U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION IX

San Francisco, California

Environmental Assessment
Salt River Project Agricultural Improvement and Power District (SRP)
Kyrene Expansion Project
Tempe, Arizona

January 2001

ENVIRONMENTAL ASSESSMENT
SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT (SRP)
KYRENE EXPANSION PROJECT
TEMPE, ARIZONA

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region IX
San Francisco, California
and
SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT (SRP)
Tempe, Arizona

Prepared by

ENSR
Fort Collins, Colorado

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1.0 INTRODUCTION

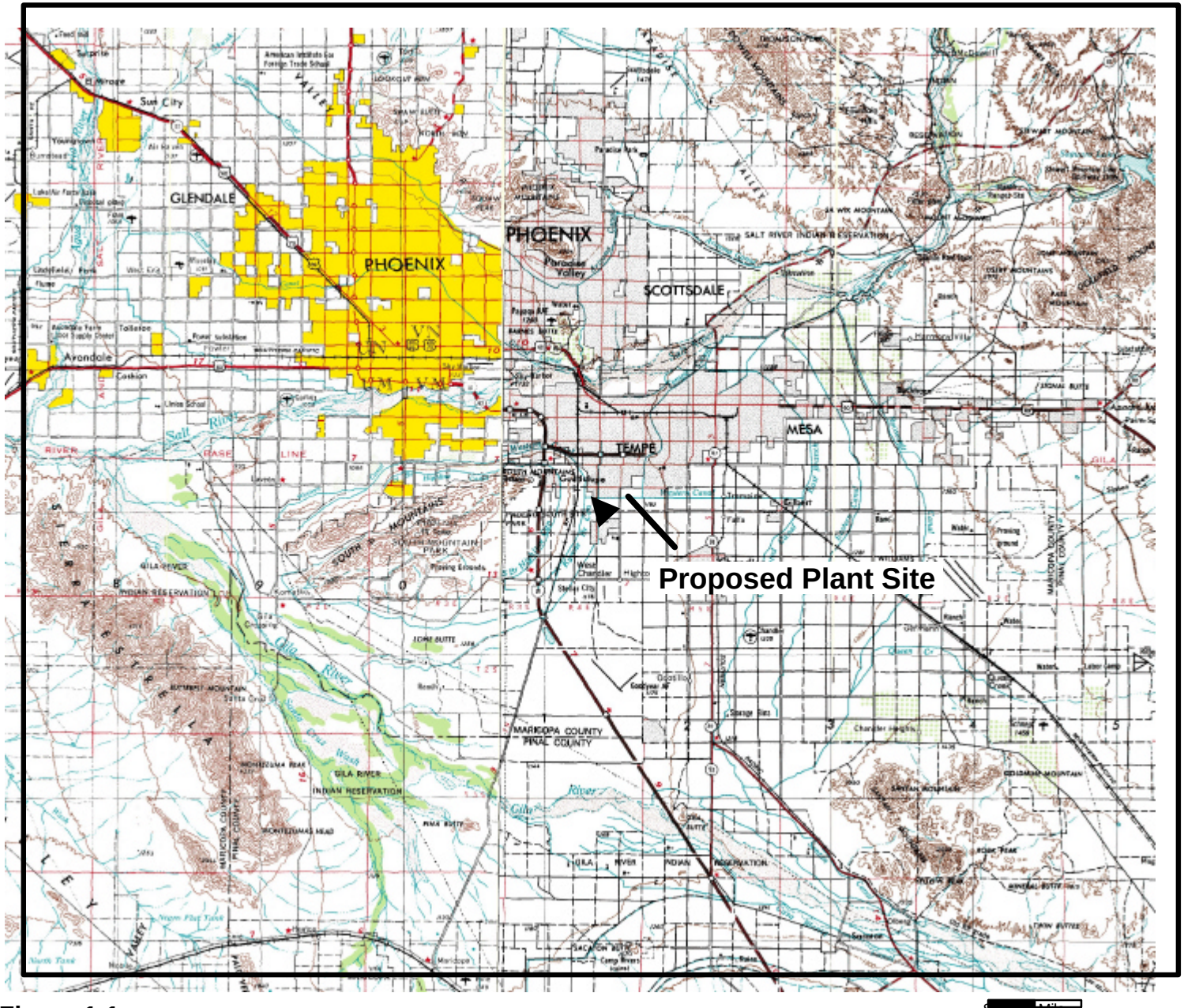
Salt River Project Agricultural Improvement and Power District (SRP) was established in 1903 as the nation's first multipurpose reclamation project authorized under the National Reclamation Act. Currently, SRP is the nation's third largest public power utility and one of Arizona's largest water suppliers. SRP provides electric power to over 727,000 customers (residential, commercial, industrial, mining, etc.) throughout a 2,900 square-mile service territory. The service territory extends through parts of Maricopa, Gila, and Pinal counties in Arizona. SRP also operates a system of dams and canals that deliver water to the metropolitan Phoenix area.

SRP is proposing to construct, own, and operate the Kyrene Expansion Project (KEP), which would expand the energy-producing capacity of its existing Kyrene Generating Station in Tempe, Arizona. The proposed facility would consist of one natural gas-fired combined cycle system (stationary combustion turbine, stationary steam turbine, and heat recovery steam generator [HRSG]); one diesel-fired emergency fire water pump; one mechanical draft cooling tower; and associated water supply, water discharge, and natural gas pipelines. The proposed plant expansion facilities would produce 250 megawatts (MW) of electricity. The existing Kyrene Generating Station operations would be scaled back once the KEP was operational. The proposed expansion would be located entirely within the 160-acre parcel that includes the existing Kyrene Generating Station and other facilities owned by SRP. The proposed site is a previously disturbed industrial area in Tempe (Figure 1-1).

SRP is in the process of applying for a National Pollutant Discharge Elimination System (NPDES) permit from the U.S. Environmental Protection Agency (USEPA). The permit would allow the discharge of cooling tower blowdown and various low volume discharges back to the Salt River and/or Gila Drain, and the management and discharges of site storm water runoff. The USEPA has determined that the proposed facility would be a "New Source" as defined under the Clean Water Act. Section 511 of the Clean Water Act states that the provisions of the National Environmental Policy Act (NEPA) apply to the issuance of New Source NPDES permits.

Under NEPA regulations found at 40 Code of Federal Regulations (CFR) Sections 6.600 through 6.607, the USEPA must evaluate the potential direct, indirect, and cumulative environmental impacts that would be associated with the construction and operation of the proposed facility. This Environmental Assessment (EA) has been prepared to determine whether or not significant impacts are anticipated from the Proposed Action and to identify alternatives that may avoid or mitigate potential adverse impacts.

PROJECT LOCATION



North

Figure 1-1

Scale in Mile

0 1 2

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1.1 Purpose and Need of the Proposed Action

Arizona is experiencing a population increase that is greater than many other states. SRP's electrical demand is directly related to the population growth rate in its service territory. Because SRP is a summer peaking utility, the demand for electricity is greatest during Arizona's hot summer months. Additionally, the use of electricity in today's advanced technological society is changing. Average usage per household is increasing due to the proliferation of electronic equipment used by the average family.

Over the past 5 years, the number of SRP electric customers has increased by more than 16 percent. Over the last fiscal year, SRP added more than 27,000 new customers to its service territory. SRP's customer growth is expected to continue at a similar pace over the coming years. This is particularly true in the Southeast Valley where a majority of the SRP population growth is occurring. SRP anticipates that during the next 10 years, SRP's greatest growth will occur in Tempe, Gilbert, mesa, Chandler, Ahwatukee/Phoenix, Apache Junction, and Queen Creek. Additional energy use and forecast data summaries are provided in Appendix A (Tables A-1 through A-5).

SRP's options for obtaining new power resources to meet customer peak demand include 1) construction of new generation within the Phoenix metropolitan area, 2) construction of new generation outside the Phoenix metropolitan area, and 3) the purchase of power from wholesale suppliers or merchant power plants (all of which would be outside of the Phoenix metropolitan area).

SRP is proposing to expand its existing Kyrene Generating Station in order to provide new generation in the Phoenix metropolitan area. This site has access to existing transmission lines and would not require any new off-site transmission. The existing transmission system bringing power into the Phoenix metropolitan area is fully utilized during the summer daytime hours (when SRP's peak load occurs) and does not provide any capacity to import additional/new energy supplies at this time. The building of generation or the purchase of power outside the Phoenix metropolitan area would require the construction of new transmission lines in order to bring energy into SRP's load center.

Building new generation, such as the KEP, is only one component of SRP's balanced approach for providing future energy supplies. SRP's existing resources are comprised of its own generating plants plus wholesale purchases and exchanges from other sources, and it will be necessary for future needs to be met in the same manner. In order to meet load growth, SRP would need to make future power purchases, add transmission capacity, and increase its electrical generating capability. No single component is capable of meeting all of the energy requirements of the

magnitude required by projected customer load growth. SRP's projected resource needs and the contribution of the various components in meeting new demand are presented in graphical form in Appendix A (Figure A-1). Additional information on SRP's actions to expand its load serving capability in response to projected growth of peak load also is presented in Appendix A (Figure A-2).

The proposed KEP also is needed to maintain and improve the reliability of the electric system. Proper system planning dictates a mix of local and remote generation. Local generation is necessary to maintain voltage levels and to provide resources in the event of an outage of a system component. No new local generation has been built in the East Valley since the mid-1970s. The KEP would partially address this element of system operations.

The North American Electric Reliability Council (NERC) in its *Reliability Assessment 1999-2008, The Reliability of Bulk Electric Systems in North America* (NERC 2000), concluded that additional voltage support is needed for the national electrical transmission system. Proper voltage levels cannot be consistently maintained over distances and must be supported locally. On an area-wide scale, voltage support is best supplied by electrical generators. Without local generators to provide adequate voltage support, components of the electrical system can be susceptible to potential voltage collapse or instability.

1.2 Existing Facilities at the Kyrene Site

The KEP would be located adjacent to the existing Kyrene Generating Station within SRP's existing 160-acre industrial parcel. The Kyrene Generating Station consists of two steam generation units and 3 combustion turbine generators with a combined capacity of approximately 250 MWs. The steam units were constructed in the 1950s and the combustion turbines were added in the early 1970s.

The SRP Tempe Service Center (TSC) also is located in the southern portion of the 160-acre site. The TSC is utilized by electric system line maintenance, transportation services and material services. Approximately 40 acres of the site is occupied by the Kyrene Pole Yard and Central Reclamation Services. The site also includes 69-kilovolt (kV), 230-kV, and 500-kV electrical switchyards.

1.3 History of the Project

SRP entered into negotiations with Dynegy and NRG for the possible development of a joint project at the Kyrene site of an approximately 825 MW combined cycle gas-fired electric generation facility with an expected in service date of June 2002.

The business structure of the project was such that a limited liability corporation (LLC) would be formed with SRP owning 30 percent versus the 35 percent ownership of Dynegy and NRG. This arrangement pulled in the power plant development expertise of both Dynegy and NRG. It also helped to limit the capital that SRP would need to contribute for that project. The LLC would then sell the first 225 MW of output from the plant to SRP, and SRP would have the option of acquiring an additional 150 MW during the months of July, August, and September.

SRP would utilize an exchange arrangement to deliver the remainder of the plant output to the Palo Verde Switchyard for use by Dynegy and NRG. The exchange arrangement was advantageous to SRP since it permitted SRP's use of the entire output of the plant to meet retail customer load. The exchange arrangement essentially delivered energy to SRP inside the metropolitan area without the construction of new transmission import capability.

During the course of business development, it became apparent that there was a growing amount of public opposition. A concern of many opposing the project was that the partners had no interest or ties to Arizona. As part of the public involvement process, SRP entered into a "mediation" process to help alleviate the concerns of the community. This process resulted in the current proposal of a 250 MW generating facility to be owned and operated solely by SRP. A summary of the public participation associated with the proposed project are provided in Section 4.1 of this document.

1.4 Agency Authority and Required Permits/Approvals

Permits and approvals necessary for construction and operation of the proposed KEP are listed in Table 1-1.

Table 1-1
Permits and Approvals Required for the Proposed KEP

Agency	Permit/Approval
Federal	
United States Environmental Protection Agency, Region IX	NEPA Compliance Issuance of a Finding of No Significant Impact Clean Water Act Compliance New Source Water Discharge NPDES Permit Storm Water Discharge NPDES Permit
U.S. Fish and Wildlife Service, Phoenix Office	Endangered Species Act Compliance Endangered Species Section 7 Consultation
Federal Aviation Administration	Determination of No Hazard of Emission Stack
State	
Arizona Corporation Commission and the Arizona State Power Plant and Transmission Line Siting Committee	Certificate of Environmental Compatibility
Arizona State Historic Preservation Office	National Historic Preservation Act (NHPA) Compliance Section 106 Clearance
Arizona Game and Fish Department	Authority over State Wildlife – Project Review Consultation/Coordination
Arizona Department of Environmental Quality	Aquifer Protection Permit 401 Water Quality Certification
County – Maricopa	
Maricopa County Environmental Services Department (MCESD), Air Quality Division	Air Quality – Title V Unified Preconstruction and Operating Permit

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Alternatives Considered in the Development of the Proposed Action

SRP's current energy conservation programs as well as alternative power purchase options were evaluated to determine if these measures would satisfy the projected system requirements. As discussed below, implementation of these measures would not provide sufficient levels of reliable power generation needed to meet the current and projected energy demands. As a result, the need to develop additional power generation was identified.

During the planning process and development of the Proposed Action for the KEP, several alternative plant site locations, technologies, wastewater disposal methods, pipeline route alignments, and construction delivery systems were evaluated. Each of these alternatives was examined to determine if it: 1) meets the identified purpose for the project, 2) is technically and economically feasible, and 3) avoids or minimizes adverse impacts. As a result of this analysis, the Proposed Action includes the location of the combined-cycle natural gas fired 250-MW power plant at the Kyrene site. Water supply and wastewater discharge alternatives and the No Action Alternative also are described in this chapter.

2.1.1 Conservation

Demand-side management programs instituted since 1986 have saved SRP approximately 160 MW of capacity that otherwise would have been needed to meet customers' needs at the time of SRP's system peak demand. The alternatives provided were representative "conservation" alternatives characterized by peak load reduction and energy conservation. SRP has developed the following programs as an attempt to promote conservation and influence the way people use electricity.

Time-of-Use Rates

Through pricing signals, time-of-use customers are encouraged to use the majority of their electricity during the designated off-peak hours when demand and energy costs are lower, and are discouraged from using electricity during designated peak hours when system demand and costs are greater. As of November 30, 2000, SRP has 100,658 active residential time of use customers and 831 commercial customers.

Interruptible Rate Alternatives

This is available to large commercial and industrial customers. SRP can minimize the need for additional firm generating resources if, when needed, some customer loads can be curtailed. SRP currently has 9 customers participating in this program, with an associated load of approximately 90 MW.

Efficient Electric Technologies

Residential programs implemented to promote energy efficiency include the SRP-Certified Homes Program that promotes new energy efficient construction standards. The SRP-Heat Pump Incentive is a program that encourages and pays SRP customers to replace old, inefficient heating and cooling systems with new, high-efficiency heat pumps. The Refrigerator Rebate Program, which pays customers to replace their old refrigerator, is designed to promote efficiency in an appliance that can account for as much as 15 percent of your home's total energy usage. The Residential KiloWatch is a self-administered home energy audit, showing customers how they are using electricity and how they can reduce that usage and save energy dollars.

M-Power

This new residential prepayment program uses a special electric meter located outside your home, a small display unit located inside your home and smart cards, which work in a way similar to telephone calling cards. The SRP M-Power display shows you how much energy you're using daily and hourly, and when to buy more energy via the smart cards. The display unit keeps track of how much energy you're using. You can check the dollar amount hourly, daily or weekly. With this information, you can make choices about your electricity use that can save money. SRP currently has approximately 4,000 customers taking advantage of this program.

Although current demand-side management programs have proven successful and beneficial in conserving energy, our customer preferences provide little opportunity to expand these programs to the degree necessary to keep pace with our projected system requirements.

2.1.2 Alternative Power Purchase

Purchasing energy from local or remotely located generating plants developed and owned by other entities was considered but not pursued due to price risk. Owners/operators of new merchant power plants typically sell the output of their facilities at market based rates. In the past few years, and particularly in 2000, market rates in the Southwest have been very volatile and very high relative to historic norms. The development and operation of its own power generating

plant would allow SRP to control the costs of power generation, and thus avoid the price volatility associated with purchasing energy from other suppliers. This ultimately would result in a more cost-effective and reliable source of electricity for SRP retail customers.

2.1.3 Alternative Plant Sites

A number of candidate plant sites located within Arizona were considered. These candidate sites are located within the Phoenix Metropolitan area (Glendale), within the general vicinity of Phoenix (Palo Verde, Mobile, Florence, and New River), and at greater distances outside of the Phoenix area (Kingman and Tucson). The following criteria were used in the evaluation of the candidate sites and in the selection of the proposed plant site:

- Plant economics (acquisition and development costs associated with land, new transmission needed to import energy into the Phoenix area and/or to interconnect to the grid, natural gas and water pipelines, and permitting).

- Delivery economics (costs for new transmission infrastructure required for delivery of power from the grid interconnection to SRP's customers).

- Environmental impacts associated with plant site and access, new transmission infrastructure, new natural gas and water supply and discharge pipelines.

- Environmental benefits of using the existing site (e.g., minimal land disturbance, compatible land use, reuse of reclaimed wastewater, availability of air quality offsets).

- Reliability (proximity of a generating resource to SRP's load center increases reliability during a major disturbance on the electric system).

- Local benefits (local communities within SRP's service territory).

Kyrene Site

The Kyrene site would be located within SRP's existing 160-acre industrial parcel, adjacent to the existing Kyrene Generating Station. This site would require the construction of approximately 0.5 mile of new natural gas pipeline to the site and 1.2 miles of water supply and discharge pipelines. No new transmission lines would be required and the construction of the plant and associated pipelines would occur within previously disturbed areas. Water for the operation of the facility would be supplied via the reuse of reclaimed wastewater from the existing City of Tempe Kyrene Water Reclamation Plant (TKRP).

Glendale Site

The Glendale site would require the construction of approximately 10 miles of new natural gas pipeline to the site and significant transmission upgrades to bring additional power from the existing generating station in the west Valley to the customer load center in the southeast Valley. The most significant transmission upgrade required would be modifications to the Arizona Public Service (APS) underground transmission system through downtown Phoenix. Modification to the APS system would be necessary to alleviate overloads caused by new generation at this alternative location. Canal capacity constraints also could be realized in moving water across the SRP service territory to supply a new power plant at this location. Based on the additional environmental impacts and costs associated with the installation of a new gas pipeline and transmission upgrades, this site was eliminated from further consideration and analysis.

Palo Verde Sites

Two sites located on vacant land several miles northwest and southeast of the Palo Verde Nuclear Generating Station would require the construction of approximately 1 to 10 miles of new gas pipeline to the site and from 25 to 35 miles of new transmission lines in order to carry the power from this site to an existing switchyard. In addition to the new transmission line needed to interconnect the generating site to the existing electrical grid at the Palo Verde Switchyard at least one new 500-kV transmission line would be needed from the Palo Verde Switchyard to the 230-kV system in the Metropolitan Phoenix Area.

Additional electric support infrastructures necessary to interconnect power from the site with the regional electric transmission grid could include plant breakers, and station and switchyard modifications. No reclaimed water sources would be available in the vicinity of the sites. Based on the additional environmental impacts and costs associated with the installation of a new gas pipeline and the substantial transmission upgrades, these sites were eliminated from further consideration and analysis.

Mobile Site

The Mobile site, located on vacant land southwest of Phoenix several miles outside of the Town of Mobile, would require the construction of approximately 1 to 5 miles of new gas pipeline to the site and approximately 55 miles of new transmission line in order to carry the power from this site to the existing switchyard at Kyrene. Additional electric support infrastructures necessary to interconnect power from the site with the regional electric transmission grid could include plant breakers, and station and switchyard modifications. The site is located in an Active Management Area (as designated by the Arizona Department of Water Resources) and water rights may be

difficult to obtain. In addition, options for backup water supply are limited and there are no reclaimed water sources available in the vicinity of the site. Based on the additional environmental impacts and costs associated with the installation of a new gas pipeline and the substantial transmission upgrades, and the uncertainty of obtaining an available and reliable water supply, this site was eliminated from further consideration and analysis.

Florence Site

The Florence site, located on vacant land southeast of Phoenix several miles outside of the Town of Florence, would require the construction of approximately 2 to 10 miles of new gas pipeline to the site and approximately 50 miles of new transmission line in order to carry the power from this site to receiving stations at Browning and in the southeast Valley. Additional electric support infrastructures necessary to interconnect power from the site with the regional electric transmission grid could include plant breakers, and station and switchyard modifications. Based on the additional environmental impacts and costs associated with the installation of a new gas pipeline and the substantial transmission upgrades, this site was eliminated from further consideration and analysis.

New River Site

The New River site, located north of Phoenix near the Town of New River, would require the construction of approximately 50 miles of new gas pipeline to the site and multiple transmission lines in order to move power from this site to the customer load center in the southeast Valley. Additional electric support infrastructures necessary to interconnect power from the site with the regional electric transmission grid could include plant breakers, and station and switchyard modifications. The site is located in an Active Management Area and water rights may be difficult to obtain. In addition, options for backup water supply are limited and there are no reclaimed water sources available in the vicinity of the site. Based on the additional environmental impacts and costs associated with the installation of a new gas pipeline and the substantial transmission upgrades, and the uncertainty of obtaining an available and reliable water supply, this site was eliminated from active consideration and analysis.

Kingman Site

The Kingman site, located on vacant land approximately 20 miles east of Kingman, would require the construction of approximately 1 to 10 miles of new gas pipeline to the site and approximately 1 to 5 miles of new transmission line in order to carry the power from this site to the Mead-Phoenix high voltage line. Additional transmission capacity would need to be purchased from the Western Area Power Authority or other owners of Mead-Phoenix rights. Additional new

transmission would be necessary within the Metropolitan Phoenix Area for this alternative to be viable. Additional electric support infrastructures necessary to interconnect power from the site with the regional electric transmission grid could include plant breakers, and station and switchyard modifications. Based on the additional environmental impacts and costs associated with the installation of a new gas pipeline and the transmission upgrades, this site was eliminated from further consideration and analysis.

Tucson Site

The final site evaluated is located on vacant land, approximately 30 miles north of Tucson. Development of this site would require the construction of approximately 10 miles of new gas pipeline to the site and approximately 130 miles of new transmission line in order to carry the power from this site to receiving stations at Browning and in the southeast Valley. Additional electric support infrastructures necessary to interconnect power from the site with the regional electric transmission grid could include plant breakers, and station and switchyard modifications. Based on the additional environmental impacts and costs associated with the installation of a new gas pipeline and the substantial transmission upgrades, this site was eliminated from further consideration and analysis.

Summary

Of the sites reviewed, the Kyrene site was selected as the proposed site for generation development. This site most closely matches the selection criteria used in the alternative site evaluations summarized above. Development of the Kyrene site would represent minimal environmental impacts including positive effects related to reduction in nitrogen oxide (NO_X) impacts, environmental protection/enhancement measures, reuse of reclaimed wastewater, favorable economics, compatible land use and zoning, improved reliability due to proximity to SRP's load center, and local tax benefits.

2.1.4 Alternative Technologies

Alternative technologies for power generation including renewable energy, coal, oil, and natural gas were evaluated during the development of the proposed project.

Renewable Energy

Existing technology for the generation of electricity through renewable sources is not currently a viable alternative for the supply of large quantities of power at an economically reasonable cost. Renewable sources such as solar and wind also are subject to daily and seasonal fluctuation in

the power produced. While renewable energy sources are not currently a viable alternative for providing significant quantities of baseload generation, SRP does include a variety of renewable energy projects in its balanced approach to meeting customer demand.

In February 2000 SRP committed to a 4-year, $29 million program to fund renewable energy resources. The goal of the program is to develop approximately 7 to 8 MW of renewable energy resources. The following projects are implemented under this program.

- SRP is developing 4 MWs of electricity to be fueled by landfill gas. This gas is produced naturally as wastes decompose in a landfill. Since 1998, SRP has been purchasing landfill gas from three landfills on the Salt River Pima-Maricopa Indian Community.

- A project to install 700 kilowatts (KW) of low-head hydroelectric generation on an SRP irrigation canal also is being developed under this program. Additionally, a wind analysis is being conducted near SRP's Coronado Generating Station in eastern Arizona to determine the site's suitability for wind generation.

- SRP's service area is located in an area with an excellent solar resource consisting of generally clear days and with an annual average solar irradiance of 6 to 7 KW-hours per square meters. SRP evaluated generating its near-term power requirements with solar technologies.

- SRP does have two 100-KW solar plants at its Santan Generating Station in Gilbert, Arizona. Under SRP's renewable energy program, two additional 100-KW solar plants will commence installation in January 2001 at SRP's Agua Fria Generating Station in Glendale, Arizona. The cost of the four 100-KW plants, not including land costs, is approximately $3.5 to $4 million. However, a 250-MW solar plant would not be feasible because of inadequate world supplies of photovoltaic modules, unavailability of solar energy during night hours, and decreasing availability of solar energy during peak demand hours. The prohibitive capital cost estimated at $2.4 billion before land costs also would make a solar plant of this capacity infeasible.

- SRP also has volunteered for the U.S. Department of Energy's Million Solar Roofs program. The purpose of that program is to support the development of the next generation of solar water heaters. SRP will commit approximately $1 million to this program, which is not included in the $29 million mentioned above.

SRP has a long history of funding and supporting the development of renewable and environmentally friendly technologies for electrical generation. Technologies include fuel cells, microturbines, photovoltaics, wind and landfill gas. SRP supports this work through the Electric

Power Research Institute, various colleges and universities, the Houston Advanced Research Center, and numerous other entities.

Coal

In evaluating alternative technologies, SRP also considered a coal-fired plant. The land area required to store the plant's coal supply is not available at the KEP site. The construction and generation of a coal-fired plant with its associated emissions would probably not be permitted in the Phoenix nonattainment area.

Oil

SRP also considered oil as a primary or secondary fuel source for the KEP facility. The use of oil, as a primary or secondary fuel source, in a nonattainment area, would require significant additional expenses and would probably not be permitted in the Phoenix non-attainment area. In addition, there are no oil pipelines of adequate capacity near the KEP site.

Natural Gas

Natural gas was selected as the proposed fuel source since it is a relatively clean-burning fuel with low emissions and ample supplies are available through the existing El Paso Natural Gas (EPNG) pipeline located near the proposed KEP.

2.1.5 Alternative Wastewater Discharge

Return of Plant Effluent to TKRP Discharge Pipe

The proposed KEP wastewater discharge would occur via a new pipeline to the existing TKRP discharge pipe, which eventually drains to the Salt River. Implementation of this discharge system would minimize wastewater treatment costs for KEP, utilize an existing discharge point to the Salt River, continue to return a portion of the current discharge flow to the Salt River, and prevent increased loading of total dissolved solids to TKRP.

Return of Plant Effluent to TKRP

Pumping plant effluent to the TKRP was considered during KEP planning. The disadvantage to this discharge method would be that as the water from KEP, which would have increased dissolved solids due to evaporation losses, would be returned, treated, and pumped back to KEP,

it would become increasingly concentrated and higher in dissolved solids. This could ultimately result in treatment problems for the City of Tempe and excessive treatment costs for KEP.

Evaporative Pond

Because of the hot, arid climate of the Southwest, evaporative ponds are often used for disposal of plant process water through evaporation. The KEP site would not provide sufficient space to allow for the construction of a pond large enough to store and evaporate the proposed volume of plant effluent.

2.1.6 Alternative Pipeline Routes

Alternative routing was considered for the proposed natural gas pipeline to the KEP site from EPNG's existing line near the intersection of Elliot Road and Kyrene Road. In addition, an alternative pipeline route was evaluated for the water supply and wastewater discharge pipelines from the site to the TKRP. Due to potential schedule delays associated with right-of-way (ROW) acquisition along the Union Pacific Railroad, these alternative routes that followed portions of railroad ROW were not selected. These schedule delays would potentially interfere with the identified purpose of the proposed project.

The majority of the proposed water supply and wastewater discharge and natural gas pipeline routes would be located within the SRP project site and within SRP ROW along the Western Canal.

2.1.7 Alternative Construction Delivery System

Trucking of all equipment and materials to the site was considered; however, the use of rail for delivery of the large equipment (e.g., turbines, generators) as proposed for the KEP was determined to be the most time-efficient and cost-effective means of transporting equipment and construction materials to the site.

2.2 Proposed Action

SRP is proposing to construct, own and operate the KEP, which would expand the energy-producing capacity of its existing Kyrene Generating Station in Tempe, Arizona. The proposed facility would consist of one natural gas fired combined cycle system (stationary combustion turbine, stationary steam turbine, and HRSG); one diesel fired emergency fire water pump; one mechanical draft cooling tower; and associated water supply, water discharge, and natural gas pipelines. The proposed expansion facilities would produce 250 MW of electricity.

SRP proposes to construct the facility on approximately 15 acres of its existing 160-acre industrial parcel. Approximately 12 acres of additional disturbance would occur during the construction of the water supply, wastewater discharge, and natural gas supply pipelines. The facility is proposed for construction adjacent to the existing Kyrene Generating Station site in close proximity to the TKRP, which is the proposed primary source of plant supply water for the proposed facility. Under the Proposed Action, the existing Kyrene Generating Station operations would be scaled back once the KEP is operational.

2.2.1 Project Location

The proposed KEP facilities would be located in the City of Tempe, Arizona, within the existing 160-acre industrial parcel currently owned by SRP, adjacent to the currently operating Kyrene Generating Station (see Figure 2-1). The proposed water supply, water discharge, and natural gas supply pipelines are the only project-related features that would extend outside the boundaries of the project site (see Figure 2-2). New electrical transmission line connections would occur entirely within the existing 160-acre parcel.

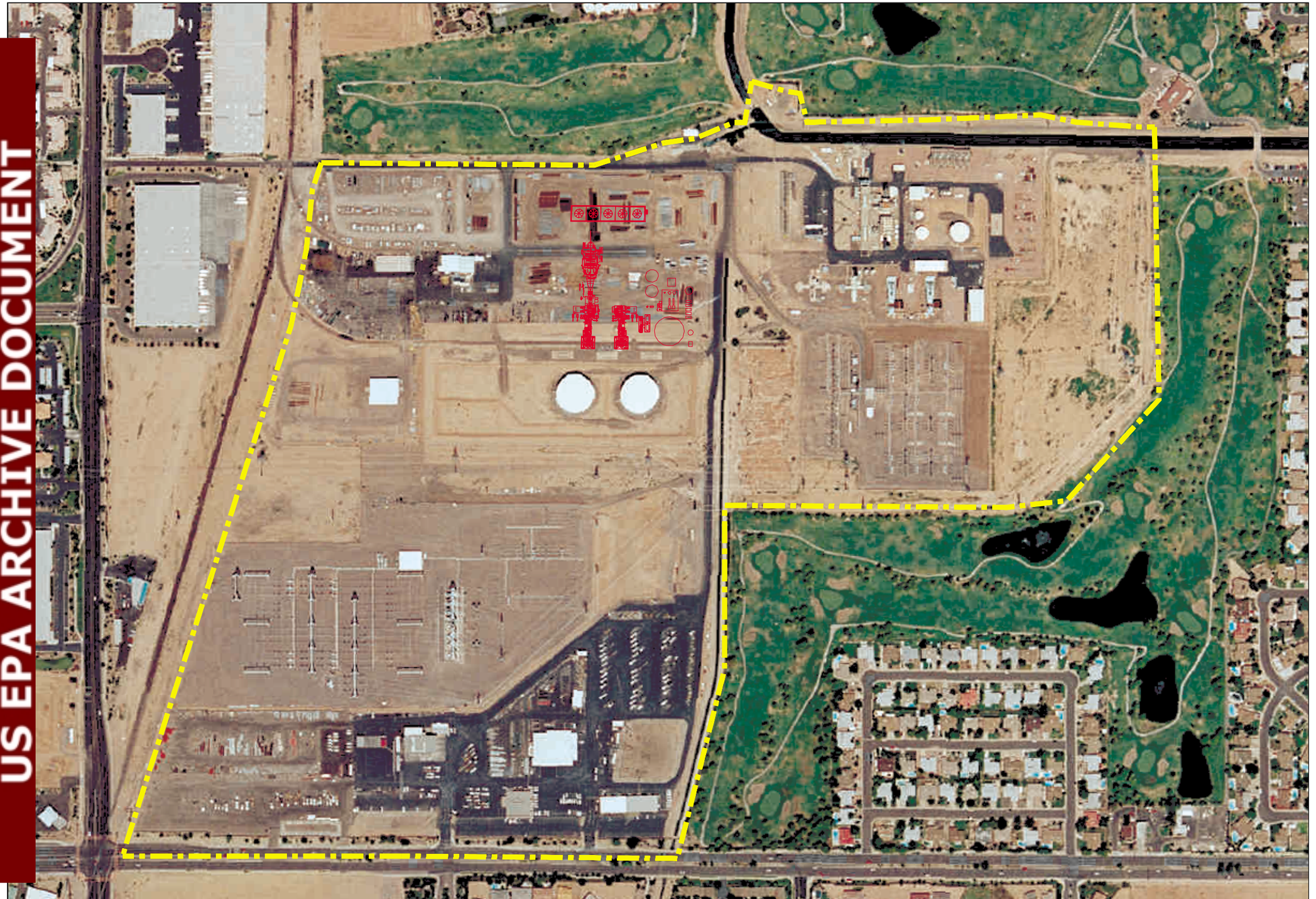
2.2.2 Project Schedule and Work Force

All permit applications for the KEP will be submitted prior to March 2001. Construction is scheduled to begin in March 2001, with an expected in-service date of May 1, 2002. The peak construction work force is estimated at 300 workers; operations would require an additional 10 to 15 employees. The construction contractors assigned to the project by SRP would be encouraged to hire locally.

2.2.3 Project Facilities

The proposed new facilities would include one combined-cycle unit and supportive equipment for the turbines. The new facilities would have a nominal output of 250 MW. The unit would be designed to operate in base load mode or cyclic duty mode (to follow power requirements). The proposed KEP would include the following major components and systems as illustrated in Figures 2-3 and 2-4:

- Site improvements, foundations, buildings, and structures;
- One natural gas fired combustion turbine generator (CTG) with dry low NO_X combustors, an air inlet silencer, an evaporative or fogging air cooler, and one direct-coupled generator;



PROJECT SITE

Figure 2-1

LEGEND

- Project Site
- Preliminary Project Location

0 100 200 400 600

SCALE IN FEET

DRAFT

Kyrene Expansion Project

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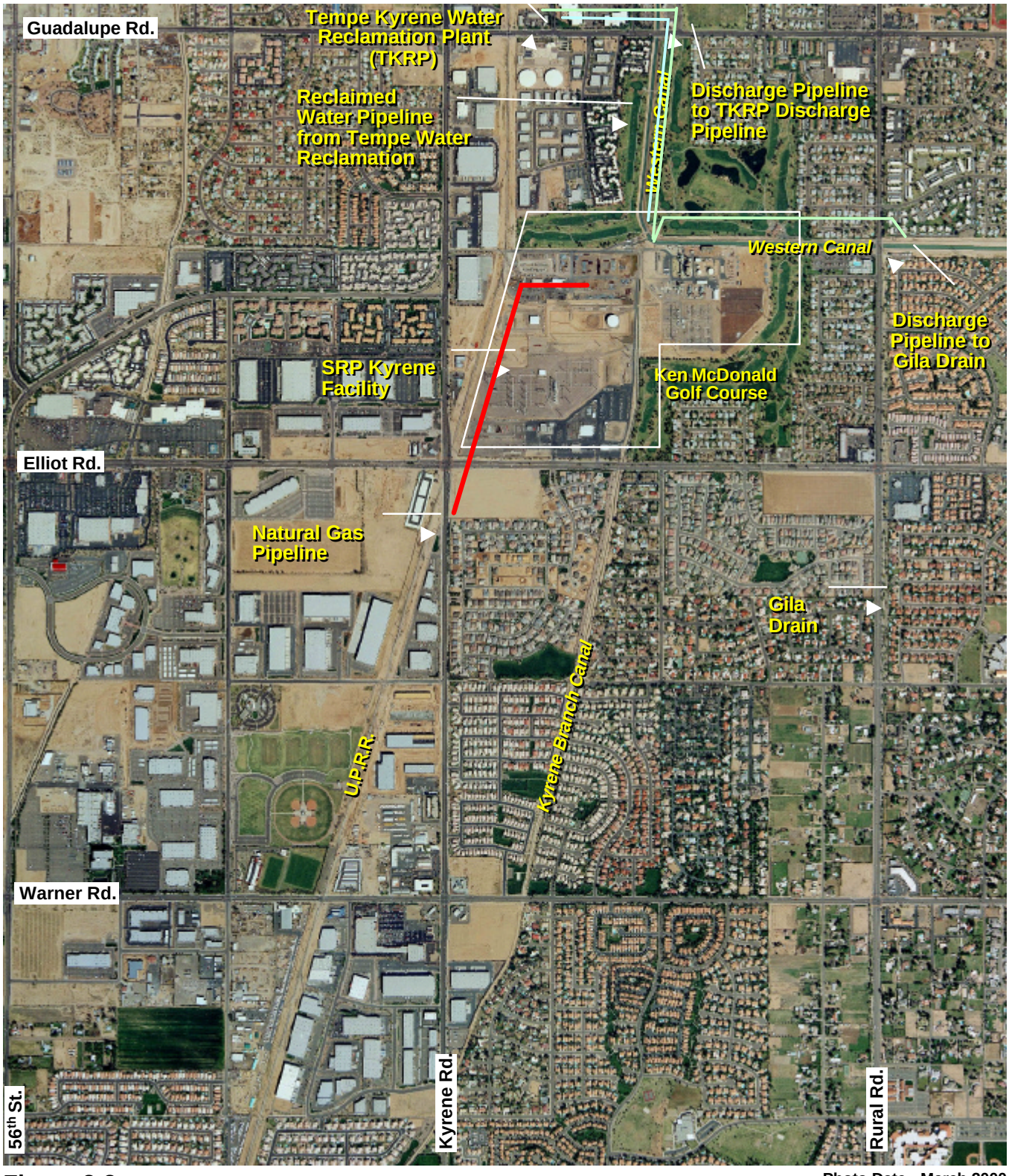

Figure 2-2

Photo Date: March 2000

Ancillary Facilities for the Proposed Project

North

Scale in Mile

0 1/2

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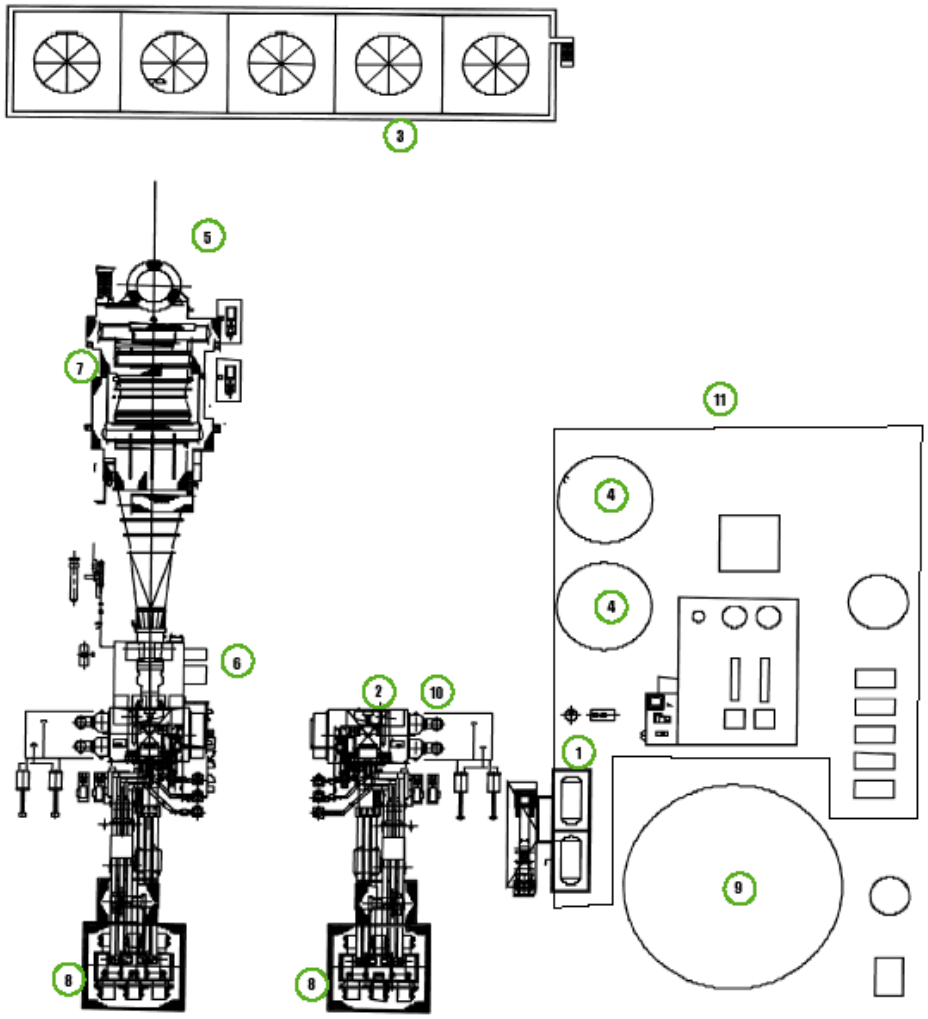
COMBINED CYCLE PLANT FACILITY LAYOUT

Figure 2-3



ITEM	DESCRIPTION
1	WATER TREATMENT CHEMICAL TANKS
2	CONDENSER
3	COOLING TOWER
4	DEMINERALIZATION WATER TANK
5	EXHAUST STACK
6	GAS TURBINE GENERATOR
7	HEAT RECOVERY STEAM GENERATOR
8	MAIN STEP-UP TRANSFORMER
9	PROCESS WATER/FIRE WATER STORAGE TANK
10	STEAM TURBINE GENERATOR
11	WATER TREATMENT AREA

0 50 100 150 200

SCALE IN FEET

Kyrene Expansion Project

JUNE 12, 2000

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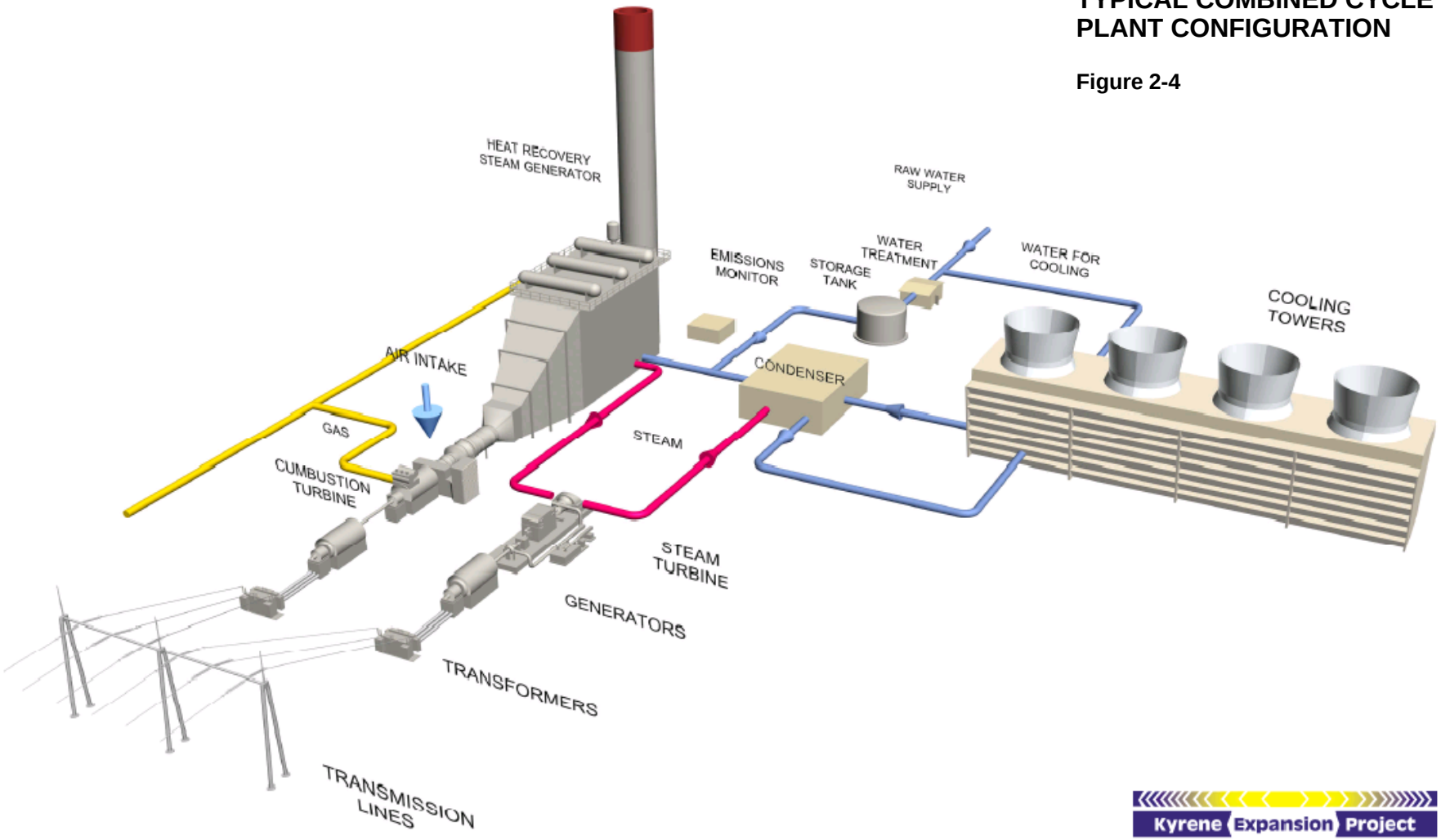
TYPICAL COMBINED CYCLE PLANT CONFIGURATION

Figure 2-4



Kyrene Expansion Project

JUNE 12, 2000

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- One multiple pressure HRSG with supplemental natural gas duct firing and catalyst oxidation systems to control NO_X, carbon monoxide (CO), and volatile organic compound (VOC) emissions;
- One 150-foot HRSG exhaust stack;
- One condensing steam turbine generator (STG), and one water-cooled condenser;
- One mechanical draft cooling tower;
- Raw water treatment and conditioning facilities;
- Natural gas handling and treatment and conditioning facilities;
- Transmission lines connecting to existing 69-kV switchyard;
- One natural gas pipeline connecting to the existing EPNG Pipeline 2214;
- Water supply and discharge pipelines to the TKRP and a back-up discharge pipeline to the Gila Drain; and
- Water supply pipeline from SRP Deepwell #1.

The following sections describe the major components and systems as listed above.

2.2.3.1 Site Improvements, Foundations, Buildings, and Structures

Access to the site would be on an existing road from Kyrene Road, approximately 0.5 mile north of Elliot Road, on the east side. This intersection would be modified by SRP, if required, by the City of Tempe. All site roads would be paved or conditioned to comply with fugitive dust emissions standards. The area would be graded and drained to route site runoff to a retention basin. The retention basin discharge would comply with state and federal standards. Final landscaping would be coordinated with the City of Tempe.

All on-site bulk storage of oil and chemicals would meet containment (berm or wall) requirements. Various chemicals would be used for conditioning of raw water and wastewater, condensate and feedwater, circulating cooling water, and emissions controls. Auxiliary systems would be installed to support the CTG. These systems include lubrication, air filtration, fire protection, noise attenuation, gas delivery, instrumentation/control, compressed air, and lighting. All noise

generating equipment would be equipped with appropriate baffles, enclosures, and other mitigation measures to meet the City of Tempe Noise ordinance. A small (42-foot x 60-foot) prefabricated building would be installed on-site for use as a power distribution center and for operations control.

2.2.3.2 Natural Gas-Fired Combustion Turbine Generator

The CTG unit would be a natural gas-fired, advanced technology unit in a combined cycle arrangement. There would be no back-up fuel source. The CTG uses state-of-the-art combustion technology to effectively burn clean natural gas with reduced NO_X and CO emissions relative to other generation options. Emissions control technology used would conform with air quality regulations. CTG performance would be dependent on ambient conditions (temperature, humidity, and barometric pressure), fuel source, and draft system losses (ductwork, emission controls, and stack height). The gas turbine driven generator would produce approximately 173 MW of electricity.

In a combined-cycle configuration, a CTG serves two functions. It produces electric power through a directly connected electric generator and supplies hot exhaust gases to a dedicated HRSG. The heat in the CTG exhaust gas transfers energy to produce steam as it passes through the HRSG. The steam generated in the HRSG is sent to a condensing STG that produces additional electricity. The steam turbine exhaust steam would be water cooled via a condenser served by a wet mechanical draft-cooling tower.

For the CTG, ambient air is drawn into the gas turbine compressor section through the silencing, air filtration, and evaporative or fogging cooling system where it is compressed. The compressed air is then mixed and burned with the gas in combustors to produce the hot gases that expand through the turbine sections. When a CTG and steam turbine are used in a combined cycle, the overall cycle efficiency is improved because most of the excess energy of the gas turbine exhaust is recovered in the HRSG.

To further increase the cycle efficiency, especially during peak power demand periods, steam from the HRSG would be returned to the CTG to augment the mass flow, which increases the power output.

2.2.3.3 Multiple Pressure Heat Recovery Steam Generator and Exhaust Stack

The HRSG is a horizontal gas flow, natural circulation type. The unit consists of ductwork, steam drums, piping, condensate preheater, three steam pressure zones (low, intermediate, and high), catalytic oxidation equipment (for NO_X, CO, and VOC), and an exhaust stack. Condensate would

be heated by the CTG exhaust gas, then passed through a series of heat exchange piping arrangements, which would result in steam at a temperature and pressure needed for efficient use in the steam turbine. The steam would be piped to the steam turbine, which is direct-coupled to a generator, converting mechanical energy to electricity.

The steam would be condensed in a wet surface condenser. The condenser is a water-cooled, horizontal surface design, close coupled to the axial exhaust from the steam turbine. The condensed steam (condensate) is recirculated back through the cycle through the boiler feedwater system. A mechanical draft wet cooling tower would provide the cooling water source for cooling the steam.

Supplemental duct firing is part of the plant design to increase the CTG exhaust gas temperature by burning natural gas in the HRSG duct. A burner grid (natural gas only) located in the duct between the CTG exhaust manifold and the HRSG housing accomplishes duct firing. The higher temperature gas produces more high-pressure steam, thereby increasing the power output of the plant. A typical application of supplemental duct firing is during high ambient temperature conditions when additional heat is needed to maintain adequate steam flow from the HRSG to the steam turbine.

The use of catalysts in the exhaust gases is necessary to reduce NO_X and CO emissions from the plant. The catalytic oxidation also would reduce VOCs. Selective catalytic reduction (SCR) reduces the emissions of NO_X to the environment utilizing aqueous ammonia, injected into the exit gases in the presence of a catalyst. The level of NO_X reduction is anticipated to be 70 percent. The combination of combustion turbine technology plus the use of catalysts in the HRSG provides an emission control rate equal to the Lowest Achievable Emission Rate (LAER) specified in the federal and county regulations. The addition of SCR involves the insertion of reactors and associated structures and transitions into the HRSG, and the addition of aqueous ammonia injection equipment and storage. To optimize the performance of the catalytic oxidation equipment, which is temperature dependent, the catalytic unit would be specifically placed within the HRSG. A 10,000- to 15,000-gallon tank would be constructed for aqueous ammonia (19.5 percent) storage.

The exhaust stack would be immediately adjacent to the HRSG, and would be 150 feet in height. A continuous emission monitor (CEM) would be placed in the stack to monitor unit air emissions. External platforms would be required to access the CEM for testing and maintenance.

2.2.3.4 Steam Turbine Generator

Steam would be piped from the HRSG to the steam turbine, which would turn the turbine and direct-coupled generator. The generator would produce approximately 112 MW of electricity.
The STG package includes supportive systems for lubrication, shaft sealing, and operational control. Cooling media for the generator cooling and lubrication systems would be from the circulating water system. The combined electrical output of the CT and the steam turbine would be 250 MW.

2.2.3.5 Mechanical Draft Cooling Tower

The cooling tower would provide cooling water to the condenser (for cooling of the steam exhausted by the steam turbine) and various smaller heat exchangers (lubricating oil, generator hydrogen, compressed air, etc.). The cooling tower would incorporate drift minimization equipment to reduce water losses and avoid fogging conditions.

2.2.3.6 Raw and Waste Water Treatment Facilities

The proposed raw water source would be from the TKRP, and would be in compliance with the State of Arizona water regulations and the City of Tempe requirements. Onsite wells owned and operated by SRP would provide a back-up raw water source and water for boiler water makeup. The primary water treatment chemicals that will be used are sulfuric acid (93 percent), sodium hypochlorite (12.5 percent), and sodium bisulfite (for dechlorination). Tank designs have not been finalized, but tank capacities are anticipated to be 10,000 gallons, 5,000 gallons, and 1,000 gallons, respectively.

Raw water would be filtered, conditioned, and chlorinated for use in the cooling tower and firewater system. The cooling tower evaporation process would be the primary consumption of site water. Well water or city potable water would be processed by reverse osmosis and demineralization systems, which would provide low TDS water for steam cycle operation and the closed bearing (lubricating oil) cooling water system.

Wastewater sources are from the cooling tower blowdown, raw water treatment and conditioning system, reverse osmosis reject, HRSG blowdown, roof and floor drains, and rainfall runoff. Floor drains would be routed to the City of Tempe sanitary sewer system via an oil/water separator. Treated wastewater, when possible, would be discharged to the circulating cooling water system to minimize raw water makeup. Cooling tower blowdown would be at three cycles of concentration; minerals in the raw water would be concentrated 3 times. Cooling tower water

would be monitored for calcium or magnesium in order to properly regulate the cycles of concentration.

All remaining wastewater would be monitored and discharged, via pipeline, into the existing TKRP discharge pipe, which discharges to a storm drain, and eventually to the Salt River below Granite Reef Dam, and above the Interstate 10 (I-10) bridge. The proposed back-up discharge would require a segment of pipeline from the plant to the Gila Drain, which ultimately drains to the Gila River. All discharges would be permitted under the NPDES through the USEPA, Region IX, and would be in compliance with federal, state, and city discharge requirements.

Potable water and sewage disposal would be tied to the City of Tempe systems. The fire water source would be filtered and conditioned raw water, independent of existing fire water protection systems and not connected to the City of Tempe. The system would be designed and installed to meet fire protection standards.

The site drainage plan may include grading and paving to direct rainwater to a retention basin. The retained water would be allowed to evaporate or be discharged to the SRP Kyrene Branch Lateral under an NPDES Permit.

2.2.3.7 Natural Gas Handling and Treatment Facilities

The natural gas handling and treatment facilities would transfer pipeline quality gas from the EPNG system to the plant site. Except for gas pressure reduction, metering, filtration, heating, connection to the CT and HRSG duct burners, all gas distribution lines to and within the plant would be underground. Filtration and heating are required to ensure proper CT and dry low NO_X combustor operation.

2.2.3.8 Switchyard and Electrical Plant

A new generator site would be installed northwest of the existing 230/69-kV receiving station on SRP property. The new generator step up transformers would be connected via an overhead to two overhead 69-kV lines and poles that would connect to the existing 69-kV bus in the existing receiving station. Four new breakers would be installed that would connect to the 69-kV bus. These new facilities, including the step up transformers, would be built, owned, and operated by SRP, to SRP design, construction, and operating standards.

The balance of the electrical plant system would be 4.16 kV. All plant electrical systems would be fed from the 4.16-kV system, and stepped down to feed various motor control centers, power

back-up systems, and other loads. Start-up power would be backfed from existing SRP circuits to the in-plant 4.16-kV system.

Critical circuits, such as control power, field instruments, and CEM, among others, have automatic alternative power sources from separately supplied motor control centers. The alternative power sources include an uninterruptible power source and batteries.

2.2.3.9 Natural Gas Pipeline

SRP proposes to convey natural gas to the project site via an approximately 0.5-mile segment of new (16-inch-diameter) buried pipeline, connecting to the existing EPNG Pipeline 2214 at adequate pressure (see Figure 2-2). The pipeline route would extend westward from the KEP site to the SRP boundary with the Union Pacific-Southern Pacific Railroad ROW. It would continue on SRP property in a general south-southwestwardly direction, parallel to the SRP boundary to the EPNG meter station in the southwest quadrant of the Kyrene Road/Elliot Road intersection.

2.2.3.10 Water Supply and Discharge Pipelines

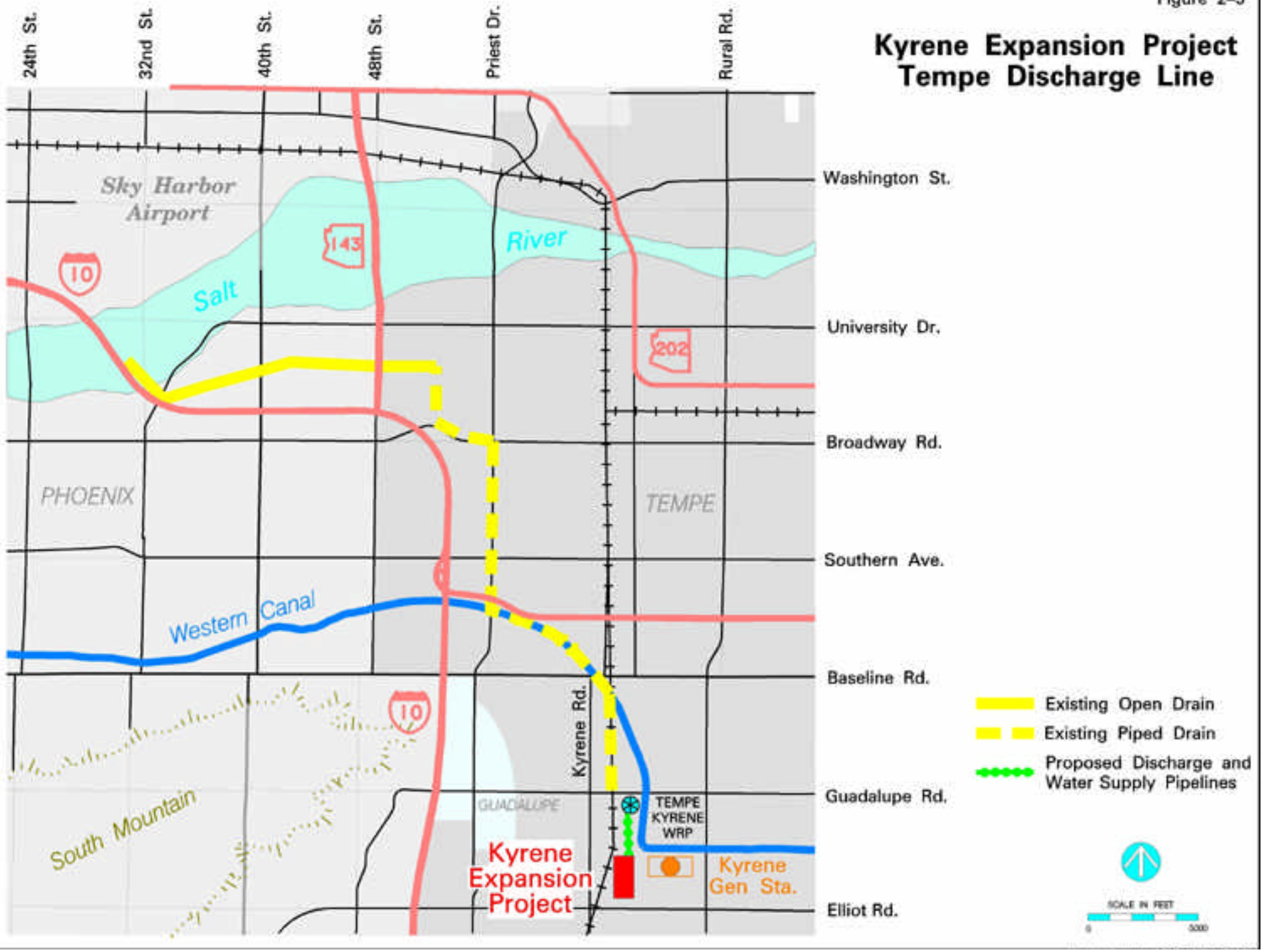
SRP proposes to obtain plant supply water from the TKRP. A 0.7-mile segment of new (16- to 24-inch-diameter) buried pipeline, connecting to the TKRP, would be installed. SRP proposes to construct the water supply line north from the plant site paralleling the west side of the Western Canal within the SRP ROW to Guadalupe Road, then westward to the TKRP (see Figure 2-2).

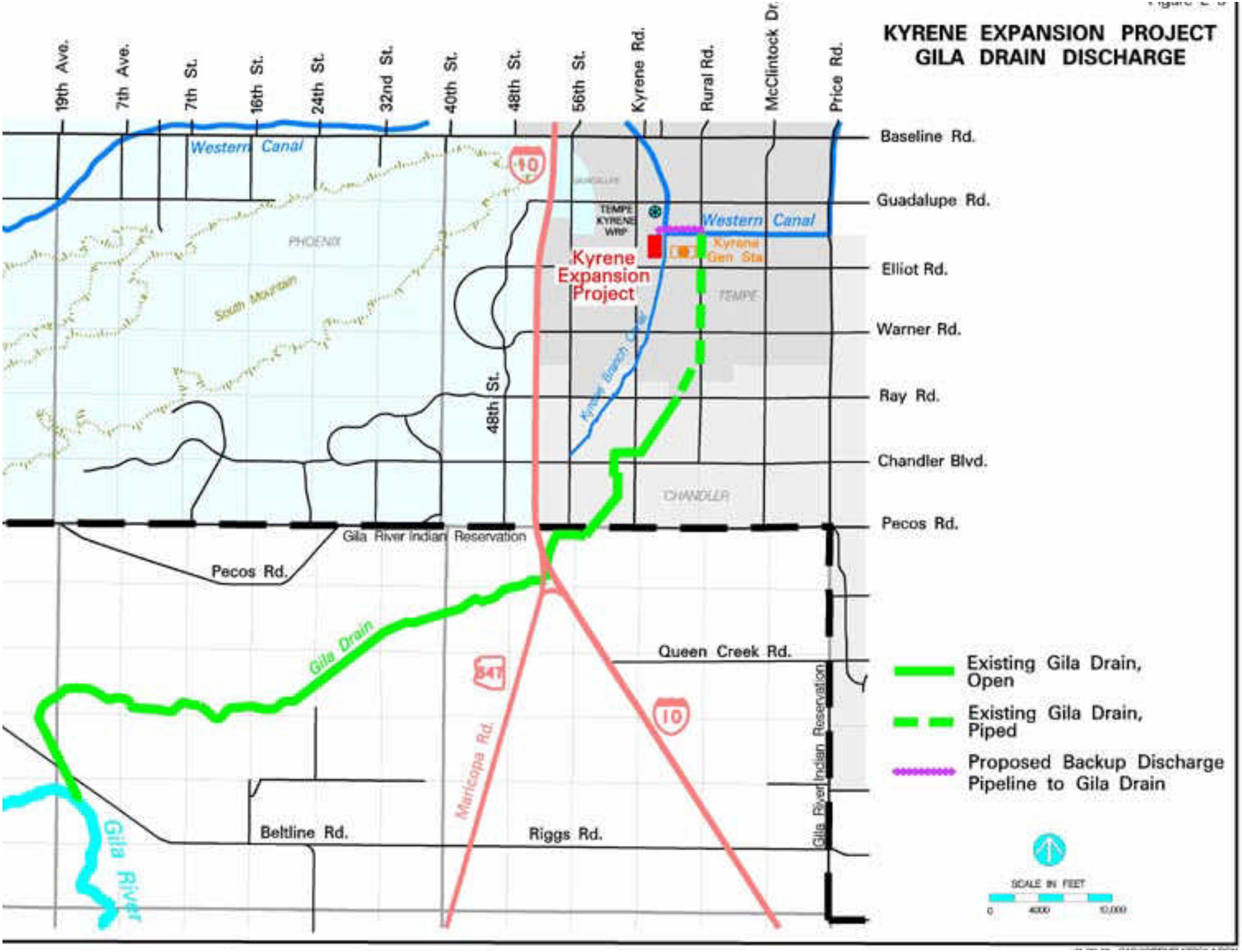
The water supply line would convey an average of 2.5 million gallons per day (MGD) of raw water to the KEP plant and would be in compliance with the State of Arizona water regulations and City of Tempe requirements. Onsite groundwater wells owned and operated by SRP would provide a back-up raw water source.

Wastewater would be monitored and discharged, via pipeline, into the existing TKRP discharge pipe, which drains to the storm drain, and eventually to the Salt River (see Figure 2-5). A 0.7-mile segment of new (12- to 16-inch-diameter) pipeline, connecting to the existing TKRP discharge pipeline, would be installed. SRP proposes to construct the wastewater discharge line adjacent to the proposed water supply line paralleling and adjacent to the western side of the Western Canal northward to Guadalupe Road, then westward to the TKRP (see Figure 2-2). The wastewater discharge line would convey up to approximately 1.0 MGD of wastewater per day to the existing TKRP discharge pipeline. The proposed back-up discharge line would require an approximately 0.5 mile segment of new (12- to 16-inch-diameter) pipeline, from the plant to the Gila Drain, which ultimately drains to the Gila River (see Figure 2-6). The new back-up discharge pipeline would run along the northern border of the plant parallel and adjacent to the northern bank of the Western

Figure 2-5

Kyrene Expansion Project
Tempe Discharge Line




KYRENE EXPANSION PROJECT
GILA DRAIN DISCHARGE
19th Ave.
7th Ave.
7th St.
16th St.
24th St.
32nd St.
40th St.
48th St.
56th St.
Kyrene Rd.
Rural Rd.
McClintock Dr.
Price Rd.
Baseline Rd.
Guadalupe Rd.
Elliot Rd.
Warner Rd.
Ray Rd.
Chandler Blvd.
Pecos Rd.
Queen Creek Rd.
Beltline Rd.
Riggs Rd.
Western Canal
Western Canal
TEMPE KYRENE WRP
Kyrene Gen Sta
Kyrene Expansion Project
Kyrene Branch Canal
PHOENIX
South Mountain
TEMPE
CHANDLER
Gila River Indian Reservation
Pecos Rd.
Gila Drain
Maricopa Rd.
Gila River Indian Reservation
Gila River
10
84
10
Existing Gila Drain, Open
Existing Gila Drain, Piped
Proposed Backup Discharge Pipeline to Gila Drain
SCALE IN FEET
0
4000
10,000

Canal, under Rural Road, to the Gila Drain. Wastewater would be discharged to the Gila Drain only when the primary discharge pipeline/drain system to the Salt River was out of service for maintenance or repairs. All discharges would be permitted under the NPDES through the USEPA, Region IX, and would be in compliance with federal and state discharge requirements.

2.2.4 Hazardous Materials and Wastes

2.2.4.1 System Controls and Emergency Response

The KEP facility would maintain a Spill Prevention and Response Plan that describes in detail the emergency response procedures for any kind of possible release. Any individual would be able to immediately obtain emergency response support. Emergency response personnel who have been trained in the assessment of emergency situations and who can call in additional support staff depending on the nature of the emergency are readily available in the community. The local fire department and Local Emergency Planning Committee would be notified of hazardous materials stored on site at plant start-up. These agencies also would be invited for a plant tour so that local responding personnel would know what to expect during an emergency. All contractor personnel would be trained in proper emergency response procedures.

2.2.5 Environmental Protection Measures and Monitoring

2.2.5.1 Air Resources

Control of fugitive dust during construction would be accomplished in accordance with the Kyrene Generating Station's current county-approved dust control plan. The dust control plan is required by the current Title V permit for the existing plant, which will be amended to include the KEP prior to start of construction. Primary control measures in the plan include watering as necessary, physical stabilization, covering of bulk loose bulk materials during hauling, and limiting access.

2.2.5.2 Water Resources

The estimated quality of plant discharge includes a potential boron concentration (1.25 milligrams per liter [mg/l]) that exceeds the Agricultural-Irrigation water quality standard for boron (1.0 mg/l). When discharge to the Gila Drain is required, KEP would blend excess water from TKRP, the Western Canal, or well water with plant wastewater. The final blended effluent would be monitored to ensure that the boron concentration is always less than the state water quality standard of 1.0 mg/l.

2.2.5.3 Soils and Geology

As appropriate, site specific engineering practices and/or design modifications would be implemented to address the relative clay content of the soils at the site during foundation construction.

2.2.5.4 Biological Resources

SRP would primarily utilize native plant species and plants with low water consumption requirements for landscaping. Some non-native species (e.g., Aleppo and Mondale pines) would be used to achieve desired screening goals. The landscaping may provide incidental benefit as habitat for any species choosing to occupy it.

2.2.5.5 Transportation/Traffic

In order to minimize potential transportation/traffic impacts, SRP would implement the following measures:

- Construction shifts would be scheduled to avoid the peak traffic hours on Kyrene Road and adjoining feeder streets.
- Heavy truck traffic would be prohibited from approaching the site during peak traffic periods, except during continuous concrete pours at the job site.
- Lane closures for pipeline construction on Guadalupe Road and Kyrene Road would be limited to non-peak traffic hours, as required by the City of Tempe.
- Trenches within the travel surface of Guadalupe Road and Kyrene Road would be protected whenever construction workers are not present and actively working, as required by the City of Tempe.
- Left turns into the KEP site access road from Kyrene Road would be prohibited or restricted to non-peak hours.

2.2.5.6 Visual Resources

SRP is developing a landscape plan that would substantially increase the density of tree planting bordering fairways 11 and 12 of the Ken McDonald Golf Course. A mixture of upper and mid-story tree species are proposed, with some planned for the rough areas flanking both fairways. The

highest density of plantings is proposed for the rough area along the fence south of the 11th fairway. A berm is proposed for the same area, which would further enhance the visual screening value, especially while the new trees were growing toward maturity. The increased screening would minimize adverse visual effects from the proposed KEP.

SRP is developing landscape plans to add screen plantings and, perhaps berming, to several key areas around the plant site and is investigating additional measures to improve the visual quality of the project site from residential neighborhoods. Landscape enhancements are being developed for each of the key observation point (KOP) locations. Lighting for the proposed facility would be designed to reduce effects of light emissions on local neighborhoods and the night sky. In addition, a revised lighting plan for existing facilities (i.e., SRP Tempe Service Center) is being planned to reduce off-site effects of light and glare. Decorative screening walls in selected locations and a pedestrian/bicycle pathway around the site are under consideration, as well.

2.2.5.7 Noise

All construction equipment would be required to be checked for properly fitted and operating mufflers. Equipment used at night would be outfitted to comply with the City of Tempe Noise Ordinance. To the degree possible, night work would be planned to avoid activities that require shrill or concussive noise emissions.

For plant operations, SRP has committed to the community that it will meet the standards of the Tempe Noise Ordinance. SRP plans to implement one or more of the following measures to ensure compliance with the standards:

- Cooling tower design (enclosed north side of the tower);
- Low noise fans and splash mats for the cooling tower;
- Inlet silencing for the combustion turbine;
- Exhaust silencing in the HRSG outlet stack;
- Mufflers on steam vents; and/or
- Barrier walls.

It may be necessary to measure noise levels after plant operations begin to ensure the standards are being met. If the KEP plant exceeds the standard, the affected residences would be treated with additional sound insulation to achieve the 45 decibels on the A-weighted scale (dBA) interior night noise limit.

2.2.5.8 Cultural Resources

SRP has entered into a Memorandum of Agreement (MOA) (2000) with the USEPA, Bureau of Reclamation, State Historic Preservation Office (SHPO), City of Tempe, the Hopi Tribe, and the Gila River Indian Community (see Appendix E) in order to comply with the requirements of the NHPA. The NHPA requires federal agencies to consult with appropriate parties when federal undertakings have the potential to affect historic properties on or eligible for listing on the National Register of Historic Places (NRHP). The MOA addresses the data recovery plan developed by Desert Archaeology, Inc. (Henderson 2000), and additional measures developed to mitigate adverse effects on cultural resources located in the proposed KEP site. The plan also details means to mitigate the effects of the proposed project to unanticipated human remains that may be encountered during project construction (see Appendix F). SRP has committed to data recovery and has contracted with an archaeological consulting firm to begin recovery of cultural resources located in the project area in November 2000.

In the event unanticipated archaeological resources are encountered during the construction phase of the proposed project, SRP and the construction contractor would stop work at the discovery location and notify the participating parties to the MOA. Cultural resources are more fully discussed in Section 3.10.

2.3 Water Supply Alternatives

2.3.1 Western Canal

Under the Western Canal Alternative, all water for KEP operation (2.5 MGD) would be pumped from the Western Canal at a location immediately north of the proposed plant site. SRP would maintain the water volumes currently available for downstream use by adding 2.5 MGD of water to the Western Canal from available water sources upstream of the proposed plant site. Approximately 200 feet of new pipeline would be constructed to connect the proposed facility to this water source. The Western Canal flows immediately adjacent to the proposed and existing plant sites and is currently used by the existing Kyrene Generation Station for once through cooling water supply. It represents a readily available source of high quality water. However, since the Western Canal occasionally experiences very low flows, groundwater from existing wells at the KEP site would serve as a back-up source of process water.

2.3.2 Groundwater

Another alternative for plant process water supply includes the exclusive use of groundwater. Groundwater would be pumped from existing wells on the project site. Due to the quality and

continuous use of the groundwater, the operation would require a larger quantity of treatment chemicals. Production from additional SRP wells would be piped to the site in order to provide redundancy and ensure a reliable water supply.

2.4 Wastewater Discharge Alternatives

2.4.1 Western Canal

Under this wastewater discharge alternative, the final effluent from the plant would be pumped into the Western Canal. The Western Canal represents a highly accessible discharge point with considerable flow most of the year and good receiving water quality. An approximately 200-foot pipeline segment would be installed from the proposed plant site immediately north to the Western Canal. This alternative also would require the installation of a 0.5 mile back-up discharge line from the plant to the Gila Drain, as described under the Proposed Action.

2.4.2 Gila Drain

Another alternative for wastewater discharge is the pumping of the final effluent exclusively to the Gila Drain. An approximately 0.5-mile pipeline would be installed along the north bank of the Western Canal under Rural Road, originating at the proposed plant site and connecting with the existing Gila Drain located east of the plant site.

As described in Section 2.2.5.2, plant wastewater may exceed the agricultural-irrigation water quality standard for boron. When wastewater would be discharged to the Gila Drain, KEP would blend excess water from the TKRP, Western Canal, or well water to reduce the boron concentration or operate the plant cooling system at lower cycles of concentration. Either of these measures would ensure that the boron concentration does not exceed the state water quality standards.

2.5 No Action Alternative

The No Action Alternative would consist of the continued full operation of the existing Kyrene Generating Station. The USEPA would not issue the NPDES permit, the expansion facilities would not be built, and consumers in the Phoenix area could continue to be dependent upon existing older utility generating plants for their electricity. Compared to a state-of-the-art combined cycle facility, older utility plants are not as efficient in their operation. This could result in higher electricity costs to the consumer. Eventually, the design life of the existing plant would be exceeded, associated with component failures and plant outages of increasing frequency.

The existing Kyrene generating facilities along with other existing power generating facilities in the Phoenix metropolitan area at one time provided a reserve margin in the electricity supply for the area. Reserve margin provides the ability to continue to provide resources in the event of an outage of a system component. However, with the high growth in the area, the system reserve capacity has been all but eliminated, and most of the generating facilities in the area are operating near or at full capacity just to meet the current demands during the summer peak period. Therefore, a system component outage could result in temporary power interruptions or blackouts under the No Action Alternative.

As a result of the expected continued high level of growth in the Phoenix metropolitan area, SRP will need to increase electricity production to meet the needs of new and future customers. If the KEP is not constructed at the proposed plant site location, other power generating facilities would still have to built elsewhere, which would require the construction of new transmission lines into the load centers from areas outside of Phoenix.

3.0 EXISTING ENVIRONMENT, POTENTIAL ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES

3.1 Air Resources

3.1.1 Existing Environment

The Phoenix metropolitan area within Maricopa County is currently designated as a serious non-attainment area for CO, particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), and ozone (O_3). Actual air quality monitoring data from monitors in Maricopa County show 8 measured exceedences of the 8-hour CO National Ambient Air Quality Standards (NAAQS), 89 measured exceedences of the 24-hour PM_{10} NAAQS, and 16 measured exceedences of the 1-hour O_3 NAAQS since 1995. In addition, the annual PM_{10} NAAQS has been exceeded at least once since 1995 at 11 of the approximately 20 monitoring stations in Maricopa County.

The entire county is classified as attainment for nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb). Actual air quality monitoring data from monitors in Maricopa County show no measured exceedences of the NAAQS for these pollutants.

The climate in the project area is classified as desert. Phoenix is located in the Salt River Valley at an elevation of about 1,100 feet. The valley is oval shaped and flat except for scattered precipitous mountains rising a few hundred to as much as 1,500 feet above the valley floor. Sky Harbor Airport, where the weather observations are taken, is in the southern part of the city. Six miles to the south of the airport are the South Mountains rising to 2,500 feet. Eighteen miles southwest, the Estrella Mountains rise to 4,500 feet, and 30 miles to the west are the White Tank Mountains rising to 4,100 feet. The Superstition Mountains, over 30 miles to the east, rise to as much as 5,000 feet.

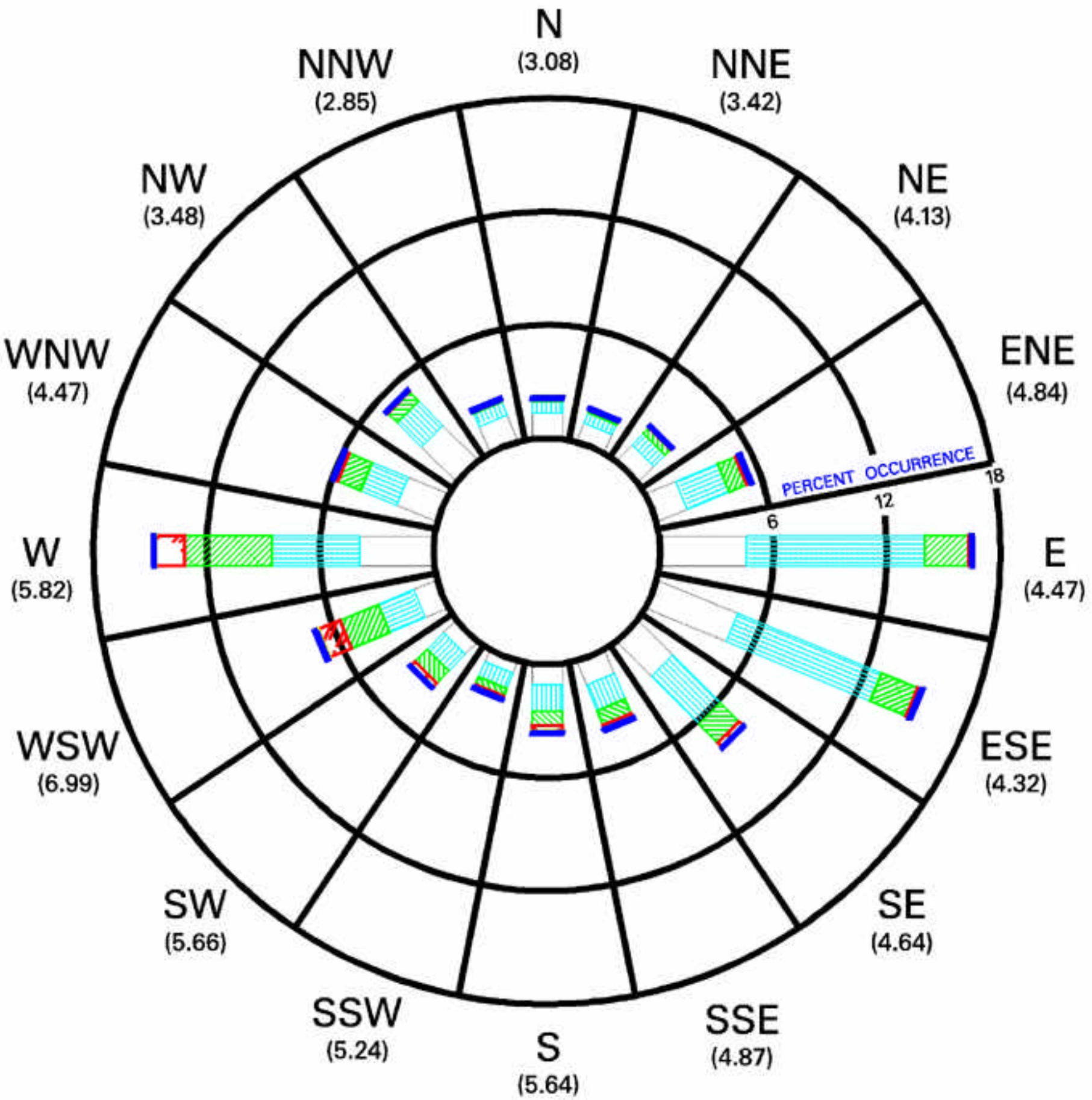
Temperatures range from very hot in summer to mild in winter. Many winter days reach over 70 degrees Fahrenheit (70°F) and typical high temperatures in the middle of the winter are in the 60s. The climate becomes less attractive in the summer. The normal high temperature is over 90°F from early May through early October, and over 100°F from early June through early September. Many days each summer will exceed 110°F in the afternoon and remain above 85°F all night. When temperatures are extremely high, the low humidity does not provide much comfort. Based on the 1951-1980 period, the average first occurrence of 32°F in the fall is December 13 and the average last occurrence in the cold season is February 7.

The climate is very dry. Annual precipitation is only about 7 inches, and humidity in the afternoon ranges from about 30 percent in winter to only about 10 percent in June. Rain comes mostly in two seasons. From about Thanksgiving to early April there are periodic rains from Pacific storms. Moisture from the south and southeast results in a summer thunderstorm peak in July and August. Usually the break from extreme dryness in June to the onset of thunderstorms in early July is very abrupt. Afternoon humidity in the summer suddenly doubles to about 20 percent, which with the great heat, gives a feeling of mugginess. Fog is rare, occurring about once per winter, and is unknown in the other seasons.

The Salt River Valley is characterized by light winds. High winds associated with thunderstorms occur periodically in the summer. These occasionally create dust storms, which move large distances across the desert. Strong thunderstorm winds occur any month of the year, but are rare outside the summer months. Persistent strong winds of 30 miles per hour or more are rare except for two or three events in an average spring due to Pacific storms. Winter storms rarely bring high winds due to the relatively stable air in the valley during that season. The entire region lies within the belt of prevailing westerly winds; however, the complexity of the terrain with mountains, hills, and valleys, greatly modifies the prevailing winds and creates local wind regimes. Prevailing winds near the project site at Sky Harbor Airport are from the east to southeast as shown by the composite annual wind rose for the period from 1994 through 1998 (Figure 3-1).

Because of the typically dry atmosphere, bright sunny days and clear nights frequently occur. This in turn allows rapid heating of the ground surface during daylight hours and rapid cooling at night. Since heated air rises and cooled air sinks, winds tend to blow uphill during the daytime and downslope at night. This upslope and downslope cycle generally occurs in all the geographical features, including mountain range slopes and river courses. The larger the horizontal extent of the feature, the greater the volume of air that moves in the cycle. Complexity of the terrain features cause complex movements in the cyclic air patterns, with thin layers of moving air embedded within the larger scale motions. The lower level, thermally driven winds also are embedded within larger scale upper wind systems (synoptic winds).

Three important meteorological factors influence the dispersion of pollutants in the atmosphere: mixing height, wind (speed and direction), and stability. Mixing height is the thickness of the layer of air aboveground within which rising warm air from the surface would mix by convection and turbulence. The degree to which pollutants are diluted in this mixed layer is determined by local atmospheric conditions, terrain configuration, and source location. Mixing heights vary diurnally, with local weather systems, and with season. For the project area, the mean annual morning mixing height is estimated to be approximately 900 feet, and the mean annual afternoon mixing height is approximately 7,200 feet (Holzworth 1972). Winter time inversions may lower the mixing



NUMBERS INDICATE SECTOR MEAN WIND SPEED
SECTORS ARE DIRECTIONS FROM WHICH THE WIND IS BLOWING

WIND SPEED RANGE (KNOTS)

- 0.0 – 3.0
- 4.0 – 6.0
- 7.0 – 10.0
- 11.0 – 16.0
- 17.0 – 21.0
- > 21.0

WIND FREQUENCY DISTRIBUTION
COMPOSITE WIND ROSE
FOR 1994 – 1998

HOURLY SURFACE WIND OBSERVATIONS
PHOENIX SKY HARBOR AIRPORT
PHOENIX, ARIZONA

height by several hundred feet, and in conjunction with light winds, inhibit mixing and dispersion of air pollutants. Inversions and generally light winds contribute to the air pollution problems in the Salt River Valley.

Emissions in tons per year (tpy) from the existing Kyrene Generating Station based on 2 years of data (1998-1999) are compared to actual emissions for the year 2000, as well as forecasted potential emissions from the new facility (Table 3-1). Actual emissions for 2000 are higher than the average of previous years due to increased demand for power.

Table 3-1
Kyrene Generating Station Emissions (tpy)

Operating Scenario	CO	NO_X	PM_{10}	SO_2	VOC
Existing (1998-1999)	71	214	15	1	3
Existing Plant (2000)	208	631	59	19	10
New Facility	157	141	69	16	26

Note: VOC emissions from the New Facility do not account for the emissions reductions that will be achieved by the new oxidation catalyst emission control system. Therefore, the VOC emissions for the New Facility shown in this table are likely overestimated. New facility emissions are based on 100 percent capacity of KEP and 2 percent cap on the existing Kyrene Generating Station as required in the air quality permit.

Class I areas considered in the analysis for the KEP site include the Pine Mountain Wilderness, Mazatzal Wilderness, Sierra Ancha Wilderness, and Superstition Wilderness.

The NAAQS, which are applicable in Maricopa County, are shown in Table 3-2. The number of exceedences and the highest value observed in the area since 1995 also are shown in the table.

3.1.2 Potential Impacts

Potential impacts have been identified in the Non-attainment New Source Review (NANSR) Permit Application that was submitted to Maricopa County in August 2000 and supplemented in October 2000. It should be noted that subsequent changes to the Application resulted in the proposed KEP plant being exempted from NANSR and Prevention of Significant Deterioration (PSD) requirements.

Section 176(c) of the Clean Air Act (CAA) requires that federal agencies ensure that their activities conform to a State Implementation Plan (SIP). Federal activities subject to this conformity requirement include federally issued permits such as the NPDES permit proposed to be issued by USEPA. As a result, USEPA must ensure that the emissions associated with the permitted activity are in compliance with the CAA's conformity requirements, implemented in regulation at 40 CFR

Table 3-2
Ambient Air Quality Standards
Phoenix, Arizona

Pollutant	Averaging Period	National/Arizona AAQS	Number of Observed Exceedences Since 1995	Maximum Value Observed in Maricopa County
PM_{10}	Annual	50 µg/m^3	29	119.9 µg/m^3
	24-hour	150 µg/m^3	89	308.0 µg/m^3
SO_2	Annual	0.03 ppm	0	NA
	24-hour	0.14 ppm	0	NA
	3-hour	0.050 ppm	0	NA
O_3	1-hour	0.12 ppm	16	0.142 ppm
NO_2	Annual	0.05 ppm	0	NA
Pb	Quarter	1.5 µg/m^3	0	NA
CO	8-hour	9 ppm	8	10.6 ppm

ppm = parts per million.
µg/m^3 = micrograms per cubic meter.

While $PM_{2.5}$ and 8-hour O_3 standards have been promulgated, a court decision has set aside these standards; therefore, they are not addressed in this document.

Part 93. These regulations require an agency to address the direct and indirect emissions caused by their activities. If the emissions for each criteria pollutant for which an area is designated nonattainment or maintenance are below the conformity regulation's *de minimis* levels for that pollutant, the activity is presumed by law to conform to the SIP. If these emissions are above the *de minimis* levels, the agency must make a formal conformity determination according to the criteria set forth in the regulation. Direct and indirect emissions for this project are the emissions associated with the construction and operation of the power plant.

3.1.2.1 Construction

Impacts to the local air quality may occur during construction of the proposed plant and its supporting facilities. Of primary concern would be fugitive dust generated by excavation, grading, and truck traffic on unpaved roads. On-road construction vehicle emissions also may have an impact on local air quality.

A screening method was used for calculating total construction emissions. The method is presented in the South Coast Air Quality Management District's *CEQA Air Quality Handbook*. This method estimates total construction emissions, excluding fugitive dust, based on gross floor area (GFA) of the project. The GFA of this project was conservatively assumed to be a 140-meter x 120-meter rectangle surrounding the primary equipment and the construction period was

assumed to be 1 year. Construction emission factors and the resulting emissions are shown in Table 3-3.

Table 3-3
Construction Emission Factors and Emissions

Pollutant	Emission Factor (lb/1,000 ft^2)	Project Emissions (tpy)	Conformity Threshold[1] (tpy)
VOC	32.79	2.96	50
NO_X	481.88	43.57	50
CO	104.79	9.47	100
PM_{10}	34.22	3.09	70

[1]Federal Conformity Thresholds at 40 CFR 93.153.

tpy = tons per year.

Since the projected construction emissions for each pollutant fall below the conformity regulation's *de minimis* levels, the construction phase of the project is presumed to conform. No formal conformity determination is necessary.

3.1.2.2 Operation

Regarding operational emissions, projected emissions also are under the CAA conformity *de minimis* levels (see Table 3-4). Thus, during the operational phase of the project, the activity also is presumed to conform.

Table 3-4
Project Net Emissions Increases

Pollutant	Net Emissions Increase (tpy)	Conformity Threshold (tpy)[1]
CO	93.6	100
NO_X	-39.8	50
PM_{10}	53.1	70
Sulfur Oxides (SO_X)	14.9	NA
VOC	22.9	50
H_2SO_4	4.4	NA
Beryllium	0.00001	NA

[1]Federal conformity thresholds at 40 CFR 93.153.

tpy = tons per year.
NA = not applicable.

Impacts to the local air quality would occur from operation of new stationary sources at the plant, including the new combustion turbine/HRSG and the cooling tower. To reduce emissions of NO_2, an SCR system would be installed in the HRSG, downstream of the supplemental duct burner. In addition, the combustion turbine would be equipped with a dry low-NO_X combustor. To reduce emissions of CO and VOC, an oxidation catalyst would be installed downstream of the supplemental duct burner. To reduce PM emissions from the new cooling tower, state-of-the-art mist eliminators designed to achieve a drift of 0.0005 percent would be employed. Beyond controlling the new equipment, SRP would cap actual emissions from the five existing units at the Kyrene Generating Station to that achieved at an operating level of 2 percent capacity factor. The State of Arizona is in the process of requesting that the USEPA reclassify Maricopa County as attainment for CO and O_3 since the region had 3 consecutive years of attainment for these pollutants.

LAER is the most stringent emissions rate, which is achieved in practice by a stationary source. LAER must be demonstrated for a major new source or a modification of a major source for all pollutants for which the area has been designated as non-attainment. As a result of the voluntary emissions cap on the existing units at the Kyrene Generating Station, the net emissions from the KEP would be less than NANSR threshold levels for major modifications in a non-attainment area. SRP has designed the KEP to meet LAER standards to ensure emission rates are kept to a minimum. The air quality permit application contains LAER analysis for the combined cycle system, cooling tower and emergency fire water pump. The design for each system and the controls to be applied on each of these systems was demonstrated to be LAER.

LAER for VOC emissions for the combined cycle unit is shown to be the application of oxidation catalyst capable of achieving 2.7 parts per million, volume, dry (ppmvd) at 15 percent oxygen averaged over a 1-hour period. For PM_{10} emissions from the combined cycle unit it is shown that LAER is achieved through combustion of low sulfur natural gas and a combustion design that minimizes the formation of NO_X.

It should be noted that SRP voluntarily conformed with NANSR requirements of using the LAER technology for the new 250-MW combined cycle unit. Furthermore, SRP performed voluntary air quality modeling to demonstrate that emissions from the new unit would have an insignificant impact on ambient air quality.

LAER for the cooling tower to control PM_{10} is shown to be state-of-the-art mist eliminators to achieve a drift of only 0.0005 percent. LAER for the firewater pump using diesel fuel is achieved by limiting the hours of operation for testing and maintenance to 37.5 hours per year.

Net emissions increases from the stationary sources at the site (including the decrease from the cap of existing units' emissions) have been estimated and reported in the air permit application and the supplement to the air permit application. These are provided in Table 3-4 below.

The existing Kyrene Generating Station would be limited plantwide to 68.5 tpy of PM_{10} emissions. This limitation would result in the Station being classified as a non-major stationary source (less than 70 tpy in a PM_{10} non-attainment area). Consequently, the significance level of 15 tpy applicable for major sources does not apply to the proposed KEP.

The Kyrene Generating Station would be limited plantwide by county air permit to 26.1 tpy of VOC emissions. This limitation would result in the Station being classified as a non-major stationary source (less than 50 tpy in a VOC non-attainment area). As a result, the significance level of 25 tpy applicable for major sources does not apply to the proposed project.

USEPA has developed regulations that are designed to control air pollution through permitting requirements for new or modified major stationary sources. The required procedure for major sources located in non-attainment areas is called NANSR. For attainment areas, the regulations that apply to major sources are called PSD. The designations "Non-attainment" and "Attainment" are applied for specific criteria pollutants. For example, an area may be classified "Non-attainment" for CO but "Attainment" for NO_2. Maricopa County is designated non-attainment for CO, PM_{10}, and O_3, but is in attainment for NO_2, SO_2, and lead (Pb).

For major sources of air pollutants, such as power plants, modifications to the facility that increase or potentially increase the air pollution emissions must be considered in light of the governing NANSR or PSD regulations. For the proposed SRP project, analyses were performed under NANSR rules for CO, PM_{10}, and O_3, and PSD rules were applied for the other pollutants NO_2, SO_2, and lead. Ozone is not generally emitted directly to the atmosphere, but is formed when other pollutants such as VOCs are present. VOCs are considered precursors of O_3; therefore, emissions of VOCs are regulated. Since NO_X emissions also are considered precursors of O_3 formation in the atmosphere, and the area is non-attainment for O_3, emissions of NO_X also were analyzed for NANSR applicability.

An analysis of the net emission rates revealed that the NANSR modification applicability thresholds are not exceeded for CO and NO_X, and the potential plantwide emissions of PM_{10} and VOC are below the major source thresholds. Thus NANSR also is not applicable for these pollutants.

Based on the potential to emit air pollutant emission rates associated with the proposed expansion project, emissions of NO_2, SO_2, Sulfuric Acid Mist, and Beryllium have been estimated

to be well below the major modification PSD thresholds of 40, 40, 7.0, and 0.0004 tons/year, respectively (Table 3-5). Since these emissions from the proposed project are below the modification threshold significance levels, the proposed expansion project is not subject to PSD review.

Table 3-5
Major Modification Thresholds of Pollutants Subject to PSD Review

Pollutant	Project Net Emissions	Major Modification Threshold (tpy)
NO_X	-39.8	40
SO_X	14.9	40
H_2SO_4	4.4	7
Beryllium	0.00001	0.0004

An expanded discussion of the applicability of NANSR and PSD requirements is provided in Appendix B.

Emissions Offsets

The existing Kyrene Generating Station would be limited plantwide to 68.5 tpy of PM_{10} emissions. This limitation would result in the Station being classified as a non-major stationary source (less than 70 tpy in a PM_{10} non-attainment area). As a result, the significance level of 15 tpy applicable for major sources does not apply to the proposed expansion project, and SRP would not be required to obtain additional PM_{10} emission offsets or credits.

The Kyrene Generating Station would be limited plantwide by county air permit to 26.1 tpy of VOC emissions. This limitation would result in the Station being classified as a non-major stationary source (less than 50 tpy in a VOC non-attainment area). Consequently, the significance level of 25 tpy applicable for major sources does not apply to the proposed expansion project and SRP would not be required to obtain additional VOC emission offsets or credits.

Based on the net emission rates, the NANSR modification applicability thresholds are not exceeded for CO and NO_X. Emissions of SO_2, sulfuric acid mist, and beryllium are not covered under the NANSR regulations; therefore, these emissions do not require offsets to be considered in the permitting process.

Impacts may occur from secondary, or indirect, emissions resulting from worker commutes, truck deliveries, etc. These impacts should be insignificant (less than 1 tpy) since there would be only 10 to 15 new workers.

The emissions increases of pollutants subject to PSD review are all less than the respective major modification thresholds (see Table 3-5). Therefore, no significant impacts to air quality under PSD guidelines are anticipated.

SRP performed dispersion modeling for CO, NO_2, SO_2, and PM_{10} emissions. Only the proposed project emissions, excluding any decrease in emissions from the existing Kyrene Generating Station or from offsets, were modeled.

Dispersion Modeling Results

SRP conducted dispersion modeling for NO_X, CO, SO_2, and PM_{10} using 5 years of meteorological data from the National Weather Service station at Sky Harbor International Airport in accordance with USEPA and Maricopa County guidance and regulations. Since the power generation facility is classified as a major PSD source for NO_2, compliance with the PSD increments for both Class I and Class II PSD areas is required, as well as compliance with NAAQS. Dispersion modeling demonstrated compliance with the PSD increment and the NAAQS for NO_2, CO, PM_{10}, and SO_2. Results of the modeling are shown in Table 3-6.

Table 3-6
Dispersion Modeling Results

Pollutant	Averaging Period	PSD Significant Levels ($\mu g/m^3$)	Maximum Concentrations ($\mu g/m^3$)
NO_2	annual	1.0	0.55
CO	1-hour	2,000	459.8
CO	8-hour	500	39.3
SO_2	3-hour	25	6.34
SO_2	24-hour	5	1.16
SO_2	annual	1	0.19
PM_{10}	24-hour	5	4.54
PM_{10}	annual	1	.70

The dispersion modeling demonstrated that there would be no adverse impacts on the Superstition Wilderness Area, which is the nearest Class I area. Ozone impacts are not modeled since there is no acceptable method to model such impacts; however, the new facility would result in lower emissions of NO_X, which is a known precursor of ozone formation. It follows that lower emissions of NO_X from the proposed facility would likely reduce local ozone formation and this would potentially result in lower ozone concentrations throughout the region, including the

Superstition Wilderness Area. Lower emissions of NO_X from the proposed facility also would potentially reduce the formation of very fine particulates since NO_X is a known precursor of $PM_{2.5}$.

Maximum impacts from the new emissions of CO from the KEP were predicted to be 459.8 $\mu g/m^3$ (1-hour) and 39.3 $\mu g/m^3$ (8-hour). These values are below the CO PSD significant impact levels of 2,000 $\mu g/m^3$ and 500 $\mu g/m^3$, respectively. Therefore, emissions of CO from the new equipment would not cause significant impacts to air quality.

Maximum impacts from the new emissions of NO_X from the proposed project were predicted to be 0.55 $\mu g/m^3$ (annual). This value is below the NO_X PSD significant impact level of 1 $\mu g/m^3$. Therefore, emissions of NO_X from the new equipment would not cause significant impacts to air quality.

Maximum impacts from the new emissions of SO_X from the KEP were predicted to be 6.34 $\mu g/m^3$ (3-hour), 1.16 $\mu g/m^3$ (24-hour), and 0.19 $\mu g/m^3$ (annual). These values are below the SO_2 PSD significant impact levels of 25 $\mu g/m^3$, 5 $\mu g/m^3$, and 1 $\mu g/m^3$, respectively. Therefore, emissions of SO_X from the new equipment would not cause significant impacts to air quality.

Maximum impacts from the new emissions of PM_{10} from the proposed project were predicted to be 4.54 $\mu g/m^3$ (24-hour) and 0.70 $\mu g/m^3$ (annual). These values are below the PM_{10} PSD significant impact levels of 5 $\mu g/m^3$ and 1 $\mu g/m^3$, respectively. Therefore, emissions of PM_{10} from the new equipment would not cause significant impacts to air quality.

Maximum impacts of NO_2, PM_{10}, and SO_2 at the nearest Class I area (Superstition Wilderness) were modeled using two separate dispersion models (ISCST3 and CALPUFF). All predicted impacts at Superstition Wilderness were less than the respective Class I significant impact levels. Since Superstition Wilderness is the nearest Class I area, modeled impacts at the other Class I areas would be less than significant also.

In addition to the impacts analyses for the aforementioned criteria pollutants, an assessment was performed on the impacts of Hazardous Air Pollutants potentially emitted from the facility. The predicted maximum ambient concentrations were compared to the appropriate Arizona Ambient Air Quality Guidelines (AAAQGs) and all concentrations were found to be below the AAAQGs.

The results of the hazardous air pollutant impact assessment for the combined impacts from the proposed new and existing equipment demonstrates that the resultant potential impacts for these chemicals, including ammonia, are well below the Arizona acceptable levels for health and the environment. However, in addition to the potential direct effects, emissions of ammonia can

potentially contribute to the secondary formation of fine particulates and, in the presence of sulfur compounds, the particulate formed is often ammonium sulfate.

Combustion sources that burn pipeline quality natural gas, as the proposed facility would, emit only small quantities of sulfur since there is very little sulfur in the natural gas. Therefore, there are no sulfur compounds to react with the ammonia, and these types of particles would not be emitted directly by the sources at the facility. The particulates that do form are produced in the atmosphere through photochemical processes. The amount of particulate formed by such processes is indirectly regulated through the ambient air standards for PM_{10} and the visibility standards addressed in the CALPUFF dispersion modeling exercise. The USEPA previously issued standards for the fine particulates know as $PM_{2.5}$, but these standards have not been put into effect and have been remanded to the courts. In the event the $PM_{2.5}$ standard is put into effect in the future, the facility will be required to be in compliance with this standard.

In summary, two separate visibility analyses were performed on the emissions from the new equipment. The first was performed using the VISCREEN model and the second was performed using the CALPUFF model. Both models demonstrated that there should be no significant impact to visibility at the Class I areas.

3.1.3 Mitigation Measures

Since no significant impacts to air resources would occur, no mitigation is proposed.

3.2 Water Resources

3.2.1 Existing Environment

3.2.1.1 Water Supply

The TKRP, which is the proposed source of cooling water, is located 0.5 mile north of the proposed KEP, and currently receives and treats approximately 3.7 MGD of sanitary sewage. Approximately 0.5 MGD are pumped to the municipal golf course and other areas in the city for irrigation. The remaining 3.2 MGD are pumped to a permitted discharge location on the Salt River through a storm water line owned by the City of Tempe and the Maricopa County Flood Control District.

Groundwater wells on the Kyrene property are currently used for process water supply and back-up water supply to the existing Kyrene Generating Station cooling tower and for make-up supply to the Western Canal.

3.2.1.2 Water Discharge

Salt River

The TKRP currently discharges to the Salt River at a location just north of the I-10 bridge and south of the Sky Harbor Airport. The discharge is permitted through an NPDES permit (Permit No. AZ0023248) issued by USEPA Region IX to the TKRP on November 28, 1997. An application for renewal will be submitted 180 days prior to its expiration date of January 2, 2003. This permit includes discharge limits for biochemical oxygen demand, total suspended solids, pH, and a number of metals and phenolic compounds. The City of Tempe is required to test for these parameters on a weekly or quarterly basis. According to USEPA records, there have been no exceedences of these limits in the last 5 years.

The Salt River, in the area of Tempe's discharge, is designated as an ephemeral stream, with no discernible flow for extended periods of the year. According to state water quality regulations, there are specific standards set to protect aquatic life and wildlife associated with ephemeral streams. These standards are designed to provide protection even when there is no flow in the river. When there is measurable flow in the river, protection is usually even greater, due to additional dilution. According to the U.S. Geological Survey Gauge No. 09512165, located approximately 1.0 mile upstream of the discharge location, flows range from 0 cubic feet per second (cfs) to a maximum of 40,000 cfs during major storm events.

The area of the City of Tempe's discharge (at the Salt River) currently supports considerable riparian habitat due to the Reclamation Plant's discharge and naturally occurring topography. However, the City of Phoenix has applied and received authorization for a 404 Permit from the U.S. Army Corps of Engineers to remove this riparian vegetation and re-grade the drainage. The purpose of this removal is to reduce the Bird Airplane Strike Hazard associated with Sky Harbor Airport.

The City of Phoenix is planning to restore riparian habitat along the Salt River (Rio Salado Project) immediately downstream of the existing TKRP discharge point. Water to support the Rio Salado Project would be obtained from groundwater wells that would be installed in the channel, west of I-10.

Gila Drain

The Gila Drain is currently used primarily for direction of excess agricultural tail water and storm water flow from the Western Canal and SRP shareholder lands to the Gila River. When large volume flows occur in the Western Canal, a valve is opened to allow flow into the Gila Drain. The

majority (approximately 14.5 miles) of the drain is an open ditch that flows approximately 17 miles to the Gila River (the other 2.5 miles are underground pipe). The southern portion of this route flows through the Gila River Indian Community. There are additional storm water flows that enter the Gila Drain along this route and several minor entities own and exercise withdrawal rights between the Western Canal diversion point and entry into the Gila River Indian Community. The Community has the right to withdraw any available flow from the Gila Drain across Community land for irrigation. Because of its designated use for irrigation purposes, the Gila Drain and any discharges to it must meet the State water quality standards for Agriculture-Irrigation and Agricultural Livestock Watering. Capacity of the Gila Drain is 75 cfs; however, actual flow has averaged 9.86 cfs, over a period from January 1997 to December 1999. Actual water flow does not typically reach the Gila River except during major storm events.

3.2.2 Potential Impacts

The KEP plant effluent, which would be discharged to the Salt River, would be discharged at lower flows (approximately 1.0 MGD) and higher dissolved solids (approximately 3 times as high) than the current flows (3.7 MGD maximum) from the TKRP to this discharge point. However, the KEP discharge would meet all applicable Arizona water quality standards and the concentrations of dissolved solids or any other parameters would not result in toxic effects to vegetation or wildlife downstream of the discharge point. The reduced flow also is not expected to impact vegetation or wildlife downstream of the discharge point, particularly since the riparian vegetation will be removed by the City of Phoenix.

The projected lower return flows to the Salt River would result in approximately 2.2 MGD less water available for alluvial aquifer recharge downstream. The City of Phoenix's Rio Salado riparian restoration project, which is located downstream of the TKRP discharge point, proposes to use water from this shallow alluvial water source. However, based on discussions with the City's Rio Salado Project hydrogeologist, no impacts to the Rio Salado Project would occur as a result of the reduced flows associated with the KEP (Stoltzfus 2000). In addition, it is projected that an additional 3 to 4 MGD of treated water would be discharged at the current TKRP discharge point as a result of the planned TKRP plant expansion. The schedule for completion and operation of this expansion (2002) would coincide with the initiation of the KEP operation as well as the Rio Salado Project.

When the plant effluent is discharged to the Gila Drain, it also would meet all water quality standards applicable to the Drain (Agricultural-Irrigation) with the implementation of the environmental protection measures discussed in Section 2.2.5.2, Water Resources. As stated previously, boron is the only anticipated exceedence of State water quality standards for the Gila Drain by plant wastewater. The Gila Drain discharge point would only be used when the primary

discharge to the Salt River is out of service for maintenance or repairs. Excess water would be blended with plant wastewater to ensure that the boron concentration meets the water quality standard. Since flow to the Drain would be increased during periods of discharge from KEP, the effect on downstream water availability would be expected to be beneficial. Significant impacts to water resources would not be expected to occur during the construction or operational phases of the proposed KEP.

3.2.3 Mitigation Measures

Since no significant impacts to water resources have been identified, no mitigation measures have been proposed.

3.3 Soils and Geology

3.3.1 Existing Environment

3.3.1.1 Soils

Soils within the project area consist of alluvial sediment deposited by the Salt River and its tributaries. The major soil unit is the Mohall loam, a well drained soil found on old alluvial fans with slopes of 0 to 1 percent. Permeability in this soil is moderately slow. Mohall loam is characterized throughout its profile as loam, clay loam, and sandy clay loam to a depth of more than 5 feet (Adams 1974).

A small component of Laveen loam occurs along the extreme eastern side of the project area, adjacent to the Kyrene Branch Canal. Laveen loam is a well drained soil found on old alluvial fans with slopes of 0 to 3 percent. Permeability is moderate. This soil is characterized as a loam to a depth of more than 5 feet.

Both of these soils have few limitations that affect their use. Runoff is slow and wind and water erosion hazards are slight to nonexistent. The primary limitation is the high clay content of the Mohall loam, which possesses a moderate shrink-swell potential and low strength when saturated.

Both the Mohall and Laveen soils are considered prime farmland if irrigated. However, because the land is part of an industrial parcel owned by SRP, no currently active prime farmland would be precluded from future use.

3.3.1.2 Geology

The proposed KEP lies within the Basin and Range physiographic province, which is characterized by rugged mountain ranges separated by intervening basins. These valleys are filled with alluvial material often several hundred feet thick. Average elevation in the project area is 1,200 feet above mean sea level.

Geologic hazards within the project area are minimal. Although Arizona is considered a seismically active state, the rate of seismicity in the Phoenix area has historically been very low. The nearest mapped potentially active faults to the Phoenix area are the Sugarloaf and Horseshoe faults located about 40 to 43 miles northeast of Phoenix, respectively. The largest credible earthquakes that could occur on these faults are about magnitude 6.75 (Bausch and Brumbaugh 1994). In addition to a low seismic threat, the project area lies within a valley floor, where slopes are generally less than 1 percent, making susceptibility to landslides or slope failures very unlikely.

Arizona is an arid state, and coupled with the relative seismic quiescence of the Phoenix area, saturated soils susceptible to liquefaction are of rare occurrence. Channelization of the Western and Kyrene Branch canals has further reduced the potential for soil liquefaction. Flash flooding also is of low concern within the project area.

The project area is not located within an economically producing industrial mining district, and no mines or quarries occupy the proposed site. Additionally, because the site is included within an industrial parcel owned by SRP, construction would not preclude any future mineral extraction efforts.

3.3.2 Potential Impacts

No significant impacts resulting from construction of the proposed project are expected. Construction would not alter or modify any unique geologic features, and would not increase the potential for exposure of any geologic hazards to people or property. Soil disturbance would occur on approximately 27 acres associated with the plant site and associated pipelines, but, given the previously disturbed nature of the proposed site, would not have any direct impact to the natural environment.

3.3.3 Mitigation Measures

Because no significant impacts to geology or soils are expected to occur as a result of the proposed project, no mitigation measures have been proposed.

3.4 Biological Resources

3.4.1 Existing Environment

3.4.1.1 Vegetation and Wildlife

The project site is composed of flat, barren, highly disturbed, industrial land. The vegetation on the site is composed of several weedy herbaceous plants, grasses, and a few scattered shrubs and trees. Most of the plant species present are exotic species that have become naturalized. Areas that have not already been developed are maintained to prevent excessive plant growth. One concrete-lined water canal (i.e., Western) and one unlined canal (Kyrene Branch) are present adjacent to or within the project site. These canals do not support aquatic or riparian vegetation. No wetlands or other natural habitats are present on the site.

The biological resources within the project site are typical of highly disturbed urban sites. Wildlife that utilize the site include species that are well adapted to human altered landscapes. Natural plant communities and associated assemblages of wildlife no longer exist on the project site. Species that could occur in the general vicinity of the site are listed in Appendix C, Tables C-1 through C-5.

The proposed water supply, wastewater discharge, and natural gas supply pipelines would be constructed in previously disturbed industrial areas or road ROWs. No wetlands or other natural habitats would be traversed or affected by the construction of these pipelines.

3.4.1.2 Threatened, Endangered, and Sensitive Species

Table C-6 in Appendix C lists plants and animals known from Maricopa County that are threatened, endangered, or otherwise sensitive. This list was compiled from information obtained through publications and websites from U.S. Fish and Wildlife Service (USFWS), Arizona Game and Fish Department (AGFD), and Arizona Department of Agriculture. Of the 47 species listed in Appendix C, Table C-6, habitat for the California leaf-nosed bat, great egret, snowy egret, peregrine falcon, and belted kingfisher could occur on the site.

The California leaf-nosed bat is a year-round resident in desert scrub habitats of southern and western Arizona. These bats are primarily insectivorous, do not hibernate and are, therefore, active all year (AGFD 1993). During the day, this species roosts predominantly in mines and caves and their foraging habitat includes Sonoran desert scrub. California leaf-nosed bats are threatened by vandalism and disturbance at roost sites and by a general limit to the number of roost sites this bat can use during the winter (AGFD 1996).

Great and snowy egrets are marshland birds that forage in open wetland habitats, especially along vegetated edges dominated by cattails, reeds, and other emergent plants. The great egret is the most cosmopolitan of all egrets (Ehrlich et al. 1988). Both species are colonial breeders, with rookeries restricted largely to the lower Colorado River (Monson and Phillips 1981). Great and snowy egrets could forage along the concrete-lined water canals near the project site; however, egrets found within this area would be transitory individuals.

Peregrine falcons are known to nest on cliffs near the Salt River, at least 10 miles northeast of the project area. Peregrines feed on small birds, usually taken in flight, and forage in places where birds concentrate. Peregrines could potentially forage in the vicinity of the project site; however, the presence of this falcon at the project site would be a rare event. Good foraging habitat is not present as there are no concentrations of birds to prey upon in the immediate vicinity of the project site.

Belted kingfishers are piscivorous (i.e., fish-eating) birds that frequent watercourses of all types, especially rivers, brooks, ponds, and lakes. They are mainly winter inhabitants in Arizona. Conceivably, belted kingfishers could forage along the water canals near the project site (Witzeman et al. 1997).

3.4.2 Potential Impacts

3.4.2.1 Vegetation and Wildlife

Approximately 27 acres of previously disturbed (barren) land would be disturbed during construction activities. The potential effects to biological resources are expected to be limited to direct impacts to small burrowing mammals and reptiles during construction and displacement of other more mobile wildlife species. Impacts to biological resources would be limited to the project site and pipeline corridors and are expected to be negligible.

Discussions and correspondence with the USFWS and AGFD support this conclusion. Appendix D includes copies of correspondence with these agencies. The AGFD letter (dated December 14, 2000) recommends coordination with the City of Phoenix regarding potential impacts to the Rio Saldo Project. As discussed in Section 3.2.2, the City of Phoenix was contacted and no impacts to the Rio Saldo Project are expected to occur as a result of the proposed KEP.

3.4.2.2 Threatened, Endangered, and Sensitive Species

Mine shafts and caves are not present at the project site; therefore, no potential California leaf-nosed bat roosting habitat would be directly affected by the proposed construction. Natural Sonoran desertscrub does not exist in close proximity to any of the proposed project disturbance areas, although California leaf-nosed bats could forage over the site. Any foraging that might occur near the site, would occur at night and would not be disrupted by daytime construction. For these reasons, no adverse effects are expected to the California leaf-nosed bat as a result of the proposed project.

No natural wetlands are located within the proposed construction areas and, therefore, no direct loss of habitat for the great and snowy egrets and the belted kingfisher would occur. Foraging habitat within the concrete-lined canals would remain unaffected following construction. Noise disturbance during construction could temporarily displace foraging birds in the immediate vicinity of the construction site; however, all three species have demonstrated a high tolerance for human activities. For these reasons, no adverse effects would be anticipated to occur to the great egret, snowy egret, or the belted kingfisher as a result of the proposed project.

The proposed construction would have no direct effect to nesting habitat for the peregrine falcon because no suitable cliffs exist in or adjacent to the project area. Although some peregrines have adapted to urban settings, this is not the case for the Arizona population. Similarly there are no important foraging areas for the peregrine at the project site or its immediate surroundings that would be affected by the proposed project. Any potential value the existing site may have for perching would remain after construction. Disturbance during construction would discourage individual birds from perching near the project site and would likely result in the use of alternative sites within the vicinity. Because there are no unique or important habitat features at the site, this displacement would not be significant. For these reasons, no adverse effects would be anticipated to the peregrine falcon, as a result of proposed project.

3.4.3 Mitigation Measures

Because no significant impacts to biological resources are expected to occur, no mitigation is proposed.

3.5 Socioeconomics

3.5.1 Existing Environment

The proposed KEP is located in a developed area including residential, retail/service, and office/warehouse to the west, the Ken McDonald Golf Course on the north and east, and residential areas to the south.

3.5.1.1 Population

Between 1990 and 2000, the population of Maricopa County increased from 2,122,101 to 2,861,395, an increase of 34.8 percent (Maricopa 1999). The majority of the population is concentrated in or near the communities of Phoenix, Tempe, Scottsdale, Mesa, Glendale, and Chandler. The city of Tempe's population increased by approximately 15.4 percent, from 141,865 to 163,775, during the same period. The state's growth rate was 30.4 percent for the same period, with a total population of 4,778,332 in 1999 (U.S. Census Bureau 1999).

3.5.1.2 Employment

The City of Tempe has a diverse employment base that provides jobs for Tempe residents and for residents from other cities in the Phoenix metropolitan area. The average labor force in 1999 for the City of Tempe was 119,947; the average number of employed was 116,923; and, the average number of unemployed was 3,024. The average unemployment rate was 2.5 percent, which was less than the state unemployment rate of 4.4 percent for the same period (Tempe 1999). Of the 140,185 jobs in Tempe, the retail sector accounted for 27,989; office and clerical work accounted for an additional 30,977 jobs; the industrial sector employed 46,887; public related jobs accounted for 33,351; and, 981 workers were employed in residential/home occupation jobs. Jobs in the industrial sector include: health, education, and legal (18.6 percent); wholesale/retail trade (21.3 percent); manufacturing (15.9 percent); personal and business services (11.1 percent); finance, insurance, and real estate (7.6 percent); transportation and communications (8.5 percent); construction (4.4 percent); public administration (11.3 percent); agriculture and mining (1.3 percent) (Tempe 1999).

3.5.1.3 Housing

The population of Tempe tends to fluctuate up or down in accordance with the Arizona State University (ASU) school year. Typically, during the summer, multi-family housing catering to students in Tempe has higher vacancy rates. Since over 50 percent of the housing inventory in Tempe is multi-family (apartments, townhouses, condominiums, and mobile homes), a small

increase or decrease in the vacancy rates during the summer or school year reflects a loss or gain of 4,000 to 5,000 people (Tempe 1999).

The 1999 Statistical Report (Tempe 1999) indicates that the total number of dwelling units in Tempe for that year was 67,087 and the number of estimated occupied units, single family or multifamily, was 65,118, for a total of 1,969 unoccupied dwelling units. For North Tempe, the vacancy rate for single-family housing was 2.0 percent; for condos, 2.0 percent; for multifamily housing, 4.0 percent; and, for mobile homes, 11.0 percent. For south Tempe, the vacancy rate for single-family housing was 1.0 percent; for condos, 2.0 percent; for multifamily, 5.0 percent; and, for mobile homes, 11.0 percent. The City of Tempe averaged 2.46 persons per dwelling unit in 1999.

From January to December 1999, a total of 296 new single-family houses and 415 multi-family units were constructed in the City of Tempe (Tempe 1999). According to the Tempe Multi-Listing Service (MLS), as of October 12, 2000, there were 368 residential listings in the Tempe area. Homes in the area range from $70,000 to $850,000 (MLS 2000).

3.5.1.4 Taxes

According to a recent survey conducted for the Phoenix metropolitan area that measures the cost of government services associated with property tax, sales tax, water and sewer charges, and refuse collection fees, Tempe ranks as the least expensive community in which to live of the eight largest cities in the metropolitan Phoenix area. The current city sales tax is 1.7 percent. From 1990 to 1999, sales tax revenues increased from $23.3 million to $88.6 million (Tempe 1999). For the 1999-2000 fiscal year, the largest sales tax revenues were generated by retail sales ($45.6 million), rental of real property ($9.7 million), restaurants ($6.4 million), and construction contracting ($6.1 million).

For the 1999-2000 fiscal year budget, total revenues for the city of Tempe totaled approximately $283.5 million. Sources of revenue include: general governmental (47.8 percent); special revenue (17.2 percent); enterprise (18.8 percent); bonds/note proceeds (8.5 percent); outside revenues (5.3 percent); other fund revenues (2.4 percent). At 47.8 percent, government entities generated the largest revenue primarily from city sales tax ($61.9 million), city property tax ($16.5 million), state income tax ($16.9 million) and state sales tax ($4.7 million).

3.5.1.5 Environmental Justice

Since publication of Executive Order (EO) 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations in the Federal Register (FR) on

February 11, 1994 (59 FR 7629), federal agencies have been developing a strategy for implementing the order. Currently, the federal agencies rely on the Environmental Justice Guidance Under the NEPA prepared by the Council on Environmental Quality (the guidance) (USEPA 1997), in implementing EO 12898 in preparing NEPA documents.

Pursuant to EO 12898 on Environmental Justice, federal agencies shall make the achievement of environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations, low-income populations, and Indian tribes, and allowing all portions of the population an opportunity to participate in the development of, compliance with, and enforcement of federal laws, regulations, and policies affecting human health or the environment regardless of race, color, national origin, or income.

EO 12898 requires identifying whether an area potentially affected by a proposed federal action may include minority populations and low-income populations and seek input accordingly. These requirements were addressed in this document by ensuring broad distribution of public information on the proposed KEP through a public involvement process begun in the fall of 1999. A variety of public involvement methods were used to provide information and address the concerns of all parties as well as those seeking involvement. Community representatives used a combination of printed materials, electronic materials, and numerous meeting formats to disseminate information and gather comment. The primary methods used were newsletters, SRP billing inserts, telephone information line, website, public open houses, small group meetings, and briefings.

3.5.1.6 Minority Populations

Minorities include individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; African American, not of Hispanic origin; or Hispanic. The guidance states that “a minority population may be present if the minority population percentage of the affected area is ‘meaningfully greater’ than the minority population percentage in the general population or other ‘appropriate unit of geographic analysis’ (USEPA 1997).” The “affected area” is the area that the proposed KEP would have an effect on. For comparison, the guidance suggests presenting data for the next larger geographic area or political jurisdiction to provide a context for population characteristics. For the purpose of this analysis, the minority populations within 0.5 mile of the proposed facility were compared to the minority populations within the Tempe city limits.

According to the 1995 Special Census (Tempe 1999), Tempe is primarily white (74.9 percent), with the remaining population Hispanic (14.7 percent), Asian (4.7 percent), African American (3.2 percent), American Indian (1.5 percent), and other (1.0 percent).

The population of the residential areas located along the north and east edge of the Ken McDonald Golf Course is primarily white (80 percent), Hispanic (11.9 percent), African American (4.6 percent), Asian (2.6 percent), American Indian (0.7 percent), and other (0.2 percent). Approximately 0.5 mile south and southeast of the proposed facility, the population of the residential area is primarily white (86.2 percent), with the remaining populations Hispanic (6.9 percent), Asian (4.7 percent), African American (1.4 percent), American Indian (0.2 percent), and other (0.6 percent). The residential area west and northwest and within 0.5 mile of the proposed facility is composed of white (68.7 percent), Hispanic (18.6 percent), African American (5.6 percent), Asian (4.3 percent), American Indian (1.9 percent), and other (0.9 percent) (Tempe 1999).

3.5.1.7 Low-Income Populations

The guidance recommends that low-income populations be identified with the annual statistical poverty thresholds from the Bureau of Census' Current Population Reports, Series P-60 on Income and Poverty. The U.S. Census Bureau 1999 poverty threshold definition for a 3-person household is $13,290. For the purpose of this analysis, populations living within 0.5 mile of the proposed facility were compared to the Tempe population as a whole.

The 1995 Special Census Income Report indicates that the median household income in Tempe was $36,049 (Tempe 1999). The residential area located immediately north and east of the Ken McDonald Golf Course had a median household income of $42,188; the residential area located approximately 0.5 mile south and southeast of the proposed facility had a median household income of $79,459; and the residential area located approximately 0.5 mile west and northwest of the proposed KEP had a median household of $36,659.

3.5.2 Potential Impacts

3.5.2.1 Population

Area population changes due to construction of the KEP would be minimal and of short duration. Construction would require 12 months to complete, from March 2001 to March 2002. The peak number of workers on the project would be 300, which is expected to occur from May to October 2001. Most of the construction work force is expected to reside in the City of Tempe or the greater Phoenix metropolitan area, which is within commuting distance of the proposed facility.

Area population changes due to operation of the facility on the Kyrene site would be minimal. The estimated number of new workers for the proposed facility would be 10 to 15. Most of the operation workers are expected to be residents of Tempe or the greater Phoenix metropolitan area. Impacts on population from operation of the proposed facility would be negligible.

3.5.2.2 Employment

In 1999, Tempe had an estimated 3,024 unemployed workers out of an average 119,947 work force, for an average 2.5 percent annual unemployment rate (Tempe 1999). The projected 300 resident construction workers on the proposed KEP, assuming that all 300 are hired from the ranks of the city's unemployed, would represent almost 10 percent of the 1999 unemployed work force in the city of Tempe. However, this calculation does not factor in the larger available work force from the greater Phoenix metropolitan area, and it is unlikely that all 300 resident construction workers would be hired from Tempe's unemployed. A more reasonable assumption is that existing construction contractors bidding for the KEP project would already employ many of the workers. It also is difficult to predict whether or not the construction skills required would be available from the pool of unemployed workers. Consequently, the impact on area employment during construction of the expansion project is expected to be positive, but only marginally and of short duration.

The estimated number of new workers for the proposed facility would be 10 to 15. It is expected that the operation workers would be hired from the available workforce in Tempe or the greater Phoenix metropolitan area. The small number of new workers would be a negligible, but beneficial impact on area employment.

3.5.2.3 Housing

No significant impacts to housing are expected to occur during construction because of the anticipated minimal number of nonresident workers and the relatively short commuting distance between the Kyrene site and the major housing markets, particularly Mesa, Chandler, Gilbert, Scottsdale, and Phoenix. Additionally, it is unlikely that many out-of-region workers would relocate their families for the relatively short construction period. Insignificant population growth is expected during construction of the proposed facility because of the minimal number of out-of-region workers required and the brevity of the construction period.

The Kyrene site is within commuting distance from the major populations and employment centers, including Mesa, Chandler, Gilbert, and Scottsdale. It is likely that a resident not within commuting distance would eventually choose to relocate closer to the proposed facility and would be seeking permanent housing in Tempe. However, no significant impacts to housing are

expected to occur from operation of the proposed facility because of the minor population growth expected and the anticipated low number of nonresident workers.

3.5.2.4 Tax Revenues

Capital costs of the proposed KEP are estimated to be $150 million, including equipment, materials, and labor. It is expected that many of the construction materials would be purchased within the region, including the greater Phoenix metropolitan area. The economic benefits would most likely spread out among Tempe, the Phoenix metropolitan area, and possibly, statewide. The impact on the local area economy, including sales tax revenue and income, during construction of the proposed facility would be positive, but is only expected to be marginal and of short duration.

The proposed KEP would result in various tax revenue increases for the local economy. SRP's estimated voluntary contribution in-lieu of ad valorem taxes would be $27.5 million over 21 years or approximately $1.3 million per year. Primary beneficiaries of the property taxes would be Kyrene Elementary ($10.3 million), Tempe Unified High School District ($7.3 million), and the City of Tempe ($3 million). Other payments would be made to Maricopa County, Maricopa Community College, East Valley Institute of Technology, CAWCD, and other special districts (i.e., fire, library). Due to recent changes in the property valuation formula for electric generating facilities, construction work in progress is not included as taxable property. The electric generating facilities would become taxable property when the plant is in-service. In addition, there is a 2-year reporting cycle on centrally assessed property. Therefore, if the KEP is placed in service in calendar year 2003, the KEP would become reportable taxable property in calendar year 2005. The proposed KEP would have a long-term positive impact on the local area economy.

SRP's estimated annual use taxes would be $3.7 million per year on natural gas purchases of $54.6 million per year. The estimate is based on the assumption that SRP purchases of natural gas would take place out of state, and then be transported into Arizona. Consequently, these gas purchases would only be subject to the State of Arizona and the City of Tempe use taxes at 5 percent and 1.7 percent, respectively. There is currently no use tax rate for Maricopa County. In addition, there would be contracting sales taxes paid during construction on landscaping, contracting labor on permanently attached machinery and equipment to the land (i.e., foundations, underground piping, etc.), and other machinery and equipment not used directly in generation or transmission of electricity (fire protection equipment, security lighting, office buildings, etc.). With respect to Operations and Maintenance (O&M), purchases for most expendable materials and supplies would be subject to sales taxes (chemicals, fuels, lubricants, etc.). Most maintenance and repairs on machinery and equipment used directly for electric generation and transmission

are exempt from sales and use taxes. If 50 percent of the annual O&M costs are taxable, sales taxes would be approximately $300,000 per year.

3.5.2.5 Environmental Justice

The data presented in Section 3.5.1.6 indicates there are no minority communities within 0.5 mile of the proposed facility; therefore, no environmental justice issues concerning minority populations are expected to occur as a result of the construction and operation of the proposed expansion project.

The data presented in Section 3.5.1.7 clearly indicates that the communities within 0.5 mile of the proposed facility do not meet the criteria of a low-income population based on the annual poverty thresholds from the Bureau of Census' Current Population Reports, Series P-60 on Income and Poverty; therefore, no environmental justice issues concerning low-income populations are expected to occur as a result of the construction and operation of the proposed expansion project.

3.5.3 Mitigation Measures

Since no significant, adverse impacts to socioeconomics are anticipated, no mitigation is recommended.

3.6 Land Use

3.6.1 Existing Environment

3.6.1.1 Current Land Use

The proposed plant would be situated adjacent to the existing Kyrene Generating Station within the 160-acre parcel owned by SRP. The site is bordered by the Union Pacific Railroad corridor on the west, the Ken McDonald Golf Course on the north and east, and Elliot Road on the south. This land has been used by SRP for reclamation functions and as the heavy transformer storage area. Existing facilities on the property include the Kyrene Generating Station, cooling towers, transmission switchyards, various storage and staging areas, and the service center. The proposed plant location is currently zoned for general industrial land uses including utilities and communication facilities.

The land immediately adjacent to the proposed KEP site is a mixture of land uses: residential, retail/service, and office/warehouse land uses to the west, residential areas to the south, and the Ken McDonald Golf Course immediately to the north and east. This 18-hole course provides a

buffer between the existing and planned facilities and nearby residential areas. The Tempe YMCA, a public/quasi-public facility, is located on the east side of the Ken McDonald Golf Course along the Western Canal and west of Rural Road; the Tempe Center for Habilitation, a school/educational facility, is located north across the Ken McDonald Golf Course. The Western Canal flows from the east along the northern border of the property until it reaches the northeast corner of the proposed project area, then turns north and flows through the golf course. The Kyrene Branch of the Western Canal continues through and along a portion of the eastern edge of the proposed KEP site and continues south across Elliot Road. The vacant land on the southeast corner of Elliot and Kyrene is zoned for retail.

The location of the proposed KEP is approximately 650 feet from the nearest residential property. Residential areas in the vicinity were characterized according to density level. These density levels are provided in the Tempe General Plan 2020 (City of Tempe 1997) in order to remain consistent with planned land use. Residential areas were divided into two categories: areas with less than or equal to eight dwelling units per acre (lower density), and areas with greater than eight dwelling units per acre (higher density). Residential areas with densities less than eight dwelling units per acre and vacant/undeveloped land are located south of the existing plant site across Elliot Road and along the north and east edges of the golf course. Two high-density developments, while not immediately adjacent to the KEP site, are located north of the Ken McDonald Golf Course (La Estancia Apartments) and west of Kyrene Road (Elliot Crossings and Grove Parkway Apartments).

Recreation use areas include parks, open space, flood control facilities, and recreation trails. Kiwanis Community Park, located approximately 0.5 mile north of the project site, offers playgrounds, lighted ballfields, volleyball courts, soccer fields, and a recreation center with indoor pool and gymnasium. The Benedict Sports Complex, located approximately 0.5 mile northwest of the project site, provides six lighted multi-purpose athletic fields for nearby neighborhoods. Smaller parks and open space are found throughout the nearby area in residential areas and adjacent to education facilities.

3.6.1.2 Planned Land Use

The Tempe General Plan 2020 reveals no major changes to existing developed land adjacent to the proposed KEP site. Since relatively few undeveloped areas exist in the vicinity of the proposed project site, significant changes to land use are not expected to occur. The areas currently undeveloped are concentrated in the corridor east of I-10 and west of the railroad, approximately 0.5 mile from the proposed expansion site. The City of Tempe General Plan has designated these areas for industrial and retail use. A few smaller parcels of undeveloped land occur in residential areas and are planned for residential development.

The Tempe General Plan 2020 divides the city into three distinct growth areas to reflect its north to south growth pattern. The proposed expansion project area falls within the South Tempe area, which is characterized by land use categories including industrial, retail office, residential, schools, and recreation areas. The existing Kyrene Generating Station is located in an area that has been designated for continued industrial use. According to the Tempe General Plan 2020, the industrial land use category accommodates industrial as well as office business park/warehouse and limited commercial activity directly related to the primary industrial use. The General Plan shows an industrial trend following the railroad corridor from Baseline Road continuing south near Ray Road. In the southern half of the study area between I-10 and the railroad corridor, mixed industrial, retail, and office/service areas are the primary types of planned land use.

The Bicycle Master Plan, found in the General Plan 2020, includes existing and proposed bicycle trail connections in the City of Tempe. The objectives of this bicycle plan include making bicycling safer in Tempe, encouraging the use of the bicycle as a part of the transportation system, and improving the bikeway system by providing facilities for all types of bicyclists. The Plan calls for expanding the network of bicycle and pedestrian pathways including the use of off-street locations such as canal banks, railroad ROW, and utility easements. Two bicycle trails in the Master Plan are located in the immediate vicinity of the proposed expansion project site. The first is a proposed trail following the railroad corridor along the western border of the plant site. The second is a trail that would parallel the Western Canal and Kyrene Canal that crosses the existing plant site adjacent to the golf course.

3.6.2 Potential Impacts

The proposed KEP is located on the property of an existing, operational power generating facility owned by SRP. Activities associated with the construction, operation, and maintenance of the proposed KEP would all be located on the current site and would be compatible with existing facilities on site. Therefore, no long-term impacts were identified for existing or planned land uses as a result of the proposed project. The proposed expansion site is within an existing industrial land use area and is part of a regional industrial area as designated in the Tempe General Plan 2020; therefore, the proposed expansion would not conflict with the General Plan.

There is currently no recreation on the project site and there are no anticipated negative impacts to recreation in the adjacent areas from the proposed KEP.

3.6.3 Mitigation Measures

Since no significant, adverse impacts to land use are anticipated, no mitigation is recommended.

3.7 Transportation/Traffic

3.7.1 Existing Environment

The proposed SRP KEP site is readily accessible via air, rail and automobile. The Phoenix Sky Harbor Airport is less than 8 freeway miles to the northwest. The project site has two existing rail spurs accessing the Union Pacific-Southern Pacific system. The project site has ready access to the interstate highway system via I-10; the Hohokam Expressway, 1.5 miles west of the site; and U.S. 60, the Superstition Freeway, about 2 miles north of the site. The metropolitan street system provides major surface thoroughfares on a 1-mile grid; the site abuts two such major streets, Kyrene Road on the west and Elliot Road on the south. Guadalupe Road is about 0.5 mile north and Rural Road is about 0.5 mile to the east.

Kyrene Road is a four-lane street with a center two-way left turn lane, bicycle lanes, and exclusive left and right turn lanes at major intersections. It carries an average of 50,933 vehicles per day (Tempe Department of Transportation [TDOT] 2000). Elliot Road is a six-lane street with a raised median and turn lanes carrying 43,476 vehicles per day. Guadalupe Road has four lanes plus turn lanes and bicycle lanes. Guadalupe carries 28,875 vehicles per day. Rural Road carries 43,029 vehicles per day (TDOT 2000); it is six lanes north of the Western Canal and four lanes south of the canal, plus a center turning lane. On-street parking is not permitted on any of the major streets.

Detailed capacity information is not available for the major streets and intersections near the project site. Consequently, estimates were made using standard traffic characteristics provided by the City of Tempe (TDOT 2000) and maximum hourly volumes observed on urban arterials in other cities (Transportation Research Board 1985). Hourly estimates are used because of the peaking behavior of traffic during the morning and evening rush hours. Observed maximum flow rates ranged from 1,035 to 1,320 vehicles per hour per lane (VPHPL) on six-lane arterials, averaging 1,165, and from 1,078 to 1,582 VPHPL on four-lane arterials, averaging 1,242. Current traffic in the peak hour dominant direction on the major streets near the SRP site average an estimated 1,223 VPHPL (2,445 total vehicles per hour [VPH]) on Kyrene Road, 696 VPHPL (2,087 total VPH) on Elliot Road, 693 VPHPL (1,386 total VPH) on Guadalupe Road, and 1,033 VPHPL (2,065 total VPH) on Rural Road. (These estimates assume 8 percent of daily traffic in the peak hour and a 60/40 directional split [TDOT 2000].) Kyrene and Elliot roads operate at 98 percent and 60 percent of average observed maximum flow, respectively; Guadalupe and Rural roads operate at 56 percent and 83 percent of average observed maximum flow, respectively.

3.7.2 Potential Impacts

The construction phase of the KEP would produce the greatest demand on transportation systems in the vicinity of the site. Major components of the plant would likely be shipped by rail because of their size and the existing rail access into the site. Rail traffic would likely be on the order of a few dozen carloads, which would have no adverse effect on the railroad system.

Highway traffic would range from construction worker automobiles to heavy trucks carrying construction materials and supplies. All construction traffic would enter the site from Kyrene Road via an existing paved road along the north boundary of the project site and would enter through a gate in the north fence. This road is currently used for SRP maintenance and construction traffic and for traffic to the reclamation facility, which includes heavy vehicles ranging up to oversized loads carrying large transformers.

The greatest impact on local traffic would likely result from workers commuting to the site. It is estimated that construction would include from one to three shifts per day. The maximum number for any one shift could reach 200 workers on the day shift, starting between 5:00 and 5:30 a.m. in the summer and between 6:00 and 6:30 a.m. in the winter (Barras 2000). Construction workers typically average from one to 1.5 workers per vehicle, generating from 133 to 200 vehicle trips into the site in the morning and the same number out in the afternoon. The traffic would converge on Kyrene Road. If it occurred during the peak hour, a worst-case would have 200 vehicles joining the northbound morning flow and increasing it from 2,445 to 2,645 VPH, exceeding the maximum estimated capacity of about 2,484 VPH. The worst case is unlikely, however, because the early start time for the day shift would not coincide with the morning peak hour and the day shift release time would precede the afternoon peak traffic period. The 200 construction worker vehicle trips would not be a significant incremental increase to off-peak traffic volumes on major streets in the site vicinity.

Truck traffic would include an estimated average of five loads (10 trips) per day spread throughout the day. Individual, large loads could slow traffic on Kyrene Road at the access road intersection, but the effects would be brief and not a regular occurrence. The highest volumes of truck traffic would occur when major concrete pours were conducted. There could be three to four loads per hour generating up to eight total trips per hour. This volume would not significantly affect traffic, although some slowing and minor delays are likely for other motorists.

The effects of construction on traffic on other major streets in the area would be less than those experienced on Kyrene Road because the traffic would dissipate onto several different roads once away from the site entrance.

Construction of the pipelines along Guadalupe Road and Kyrene Road would likely cause some congestion and slowing as closure of one or two lanes may be necessary, depending on the alignment of the pipeline corridor. The degree of adverse effect would depend on the timing and scope of the closures. The duration of construction on the pipeline, and thus the traffic effects, would be very short. The construction of the gas line across Kyrene Road and Elliot Road will utilize boring and not trenching as the method of construction.

Traffic from operation of the KEP plant would have very little effect on traffic in the site vicinity. Operation would add from 10 to 15 people to the SRP site work force. Perhaps two-thirds, or 7 to 10 people, would work the normal day shift. They would likely enter and exit the site during the peak traffic periods, but the numbers would be too small to measurably affect traffic conditions.

3.7.3 Mitigation Measures

Since no significant impacts would occur, no mitigation is proposed.

3.8 Visual Resources

3.8.1 Existing Environment

A systematic evaluation of visual resources commonly involves characterizing the visual environment based on both the quality of the existing landscape and its sensitivity. Visual quality is a measure of the visual appeal of a site, determined by the apparent scenic value of site features, their variety, harmonious composition, and their relationship to the natural landscape. Visual sensitivity is a measure of public concern for the scenic quality of a site or an area. Considerations include the number of viewers, their reason for being in a position to view a site, their interest in the visual environment, and the community context of a site. As a simple example, an individual racing down the freeway to and from work on a daily basis with an obtuse view of a site from 1 mile away is likely to be much less sensitive to the visual quality of the site than someone with a close-up view of the site from her own backyard patio.

The proposed KEP site represents approximately 15 acres within SRP's existing 160-acre industrial parcel. The KEP site is generally barren, occupied only by a rail spur and a few utility lines and was formerly used for storage of power poles awaiting transfer to field use locations. The site has essentially no existing native vegetation.

The project site is industrial in character. The northeast quadrant hosts the existing 255-MW Kyrene Generation Station, a substation, and the current location of the pole yard. The southerly leg of the site contains another, larger, substation; maintenance and repair facilities for vehicles

and equipment; and a business office. SRP's reclamation and recycling facilities are located in the northwest corner of the site, where old transformers and other equipment are disassembled to facilitate recycling of salvageable materials and proper disposal of non-salvageable materials. The site is almost entirely devoid of landscape plantings or other vegetation. The exception is the southern site boundary, where there is a decorative block wall facing Elliot Road with a relatively sparse planted area between the wall and the public sidewalk. The block wall also extends for short distances northward along the east and west property boundaries and a chain link fence surrounds the remainder of the site.

The site context reflects a growing level of sensitivity in recent years. The west boundary abuts a Southern Pacific Railroad line, the backs of a row of commercial/industrial buildings, and Kyrene Road, all of which would be considered relatively low in visual sensitivity. There are apartments on the west side of Kyrene Road, however. The south boundary fronts on Elliot Road, a major thoroughfare, and is across the street from Alisanos, a developing, walled and gated, residential subdivision where concerns have been expressed about the visual character of the SRP site. The City of Tempe's public Ken McDonald Golf Course surrounds the remainder of the site boundary. There are more modest residential subdivisions across the golf course from the site all along the eastern boundary. There also are an apartment complex and a habilitation center for people with disabilities across from the golf course to the north. Visual sensitivity from the golf course and surrounding residential areas would be considered moderate to high, as evidenced by the neighborhood interest and concerns that surfaced when the KEP project was first proposed.

3.8.2 Potential Impacts

The effects of a proposed project, like the KEP, on the visual environment are evaluated by comparing the visual landscape as it would look if the project should be constructed with the landscape as it appears today. The key question involves visual compatibility or contrast; would the proposed changes "fit" with the existing landscape or would they stand out? Would they improve or degrade existing views in the eye of a typical observer. Common design elements of form, line, color and texture provide the framework for evaluating contrast and compatibility.

In order to conduct the evaluation, five perspectives, called KOPs, were selected to represent the myriad of possible views of the site (see Figure 3-2). KOP A looks northeast into the SRP site from the intersection of Kyrene Road and Elliot Road. KOP B looks north at the site from the Alisanos subdivision main entrance on Elliot Road. KOP C looks northwesterly toward the KEP site from the residences at the intersection of South Forest Street and East Chilton Street; this perspective also represents views from the front nine holes of the Ken McDonald Golf Course. KOP D is at the apartment complex north of the golf course, looking almost straight south into the KEP site, also representing views from the back nine holes of the golf course. KOP E looks east

across Kyrene Road into the project site from the apartment complex just south of West Grove Parkway.

The most prominent visual features of the proposed KEP would be the 150-foot-tall exhaust stack, the cooling tower, the CT, and the enclosed HRSG illustrated in Figures 2-3 and 2-4. The steam generator and various ancillary equipment also would be visible, though notably smaller and less visually prominent. The visual character of the proposed facilities would be industrial in nature. Most surface materials would be clearly metallic (steel and aluminum); some may be painted, though the form and texture would still be characteristic of metal. The stack would be constructed of steel. The visual impression would be somewhat "cleaner" and more modern than the existing Kyrene Generating Station because of the enclosures for the HRSG and CT, but it would be apparent to most viewers that they were observing an industrial plant. KOP A is approximately 3,000 feet (0.6 mile) southwest of the KEP site. A billboard, a prominent traffic signal/street sign standard and a large transmission line tower dominate immediate foreground views toward the site. There is a fairly plain, but attractive, masonry wall on the project site boundary. Middle range views are very "busy" with the structures and conductors of a sizable electrical substation beginning about 750 feet into the project site. The complexity of the substation masks views of plant features beyond it. The stack, and perhaps the upper portions of the plant enclosure, would be visible through the substation "maze." They would not be visually prominent, however, because they would be partially screened by intervening structures and they would continue the industrial character of the existing view in terms of color, line and texture. The form would be somewhat different, but at the 3,000-foot distance, it would not stand out from the intervening electrical equipment.

KOP B is 2,550 feet (0.5 mile) south-southwest of the project site. Foreground views are dominated by hard surfaces. Elliot Road is over 90 feet of uninterrupted pavement flowing into the three-lane main access drive to the SRP service center. The site is surrounded by the brown masonry wall noted above and, just inside the site, there is a plain, but reasonably attractive service building of the same two-tone brown black. Electrical substation support structures and conductors start just behind the building and present a similar "busy" visual picture that dominates the view toward the site further north. The stack and upper half of the plant enclosure would be visible through the forest of substation and transmission line towers. Because of the greater distance, the stack would appear about half as tall as the foreground-midrange structures. The KEP would continue the industrial character of the view and would be visually subordinate to the intervening equipment.

KOP C is about 1,850 feet (0.4 mile) southwest of the project site. Views are dominated by the designed landscape greenery of the golf course. Though clearly man-made and maintained in the desert environment, it is pleasing and restful to the eye with green lawns and numerous small to

KOP LOCATIONS

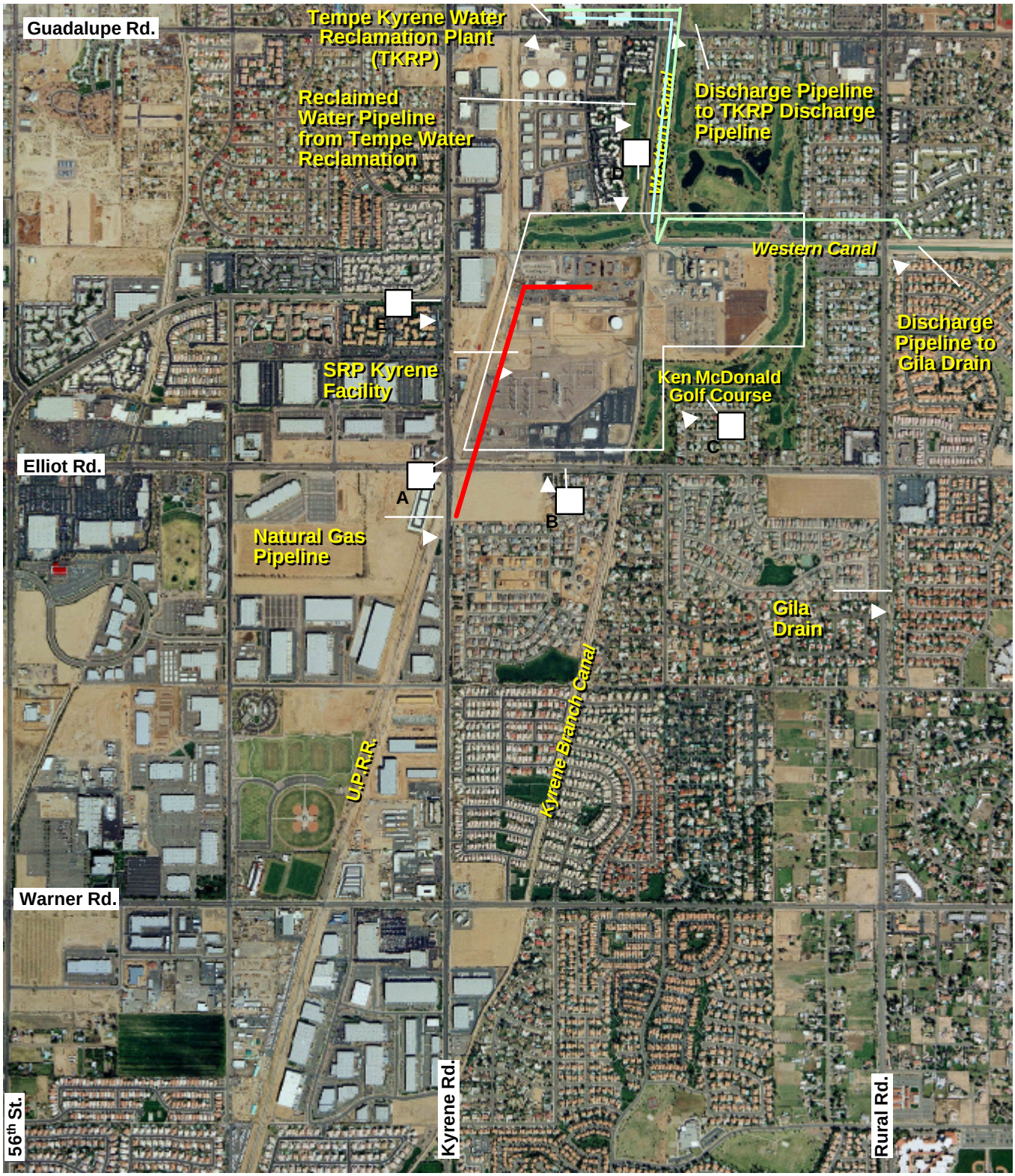


Figure 3-2

Photo Date: March 2000

North

Scale in Mile

0 1/2

1/25/01 000536P-2

medium sized trees. The proximity of the plant is apparent mainly from the large transmission line towers in the middle distance behind and above the trees of the golf course. The large, white storage tank contrasts sharply with the foreground greenery, but is set back and partially screened by trees; the existing power plant also is partially screened and is somewhat less prominent because its color is less stark. The top of the stack and, from some angles, the upper portion of the plant enclosure would be visible through the foreground screen of trees. The transmission towers and conductors would remain the most visually dominant plant feature from this perspective. The stack would appear quite small – less than half as tall as the towers – because of the greater distance from viewers. The KEP would be industrial in character, unlike the more pastoral foreground view of the golf course, but would be visually subordinate to the golf course landscape.

KOP D is about 650 feet (0.1 mile) north of the project site, at the apartment complex. Fairways 11 and 12 of the golf course compose the foreground view, though they are much more open, with fewer trees than the portion of the course described for KOP C. The project site is the closest portion of the project site to KOP D; it is currently vacant and barren. The existing power plant is visible through the trees to the southeast; the large white storage tank is similarly visible to the south. There is a tall, narrow surge tower at the SRP well site and less prominent views of the transmission tower/conductor system within the site. The visual character, as viewed from KOP D, is a mixture of golf course open space and industrial. The cooling tower, with the stack and plant enclosure building towering behind, would dominate middle range views from this KOP. The existing golf course landscape in the foreground will continue to provide visual separation and some relief from the industrial character of the project site, but the proximity of the KEP facilities and the relatively sparse existing tree cover would notably shift the visual landscape further toward industrial.

KOP E is almost 2,000 feet (0.4 mile) west of the project site. Views eastward toward the plant site encounter Kyrene Road, a vacant commercial/industrial site, and the Southern Pacific Railroad track before opening onto the project site. The site at this location is largely barren. Two major transmission lines pass overhead on the south edge of the apartment complex. Their attendant tower structures, diminishing into the distance across the site, are the dominant visual features. The large white storage tank and existing power plant are visible, but appear fairly small at 2,000 and 3,000 feet away, respectively. The stack, enclosure building and cooling tower would be visible from this perspective, but would not dominate the view because of the distance. The new plant would continue the existing industrial character of the landscape. The vacant commercial/industrial site is a unique feature of this perspective. It is expected that the site will be developed at some future date, at which time views of the proposed KEP facility are likely to be largely screened from view.

Construction of the pipelines would cause temporary visual effects, but they would be similar to common urban utility construction and repair projects and would be short-term in nature, lasting only a few weeks. Once completed, the pipelines would not be noticeable to the typical observer.

In summary, the proposed KEP project facilities would continue the industrial character of the existing landscape at the project site. They would be visible from each of the KOPs to varying degrees, but would not dominate, or even notably impact views from KOPs A, B, C, or E. Project facilities would be quite visually prominent from KOP D on the north side of the plant. Although the KEP site is currently vacant industrial land, the new facilities would notably increase the industrial character of the view. Based on SRP's committed landscape enhancement program, visual impacts would be less than significant.

3.8.3 Mitigation Measures

Based on the committed visual enhancements described in Section 2.2.5.6, Visual Resources, no significant visual impacts are anticipated. As a result, no mitigation measures are proposed.

3.9 Noise

3.9.1 Existing Environment

The existing noise environment is characterized by existing ambient noise levels, noise sources, locations of noise-sensitive land uses near the proposed project and terrain that could provide potential noise barriers.

Existing noise in suburban areas is typically dominated by traffic on adjacent roadways with levels dropping the farther one departs from a major street. In this case, the existing power plant is an additional identifiable source of community noise. Ambient levels in suburban communities commonly average in a range from the low 40s to the low 50s dBA (USEPA 1971). Existing noise levels were measured at several selected locations near the project site, representing the nearest residences in several directions (Hessler 1999). Continuous measurements were taken over a 68-hour period at the nearest residence to the site (monitoring site 1, see also KOP D in Section 3.8.2) and spot measurements were taken over the same 3-day period at four additional locations (Hessler 1999). The highest average levels measured were at an apartment complex west of Kyrene Road (see KOP E in Section 3.8.2) where traffic noise dominated and existing plant noise was not audible. The short-term equivalent continuous sound level (L_{eq}) at that location was 60.5 dBA. Comparable short-term L_{eq} at other locations ranged from 47.7 dBA to 59.4 dBA with the existing plant operating and from 46.3 dBA to 54.8 dBA with the plant shut down (Hessler 1999). Continuous measurements at site 1 yielded hourly L_{eq} levels ranging from 46 dBA

to 66 dBA with the plant operating and in the 46 dBA to 56 dBA without the plant (Hessler 1999) In general, day-night average levels fell in the “normal suburban residential” range with the existing plant quiet and somewhat higher with the plant operating.

Noise-sensitive land uses, called receptors, near the proposed KEP are mainly residences and a habilitation center for individuals with disabilities. The nearest residences are in an apartment complex about 650 feet north of the KEP project site. The habilitation center is adjacent to the apartment complex. The next closest sensitive receptors would be a single-family residence approximately 1,850 feet southeast of the KEP site and another apartment complex about 2,000 feet to the west-southwest. These receptors correspond to visual KOPs D, C, and E, respectively (see Section 3.8.2)

Terrain on the project site is virtually flat; there are no topographic features that would affect the transmission of noise. There may be isolated locations that would receive some noise barrier benefits from a structure on or near the site, but there are no structures large enough to create more generalized substantive barrier effects.

3.9.2 Potential Impacts

Noise impacts are commonly judged according to two general criteria: the extent to which a project would exceed federal, state, or local noise regulations, and the estimated degree of disturbance to people. The KEP would be governed by the City of Tempe Noise Ordinance (Tempe City Code, Chapter 20).

Tempe’s noise ordinance generally limits noise at a residential property line to 45 dBA between 10:00 p.m. and 7:00 a.m. and 55 dBA between 7:00 a.m. and 10:00 p.m. The Tempe ordinance exempts power plant equipment from these limits, provided the plant does not cause noise inside a dwelling unit to exceed 45 dBA at night or 55 dBA during the day. Based on this exemption, the estimated exterior limits would be 57 dBA at night and 67 dBA during the day (USEPA 1974).

The noise ordinance limits concrete pouring to the hours between 5:00 a.m. and 7:00 p.m. from April 15 to October 15 and between 6:00 a.m. and 7:00 p.m. the remainder of the year within 500 feet of a residential zone. Other types of construction activity are restricted to starting one hour later in the morning and must quit at the same time in the evening. The time restrictions can be waived or adjusted, however, by permit from the City Manager. The standard noise level limits are increased by 5 dBA for construction activities. Beyond that, the levels may be further adjusted or waived by the City Manager.

SRP has committed to meeting the standards of the Tempe Noise Ordinance, however, it may be necessary to employ two or three shifts during construction to meet planned schedules (Barras 2000). Specific permits would be required from the city to construct during extended hours.

Noise generated from the proposed project during construction, would emanate from operation of power tools and heavy equipment such as excavators, concrete trucks, backhoes and compressors. Noise emission levels may reach 85 to 90 dBA at 50 feet from the construction activity. Resulting noise levels at the nearest residence could reach 59 to 64 dBA. These levels would typically not disrupt residential activities during daytime hours, but would be considered excessive at night when background ambient noise levels are lower and people are generally sleeping. The degree of adverse effect would depend to some extent on the specific type of construction activity. Concussive noise or shrill noise, for example, would be more disruptive than the general din of people and machines working.

Noise from operation of the KEP plant, without background noise, has been estimated at 56.7 dBA at the nearest residence (extrapolated from Rowell 2000). Adding background noise would raise the level to between 57 and 58 dBA. (If the existing and proposed plants operate simultaneously, noise levels would increase to 60 to 61 dBA.) However, simultaneous operation would only be expected to occur approximately 88 hours per year and only during the day when energy demand is expected to be the highest. Noise levels at other sensitive receptors would be well within the standards required by the Tempe Noise Ordinance because of their significantly greater distances from the KEP plant site.

In summary, construction activities would be expected to comply with the Tempe noise standards for daytime operation, but may exceed them at the nearest residences if night work is required and permitted by the city. Operation of the plant would readily achieve the city standards for power plants during the day, but may slightly exceed the standard at the nearest residence during nighttime hours.

3.9.3 Mitigation Measures

Beyond those environmental protection measures presented in Section 2.2.5.7, Noise, no mitigation is proposed.

3.10 Cultural Resources

3.10.1 Existing Environment

3.10.1.1 Prehistoric and Historic Resources

Archaeological research has been conducted in the vicinity of the proposed project area since the 1880s as part of research and cultural resource management projects, ranging from archaeological monitoring and small-scale surveys to data recovery excavations. Desert Archaeology, Inc. conducted archaeological investigations for the proposed KEP to determine whether any historic properties, including historic archaeological sites and structures and prehistoric archaeological sites, were present in the project area, and what effects, if any, the proposed project might have on the resources. Historic sites post-date the arrival of Europeans and written records and can include homesteads, trash scatters, canals, ditches, railroads, and trails. Prehistoric sites pre-date the arrival of Europeans and written records and can include lithic debitage, tools, campsites, hearths, and structures. All work associated with the archaeological investigations for the proposed KEP has been conducted in accordance with the procedures outlined in the NHPA of 1966, as amended; the Archaeological and Historic Preservation Act of 1974; the Archaeological Resources Protection Act of 1979, as amended; and Title 36 of the CFR, Parts 60-66 and 800, as appropriate.

A Class I comprehensive literature search and records review was conducted to identify previously completed cultural resources inventories and all previously recorded archaeological sites and historic properties listed on the NRHP, and previously recorded standing structures situated within 1 mile of the project area. Records at ASU, the SHPO, Arizona State Museum, Museum of Northern Arizona, Pueblo Grande Museum, Mesa Southwest Museum, and the Bureau of Land Management General Land Office were examined. The records reviewed at ASU included the site files of the Department of Anthropology, the statewide electronic database AZSITE, and the Midvale files housed at the ASU Hayden Library.

Ten historic properties are recorded within 1 mile of the proposed project area; these are presented in Table 3-7.

Gray Ditch, the original Highline Pumping Station, the Kyrene Branch of the Tempe Canal, the Tempe Canal, and the historic road are no longer evident due to residential/commercial development. The Gila Drain near the proposed project area has been piped and has no original integrity. The Highline Canal aqueduct, the Kyrene Branch of the Western Canal, the Union Pacific Railroad, and the Western Canal are adjacent to the proposed KEP site. Eleven prehistoric sites are recorded within 1 mile of the proposed project area; these are presented in Table 3-8.

Table 3-7
Historic Properties Within 1 Mile of the Proposed Project Area

Property	Constructed	Location	Affected	Eligibility
Gila Drain	1914-1921	T1S, R4E, Sec. 11	No	Not eligible
Gray Ditch	Unknown	T1S, R4E, Sec. 15	No	Unknown
Highline Canal/Aqueduct	1912	T1S, R4E, Sec. 10	No	Eligible
Highline Pumping Station (Original)	1913-14	T1S, R4E, Sec. 10	No	Unknown
Kyrene Branch of the Tempe Canal	1880s	T1S, R4E, Sec. 10	No	Unknown
Kyrene Branch of the Western Canal	1912	T1S, R4E, Sec. 10	No	Eligible
Union Pacific Railroad	1887	T1S, R4E, Sec. 10	No	Potentially eligible
Tempe Canal	1871-1900	T1S, R4E, Sec. 10	No	Unknown
Western Canal	1911-13	T1S, R4E, Sec. 10	No	Eligible
Historic Road	By 1870	T1S, R4E, Sec. 9	No	Unknown

Table 3-8
Prehistoric Properties Within 1 Mile of the Proposed Project Area

Site Number	Site Name	Location	Affected	Eligibility
AZ U:9:16 (ASM)	None	T1S, R4E, Sec. 8	No	Unknown
AZ U:9:17 (ASM)	None	T1S, R4E, Sec. 8	No	Unknown
AZ U:9:48 (ASM)	Los Hornes	T1N, R4E, Sec. 32, 33; T1S, R4E, Sec. 3, 4	No	Potentially eligible
AZ U:9:116 (ASM)	Los Guanacos	T1S, R4E, Sec. 10, 15	Yes	Eligible
AZ U:9:147 (ASM)	None	T1S, R4E, Sec. 9	No	No
AZ U:9:71 (ASU)	Las Estufas	T1S, R4E, Sec. 2, 11, 12, 14	No	Potentially eligible
AZ U:9:24 (PG)	None	T1S, R4E, Sec. 10	Yes	Eligible
NA15,799	None	T1S, R4E, Sec. 10	Yes	Eligible
Turney-1 (T-1)	None	T1S, R4E, Sec. 1	No	Potentially eligible
Turney-10 (T-10)	None	T1S, R4E, Sec. 2	No	Potentially eligible
None	"Hemenway" Site	T1S, R4E, Sec. 1, 2	No	Potentially eligible
None	Agricultural Fields	T1N, R4E, Sec. 32; T1S, R4E, Sec. 5	No	Potentially eligible

Three prehistoric sites have been recorded in, or adjacent to, the proposed expansion project area: AZ U:9:116 (ASM) (Los Guanacos); NA15,799; and AZ U:9:24 (PG). Site AZ U:9:116 (ASM) is recorded to the south of the proposed project area, NA15,799 is adjacent to the southern edge of the proposed project area, and AZ U:9:24 (PG) is north of and extends into the proposed project area. All are affiliated with the Hohokam culture and have Preclassic- and Classic-period components. The sites are considered to be potentially eligible for inclusion to the NRHP under Criterion D. These are effectively one site reflecting a shifting land use over time. SHPO concurred with the eligibility of site AZ U:9:116 (ASA) in a letter dated August 3, 2000.

Between February and May 2000 an archaeological testing program was conducted to determine the extent and NRHP eligibility of any cultural resources present in the proposed plant site and related facilities. The testing was conducted in and immediately south of the existing 11-acre Tank Yard of the Kyrene Generating Station, in the 10-acre Pole Yard, and along the proposed gas line that runs along the station's western boundary and then turns east toward and around the Tank

Yard. A total of 123 subsurface prehistoric (121) and historic (2) features related to the Preclassic- and Classic-period Hohokam were discovered; 81 in the 10-acre Pole Yard, 38 in the 11-acre Tank Yard, and 4 along the proposed gas line within the Tank Yard. In addition to standard backhoe trenching, feature recording, and artifact collection, excavations were conducted to recover materials associated with five cremation burials encountered during the trenching operation. These materials were repatriated to the Gila River Indian Community immediately following their excavation, pursuant to Agreement A.R.S. §41-844, Case #00-14.

The Hohokam site of Los Guanacos, located within 0.5 mile of the proposed plant site, has already been determined to be eligible for listing in the NRHP, under Criterion D in 36 CFR 60.6, the Advisory Council Regulations (Fedick 1986; Howell 1993). The conditions under which cultural resources meet the requirements for inclusion in the NRHP include the likelihood that the archaeological deposits possess structural remains that could be used to explain continuities or discontinuities in the archaeological record for a particular area. More than a third of the prehistoric features discovered during the testing program are structural remains (pithouses). Structural elements such as plastered floors, hearths, floor pits, and wall trenches could be recognized in many of the feature profiles. These prehistoric features can provide significant information about the occupational history of the area; therefore, they are considered potentially eligible for inclusion in the NRHP pending SHPO concurrence.

The two historic features, a ditch and the remains of a tool shed, are not older than 50 years, nor do they contain characteristics or have historical associations that would meet the eligibility criteria for listing on the NRHP. Both features have been recommended as ineligible for the NRHP and are pending SHPO concurrence.

3.10.1.2 Native American Consultation

Federal agencies are required under the following regulations to consult with Native Americans before certain types of land use or resource management decisions are implemented on federal lands. The Archaeological Resources Protection Act requires notification of affected tribes if proposed archaeological investigations would result in harm to or destruction of any location considered by the tribe to have religious or cultural significance. The Native American Graves Protection and Repatriation Act stipulates that lineal descendants or culturally affiliated groups be consulted to determine the treatment of discovered human remains, associated funerary objects, sacred objects, or objects of cultural patrimony. In association with the American Indian Religious Freedom Act of 1978 and the NHPA of 1966, as amended, and its implementing regulation 36 CFR 800, sites that possess religious or traditional significance to contemporary Native Americans can be determined eligible for inclusion to the NRHP. Their cultural and religious significance would usually be a result of interpretation by the Native American groups associated

with the area. Section 106 of the NHPA requires consultation with federally recognized Native American groups prior to actions on federal lands or federal undertakings.

As part of the Section 106 compliance process, letters were sent on July 25, 2000, to all Federally recognized Native American groups either residing in or with cultural ties to the proposed project area. The letter was sent to inform the various nations and bands of the proposed undertaking and solicit their concerns/comments regarding the possible presence of religious or spiritual sites within the project area. A total of eight applicable Native American groups have been contacted: Ak-Chin, Tohono O'odham, Fort McDowell Mojave Apache Tribe, Gila River Indian Community, Hopi Tribe, Salt River Pima Maricopa Indian Community, San Carlos Apache Tribe, Zuni. At this time, only the Gila River Indian Community and Hopi Tribe have responded to the consultation letter. The Gila River Indian Community has stated that there is no further need for contact unless human remains are found during the construction phase of the project. The Hopi Tribe has requested a visit by SRP to the Tribal Council after data recovery has been completed. The purpose of the visit would be to involve the Tribe in the data analysis process and provide the Tribe with information pertinent to reconstructing their past.

3.10.2 Potential Impacts

Desert Archaeology's archaeological investigations, including the literature search and testing program, has demonstrated that a portion of a substantial Hohokam village is present in the project area. Construction activities, including grading and leveling of the property, installation of utility lines, and laying of foundations, could result in direct impacts to identified cultural resources in the form of vertical and horizontal displacement of the soil matrix containing prehistoric and historic materials resulting in the loss of integrity and alteration of site setting. The loss of physical integrity could diminish research potential that contributes to the importance of archaeological sites and properties. However, since SRP has committed to data recovery for identified archaeological sites located in the project area, no direct impacts to these sites are expected to occur (see Section 2.2.5.8, Cultural Resources).

Increases in both surface activities and number of workers during construction could increase the potential for indirect impacts at archaeological sites. Studies indicate that human activities and increased access could result in both advertent and inadvertent harmful effects to these fragile resources (Truesdale 1998). Indirect impacts are difficult to quantify and control, but they can include loss of surface artifacts due to illicit collection and inadvertent destruction. SRP currently instructs employees engaged in construction projects to watch out for archaeological resources and report any discoveries; therefore, indirect impacts to cultural resources located in the project area are not expected to occur.

Project-related construction activities could adversely affect undiscovered prehistoric and historic sites as described above. Archaeological investigations may not locate all cultural resources. Previously undiscovered prehistoric and historic sites, in particular burial remains and associated artifacts, may be missed during field investigations. However, impacts to previously undiscovered archaeological sites or burial remains are not expected to occur based on the committed environmental protection measures described in Section 2.2.5.8, Cultural Resources.

3.10.3 Mitigation Measures

Based on the committed environmental protection measures described in Section 2.2.5.8, Cultural Resources, no significant impacts are anticipated. As a result, no mitigation measures are proposed.

3.11 Health and Safety

3.11.1 Safety

The KEP facility has established policies and procedures to ensure the safety conduct of activities on its property. In addition to SRP's standard for safety guidelines for specific activities at its facilities, including construction activities, the Occupational Safety & Health Administration (OSHA) provides the worker safety during construction activities through regulations promulgated under 29 CFR 1926. This project would strictly comply with OSHA regulations during the construction and operational phases.

3.11.2 Waste and Hazardous Materials

Solid and hazardous waste are defined and managed under the Resource Conservation and Recovery Act (RCRA). Hazardous waste is defined as wastes that are listed under RCRA 40 CFR Part 261 or that are ignitable, corrosive, reactive, or toxic. Hazardous substances are listed in 40 CFR 302.4 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) including the Emergency Planning and Community Right-to-Know Act, and the appendices of the Superfund Amendments and Reauthorization Act. There are established reportable quantities for these substances, which apply to the reporting requirements associated with a release of each chemical.

The KEP facility would be a small quantity generator of hazardous waste under RCRA. Hazardous waste would be generated during routine maintenance operations, support operations, and laboratory activities. The wastes generated would include small amounts of paints, solvents, and laboratory waste. These wastes would be accumulated for no more than 180 days prior to

disposal at an approved off-site facility. Solid waste (i.e., office and non-hazardous waste) would be disposed of in an off-site sanitary landfill.

3.11.3 Transportation

The U. S. Department of Transportation (USDOT) developed a list of materials that are classified as hazardous for transportation purposes (49 CFR 172.101). This list includes hazardous substances under CERCLA, as well as petroleum-based fuels such as diesel and gasoline, which would be used by construction contractors. The transportation of these hazardous materials must comply with USDOT packaging and labeling requirements. OSHA defines a hazardous chemical under 29 CFR 1926.59 as any chemical that is a physical or a health hazard.

Only a few hazardous materials would be transported to the KEP facility; these would include sulfuric acid for cooling water treatment and aqueous ammonia for removal of nitrous oxides from the stack gases. Transport of these materials would comply with all applicable USDOT regulations.

3.11.4 Storage

Storage of hazardous materials on site would comply with all standard engineering requirements including compatibility of tank and piping materials. A Risk Management Plan would be developed and implemented for an hazardous materials stored over the regulatory thresholds.

All employees would be trained on appropriate handling and spill response procedures for each hazardous materials. Material Safety Data Sheets on all hazardous materials would be kept on site for employee reference and would be sent to the local fire department and emergency planning commission for their reference, as required by federal and state regulations.

3.11.5 Electric and Magnetic Fields

There has been some concern in the past that electric and magnetic fields (EMF) from transmission lines cause health risks. The statistical public health studies, or epidemiological studies, conducted to date, have yielded inconclusive results. Most recent studies have not connected EMF with increased health risks.

The proposed KEP would not require the construction of any new off-site transmission lines. The only transmission to be built as a part of the project would be short segments to connect the generators to the existing 69-kV switchyard. These new lines would be far from the site

boundaries and therefore buffered from the residential neighborhoods. All off-site transmission would be through currently existing and permitted transmission lines.

3.12 Cumulative Impacts

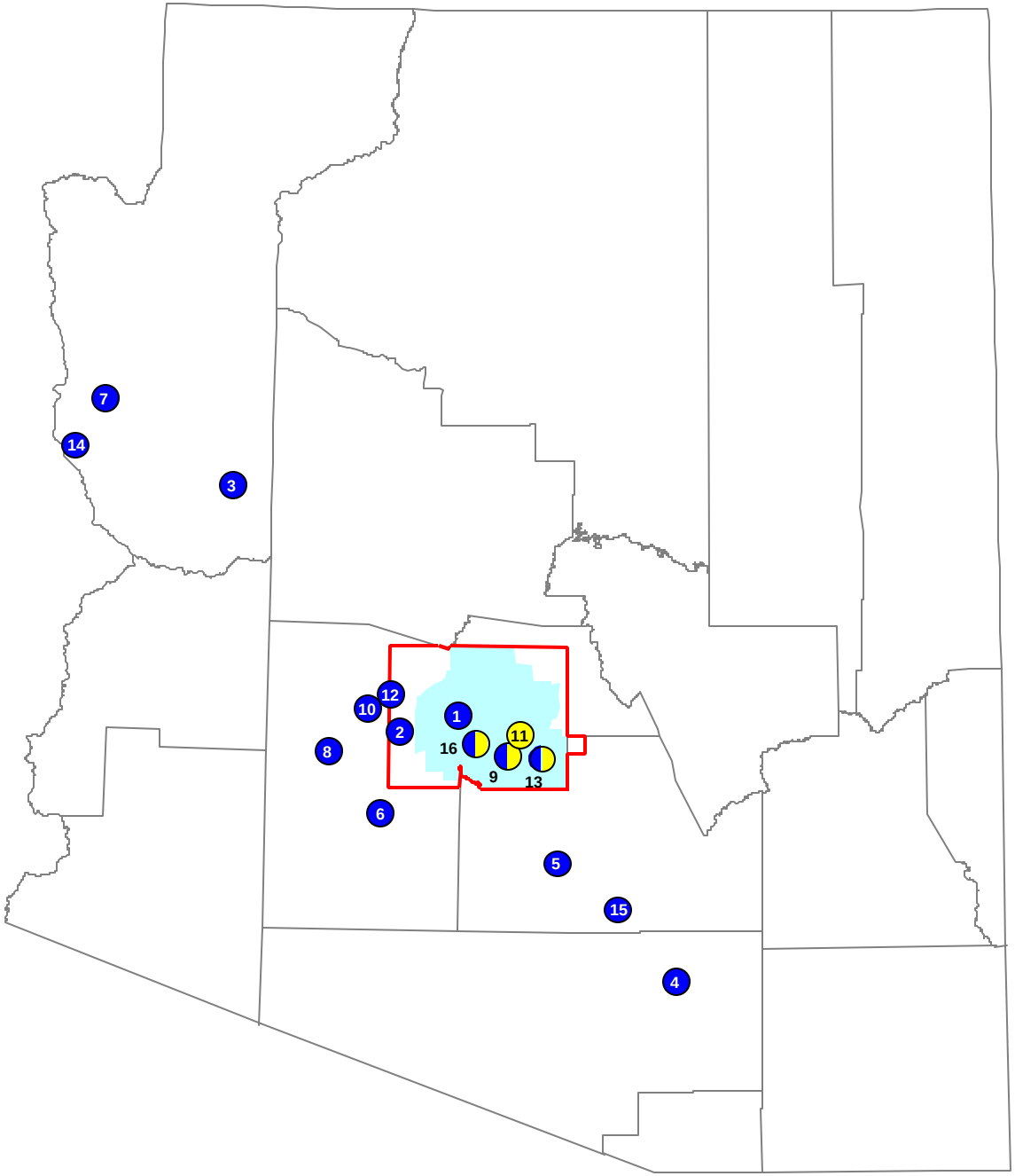
Cumulative impacts are defined as the impacts that result from the additive effects of an action, decision, or project when analyzed with respect to other past, present, and reasonably foreseeable future actions. Cumulative impacts must occur to the same resources, in the same geographic area, and within the same time frame for both the Proposed Action and the interrelated projects. The Proposed Action analyzed for this NEPA document is a small, discreet industrial expansion within a developed industrial area.

The proposed plant site and pipeline corridors have been modified by past man-induced changes and development. Past actions primarily consist of previous disturbances associated with development within the City of Tempe. Present disturbances include ongoing use of the area for primarily industrial purposes. Reasonably foreseeable future actions in the vicinity primarily include the continued development of vacant land for industrial, commercial, and residential purposes. Existing and planned power generation projects within the non-attainment area are illustrated in Figure 3-3.

The specific geographical area of environmental impacts would be different for each resource, depending on resource issues, mobility, and relative sensitivity. For example, the cumulative effects area for wildlife is larger than that examined for vegetation or cultural resources, and the area for air quality resources is even larger, because it is based on the complex interaction between climatic factors, terrain, and the associated airshed.

For the majority of the resources analyzed, impacts are expected to be minimal and short-term. These levels of impacts, combined with the current and projected activities in the vicinity of the proposed project, would result in minimal cumulative impacts. As a result, the cumulative analysis for the KEP focuses on air quality and water resources.

Cumulative impacts to air quality due to construction activities would be minimal in both areal extent and duration since these local impacts would be transitory and temporary. The construction activities proposed for KEP would occur in an area designated as non-attainment for PM_{10}. The project would be required to comply with a dust control plan in order to minimize construction impacts.



ID	Plant Name
1	Agua Fria
2	Arlington
3	Big Sandy
4	De Moss Petrie
5	Desert Basin
6	Gila River (Panda)
7	Griffith Energy Project
8	Harquahala
9	Kyrene
10	Mesquite
11	Ocotillo
12	Red Hawk
13	Santan
14	South Point Power Plant
15	Sundance
16	West Phoenix

Existing Plant

Proposed Plant

Existing & Proposed Plant

PM_{10} Non-Attainment Area

CO & O_3 Non-Attainment Area

Figure 3-3. Proposed Plants Statewide and Existing Plants within Non-Attainment Area

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Operation of the KEP facilities would add to existing background levels of certain pollutants but would result in the reduction of other pollutants over the lifetime of the facility. The proposed project would be located in a Class II PSD area, where small increases to ambient concentrations of certain pollutants are allowed as long as the ambient air quality standards and PSD increments are not violated.

For areas not in attainment with standards set under the Clean Air Act, a SIP must be developed by local authorities and approved by the USEPA. The SIP for Arizona prohibits any project in the Maricopa County non-attainment area that does not conform with the approved implementation plan and includes procedures for determining conformity. The SIP requires local permitting authorities to have a comprehensive emissions inventory, and they must be able to show that the area will come into attainment by statutory deadlines. The inventory must be updated every 3 years as part of a showing of Reasonable Further Progress. This must show that overall emissions are on track and decreasing toward the levels needed for NAAQS attainment. The SIP effectively overlays the entire non-attainment area and will allow no net decrease in the local air quality.

During the air permitting process, the proposed project was reviewed by the Maricopa County Environmental Services Department (MCESD). The MCESD has been delegated authority by USEPA for PSD, NANSR, and Title V Operating Permits requirements, and is the primary authority for air permit approvals for new and modified sources.

Net changes to emissions for each pollutant, after controls are applied, are shown in Table 3-4. The results indicate that emissions of NO_X would be reduced by approximately 40 tpy. Since NO_X is a precursor for O_3, these reductions would indicate that the proposed project would actually improve the air quality in the region for one of the region's pollutants.

SRP voluntarily conducted air dispersion analyses to demonstrate that the project would not have a significant negative impact on the concentrations in the area for these pollutants listed above. Modeled impacts were added to background concentrations as measured by air quality monitoring stations in the vicinity of the proposed facility. Background concentrations consist of the pollutants that are present in the atmosphere contributed by all local sources, including those at the existing Kyrene Generating Station, as well as other sources in the region.

The modeling results, including background levels in the project vicinity for CO, PM_{10}, SO_X, and NO_X, demonstrate that the project would not have a significant impact on concentrations of the listed air pollutants, nor would the proposed facility cause or contribute to violations of NAAQS. Therefore, cumulative air quality impacts from the proposed project and interrelated projects are not considered significant.

The proposed project would have a cumulative impact on water resources if the project reduced the amount of water available for continued development for industrial, commercial, or residential uses in the Tempe area. As noted in Section 3.2.2, Water Resources, operation of the proposed KEP plant would lead to a net consumptive use of approximately 2.2 MGD of water that would not be available for recharge to the alluvial aquifer at the Salt River. While this would constitute a loss of water that would no longer be available for other uses, the alluvial aquifer is already not considered a useable water source due to water quality concerns. Hence, the water to be used by KEP was already unavailable for other uses. The proposed project would make beneficial use of wastewater that would otherwise not be used. Therefore, the proposed project would not reduce the amount of water available for future development and there would be no significant impact to water resources.

3.13 Water Supply Alternatives

With the exception of the water resources discipline, the impacts for the Water Supply Alternatives would be the same as those described for the Proposed Action (see Section 3.16, Table 3-9 for summary of impacts).

Western Canal water represents a readily available source of high quality water. Use of 2.5 MGD of Western Canal water for operation of the proposed plant would not reduce the water currently available for downstream use as SRP would provide supplemental water from water sources available to them. During low flow periods, groundwater would be utilized as a supplemental water source.

The use of groundwater as the primary water supply source for plant operation also was evaluated as an alternative. The groundwater is of lower quality than the water available at the TKRP and the Western Canal. Its continuous use could result in lower efficiency of the KEP cooling system, and costs of HRSG make-up treatment and cooling system treatment chemicals could be significantly higher. In addition, additional wells and pumps would need to be installed to ensure reliable water supply. Additional rights to groundwater would have to be obtained. These impacts could include a decline in groundwater levels or water quality of adjacent wells.

3.14 Water Discharge Alternatives

With the exception of the water resources discipline, the impacts of the Water Discharge Alternatives would be the same as those described for the Proposed Action (see Section 3.16, Table 3-9 for summary of impacts).

The Western Canal flows immediately adjacent to the proposed KEP site and is used by the existing Kyrene Generating Station for discharge of its "once through" cooling water. It represents a highly accessible discharge point with considerable flow most of the year and good receiving water quality. Discharge to the Western Canal would result in increased TDS concentrations. However, based on the high water volume of the Western Canal combined with up to approximately 1.0 MGD effluent, impacts to water quality would be minimal and would not exceed Arizona water quality standards. The City of Phoenix has indicated that within the next few years, they may build a drinking water plant on the Western Canal, downstream of the KEP. The discharge from KEP would not significantly affect the water quality of the Western Canal and it would meet the state water quality standards for domestic water sources. None of the 2.5 MGD of TKRP water would be discharged to the Salt River, resulting in reduced flows for downstream use. Occasional discharges (as a backup water discharge location) to the Gila Drain would have the same TDS concentrations or less as the discharge to the Salt River, and would sporadically provide additional water for downstream use. All discharges would be within applicable Arizona water quality standards.

Another alternative for wastewater discharge would include the pumping of the plant effluent exclusively to the Gila Drain. Continuous discharge to the Gila Drain would result in an increase in available water for downstream use year-round. The water quality of the effluent would be the same as the proposed discharge to the Salt River.

3.15 No Action Alternative

Under the No Action Alternative, existing Kyrene Generating Station would continue to operate at increasing capacity factors as customer demand continues to grow. In addition, the KEP would not be constructed and the TKRP would continue to discharge reclaimed water to their permitted discharge location at the Salt River.

Under the No Action Alternative, none of the adverse impacts identified under the Proposed Action would occur (see Section 3.16, Table 3-9). However, none of the benefits provided under the Proposed Action would be realized. These benefits include:

- Continued reliability of electric service to SRP's customers, especially those in the East Valley;
- Decrease in O_3 concentrations associated with lower NO_X emissions;
- Reuse of reclaimed water from TKRP;
- Employment opportunities associated with construction and operation of the proposed facility;
- Tax revenues of approximately $27.5 million over 21 years;
- Landscape enhancements that would screen the existing industrial plant site and facilities; and
- Cultural resources data recovery.

3.16 Summary Comparison of Impacts Among the Proposed Action and Alternatives

Table 3-9 summarizes and compares the environmental impacts among the Proposed Action and the three alternatives considered in detail: the Water Supply Alternatives, Water Discharge Alternatives, and the No Action Alternative. Detailed descriptions of impacts are contained in Chapter 3.0. The summarized impacts include the implementation of the committed environmental protection measures outlined in Section 2.2.5, Environmental Protection Measures and Monitoring.

Table 3-9
Comparison of the Proposed Action and Alternatives

Disciplines	Proposed Action Alternative	Water Supply Alternatives	Water Discharge Alternatives	No Action Alternative
Air Resources	Fugitive dust and vehicle emissions would have minimal impact on local air quality. Operational impacts would result in increased CO, SO_2, and sulfuric acid emissions, but would not cause or contribute to exceedences of Arizona or NAAQS. The Proposed Action would result in a net decrease in O_3 and NO_x levels.	Same as the Proposed Action.	Same as the Proposed Action.	Emissions would remain at the present levels at the Kyrene Generating Station and the benefits of O_3 and NO_x levels reduction would not be realized.
Water Resources	Plant supply water from TKRP (2.5 MGD) would constitute a beneficial use of the reclaimed water. KEP effluent volume discharged to the Salt River would be approximately 30% of the current discharge from the TKRP and TDS concentrations would be tripled. Occasional discharges (as a backup water discharge location) to the Gila Drain would have the same TDS concentrations or less as the discharge to the Salt River, and would sporadically provide additional water for downstream use. All final discharges would be within applicable Arizona water quality standards. With the planned expansion of TKRP of 4 MGD, total flow	Western Canal: The 2.5 MGD of Western Canal water used by KEP would be replaced in the Canal from water sources upstream of the proposed plant site. Groundwater: Use of 2.5 MGD of groundwater secured under SRP water rights could result in the decline in groundwater levels or water quality of adjacent wells.	Western Canal: Plant effluent discharge would result in increased TDS concentrations, but water quality would still meet Arizona water quality standards. If necessary, a mixing zone for boron would be incorporated into the discharge permit to ensure compliance with the boron water quality standard. None of the 2.5 MGD of TKRP water would be discharged to the Salt River, resulting in reduced flows for downstream use. Occasional discharges (as a backup water discharge location) to the Gila Drain would have the same TDS concentrations or less as the discharge to the Salt River, and would sporadically provide additional water for downstream use. All discharges would be within applicable Arizona water quality standards including domestic water source standards.	Beneficial reuse of reclaimed water from TKRP would not occur. Current volumes and water quality parameter concentrations discharged to the Salt River from TKRP would remain the same.

Table 3-9 (Continued)

Disciplines	Proposed Action Alternative	Water Supply Alternatives	Water Discharge Alternatives	No Action Alternative
	to the Salt River would eventually increase to 5 MGD.		Gila Drain: Same as the Proposed Action under the Gila Drain, except that the discharge would occur year-round.	
Soils and Geology	Approximately 27 acres of previously disturbed soils would be disturbed during the construction of the plant and associated facilities.	Same as the Proposed Action.	Western Canal: Same as the Proposed Action. Gila Drain: Same as the Proposed Action.	No impacts to soils or geologic resources would occur.
Biological Resources	Approximately 27 acres of previously disturbed (barren) land would be disturbed. Direct impacts may occur to small burrowing mammals and reptiles and more mobile wildlife species may be displaced during construction activities. No impacts to threatened, endangered, or sensitive species are anticipated.	Same as the Proposed Action.	Western Canal: Same as the Proposed Action. Gila Drain: Same as the Proposed Action.	No impacts to biological resources would occur.
Socioeconomics	An average construction work force of 300 would be employed for approximately 12 months. Approximately 10 to 15 operations personnel would be permanently employed. Approximately $27.5 million in tax revenues would be generated over 21 years.	Same as the Proposed Action.	Same as the Proposed Action.	The positive benefits described under the Proposed Action would not be realized.
Land Use	No impacts identified.	No impacts identified.	No impacts identified.	No impacts identified.
Transportation/Traffic	Potential short-term traffic delays and congestion could occur during the construction phase of the project.	Same as the Proposed Action.	Same as the Proposed Action.	No impacts to transportation/traffic would occur.

Table 3-9 (Continued)

Disciplines	Proposed Action Alternative	Water Supply Alternatives	Water Discharge Alternatives	No Action Alternative
Visual Resources	The visual character of the proposed facilities would notably increase the industrial character of the view from KOP D but would be consistent with the existing industrial landscape. The proposed landscape enhancements would screen existing and proposed Kyrene facilities and soften the industrial nature of views from all key perspectives.	Same as the Proposed Action.	Same as the Proposed Action.	The views from all key perspectives would not change from current conditions. In addition, landscape enhancement would not be implemented and corresponding visual benefits would not be realized.
Noise	Noise levels generated during night construction activities could exceed 57 dBA, which would exceed the local noise ordinance limit at the nearest residence (650 feet north of the project site). Noise from operation may slightly exceed the nighttime noise ordinance limit.	Same as the Proposed Action.	Same as the Proposed Action.	No construction-related noise would be generated; ambient operational noise levels at the existing Kyrene Generating Station would continue.
Cultural Resources	No direct or indirect impacts to cultural resources are anticipated.	Same as the Proposed Action.	Same as the Proposed Action.	Data recovery would not occur at the plant site and regional archaeological data would not be recovered.
Health and Safety	No impacts are anticipated based on the required state and federal regulations governing the storage, transportation, use, and disposal of wastes and hazardous materials.	Same as the Proposed Action.	Same as the Proposed Action.	Spill or release potential would be lower than the Proposed Action but would remain the same as what currently exists at the Kyrene Generating Station.

4.0 CONSULTATION AND COORDINATION

4.1 Summary of Public Participation Process

4.1.1 Public Involvement Activities

Public involvement activities were initiated by SRP in August 1999. Various methods of communication and public interest were utilized over a period of several months in order to integrate public input into the KEP planning process.

Prior to initiating any public contact, a study area was established extending an approximate 2.5-mile radius from the project site. Within this study area, groups, businesses, homeowner and neighborhood associations, and individuals active in the community who would likely be interested in, or perceived to be impacted by, the proposed project were identified. Initial project meetings were held with these groups and individuals to help determine what public involvement methods and contacts would be most effectively used for the duration of the project.

A combination of printed materials, electronic materials, and numerous meeting formats to disseminate information and gather comment were used including:

- Project mailing lists included over 500 interested parties;
- Newsletters including fact sheets and open house announcements;
- SRP billing inserts to approximately 710,000 SRP customers;
- Telephone information line to provide updated project information via telephone voice messaging;
- Web site and e-mail addresses for review of written materials;
- Neighborhood workshops at residences or local facilities;
- Public open houses on October 21 and 23, 1999, and February 3 and 5, 2000;
- Small group meetings in the community and with local officials; and

- Community working groups (CWG) included 17 members that were selected based on professional knowledge, neighborhood representation, availability, and knowledge of the community.

A CWG was formed and 10 meetings were held, to date. Discussions of the meetings included aspects of the project such as need, description, resources, impacts, and mitigation. The following were the primary methods of distributing information and gathering comments from the public.

Following the 10th CWG meeting, CWG transitioned into a "Focus Group" where members participated in and reviewed mitigation and enhancement concepts and plans. The membership was expanded to include owners/managers of apartment complexes in close proximity to the KEP site. It is expected that the Focus Group will continue to meet over the next several months.

During the public participation process, comments were received on the existing and proposed facilities concerning air quality, water use, noise levels, visual impact, land use, recreation, and health and safety. Property values related to the proposed facility also were of concern.

4.1.2 USEPA Scoping Meeting Activities and Issues Raised

USEPA conducted a scoping meeting on March 8, 2000. It is important to note that this scoping meeting addressed the proposed Oasis Energy, LLC 825-MW power plant project. Subsequent to this USEPA scoping meeting and mediation with the local community, the proposed project (KEP) was scaled back to a 250-MW facility. The issues raised were as follows:

- Aesthetics;
- Air Quality Impacts;
- Alternatives (or lack there of) and screening process;
- Cultural Resources;
- Cumulative Impacts;
- EIS versus EA;
- Environmental Justice (Town of Guadalupe);
- Hazardous Materials;
- Health and Safety;
- Noise;
- Project Need;
- Socioeconomics;
- Transportation;
- Water Quantity and Quality;

- Wildlife; and
- Permit Requirements and Institutional/Political Concerns

4.1.3 Issues Resolved With Local Communities

At the suggestion of Tempe Mayor Neil Giuliano, in March 2000 a mediation group consisting of the neighborhood group opposing the expansion, other neighborhood representatives, and SRP was formed to examine SRP's Kyrene facility expansion plans and resolve any differences to these plans. The mediator was former Arizona Attorney General and Tempe resident Grant Woods.

The mediation participants held meetings on April 11, 20, 24, and May 4, 2000. On May 4, the mediation group reached agreement on the major issues involving the Kyrene facility expansion, the operation of the current facilities, and mitigation and enhancement requirements. The agreements reached were:

- SRP's proposed expansion of the Kyrene facility will be scaled back from 825 MW to 250 MW. With the existing units, this will create an overall site limit of 505 MW.

- SRP will operate the existing units at no greater than a 1 percent capacity factor, calculated on a rolling 2-year average.

- SRP will retrofit units one and two of the existing units with NO_X reduction technology.

- SRP will implement mitigation and enhancement measures as identified by the CWG.

- SRP will diligently pursue obtaining required air emissions offsets in the immediate area of the Kyrene facility.

- SRP will comply with applicable Tempe noise ordinances.

4.2 Agencies Consulted in Preparation of EA

Arizona Game and Fish Department – Phoenix, Arizona
U.S. Fish and Wildlife Service – Phoenix, Arizona
State Historic Preservation Office – Phoenix, Arizona

4.3 List of Preparers

Name	Responsibility	Education and Experience
ENSR		
Paul Smokler	Project Manager	PhD (Environmental Science and Engineering) MPH (Environmental Management) BA (Zoology) 26 years experience
Phil Hackney	Assistant Project Manager/NEPA Specialist, Project Description and Alternatives	BS (Botany) 25 years experience
Scott Patti	Project Coordinator, Biological Resources	BS (Natural Resources Management/Fisheries Biology 15 years experience
Jean Decker	Water Resources, Health and Safety	MS (Environmental/Chemical Engineering) BA (Biology/Chemistry) 25 years experience
Vincent Scheetz	Air Resources	MS (Systems Management) 26 years experience Certified Consulting Meteorologist
Kim Munson	Cultural Resources, Socioeconomics, Land Use	M.A. Anthropology B.A. Anthropology 6 years experience
Bernie Strom	Transportation/Traffic, Aesthetics, Noise	M.C.R.P. (City and Regional Planning) B.S. (Urban Planning) 26 years experience
John Johnson	Soils and Geology	BS (Geology) 3 years experience
Sue Coughenour	Document Production	17 years experience

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APPENDIX A

ADDITIONAL ENERGY USE AND FORECAST DATA SUMMARIES

APPENDIX A
ADDITIONAL ENERGY USE AND FORECAST DATA SUMMARIES

The sum of all of SRP retail customers' electricity use during a particular time frame is the Total System Energy, which is forecasted annually and reflected in Table A-1.

Table A-1
SRP System Energy Sales – MWh
Based on FY 2001 Forecast

	FY01	FY02	FY03	FY04	FY05	FY06
SRP Distribution Area	21,801,225	22,704,965	23,554,408	24,338,876	25,204,812	25,946,700

The maximum hourly use of electricity by all of SRP's retail customers in any given year is called the Total System Demand. The forecasted values for this peak demand are reflected in Table A-2.

Table A-2
SRP System Peak – MW
Based on FY 2001 Forecast

	FY01	FY02	FY03	FY04	FY05	FY06
SRP Distribution Area	4,970	5,170	5,380	5,590	5,800	6,010

The Western Systems Coordinating Council (WSCC) is an organization formed to protect the reliability of the bulk electric system in the Western United States as well as parts of Canada and Mexico. Most electric utilities in the western United States belong to this organization. The WSCC functions include forecasting customer demand in the geographic area. This is performed by compiling forecasts from all member utilities. A summary of the 1999-2008 annual energy requirements for two of the four major areas of the WSCC is reflected in Table A-3. The estimated peak demand values for these regions are reflected in Tables A-4 and A-5.

The Arizona-New Mexico Southern Nevada Power Area consists of Arizona, most of New Mexico, the westernmost part of Texas, southern Nevada, and a portion of southeastern California. Over the period from 1998 through 2008, peak demand and annual energy requirements are projected to grow at a 2.5 percent annual compound rate.

The California-Mexico Power Area encompasses most of California and the northern portion of Baja California, Mexico. Restructuring of the electric industry in California in 1998 and beyond

adds much uncertainty to future adequacy projections of generating capacity, energy production by independent power producers, and effects of customer energy efficiency/demand-side management programs. Recognizing that future forecast uncertainty exists, peak demands and annual energy requirements are currently projected to grow at respective annual compound rates of 1.3 percent and 1.8 percent from 1998 through 2008.

Table A-3
Summary of Project Energy Loads – GWh
Adverse Hydrogeneration Conditions

	1999	2000	2001	20002	2003	2004	2005	2006	2007	2008
Arizona-New Mexico So. Nevada **Power Area**	99,020	102,280	103,836	106,729	109,597	112,575	115,567	118,524	121,231	124,070
California-Mexico **Power Area**	259,368	261,852	263,861	266,830	273,663	281,022	284,991	291,219	298,772	304,855

Table A-4
Arizona-New Mexico-So. Nevada Power Area
Estimated Peak Demands, Resources, and Reserves – MW
Summer Peak

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Loads	20,502	21,070	21,680	22,304	22,978	23,634	24,279	24,894	25,489	26,109
Reserve Capability	2,658	3,600	3,614	3,526	3,339	3,255	3,168	3,406	3,321	3,405
Total	**23,160**	**24,670**	**25,294**	**25,830**	**26,317**	**26,889**	**27,447**	**28,300**	**28,810**	**29,514**

Table A-5
California-Mexico Power Area
Estimated Peak Demands, Resources, and Reserves – MW
Summer Peak

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Loads	55,372	56,075	56,927	57,809	58,892	59,624	60,402	61,177	62,013	62,840
Reserve Capability	6,646	6,868	6,868	6,988	7,269	6,789	7,142	6,986	7,362	7,514
Total	**62,018**	**62,943**	**63,795**	**64,797**	**66,161**	**66,413**	**67,544**	**68,163**	**69,375**	**70,354**

Balanced Approach to Meeting New Demand

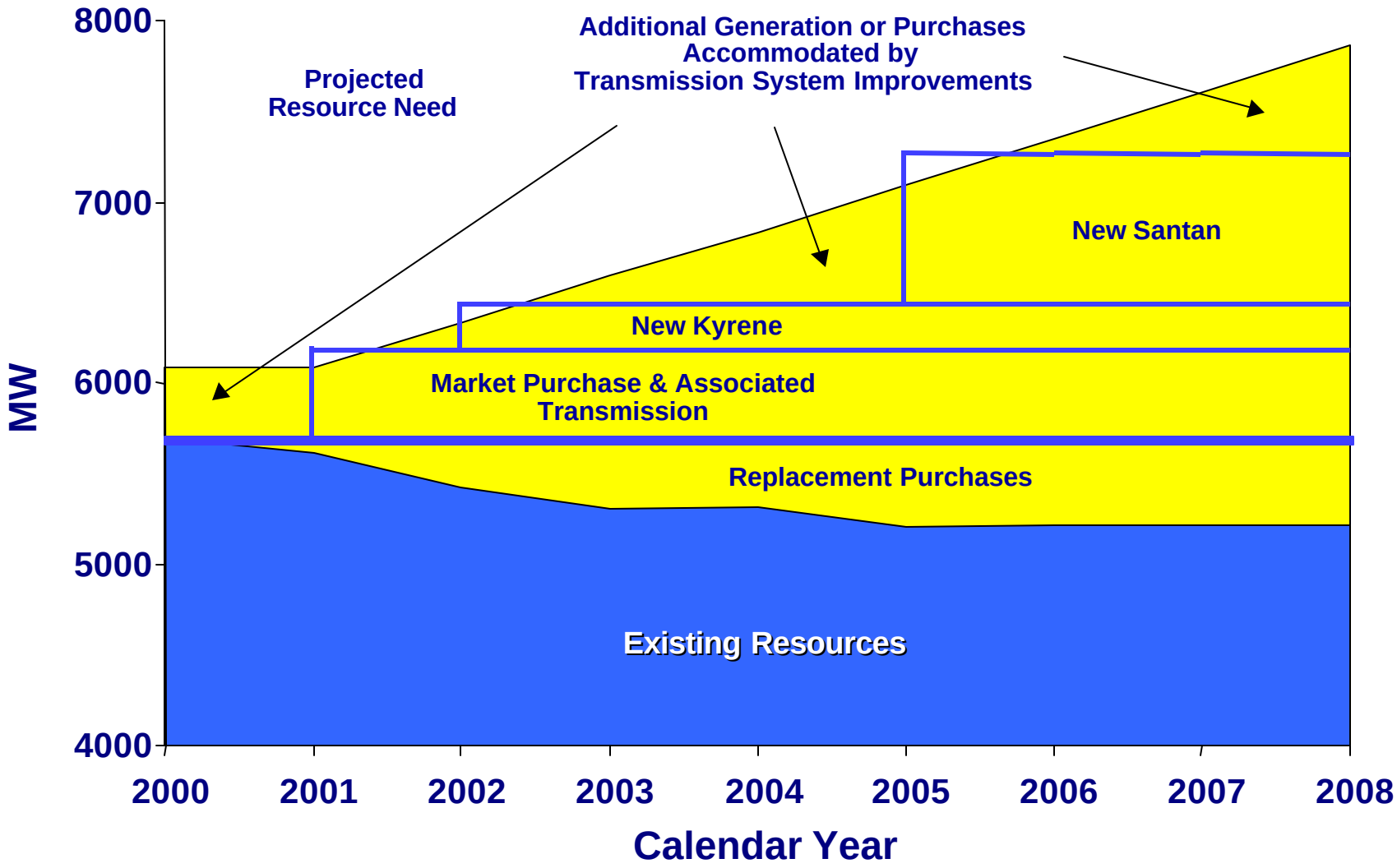

Figure A-1

SRP Load Serving Capability vs Peak Load

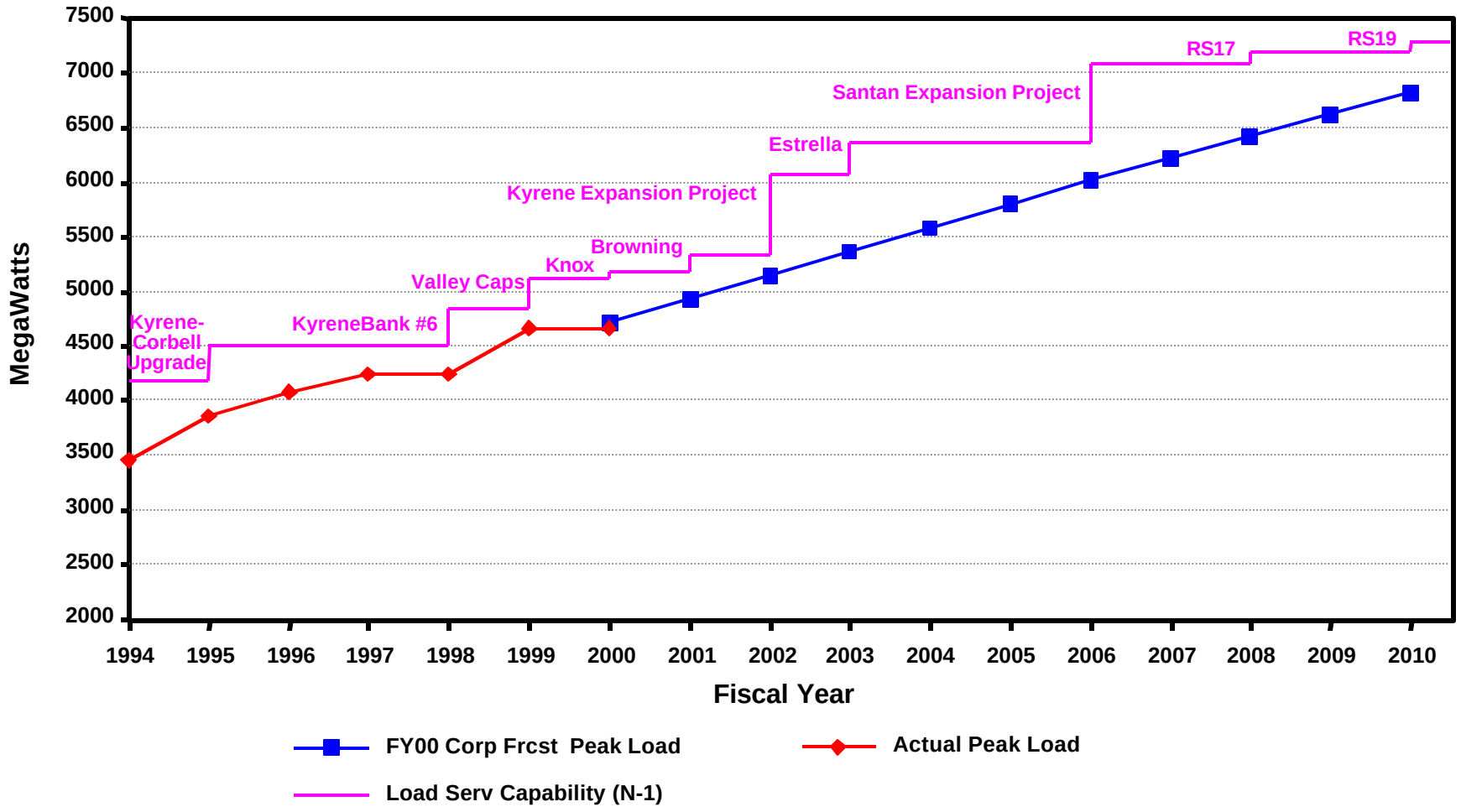

Figure A-2

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APPENDIX B

NON-ATTAINMENT AREA NEW SOURCE REVIEW

APPENDIX B
NON-ATTAINMENT AREA NEW SOURCE REVIEW

The U.S. Environmental Protection Agency (USEPA) has developed regulations that are designed to control air pollution through permitting requirements for new or modified major stationary sources. The requirements for major sources located in non-attainment areas are called Non-attainment Area New Source Review (NANSR) regulations. For attainment areas, major sources are subject to "Prevention of Significant Deterioration" (PSD) regulations. The designations "Non-attainment" and "Attainment" are applied for specific criteria pollutants. For example, an area may be classified "Non-attainment" for carbon monoxide (CO) but "Attainment" for nitrogen dioxide (NO_2). Maricopa County is designated non-attainment for CO, particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), and ozone (O_3), but is in attainment for NO_2, sulfur dioxide (SO_2), and lead.

For major sources of air pollutants, such as power plants, modifications to the facility that increase or potentially increase the air pollution emissions must be considered in light of the governing NANSR or PSD regulations. For the proposed Salt River Project Agricultural Improvement and Power District (SRP) project, analyses were performed under NANSR rules for CO, PM_{10}, and ozone; and PSD rules were applied for the other pollutants NO_2, SO_2, and lead. However, since oxides of nitrogen (NO_X) and volatile organic compounds (VOCs) also are considered precursors of O_3 formation in the atmosphere, emissions of NO_X also were analyzed for NANSR applicability.

Non-Attainment Area Provisions

Any proposal to construct a new major stationary source or to modify an existing major stationary source in a non-attainment area where the source has the potential to emit significant levels of that pollutant for which the area is designated non-attainment must perform specialized analyses as part of an air permit application to construct.

These analyses include the following:

- A demonstration that the proposed emission sources will meet the Lowest Achievable Emission Rate;

- Reduction in actual emissions (emission offsets) for each non-attainment area pollutant associated with the proposed source. This reduction in actual emissions should be at least 1.2 to 1 for VOC emissions, and as necessary to show a net air quality benefit for emissions of PM_{10};

- Conduct a net air quality benefit demonstration for each non-attainment area pollutant associated with the proposed source. USEPA Region IX has stated that due to the regional

nature of emissions of VOCs and NO_X, a net air quality benefit will be achieved as long as the emission offset requirement is met. Thus, a net air quality demonstration is not required for emissions of VOC;

- Demonstrate that the benefits of constructing the new source significantly outweigh the social and environmental costs imposed as a result of its location, construction, or modification; and

- Demonstrate that all existing major sources owned and operated by SRP in the state are in compliance with, or are on a schedule of compliance for, all conditions contained in a permit and all other applicable state and federal emission limitations and standards.

An analysis of the applicability of NANSR rules was performed for the proposed SRP project for each criteria pollutant as required by the guidelines and regulations. These analyses show that the proposed SRP project does not fall under NANSR applicability, and the new proposed emissions sources qualify as minor sources and minor source rules apply. Simplified flow charts demonstrating the review process used to determine NANSR applicability are shown below.

Following the chart for CO, it can be seen that the location of the proposed facility is not in attainment for CO and the path leads to whether the area is considered seriously non-attainment. Maricopa County is in serious non-attainment status, and this leads to consideration of whether the majority of CO emissions come from stationary or mobile sources. In Maricopa County, stationary sources are not a significant factor in CO emissions; therefore, the NANSR threshold is reached only when the net change in emissions is greater than 100 tons per year (tpy). The proposed plant emissions are less than this threshold and minor source rules apply. This means that the plant is not required to demonstrate LAER and does not have to obtain offsets for CO.

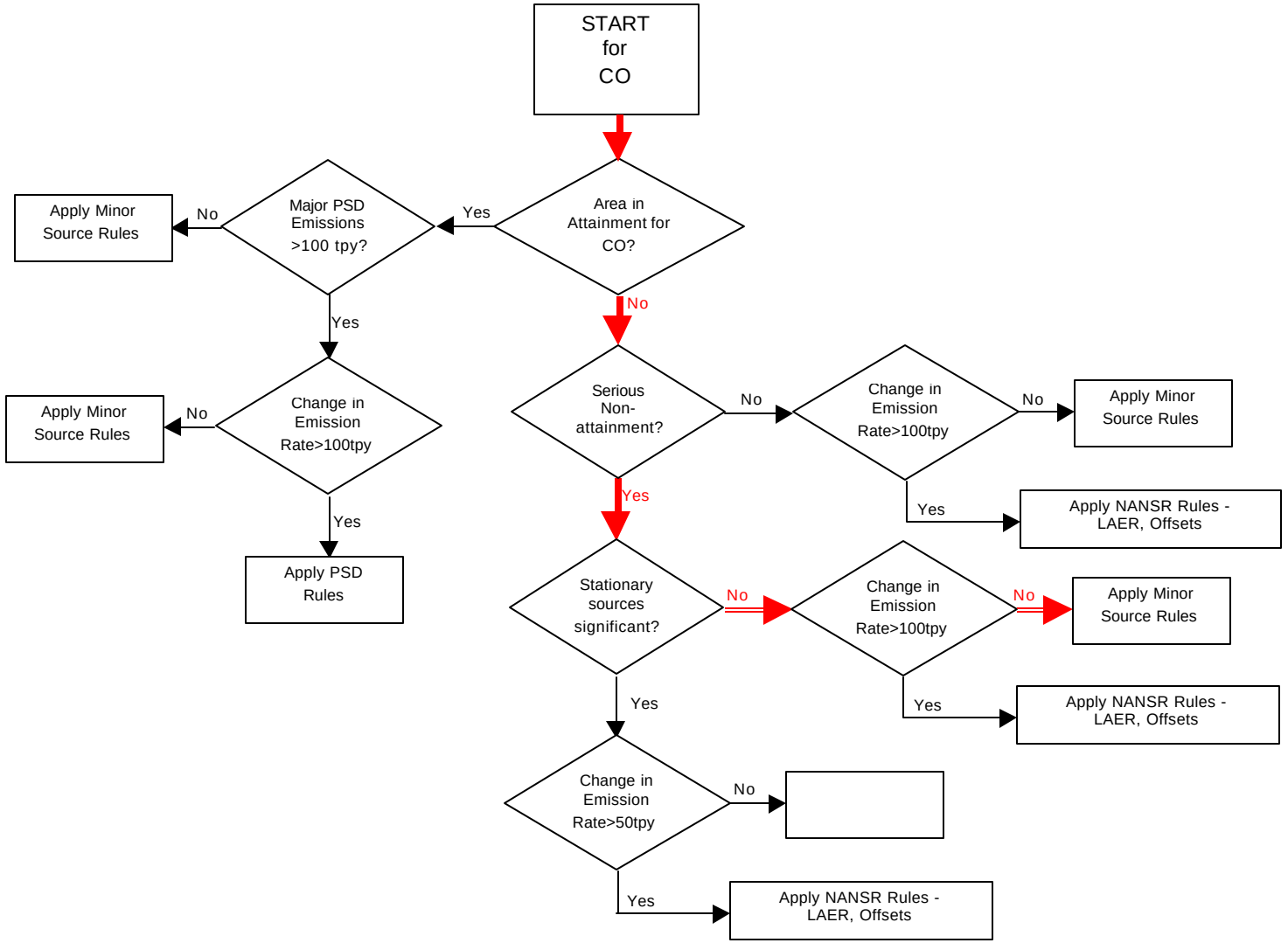
The second chart shows a similar decision tree for NO_2. However, in this case, the area is in attainment for NO_2, and the path then considers whether the total facility is a major source under PSD rules. The plant is considered a major source for NO_2, so the next consideration is whether the net change in emissions exceeds the PSD significance level of 40 tpy. The proposed project would actually reduce NO_2 emissions, and therefore the change would be considered minor and minor source rules would apply.

Since NO_X is considered a precursor to O_3 formation, and the area is in serious non-attainment status for O_3, NO_X emissions must be considered to see if NANSR rules apply. The NANSR significance level for NO_X emissions is a net change greater than 25 tpy. The proposed project would actually reduce NO_X emissions, and therefore the change would be considered minor and minor source rules would apply.

A similar analysis for VOCs was performed, since VOCs also are considered to be a precursor of O_3. The NANSR significance level for VOC emissions is a net change greater than 50 tpy. The proposed project would result in a net change in VOC emissions less than 50 tpy; therefore, the change would be considered minor and minor source rules would apply.

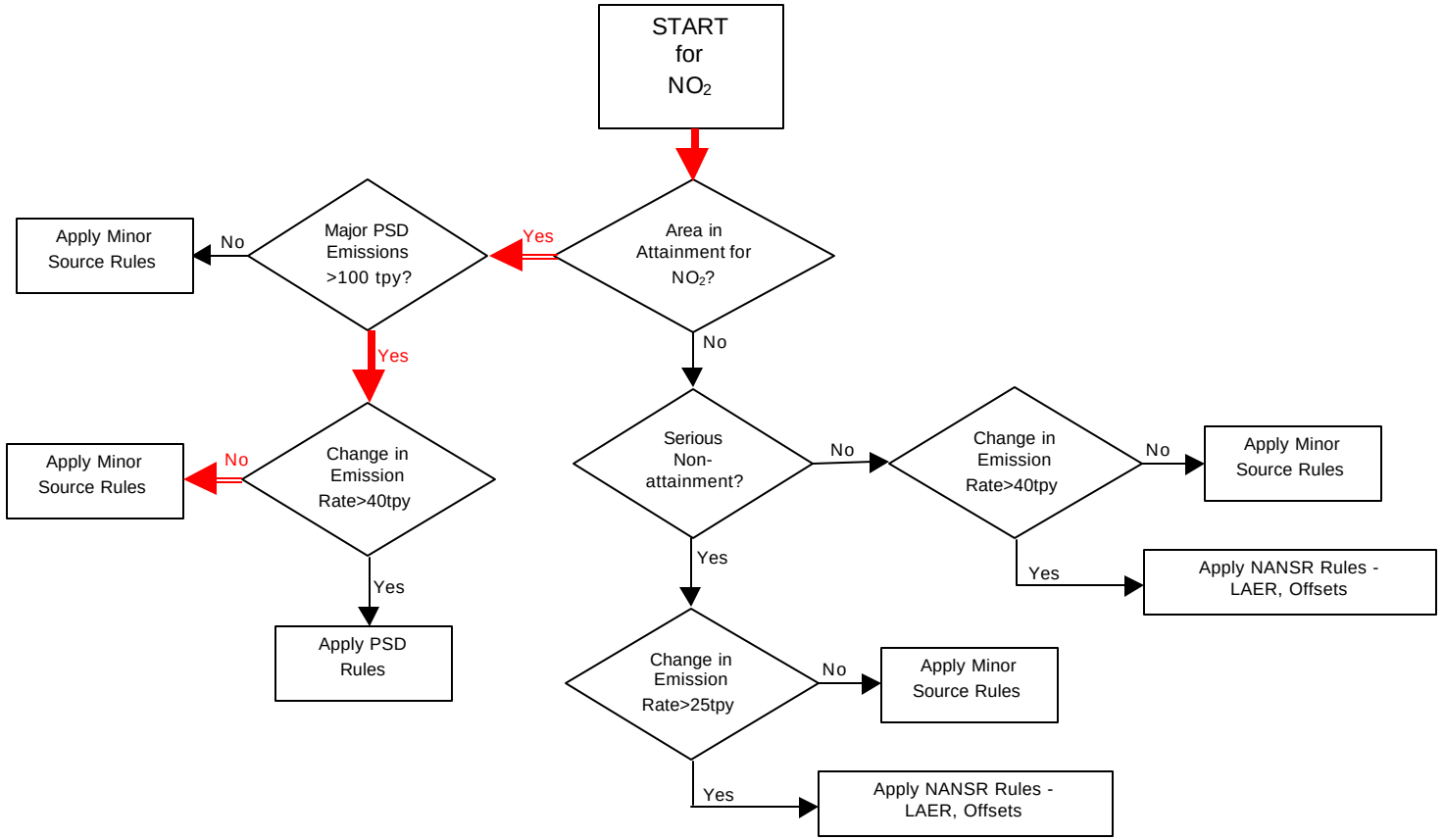
For PM_{10}, one also must consider the severity of the non-attainment status of the area. If an area is classified non-attainment but not serious, a source would be considered a major source if it would have plantwide emissions greater than 100 tpy. However, Maricopa County is classified as serious non-attainment for PM_{10}, and a source that has plantwide emissions greater than 70 tpy is considered to be a major source. The proposed expansion of the facility results in projected plantwide emissions below this 70 tpy threshold; therefore, the facility is a minor source and NANSR rules do not apply.

PERMITTING RULES APPLICABILIITY FLOW CHART FOR CARBON MONOXIDE (CO)
CLEAN AIR ACT AMENDMENTS, ARIZONA ADMINISTRATIVE CODE, AND MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS (40 CFR; AAC R18-2; ARS RULES)



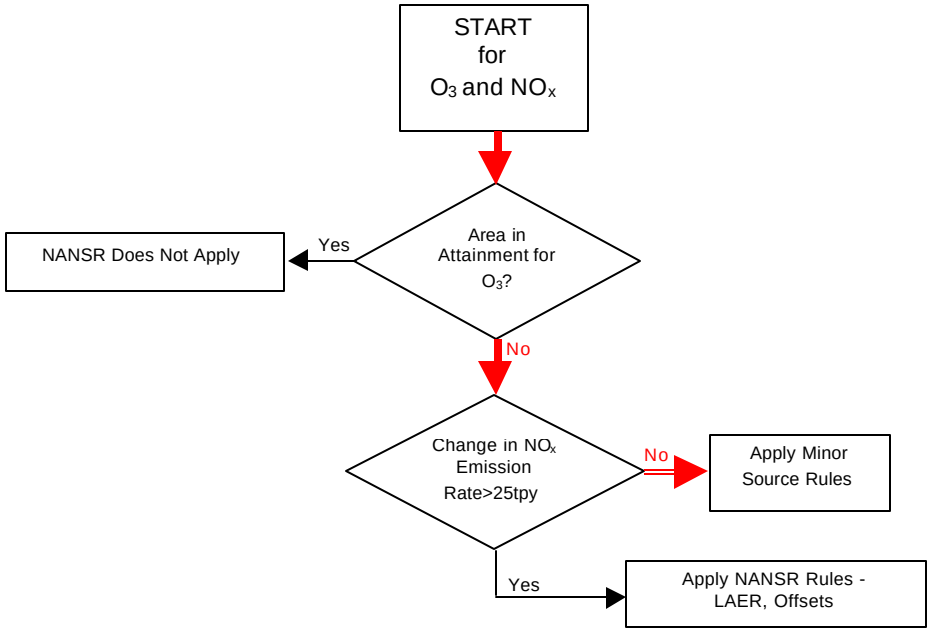
Note: ⇒ Indicates path for SRP analysis

PERMITTING RULES APPLICABILIITY FLOW CHART FOR NITROGEN DIOXIDE (NO_2)
CLEAN AIR ACT AMENDMENTS, ARIZONA ADMINISTRATIVE CODE, AND MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS (40 CFR; AAC R18-2; ARS RULES)



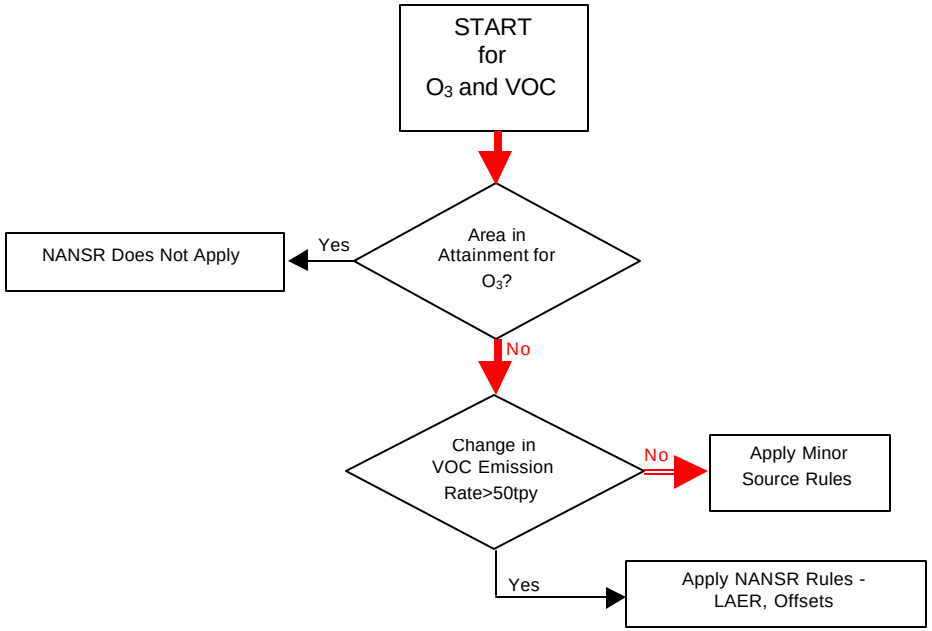
Note: → Indicates path for SRP analysis

PERMITTING RULES APPLICABILIITY FLOW CHART FOR NO_X EMISSIONS AS A PRECURSOR TO O_3 CLEAN AIR ACT AMENDMENTS, ARIZONA ADMINISTRATIVE CODE, AND MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS (40 CFR; AAC R18-2; ARS RULES)



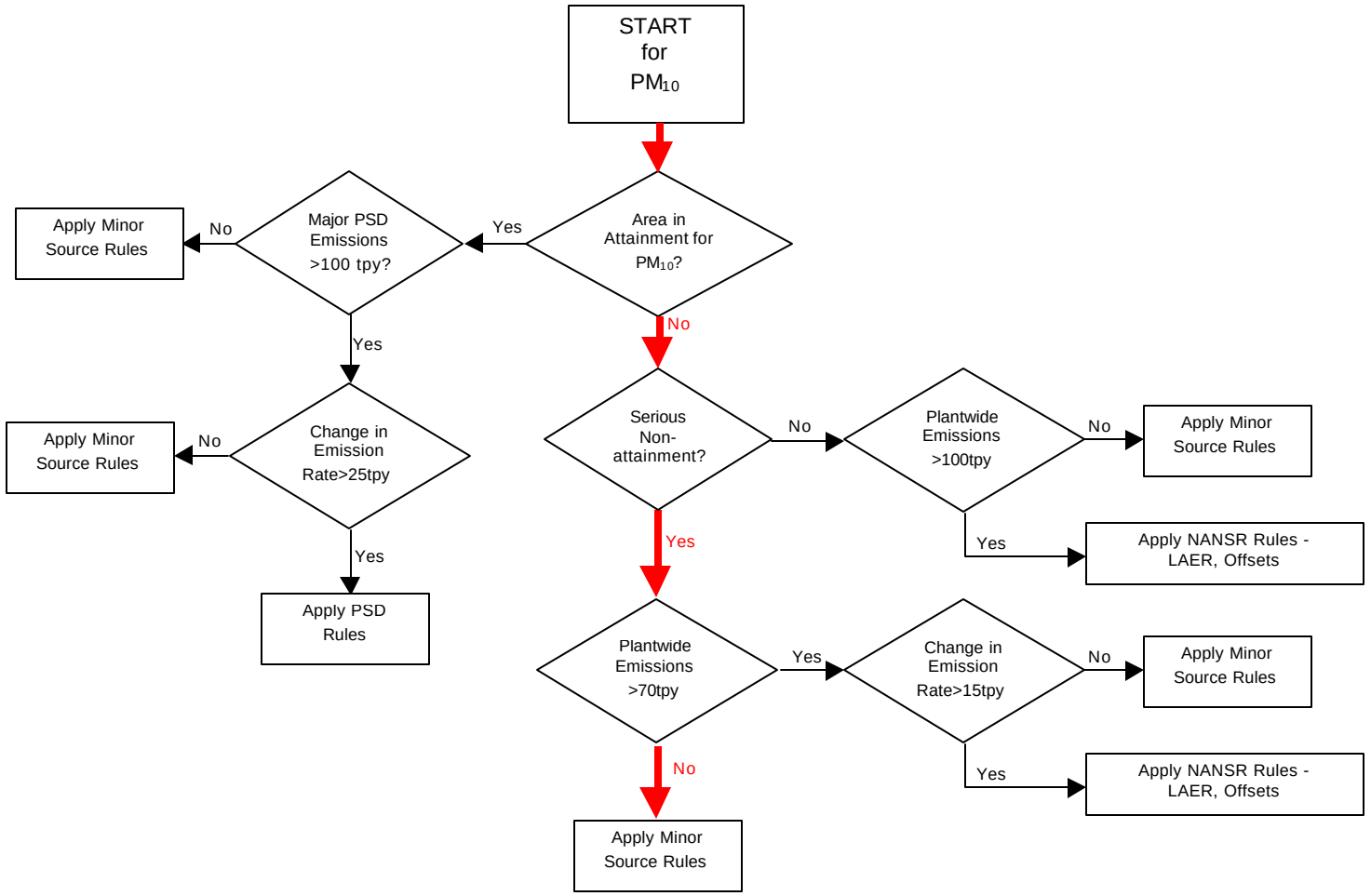
Note: ⇒ Indicates path for SRP analysis

PERMITTING RULES APPLICABILIITY FLOW CHART FOR VOC EMISSIONS AS A PRECURSOR TO O_3 CLEAN AIR ACT AMENDMENTS, ARIZONA ADMINISTRATIVE CODE, AND MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS (40 CFR; AAC R18-2; ARS RULES)



Note: ⇒ Indicates path for SRP analysis

PERMITTING RULES APPLICABILIITY FLOW CHART FOR PARTICULATES (PM_{10})
CLEAN AIR ACT AMENDMENTS, ARIZONA ADMINISTRATIVE CODE, AND MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS (40 CFR; AAC R18-2; ARS RULES)



Note: ⇒ Indicates path for SRP analysis

APPENDIX C

BIOLOGICAL RESOURCES

Table C-1
Mammal Species in the Vicinity of the Site

Common Name	Scientific Name	Habitat
Desert shrew	*Notiosorex crawfordi*	Any arid habitat with ample cover, in oak belt, among junipers, desertscrub, and riparian
Cave myotis	*Myotis velifer*	Inhabit mine shafts, tunnels, caves, under bridges in desert areas, never far from water source - tanks, canal
Yuma myotis	*Myotis yumanensis*	Where water is present - Colorado and Little Colorado rivers, irrigation canals, permanent ponds, streams
Big brown bat	*Eptesicus fuscus*	In wooded areas and desertscrub
Southern yellow bat	*Lasiurus ega*	Associated with California fan palms (*Washingtonia filifera*)
Townsend's big-eared bat	*Plecotus townsendi*	Caves or mine tunnels, buildings in desertscrub
Pallid bat	*Antrozous pallidus*	Attics of houses, roofs of barns and sheds, old mine tunnels, crevices in cliffs, under bridges in desertscrub
American free-tailed bat	*Tadarida brasiliensis*	Caves and mines, old buildings or bridges in desertscrub and foothills of some higher mountains
Pocketed free-tailed bat	*Tadarida femorosacca*	Rocky cliffs and slopes of southern deserts, also use manmade shelters such as roofing tiles of buildings
Desert cottontail	*Sylvilagus audubonii*	Desertscrub, as high as junipers or oak belt
Black-tailed jack rabbit	*Lepus californicus*	Deserts to open scrub forests, grazed lands, croplands
Botta's pocket gopher	*Thomomys bottae*	Nearly every habitat with sufficient tuberous roots and plant material, and soil is suitable for digging tunnels
Arizona pocket mouse	*Perognathus amplus*	Mohave and Sonoran desertscrub and parts of Great Basin desertscrub
Western harvest mouse	*Reithrodontomys megalotis*	Wide variety of habitats and elevations, along streams, bottomlands, fences, around irrigated areas
Deer mouse	*Peromyscus maniculatus*	Sonoran desertscrub along intermittent creek beds or canals
Arizona cotton rat	*Sigmodon arizonae*	Desert areas or along canals and banks of small streams
House mouse*	*Mus musculus*	In and around houses, buildings, cultivated fields, manmade dumps, edge of towns
Coyote	*Canis latrans*	Every habitat

*Exotic/introduced species.

Sources: Hoffmeister 1986; Jones et al. 1992.

Table C-2
Bird Species in the Vicinity of the Site

Common Name	Scientific Name	Habitat
Pied-billed grebe	*Podilymbus podiceps*	Lakes, ponds, streams, and canals
Double-crested cormorant	*Phalacrocorax auritus*	Lakes, ponds, streams, and aqueducts
Snowy egret	*Egretta thula*	Ponds, streams, and marshes
Great egret	*Casmerodius albus*	Ponds, streams, and marshes
Great blue heron	*Ardea herodias*	Lakes, ponds, streams, canals, and marshes
Green heron	*Butorides striatus*	Lakes, ponds, streams, marshes, and canals
Black-crowned night-heron	*Nycticorax nycticorax*	Lakes, ponds, marshes, and streams
Black-bellied whistling-duck	*Dendrocygna autumnalis*	Ponds
Canada goose	*Branta canadensis*	Lakes, ponds, and fields
Green-winged teal	*Anas crecca*	Lakes, ponds, and streams
Mallard	*Anas platyrhynchos*	Lakes, ponds, streams, and canals
Northern pintail	*Anas acuta*	Lakes, ponds, and streams
Cinnamon teal	*Anas cyanoptera*	Ponds, streams, and canals
Northern shoveler	*Anas clypeata*	Lakes, ponds, and streams
Gadwall	*Anas strepera*	Lakes, ponds, and streams
American wigeon	*Anas americana*	Lakes, ponds, and streams
Ring-necked duck	*Aythya collaris*	Lakes and ponds
Common merganser	*Mergus merganser*	Lakes, ponds, and streams
Ruddy duck	*Oxyura jamaicensis*	Lakes and ponds
Turkey vulture	*Cathartes aura*	Generally distributed
Bald eagle	*Haliaeetus leucocephalus*	Lakes and rivers
Red-tailed hawk	*Buteo jamaicensis*	Generally distributed
Osprey	*Pandion haliaetus*	Lakes and streams
American kestrel	*Falco sparverius*	Generally distributed
Peregrine falcon	*Falco peregrinus*	Cliffs near Salt River Reservoir, generally distributed, tops of tall urban buildings
Common moorhen	*Gallinula chloropus*	Streams, marshes, and ponds
American coot	*Fulica americana*	Lakes, ponds, streams, and marshes
Killdeer	*Charadrius vociferus*	Ponds, streams, and fields
Black-necked stilt	*Himantopus mexicanus*	Ponds and marshes
Greater yellowlegs	*Tringa melanoleuca*	Lakes, ponds, streams, and flooded fields
Spotted sandpiper	*Actitis macularia*	Lakes, ponds, streams, and canals
Least sandpiper	*Calidris minutilla*	Ponds and streams
Long-billed dowitcher	*Limnodromus scolopaceus*	Ponds and streams
Common snipe	*Gallinago gallinago*	Ponds, marshes, streams, and wet fields
Wilson's phalarope	*Phalaropus tricolor*	Lakes and ponds
Ring-billed gull	*Larus delawarensis*	Lakes, ponds, and streams
Rock dove*	*Columba livia*	Suburban and agricultural areas
White-winged dove	*Zenaida asiatica*	Sonoran zones
Mourning dove	*Zenaida macroura*	Generally distributed, mainly in agricultural and suburban areas
Inca dove	*Columbina inca*	Suburban areas, farmyards, and fields
Western screech owl	*Otus kennicottii*	Riparian woodlands, Sonoran desert, and suburban areas
Great horned owl	*Bubo virginianus*	Riparian woodlands, Sonoran desert, and suburban areas
Lesser nighthawk	*Chordeiles acutipennis*	Lower Sonoran desert

Table C-2 (Continued)

Common Name	Scientific Name	Habitat
Black-chinned hummingbird	*Archilochus alexandri*	Suburban and riparian areas in Sonoran desert
Anna's hummingbird	*Calypte anna*	Suburban areas, riparian areas, and fields in Sonoran desert
Belted kingfisher	*Ceryle alcyon*	Ponds, streams, and canals
Gila woodpecker	*Melanerpes uropygialis*	Lower Sonoran zone
Ladder-backed woodpecker	*Picoides scalaris*	Riparian and desert areas in the Sonoran desert
Red-shafted northern flicker	*Colaptes cafer*	Transition zone forests, lowlands
Gilded flicker	*Colaptes chrysoides*	Desert and riparian areas in lower Sonoran desert
Black phoebe	*Sayornis nigricans*	Streams and ponds
Common raven	*Corvus corax*	Upper Sonoran desert, generally distributed
Cactus wren	*Campylorhynchus brunneiccapillus*	Lower Sonoran desert, upper Sonoran mesquite habitat
Northern mockingbird	*Mimus polyglottos*	Suburban areas in Sonoran desert
European starling*	*Sturnus vulgaris*	Sonoran desert
Abert's towhee	*Pipilo aberti*	Riparian areas, suburban areas, lower Sonoran desert
Brewer's sparrow	*Spizella breweri*	Sonoran desert, field edges, and suburban areas
White-crowned sparrow	*Zonotrichia leucophrys*	Suburban, riparian, and other brushy areas in Sonoran desert
Great-tailed grackle	*Quiscalus mexicanus*	Riparian areas, ponds, marshes, farmyards, and suburban areas
Brown-headed cowbird	*Molothrus ater*	Generally distributed, feedlots and fields
House finch	*Carpodacus mexicanus*	Riparian and suburban areas, farmlands, and desert in Sonoran desert
House sparrow*	*Passer domesticus*	Wherever humans live

*Exotic/introduced species.

Source: Witzeman et al. 1997.

Table C-3
Reptile and Amphibian Species in the Vicinity of the Site

Common Name	Scientific Name	Habitat
Southern spadefoot	*Scaphiopus multiplicatus*	Sandy or gravelly soil in desert grassland, shortgrass plains, creosote bush and sagebrush desert, mixed grassland and chaparral, piñon-juniper and pine-oak woodlands, and open pine forests
Couch spadefoot	*Scaphiopus couchii*	Shortgrass plains, mesquite savannah, creosote bush desert, thornforest and tropical deciduous forest and other areas of low rainfall
Woodhouse toad	*Bufo woodhousei*	Sandy areas in grassland, sagebrush flats, woods, desert streams, valleys, floodplains, farms, and city backyards, breeds in quiet water of streams, marshes, lakes, freshwater pools, and irrigation ditches
Great plains toad	*Bufo cognatus*	Prairies or deserts, primarily a grassland species, breeds in shallow temporary pools or quite water of streams, marshes, irrigation ditches, and flooded fields
Sonoran desert toad	*Bufo alvarius*	Ranges from arid mesquite-creosote bush lowlands and arid grasslands into oak-sycamore-walnut groves in mountain canyons, often found near permanent water of springs, reservoirs, canals, and streams, and frequents temporary pool
Lowland leopard frog	*Rana yavapaiensis*	Desert, grassland, oak and oak-pine woodland, entering the permanent pools of foothill streams, overflow ponds and side channels of major rivers, and permanent springs and stock tanks
Bullfrog*	*Rana catesbeiana*	Wide variety of habitats with permanent water
Western banded gecko	*Coleonyx variegatus*	Ranges from creosote bush flats and sagebrush desert to the piñon-juniper belt, often associated with rocks and crevices
Mediterranean gecko*	*Hemidactylus turcicus*	Urban environments
Zebra-tailed lizard	*Callisaurus draconoides*	Washes, desert pavement, and hardpan where plant growth is scant
Long-tailed brush lizard	*Urosaurus graciosus*	Loose sand and scattered bushes and trees, creosote bush, burrobush, galleta grass, catclaw, mesquite, and paloverde
Side-blotched lizard	*Uta stansburiana*	Sand, rock, hardpan, or loam with grass, shrubs, and scattered trees
Desert horned lizard	*Phrynosoma platyrhinos*	Arid lands–sandy flats, alluvial fans, along washes, at the edge of dunes
Western whiptail	*Cnemidophorus tigris*	Firm soil, sandy, or rocky ground in deserts and semi-arid habitats usually where plants are sparse with open areas
Coachwhip	*Masticophis flagellum*	Sandy or rocky ground in desert, prairie, scrubland, juniper-grassland, woodland, thornforest, and farmland, avoids dense vegetation
Western patch-nosed snake	*Salvadora hexalepis*	Sandy and rocky lower slopes of mountains, low dry creosote bush plains, grasslands, chaparral, sagebrush plains, piñon-juniper woodland, and desertscrub

Table C-3 (Continued)

Common Name	Scientific Name	Habitat
Gopher snake	*Pituophis melanoleucus*	Sand, loam, rock or hardpan soils in desert, prairie, brushland, woodland, open coniferous forest, and farmland
Glossy snake	*Arizona elegans*	Sandy or loamy open areas–light shrubby to barren desert, sagebrush flats, grassland, chaparral-covered slopes, and woodland
Long-nosed snake	*Rhinocheilus lecontei*	Deserts, prairies, and shrubland
Western shovel-nosed snake	*Chionactis occipitalis*	In the desert in washes, dunes, sandy flats, loose soil, and rocky hillsides with sandy gullies or pockets of sand among rocks, vegetation is sparse
Nightsnake	*Hypsiglena torquata*	Rocky and sandy areas in grassland, chaparral, sagebrush flats, deserts, woodlands, moist mountain meadows, thornscrub, and thornforest
Western diamondback rattlesnake	*Crotalus atrox*	Sandy flats to rocky upland areas in desert, grassland, shrubland, woodland, pine forests, and rank growth of river bottoms

*Exotic/introduced species.

Source: Stebbins 1985.

Table C-4
Fish Species in the Vicinity of the Site

Common Name	Scientific Name	Habitat Type
White amure* (Grass carp)	*Ctenopharyngodon idellus*	Ponds and canals where it has been introduced to control aquatic vegetation
Threadfin shad*	*Dorosoma petenense*	Rivers and lakes in temperatures that do not drop below 9°C
Carp*	*Cyprinus carpio*	Almost all waters of the state below 2,000 meters elevation
Golden shiner*	*Notemiqonus crysoleucus*	Shallow, mud-bottomed, oeverflow ponds along creeks and rivers
Roundtail chub	*Gila robusta*	Pools and eddies of rivers, often concentrating in swift, swirling waters below rapids
Gila chub	*Gila intermedia*	Smaller creeks, cienegas, and some artificial impoundments
Longfin dace	*Agosia chrysogaster*	Ranges from low, hot sandy-bottomed desert streams to clear cooler brooks in the lower reaches of conifer zones
Red shiner*	*Notropis lutrensis*	Thrives under conditions of intermittency, high turbidities, and high temperatures
Fathead Minnow*	*Pimephales promelas*	Quiet, muddy streams, surviving in small pools of intermittent streams
Gila sucker	*Catastomus insignis*	Gravelly or rocky pools, relatively deep quite waters
Gila-mountain sucker	*Pantosteus clarki*	Rapids, swift areas
Channel catfish*	*Ictalurus punctatus*	Forage over swift riffles
Black bullhead*	*Ictalurus melas*	Relatively quiet turbid waters
Yellow bullhead*	*Ictalurus natalis*	Clear, rocky-bottomed, intermediate-sized streams
Mosquito fish*	*Gambusia affinis*	Ranges from clear cool springs to turbid hot stock tanks
Sailfin molly*	*Poecilia latipinna*	Canals and wastewater ponds, along shallow margins of streams and ponds, avoiding currents and deeper water
Largemouth bass*	*Micropterus salmoides*	Lakes, ponds, reservoirs, slow-moving downstream portions of larger streams
Green sunfish*	*Chaenobryttus cyanellus*	Rocky situations or lakes or streams
Bluegill*	*Lepomis macrochirus*	Rservoirs and ponds below 2,500 meters elevation
Black crappie*	*Pomoxis nigromaculatus*	Clear, cool, sparsely vegetated, acidic waters
Tilapia*	*Tilapia* spp.	Canals and backwaters, introduced to control aquatic vegetation

*Exotic/introduced species.

Source: Minckley 1973.

Table C-5
Species of Plants Observed on the Kyrene Site

Common Name	Scientific Name
Johnsongrass*	*Sorghum halapense*
Sticky-stem, Spiderling	*Boerhaavia* sp.
Russian thistle*	*Salsola iberica*
Velvet mesquite	*Prosopis velutina*
Tamarisk, Salt cedar*	*Tamarisk pentandra*
Desert broom	*Baccharis sarathroides*
Jimmyweed	*Haplopappus heterophyllus*

*Exotic/ornamental.

Sources: Elias 1989; Jeager 1941; Kearney and Peebles 1960.

Table C-6
Special Status Wildlife and Plant Species Known from Maricopa County

Key: Federal Status: E = Endangered T = Threatened C = Candidate
State Status: SC = Special Concern HS = Highly Safeguarded

Common Name	Scientific Name	Habitat	Federal Status	State Status	Habitat Present in Project Area
MAMMALS					
California leaf-nosed bat	Macrotus californicus	Primarily cave and mine dwellers, mostly in Sonoran desertscrub		SC	Yes
Lesser long-nosed bat	Leptonycteris curasoae yerbabuenae	Desertscrub with agave and columnar cacti present as food plants	E	SC	No
Red bat	Lasiurus borealis	Over ponds, along waterways, among oaks, sycamores, walnuts, cottonwoods, and pine-fir forest		SC	No
Southern yellow bat	Lasiurus ega	Associated with Washington fan palms		SC	No
Spotted bat	Euderma maculatum	Uneven cliffs within 1 mile of a riparian situation		SC	No
Jaguar	Panthera onca	Generally distributed		SC	No
Chihuahuan pronghorn	Antilocapra americana mexicana	Plains and meadows of shortgrass from the deserts of the south to the high plateaus of the north		SC	No
Sonoran pronghorn	Antilocapra americana sonoriensis	Broad, intermountain alluvial valleys with creosote-bursage and paloverde-mixed cacti	E	SC	No
BIRDS					
American bittern	Botaurus lentiginosus	Marshy areas		SC	No
Least bittern	Ixobrychus exilis	Cattail marshes		SC	No
Great egret	Ardea alba	Ponds, streams, and marshes		SC	Yes
Snowy egret	Egretta thula	Ponds, streams, and marshes		SC	Yes
Black-bellied whistling duck	Dendrocygna autumnalis	Ponds		SC	No
Osprey	Pandion haliaetus	Near lakes and streams		SC	No
Mississippi kite	Ictinia mississippiensis	Riparian areas		SC	No
Bald eagle	Haliaeetus leucocephalus	Large trees or cliffs near water (reservoirs, rivers and streams) with abundant prey	T	SC	No
Northern goshawk	Accipiter gentilis	Generally distributed		SC	No
Gray hawk	*Asturina nitida*	Riparian areas in Sonoran zones		SC	No
Common black-hawk	*Buteogallus anthracinus*	Riparian areas in Sonoran zones		SC	No

Table C-6 (Continued)

Common Name	Scientific Name	Habitat	Federal Status	State Status	Habitat Present in Project Area
Ferruginous hawk	*Buteo regalis*	Dry open country, fields		SC	No
Peregrine falcon	*Falco peregrinus*	Cliffs near Salt River reservoir, generally distributed, tops of tall urban buildings		SC	Yes
Yuma clapper rail	*Rallus longirostris yumanensis*	Fresh water and brackish marshes	E	SC	No
Snowy plover	*Charadrius alexandrinus*	Ponds		SC	No
Western yellow-billed cuckoo	*Coccyzus americanus*	Riparian areas of lower Sonoran zone		SC	No
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	Mature cottonwood/willow, mesquite bosques, and Sonoran desertscrub	E	SC	No
Mexican spotted owl	*Strix occidentalis lucida*	Nests in canyons and dense forests with multi-layered foliage structure	T	SC	No
Belted kingfisher	*Ceryle alcyon*	Ponds, streams, and canals		SC	Yes
Southwestern willow flycatcher	*Empidonax trailli extimus*	Cottonwood/willow and tamarisk vegetation communities along rivers and streams	E	SC	No
Tropical kingbird	*Tyrannus melancholicus*	Lowlands near water, often nests in cottonwood		SC	No
REPTILES AND AMPHIBIANS					
Chiricahua leopard frog	*Rana chiricahuensis*	Rocky streams and other wetlands	C	SC	No
Lowland leopard frog	*Rana yavapaiensis*	Restricted to permanent waters: pools of foothill streams, overflow ponds		SC	No
Desert tortoise	*Gopherus agassizii*	Riverbanks, washes, dunes, and rocky slopes		SC	No
Arizona skink	*Eumeces gilberti arizonensis*	Piñon-juniper woodland and yellow pine forest		SC	No
Narrow-headed garter snake	*Thamnophis rufipunctatus*	Piñon-juniper and oak-pine belts to ponderosa pine forests along clear, permanent, or semi-permanent rocky streams		SC	No
FISH					
Colorado squawfish	*Ptychocheilus lucius*	Water deeper than a meter and with strong to moderate currents	E	SC	No
Bonytail chub	*Gila elegans*	Eddies and pools, not in swift currents	E	SC	No
Spikedace	*Meda fulgida*	Shallow water, often near the downstream ends of riffles or in eddies	T	SC	No

Table C-6 (Continued)

Common Name	Scientific Name	Habitat	Federal Status	State Status	Habitat Present in Project Area
Razorback sucker	*Xyrauchen texanus*	Riverine and lacustrine areas, generally not in fast-moving water and may use backwaters	E	SC	No
Desert pupfish	*Cyprinodon macularius macularius*	Shallow springs, small streams, and marshes; tolerates saline and warm water	E	SC	No
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Concentrates in shallow water, especially where aquatic vegetation or debris is present	E	SC	No
PLANTS					
Arizona agave	*Agave arizonica*	Transition zone between oak-juniper woodland and mountain mahogany oak scrub	E	HS	No
Hohokam agave	*Agave murpheyi*	In Maricopa County, found in Paradise Valley		HS	No
Arizona cliffrose	*Purshia subintegra*	Characteristic white soils or tertiary limestone lakebed deposits	E	HS	No
Crested or Fan-top saguaro	*Carnegiea gigantea*	Rocky hillsides and outwash slopes		HS	No
Arizona hedgehog cactus	*Echinocereus triglochidiatus arizonicus*	Ecotone between interior chaparral and madrean evergreen woodland	E	HS	No
Acuna cactus	*Echinomastus erectocentrus acunensis*	Limestone hills and flatlands in western lower Sonoran desert	C	HS	No
Lemmon fleabane	*Erigeron lemmoni*	Cliff areas within Fish Creek Canyon in Maricopa County	C	HS	No

Sources: Arizona Department of Agriculture 1999; AGFD 1996; Hoffmeister 1986; Stebbins 1985; USFWS 1999a,b,c.

APPENDIX D

AGENCY CORRESPONDENCE

U.S. Fish and Wildlife Service (USFWS)
and
Arizona Game and Fish Department (AGFD)

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(Available upon request from
Jacques Landy
CWA Standards and Permits Office (WTR-5)
USEPA
75 Hawthorne Street
San Francisco, CA 94105

Tel: (415) 744-1922
e-mail: landy.jacques @epa.gov)

APPENDIX E

MEMORANDUM OF AGREEMENT (MOA)

Archaeological Data Recovery
SRP Kyene Expansion Project

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APPENDIX F

ARCHAEOLOGICAL TESTING FOR THE KYRENE EXPANSION PROJECT (TECHNICAL REPORT NO. 2000-09, SEPTEMBER 2000)

A copy of this technical report can be viewed by accessing EPA's web page http://www.epa.gov/ or by contacting Mr. Jack Landry at EPA Region 9 at (415) 744-1922