companies millions of dollars.

In this country, shareholder activists already are lobbying companies to share water-dependency concerns worldwide with their stakeholders in their financial statements.

Water, water everywhere, but . . .

The central problem is that less than 2% of the world's ample store of water is fresh. And that amount is bombarded by industrial pollution, disease and cyclical shifts in rain patterns. Its increasing scarcity has impelled private companies and countries to attempt to lock up rights to key sources. In an article last month, the Christian Science Monitor suggested that the next decade may see a cartel of water-exporting countries rivaling the Organization of Petroleum Exporting Countries for dominance in the world economy.

"Water is blue gold; it's terribly precious," Maude Barlow, chair of the Council of Canadians, told the Monitor. "Not too far in the future, we're going to see a move to surround and commodify the world's fresh water. Just as they've divvied up the world's oil, in the coming century, there's going to be a grab."

Besides the domestic water utilities listed above -- and similarly plodding foreign utilities such as **United Utilities** (UU, news, msgs) of the United Kingdom, which sports a 6.9% dividend yield, and **Suez** (SZE, news, msgs) of France -- investors interested in the sector can consider a number of variant plays. None are extremely exciting, but my guess is that, over the next few years, some more interesting purification technologies will emerge, along with, perhaps, a vibrant attempt at worldwide industry consolidation.

One current idea is Tennessee-based copper pipe and valve maker **Mueller Industries** (MLI, news, msgs), a $1 billion business with a trailing price/earnings multiple of 15 that is still not expensive despite a 47% run-up in the past year. Its leading outside investor is **Berkshire Hathaway** (BRK.A, news, msgs), the

investment vehicle of legendary investor Warren Buffett.

Another is flow-control products maker **Watts Water Technologies** (WTS, news, msgs), which is a little richer at a $975 million market cap and a trailing P/E multiple of 19, but is still owned by several leading value managers, including Mario Gabelli.

And possibly the most interesting is **Consolidated Water** (CWCO, news, msgs), a $160 million company based in the Cayman Islands that specializes in developing and operating ocean-water desalinization plants and water-distribution systems in areas where natural supplies of drinking water are scarce, such as the Caribbean and South America. It currently supplies water to Belize, Barbados, the British Virgin Islands and the Bahamas, and it has expansion plans. It is the most expensive, but it may also have the greatest growth prospects. Of all of these, it is up the most over the past five years, a relatively steady 355%.

Of course, there is one other benefit to water investing: When these companies say they're going to do a dilutive deal, it's not something to worry about.

Fine Print

Dickerson runs a hedge fund in San Diego strictly focused on water investing, the Summit Water Equity Fund. . . To learn more about Southwest Water, click here. . . . To learn more about California Water Service Group, which runs systems in New Mexico, Hawaii and Washington State, as well as California, click here. . . . To learn more about American States Water, click here. . . To learn more about Mueller, click here, and, for Consolidated Water, click here. . . . Seems like talk is cheap. Since mid-December, the value of the company radio personality Howard Stern is leaving, **Viacom** (VIA.B, news, msgs), has risen 9% while the value of the company he's headed to, **Sirius Satellite Radio** (SIRI, news, msgs), is down 13.5%. . . . For background on the Kobe earthquake, approaching its 10th anniversary, click here and here.

Jon D. Markman is publisher of StockTactics Advisor, an independent weekly investment newsletter, as well as senior strategist and portfolio manager at Pinnacle Investment Advisors. While he cannot provide personalized investment advice or recommendations, he welcomes column critiques and comments at jon.markman@gmail.com; put COMMENT in the subject line. At the time of publication he held positions in the following stocks mentioned in this column: Coca-Cola.

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10

Estimating the Cost of Capital

To value a company using enterprise DCF, we discount free cash flow by the weighted average cost of capital (WACC). The weighted average cost of capital represents the opportunity cost that investors face for investing their funds in one particular business instead of others with similar risk.

The most important principle underlying successful implementation of the cost of capital is consistency between the components of WACC and free cash flow. Since free cash flow is the cash flow available to all financial investors (debt, equity, and hybrid securities), the company's WACC must include the required return for each investor. In addition, the duration and risk of the financial securities used to estimate the WACC must match that of the free cash flow being discounted. To assure consistency, the cost of capital must meet several criteria:

- It must include the opportunity costs from *all* sources of capital—debt, equity, and so on—since free cash flow is available to all investors, who expect compensation for the risks they take.
- It must weight each security's required return by its target market-based weight, not by its historical book value.
- It must be computed after corporate taxes (since free cash flow is calculated in after-tax terms). Any financing-related tax shields not included in free cash flow must be incorporated into the cost of capital or valued separately (as done in the adjusted present value).
- It must be denominated in the same currency as free cash flow.
- It must be denominated in nominal terms when cash flows are stated in nominal terms.

For most companies, discounting free cash flow at the WACC is a simple, accurate, and robust method of corporate valuation. If, however, the

since no single model for estimating the market risk premium has gained universal acceptance, we present the results of various models.

Methods to estimate the market risk premium fall in three general categories:

1. Estimating the future risk premium by measuring and extrapolating historical excess returns.
2. Using regression analysis to link current market variables, such as the aggregate dividend-to-price ratio, to project the expected market risk premium.
3. Using DCF valuation, along with estimates of return on investment and growth, to reverse engineer the market's cost of capital.

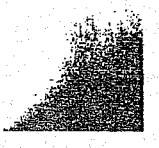
None of today's models precisely estimate the market risk premium. Still, based on evidence from each of these models, we believe the market risk premium as of year-end 2003 was just under 5 percent.

Historical market risk premium Investors, being risk-averse, demand a premium for holding stocks rather than bonds. If the level of risk aversion hasn't changed over the last 75 years, then historical excess returns are a reasonable proxy for future premiums (assuming measurement issues, such as survivorship bias, aren't overly problematic). To best measure the risk premium using historical data, follow these guidelines:

- Calculate the premium relative to long-term government bonds.
- Use the longest period possible.
- Use an arithmetic average of longer-dated intervals (such as five years).
- Adjust the result for econometric issues, such as survivorship bias.

Use long-term government bonds When calculating the market risk premium, compare historical market returns with the return on 10-year government bonds. As discussed in the previous section, long-term government bonds better match the duration of a company's cash flows than do short-term bonds.

Use the longest period possible When using historical observations to predict future results, the issue is what length of history to examine. If the market risk premium is stable, a longer history will reduce estimation error. Alternatively, if the premium changes and estimation error is small, a shorter period is better. To determine the appropriate historical period, we consider any trends in the market risk premium compared with the noise associated with short-term estimates.



To test for the presence of a long-term trend, we regress the U.S. market risk premium versus time. Over the last 100 years, no statistically significant trend is observable.[7] Based on regression results, the average excess return has fallen by 3.3 basis points a year, but this result is well below its standard error (leading to a low *t*-statistic). In addition, premiums calculated over subperiods, even as long as 10 years, are extremely noisy. For instance, U.S. stocks outperformed bonds by 18 percent in the 1950s but offered no premium in the 1970s. Given the lack of any discernible trend and the significant volatility of shorter periods, you should use the longest time series possible.

Use arithmetic average of longer-dated intervals When reporting market risk premiums, most data providers report an annual number, such as 6.2 percent per year. But how do they convert a century of data into an annual number? And is an annualized number even important?

Annual returns can be calculated using either an arithmetic average or a geometric average. An arithmetic (simple) average sums each year's observed premium and divides by the number of observations:

$$\text{Arithmetic Average} = \frac{1}{T}\sum_{t=1}^{T}\frac{1+R_m(t)}{1+r_f(t)} - 1$$

A geometric average compounds each year's excess return and takes the root of the resulting product:

$$\text{Geometric Average} = \left(\prod_{t=1}^{T}\frac{1+R_m(t)}{1+r_f(t)}\right)^{1/T} - 1$$

The choice of averaging methodology will affect the results. For instance, between 1903 and 2002, U.S. stocks outperformed long-term government bonds by 6.2 percent per year when averaged arithmetically. Using a geometric average, the number drops to 4.4 percent. This difference is not random; arithmetic averages always exceed geometric averages when returns are volatile.

So which averaging method on historical data best estimates the *expected* future rate of return? To estimate the mean (expectation) for any random variable, well-accepted statistical principles dictate that the arithmetic average is the best unbiased estimator. Therefore, to determine a security's

[7] Some authors, such as Lewellen, argue that the market risk premium does change over time—and can be measured using financial ratios, such as the dividend yield. We address these models separately. J. Lewellen, "Predicting Returns with Financial Ratios," *Journal of Financial Economics*, 74(2) (2004): 209–235.

expected return for one period, the best unbiased predictor is the arithmetic average of many one-period returns. A one-period risk premium, however, can't value a company with many years of cash flow. Instead, long-dated cash flows must be discounted using a compounded rate of return. But when compounded, the arithmetic average will be *biased* upward (too high).

This bias is caused by estimation error and autocorrelation in returns. Let's examine the effect of estimation error first. To estimate the mean of a distribution, statistical theory instructs you to average the observations. In a finite sample, the sample average (R_A) will equal the true mean (μ) plus an error term (ε):

$$R_A = \mu + \varepsilon$$

Sometimes the error term is positive, so the sample average overestimates the true mean, and at other times, the error term is negative. But the average error term equals 0, so the sample average is an unbiased estimator of the true mean.

To value a cash flow *beyond* one period, we must determine the discount factor by raising R_A to a given power. For instance, to estimate a two-period discount rate, we calculate R_A squared. Squaring R_A leads to the following equation:

$$R_A = (\mu + \varepsilon)^2 = \mu^2 + \varepsilon^2 + 2\mu\varepsilon$$

Since the true mean, μ, is a constant and the expectation of ε is 0, the expectation of $2\mu\varepsilon$ equals 0. The expectation of ε^2, however, is not 0, but a positive number (the square of any nonzero number is greater than zero). Therefore, $R_A{}^2$ will be greater than μ^2 (the true mean squared), and a compounded sample average will be too high.

The compounded arithmetic average will also be biased upward when returns are negatively autocorrelated (meaning low returns follow high returns and high returns follow low returns). Although there is disagreement in the academic community, the general consensus is that the aggregate stock market exhibits negative autocorrelation.[8] In this case, the arithmetic mean is biased upward.

[8] Empirical evidence presented by James Poterba, Lawrence Summers, and others indicates that a significant long-term negative autocorrelation exists in stock returns. See J. Poterba and L. Summers, "Mean Reversion in Stock Prices," *Journal of Financial Economics* (October 1988): 27–60. However, subsequent studies by Matthew Richardson and others challenge the statistical significance of earlier studies. See M. Richardson, "Temporary Components of Stock Prices: A Skeptic's View," *Journal of Business and Economic Statistics*, 11 (1993): 199–207.

Exhibit 10.4 Expected Value When Returns Exhibit Negative Autocorrelation

Potential return	Unconditional probability
20%	50%
(10%)	50%

Scenario	Current value	Return in period one	Return in period two	Future value	Expected value when returns are independent		Expected value when returns are negatively autocorrelated	
1	100	1.2	1.2	144	25%	36.0	15%	21.6
2	100	1.2	0.9	108	25%	27.0	35%	37.8
3	100	0.9	1.2	108	25%	27.0	35%	37.8
4	100	0.9	0.9	81	25%	20.3	15%	12.2
					100%	110.3	100%	109.4

To better understand the effect of negative autocorrelation, consider a portfolio that can either grow by 20 percent or fall by 10 percent in a given period (see Exhibit 10.4). Since both returns are equally likely, the one period average return equals 5 percent. In addition, if returns are independently and identically distributed, after two periods there is:

1. A 25 percent probability that an initial investment of $100 will grow to $144
2. A 50 percent probability (two equally probable scenarios) that $100 will grow to $108
3. A 25 percent probability that $100 will shrink to $81

The expected value in two periods equals $110.3, the same as if $100 had grown consistently at the *arithmetic* average of 5 percent for two periods. But if the four scenarios are not equally likely, the expected value in two periods will not equal $110.3. For instance, if there is a 70 percent probability that low returns will be followed by high returns (or vice versa), the expected value in two periods is only $109.4. In this case, compounding the arithmetic mean will lead to an upward bias in expected return.

To correct for the bias caused by estimation error and negative autocorrelation in returns, we have two choices. First, we can calculate multiperiod holding returns directly from the data, rather than compound single-period averages. Using this method, a cash flow received in five years will be discounted by the average five-year market risk premium, not by the annual

Exhibit 10.5 Cumulative Returns for Various Intervals, 1903–2002

Percent

		Cumulative returns			Annualized returns	
Arithmetic mean of:	Number of observations	U.S. stocks	U.S. government bonds	U.S. excess return	U.S. excess returns	Blume estimator
1-year holding periods	100	11.3	5.3	6.2	6.2	6.2
2-year holding periods	50	24.1	10.9	12.6	6.1	6.1
4-year holding periods	25	49.9	23.1	23.0	5.5	6.0
5-year holding periods	20	68.2	29.5	32.3	5.8	5.9
10-year holding periods	10	165.6	72.1	70.1	5.5	5.6

Source: Ibbotson Associates; McKinsey analysis

market risk premium compounded five times.[9] In Exhibit 10.5, we present arithmetic averages for holding periods of 1, 2, 4, 5, and 10 years. To avoid placing too little weight on either early or recent observations, we use nonoverlapping returns. The downside of this method is that 5- and 10-year holding periods have very few observations. As shown in the exhibit, the annualized excess return trends downward from 6.2 percent to 5.5 percent as the length of the holding period increases.

Alternatively, researchers have used simulation to show that an estimator proposed by Marshall Blume best adjusts for problems caused by estimation error and autocorrelation of returns:[10]

$$R = \frac{T-N}{T-1} R_A + \frac{N-1}{T-1} R_G$$

where T = Number of historical observations
N = Forecast period
R_A = Arithmetic average
R_G = Geometric average

In the last column of Exhibit 10.5, we report Blume's estimate for the market risk premium. Blume's method generates the same downward-trending estimate of the market risk premium (albeit more smoothly than the raw holding period averages). Based on both estimation techniques, it appears 5.5 percent is a reasonable approximation for *historical* excess returns.

[9] Jay Ritter writes, "There is no theoretical reason why one year is the appropriate holding period. People are used to thinking of interest rates as a rate per year, so reporting annualized numbers makes it easy for people to focus on the numbers. But I can think of no reason other than convenience for the use of annual returns." J. Ritter, "The Biggest Mistakes We Teach," *Journal of Financial Research*, 25 (2002): 159–168.

[10] D. C. Indro and W. Y. Lee, "Biases in Arithmetic and Geometric Averages Premia," *Financial Management*, 26(4) (Winter 1997); M. E. Blume, "Unbiased Estimators of Long Run Expected Rates of Return," *Journal of the American Statistical Association*, 69(347) (September 1974).

Survivorship bias Other statistical difficulties exist with historical risk premiums. According to one argument,[11] even properly measured historical premiums can't predict future returns, because the observable sample will include only countries with strong historical returns. Statisticians refer to this phenomenon as survivorship bias. The U.S. market outperformed all others during the twentieth century, averaging 4.3 percent in real terms (deflating by the wholesale price index) versus a median of 0.8 percent for other countries.[12] A concurring study[13] notes that the −100 percent returns from China, Russia, and Poland are too often ignored in discussions of stock market performance.

Since it is unlikely that the U.S. stock market will replicate its performance over the next century, we adjust downward the historical arithmetic average market risk premium. Using data from Philippe Jorion and William Goetzmann, we find that between 1926 and 1996, the U.S. arithmetic annual return exceeded the median return on a set of 11 countries with continuous histories dating to the 1920s by 1.9 percent in real terms, or 1.4 percent in nominal terms. If we subtract a 1 percent to 2 percent survivorship bias from the long-term arithmetic average of 5.5 percent, the difference implies the future range of the U.S. market risk premium should be 3.5 to 4.5 percent.

Market risk premium regressions Although we find no long-term trend in the historical risk premium, many argue that the market risk premium is predictable using observable variables, such as the aggregate dividend-to-price ratio, the aggregate book-to-market ratio, or the aggregate ratio of earnings to price.

The use of current financial ratios to estimate the expected return on stocks is well documented and dates back to Charles Dow in the 1920s. The concept has been tested by many authors.[14] To predict the market risk premium using financial ratios, excess market returns are regressed against a financial ratio, such as the market's aggregate dividend-to-price ratio:

$$R_m - r_f = \alpha + \beta \ ln\left(\frac{\text{Dividend}}{\text{Price}}\right) + \varepsilon$$

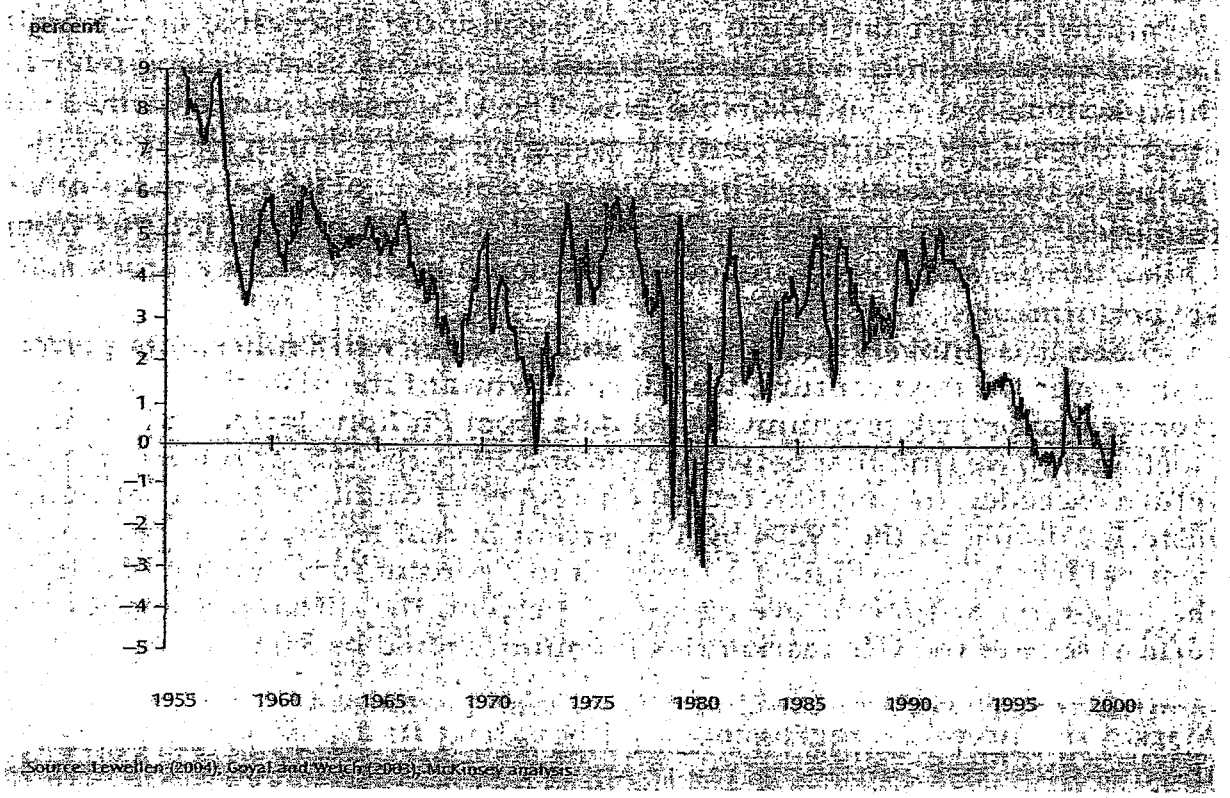
[11] S. Brown, W. Goetzmann, and S. Ross, "Survivorship Bias," *Journal of Finance* (July 1995): 853–873.

[12] P. Jorion and W. Goetzmann, "Global Stock Markets in the Twentieth Century," *Journal of Finance*, 54(3) (June 1999): 953–974.

[13] Elroy Dimson, Paul Marsh, and Michael Staunton, *Triumph of the Optimists* (Princeton: Princeton University Press, 2002).

[14] E. Fama and K. French, "Dividend Yields and Expected Stock Returns," *Journal of Financial Economics*, 22(1) (1988): 3–25; R. F. Stambaugh, "Predictive Regressions," *Journal of Financial Economics*, 54(3) (1999): 375–421; and J. Lewellen, "Predicting Returns with Financial Ratios," *Journal of Financial Economics*, 74(2) (2004): 209–235.

Exhibit 10.6 Expected Market Risk Premium Based on Dividend Yield



Source: Lewellen (2004); Goyal and Welch (2003); McKinsey analysis

Using advanced regression techniques unavailable to earlier authors, Jonathan Lewellen found that dividend yields *do* predict future market returns. But as shown in Exhibit 10.6, the model has a major drawback: the risk premium prediction can be negative (as it was in the late 1990s). Other authors question the explanatory power of financial ratios, arguing that a financial analyst relying solely on data available at the time would have done better using unconditional historical averages (as we did in the last section) in place of more sophisticated regression techniques.[15]

Forward-looking models A stock's price equals the present value of its dividends. Assuming dividends are expected to grow at a constant rate, we can rearrange the growing perpetuity to solve for the market's expected return:

$$P = \frac{\text{DIV}}{k_e - g} \quad \text{converts to} \quad k_e = \frac{\text{DIV}}{P} + g$$

In the previous section, we reviewed regression models that compare market returns (k_e) to the dividend-price ratio (DIV/P). Using a simple re-

[15] A. Goyal and I. Welch, "Predicting the Equity Premium with Dividend Ratios," *Management Science*, 4, 9(5) (2003): 639–654.

gression, however, ignores valuable information and oversimplifies a few market realities. First, the dividend-price yield itself depends on the expected growth in dividends (g), which simple regressions ignore (the regression's intercept is determined by the data). Second, dividends are only one form of corporate payout. Companies can use free cash flow to repurchase shares or hold excess cash for significant periods of time; consider Microsoft, which accumulated more than $50 billion in liquid securities before paying its first dividend.

Using the principles of discounted cash flow, along with estimates of growth, various authors have attempted to reverse engineer the market risk premium. Two studies used analyst forecasts to estimate growth,[16] but many argue that analyst forecasts focus on the short term and are severely upward biased. Fama and French use long-term dividend growth rates as a proxy for future growth, but they focus on dividend yields, not on available cash flow.[17] Alternatively, our own research has focused on *all* cash flow available to equity holders, as measured by a modified version of the key value driver formula (detailed in Chapter 3):[18]

$$k_e = \frac{\text{Earnings}\left(1-\frac{g}{\text{ROE}}\right)}{P} + g \text{ such that } \text{CF}_e = \text{Earnings}\left(1-\frac{g}{\text{ROE}}\right)$$

Based on this formula, we used the long-run return on equity (13 percent) and the long-run growth in real GDP (3.5 percent) to convert a given year's S&P 500 median earnings-to-price ratio into the cost of equity.[19]

Exhibit 10.7 on page 306 plots the nominal and real expected market returns between 1962 and 2002. The results are striking. After stripping out inflation, the expected market return (*not* excess return) is remarkably constant, averaging 7.0 percent. For the United Kingdom, the real market return is slightly more volatile, averaging 6.0 percent. Based on these results, we estimate the current market risk premium by subtracting the current real long-term risk-free rate from the real equity return of 7.0 percent (for U.S. markets). At year-end 2003, the yield on a U.S. Treasury inflation-protected security (TIPS) equaled 2.1 percent. Subtracting 2.1

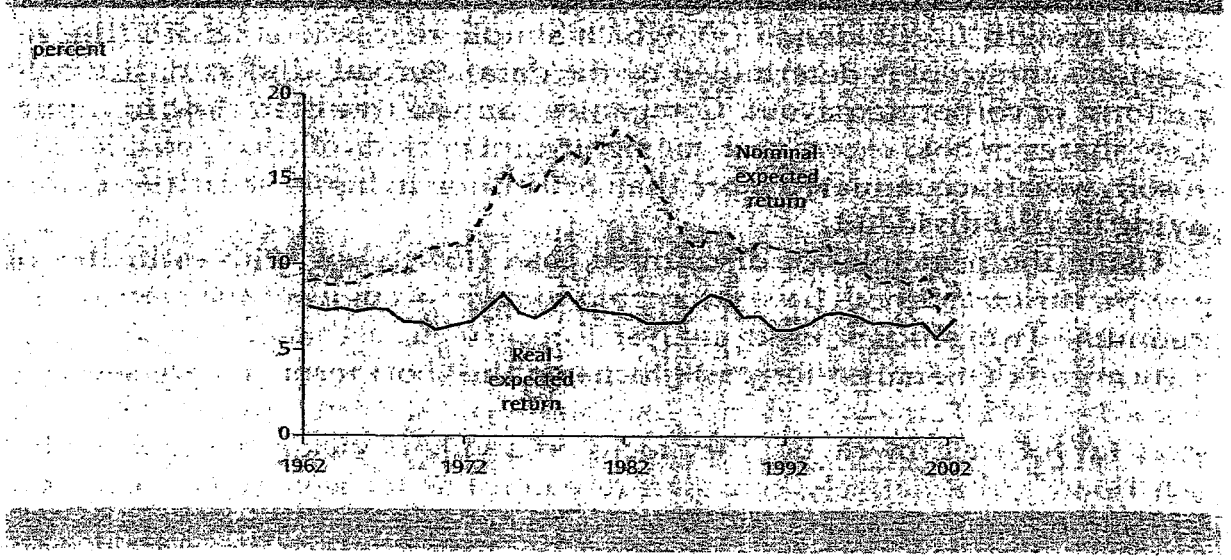
[16] J. Claus and J. Thomas, "Equity Premia as Low as Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic and International Stocks," *Journal of Finance*, 56(5) (October 2001): 1629–1666; and W. R. Gebhardt, C. M. C. Lee, and B. Swaminathan, "Toward an Implied Cost of Capital," *Journal of Accounting Research*, 39(1) (2001): 135–176.

[17] Eugene F. Fama and Kenneth R. French, "The Equity Premium," Center for Research in Security Prices Working Paper No. 522 (April 2001).

[18] Marc H. Goedhart, Timothy M. Koller, and Zane D. Williams, "The Real Cost of Equity," *McKinsey on Finance* (Autumn 2002): 11–15.

[19] Using a two-stage model (i.e., short-term ROE and growth rate projections, followed by long-term estimates) did not change the results in a meaningful way.

Exhibit 10.7 Real and Nominal Expected Market Return



percent from 7.0 percent gives an estimate of the risk premium at just under 5 percent.

Although many in the finance profession disagree about how to measure the market risk premium, we believe 4.5 to 5.5 percent is an appropriate range. Historical estimates found in most textbooks (and locked in the mind of many), which often report numbers near 8 percent, are too high for valuation purposes because they compare the market risk premium versus short-term bonds, use only 75 years of data, and are biased by the historical strength of the U.S. market.

Estimating beta According to the CAPM, a stock's expected return is driven by beta, which measures how much the stock and market move together. Since beta cannot be observed directly, we must *estimate* its value. To do this, we first measure a raw beta using regression and then improve the estimate by using industry comparables and smoothing techniques. The most common regression used to estimate a company's raw beta is the market model:

$$R_i = \alpha + \beta R_m + \varepsilon$$

In the market model, the stock's return (not price) is regressed against the market's return.

In Exhibit 10.8, we plot 60 months of Home Depot stock returns versus S&P 500 returns between 1999 and 2003. The solid line represents the "best