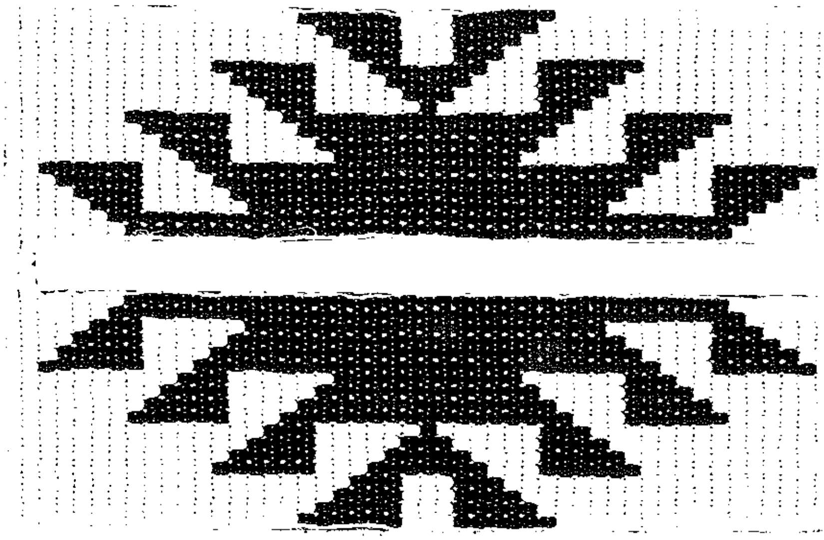
FES 99-1

SOUTHPOINT POWER PLANT



FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR A LEASE DEVELOPMENT PROJECT ON THE FORT MOJAVE INDIAN RESERVATION, MOHAVE COUNTY, ARIZONA

DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
and
Department of Energy
Western Area Power Administration
and
The Fort Mojave Indian Tribe
as cooperating agencies

JANUARY, 1999

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
PHOENIX AREA OFFICE
P.O. BOX 10
PHOENIX, ARIZONA 85001

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

Environmental Quality Services
(602) 379-6750

JAN 13 1999

Dear Reader:

We are pleased to provide this Final Environmental Impact Statement (FEIS) for a proposed lease of acreage on the Fort Mojave Indian Reservation in Mohave County, Arizona for development of a natural gas fired 500 megawatt combined cycle power plant. The Bureau of Indian Affairs (BIA) serves as the federal lead agency and the Fort Mojave Indian Tribe (FMIT) and the Western Area Power Administration (WAPA) are cooperating agencies for the EIS process.

The purpose of this document is to provide information to the public and to interested public agencies regarding the environmental consequences of the approval of a long-term lease for the construction and operation of the proposed Southpoint power plant. The FEIS, prepared by Hallock/Gross, Inc. under the direction of the BIA and in cooperation with the FMIT and WAPA, addresses the comparative analysis of alternatives and evaluates the environmental consequences of such alternatives on various resources and addresses public comments. A number of technical reports were used in the preparation of the Draft EIS and FEIS and are available for review as Appendices to this document under separate cover that can be reviewed at the BIA offices listed below.

Copies of this FEIS and its Appendices are available at the FMIT headquarters located at 500 Merriman St., Needles, California; the BIA Phoenix Area Office, Environmental Quality Services, 14th Floor, 2 Arizona Center, 400 N. 5th St., Phoenix, Arizona; and at the BIA Colorado River Agency, Real Estate Services, Building 4, Agency Road, Parker, Arizona.

This document has been prepared in partial fulfillment of the BIA's responsibility to comply with the National Environmental Policy Act (NEPA), the Department of the Interior's implementing procedures, and BIA's guidelines for any major Federal action significantly affecting the quality of the human environment.

Any comments concerning the adequacy or accuracy of this document will be considered prior to the BIA's issuance of the Record of Decision. A 30-day public review period has been established for this document.

Written comments on this final document will be accepted within 30 days after the publication of the Notice of Availability in the Federal Register.

Area Director
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Phoenix Area Office
Environmental Quality Services
P.O. Box 10
Phoenix, Az 85001

Superintendent
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Rte. 1, Box 9-C
Parker, AZ 85344

We encourage you to review the documentation, as we are interested in receiving your comments. If you are interested in a specific topic or subject, please reference the table of contents. Any comments should be submitted to the addresses listed above. If you have any questions, please contact either Amy Heuslein, BIA Phoenix Area Office, Environmental Quality Services at (602) 379-6750 telephone, (602) 379-3833 telefax or Goldie Stroup, BIA Colorado River Agency, Real Estate Services at (520) 669-7141 telephone, (520) 669-7187 telefax.

Sincerely,

Wayne C. Nordwall

Phoenix Area Director

Enclosure

Southpoint Power Plant
Final Environmental Impact Statement (FEIS)

Fort Mojave Indian Reservation
Mohave Count , Arizona

Prepared by:
Hallock/Gross, Inc., FMIT Planners

Prepared for:
US Department of the Interior
Bureau of Indian Affairs

Phoenix Area Office, Phoenix, Arizona
and the
Colorado River Agency, Parker, Arizona
with the
US Department of Energy
Western Area Power Administration
Cooperating Agency
and the
Fort Mojave Indian Tribe
Cooperating Agency

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January, 1999

SOUTHPOINT POWER PLANT
Final Environmental Impact Statement
FES 99-1
January, 1999

Lead Agency:	US Department of the Interior Bureau of Indian Affairs Phoenix Area Office
Cooperating Agencies:	US Department of Energy Western Area Power Administration Phoenix Office **and** The Fort Mojave Indian Tribe Needles, California
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Abstract:

The proposed action consists of Bureau of Indian Affairs approval of a lease between the Fort Mojave Indian Tribe and Calpine Corporation. The approval of the lease would constitute a major federal action requiring compliance with the National Environmental Policy Act (NEPA) and implementing regulations. The lease would permit use of approximately 320 acres of tribal trust land located in Mohave County, Arizona for the construction and operation of a 500 megawatt combined cycle natural gas fired power plant. The project would generate electric power for distribution through the federal Western Area Power Administration's wheeling and distribution facilities. Several alternatives, including a no-action alternative, were analyzed in the Final EIS.

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This Executive Summary describes the Southpoint natural gas fired power plant proposed to be built on the Fort Mojave Indian Reservation in Mohave County, Arizona, and alternatives analyzed in this Environmental Impact Statement (EIS). The potential significant impacts to the human environment for each environmental resource associated with the proposed power plant and the alternatives are briefly summarized. The Bureau of Indian Affairs (BIA), an agency of the US Department of Interior, is the lead agency responsible for documentation of National Environmental Policy Act (NEPA) compliance for major federal actions which fall under the BIA's organizational responsibilities. Indian lands are held in trust by the United States. The BIA has been delegated trust responsibility for Indian lands and resources. As the trustee of Indian resources, the BIA must ensure compliance with NEPA and BIA's regulations for implementing NEPA.

The Southpoint power plant is a private project proposed to be built and operated on sovereign Indian lands. Therefore, the proposed Southpoint power plant is not a federal project. The major federal action associated with the proposed Southpoint power plant is BIA approval of a lease between the developer, Calpine Corporation, and the landowner, the Fort Mojave Indian Tribe (FMIT). The BIA must analyze and address adequately the environmental consequences of the proposed Southpoint power plant before making a determination as to whether the lease between Calpine Southpoint, Inc. (Calpine) and the FMIT should be approved.

A lease between Calpine and the FMIT was executed on April 28, 1998. This lease is an exercise of the Tribe's self determination. This lease remains conditional until NEPA compliance documentation is complete and BIA determines whether or not to issue a Record of Decision (ROD) on this EIS. Final lease approval cannot occur without a favorable ROD.

BIA authority is limited to approval or disapproval of the lease. Determination to approve or disapprove the lease is made on a two-tiered decision process. The first tier is findings of whether or not the lease meets regulatory requirements for leases of Indian lands set forth in Title 25 of the Code of Federal Regulations, Part 162. The second tier of the lease approval decision process is documentation of NEPA compliance. This EIS was prepared as the basis for BIA determination of NEPA compliance of the proposed lease and the environmental consequences which would result from its approval and implementation. The lease agreement between Calpine and the FMIT defines the preferred course of action of the parties to the lease. Therefore, the proposed lease is the basis for defining the Preferred Alternative of this EIS.

The final decision on approval or disapproval of the proposed lease and the consequent construction, or cancellation, of the proposed Southpoint power plant project, may be made no sooner than 30 days following publication of the Notice of Availability of the Final EIS in the *Federal Register*. The final decision will be announced in a ROD issued by the BIA. If the lease and the Southpoint power plant project are approved with conditions (such as committed environmental mitigation measures), the ROD will contain those conditions. These conditions would be legally binding on the lessee, Calpine, and on the construction and operation of the Southpoint power plant.

Description of Proposed Southpoint Power Plant

Calpine proposes to construct and operate a nominal 500 megawatt (MW) natural gas fired power plant on 320 acres of leased tribal trust lands on the Fort Mojave Indian Reservation (FMIR) in Mohave County, Arizona. The proposed power plant, called "Southpoint," would be a combined cycle facility. Power generated would meet existing demand for electric energy in the western states. The electric power produced would enter the multi-state federal Western Area Power Administration's power wheeling and distribution facilities, and local facilities. The proposed Southpoint power plant would be a "merchant plant" which sells electrical energy on a spot-market basis to public and private utility companies for resale and redistribution to end-consumers. The construction cost of the proposed power plant is estimated to be between $200 and $250 million. Funding would be provided by private financing. The power plant would employ approximately 20 full time employees when completed.

Construction of an energy production facility on the FMIR would enhance tribal sovereignty, self determination and economic development of the FMIT. The proposed power plant would be a source of economic benefit through direct income to the FMIT from lease payments for land and water, and from indirect economic benefits.

The conceptual design of the proposed power plant is based on "state of the art" commercially available combustion turbines. The electric generating equipment would consist of a 500 MW combined cycle power block, comprised of two combustion turbine generators, two heat recovery steam generators (HRSGs), one steam turbine, and one condenser. The combined cycle combustion turbines would use dry, low nitrogen oxide (NOx) combustors and HRSG with selective catalytic reduction (SCR) to control NOx emissions. Carbon monoxide (CO) is controlled using an oxidation catalyst. Waste heat would be rejected to the atmosphere through exhaust stacks and a multiple-cell mechanical draft cooling tower.

The proposed Southpoint power plant would burn only natural gas. It would require 90 million cubic feet of natural gas per day. El Paso Natural Gas Company (EPNGC) and Transwestern Pipeline Company (TPC) have natural gas transmission lines in the vicinity of the proposed power plant, New lines connecting the proposed power plant to the main natural gas lines would be constructed on new right of way (ROW) across Bureau of Land Management (BLM) land. ROW acquisition for these natural gas pipelines requires documentation of NEPA compliance. The documentation would be prepared by the natural gas suppliers, with the BLM as lead agency.

The proposed Southpoint power plant would require construction of an off-site substation and two 230kV transmission lines in order to wheel power to the Western Area Power Administration (WAPA) distribution grid. An Environmental Assessment (EA) for the proposed substation and transmission line was prepared with the BLM as lead agency and WAPA as a cooperating agency. A Finding of No Significant Impact (FONSI) and ROD was approved on December 2, 1997.

The proposed Southpoint power plant would use water withdrawn from the Colorado River and piped to the plant in a buried pipeline constructed, owned and operated by the FMIT on reservation land as the primary source of water for the steam turbine and cooling towers. Two onsite wells would provide a backup water supply. Up to 4,000 acre feet (AF) of water would be used consumptively per year.

Wastewater produced by the proposed power plant would be piped for disposal to a 30 acre evaporation pond located on top of the bluffs. Approximately 94 AF per year would be piped to the pond to evaporate. The evaporation pond would be lined with two highly impervious geomembrane liners to minimize leakage. A similarly lined three acre interim storage pond would also be constructed to hold approximately two days' wastewater output.

Stormwater would be retained in onsite retention basins approximately 30 acres in size. Soil excavated from the basins would be used as fill to create a buildable area for the power plant equipment block, administrative offices, other site structures, internal roads, and parking areas.

Alternatives

Preferred Alternative

The Preferred Alternative is construction and operation of a nominal 500 MW power plant on 320 leased acres on the FMIR on the east half of Section 8, Township 17 North, Range 21 West, Gila and Salt River Base and Meridian, Mohave County, Arizona. The Preferred Alternative site is located in undeveloped desert at the southern end of the Mohave Valley.

The Preferred Alternative site consists of valley floor, and bluffs which rise approximately 150 feet above the valley floor. The power plant's equipment complex would occupy approximately 15 acres on the valley floor at the base of the bluffs. Onsite retention basins would require approximately 30 acres on the valley floor. A lined evaporation pond on top of the bluffs would require approximately 30 acres. A temporary storage pond at the foot of the bluffs would occupy three acres. A new asphalt entry road providing access from the Topock-Davis Dam Highway would be built. A parking area would be provided adjacent to the administrative buildings. Approximately 212 acres of the 320 acre site would remain undeveloped and would serve as a buffer surrounding the power plant.

Natural gas would be supplied by two new buried pipelines connecting the proposed power plant to existing natural gas transmission lines. Power would be delivered from the proposed Southpoint power plant to the proposed Topock substation and 230 kV transmission lines.

Water for the power plant would be withdrawn from the Colorado River and conveyed in a buried pipeline to the proposed power plant site, and from two new backup wells drilled onsite. The river water pumping apparatus and the buried pipeline would be constructed, owned, and operated by the FMIT, which would be responsible for any federal permits or NEPA compliance.

Wastewater would be piped to a lined 30 acre evaporation pond located on top of the bluffs and would be disposed of by evaporation. Accumulated precipitates would be removed from the pond bottom as needed during the life of the proposed Southpoint power plant to assure adequate wastewater storage capacity.

Alternative Two

Alternative Two would construct and operate a power plant on approximately 160 acres on the FMIR in the east half of the east half of Section 30, Township 18 North, Range 21 West, Gila and Salt River Base and Meridian, Mohave County, Arizona. This site is approximately two and one half miles northwest of the Preferred Alternative site. The power plant proposed to be built on the Alternative Two site would be identical in size to that proposed for the Preferred Alternative. All plant facilities, except paved access roads, would be located on the top of the bluffs. Natural gas would be available to the plant from the same sources as for the Preferred Alternative and would require construction of two branch lines across BLM land to the FMIR's boundary. The site would connect to the Topock substation and transmission corridor.

Alternative Three

Alternative Three would construct and operate a power plant on approximately 160 acres on the FMIR in the west half of Section 16, Township 17 North, Range 21 West, Gila and Salt River Base and Meridian, Mohave County, Arizona. This site is immediately to the south and east of the Preferred Alternative site, on the south side of the Davis Dam-Topock Highway. The power plant proposed to be built on the Alternative Three site would be identical in size to that proposed for the Preferred Alternative. All plant facilities would be located on the valley floor. Natural gas would be available to the plant from the same sources as for the Preferred Alternative and would require construction of two branch lines across BLM land to the FMIR's boundary. The site would connect to the Topock substation and transmission corridor.

No Action Alternative

Under a No Action Alternative, no power plant would be built. Neither the Preferred Alternative, nor the other two alternatives, would be developed. All three alternative sites would remain in their present condition. Tribal economic development goals would not be met.

Environmental Consequences

Land Resources

Alteration of surface topography would be required to develop any of the three alternative sites. Topographic alteration would not result in significant impacts on the Preferred Alternative site or Alternative Three site. Impacts would be significant on the Alternative Two site because the bluff face would have to be cut.

No significant impacts to geologic resources would result from construction and operation of the proposed power plant on any of the three alternative sites.

No significant impacts to soils would occur if any alternative site were selected. The Preferred Alternative site contains approximately eight acres of prime farmland which would be avoided, and therefore would remain undeveloped.

The Preferred Alternative site and Alternative Three site would require alteration of natural drainage patterns to reduce flood hazard from stormwater sheetflow. Flood hazard onsite would be reduced to acceptable levels by elevating building pads for equipment and other facilities of the proposed power plant. Fill would originate onsite; areas excavated to produce fill would be recontoured to create onsite retention basins. These alterations would not be significant because there would be no change in rate or velocity of flows passed to offsite properties. Sedimentation is a natural hazard affecting the Preferred Alternative site and Alternative Three site. Large volumes of sediment could be deposited onsite, requiring removal for offsite disposal. Impacts of trucking offsite and disposal would not be significant.

The Alternative Two site would not require substantial alteration of natural drainage patterns because it would be located out of the valley floor floodplain. Sedimentation hazard on the Alternative Two site is minimal. Drainage and sediment impacts would be insignificant.

Water Resources

The FMIT has perfected water rights to Colorado River water in quantities adequate to meet the estimated 4,000 acre feet per year consumptive use requirements of the proposed power plant. No impacts to water rights would result from construction and operation of a power plant on any of the three alternative sites.

No significant impacts to surface or ground water quality were identified with the proposed power plant on any of the three alternative sites.

Use of wellwater as a backup water supply source for the proposed power plant would have no significant impacts on ground water quantity or depth to groundwater in the vicinity of the proposed power plant.

Air Resources

The potential air quality impacts from construction and operation of the proposed Southpoint power plant would be essentially the same for all three alternative sites. Air quality impacts from construction-related vehicle emissions and fugitive dust would not be significant. Plant operational impacts would be significant, but could be mitigated to below-significant levels. No Class I areas would be affected. With mitigation, potential significant adverse air quality impacts could be mitigated to acceptable levels if the proposed power plant were constructed and operated on any of the three alternative sites. With implementation of fugitive dust control measures, fugitive dust impacts could be mitigated to insignificance. Through the Prevention of Significant Deterioration (PSD) permitting process, Best Available Control Technology (BACT) for stationary sources of air pollutant emissions would mitigate operations-related air quality impacts to insignificance because the National Ambient Air Quality Standards (NAAQS) would not be exceeded.

Biotic Resources

No rare, threatened or endangered plant or animal species, critical habitat, or wetlands occur on any of the three alternative sites. No significant adverse impacts to biotic resources were identified. Havasu National Wildlife Refuge, located proximate to the Preferred Alternative and Alternative Three sites, would not experience significant adverse effects if the proposed power plant were built and operated on either of those sites.

Cultural Resources

Cultural resources sites identified on the Preferred Alternative and Alternative Three sites would be avoided if the proposed power plant were constructed at either of those locations. No significant impacts would occur. The Alternative Two site has unavoidable cultural resources sites, and significant impacts would occur if the power plant were built on this location.

Socioeconomics

Construction and operation of the proposed power plant would have significant beneficial impacts to the tribe and its individual members from land rent payments, lease of water, and employment opportunities if it were built on any of the three alternative sites.

Under a No Action Alternative, loss of income to the tribe and its members would be an unmitigable significant adverse impact.

Community Infrastructure

With mitigation, potentially significant adverse impacts to hazardous materials and fire protection response capabilities could be mitigated to acceptable levels if the proposed power plant were to be built and operated at any of the three alternative sites.

No other significant adverse impacts to community infrastructure were identified.

Resource Use Patterns

No significant adverse impacts to agriculture, hunting, gathering and fishing, mining, or recreation were identified if the proposed power plant were to be built and operated on any of the three alternative sites.

Transportation

With mitigation, temporary significant adverse traffic impacts to County Road 227 (CR 227) and State Route 95 (SR 95) during construction of the proposed power plant on either the Preferred Alternative or Alternative Three sites could be mitigated to acceptable levels. No significant long term traffic impacts were identified at either of these sites.

Significant unmitigable adverse temporary and long term impacts to transportation and traffic would result from construction and operation of the proposed power plant on the Alternative Two site.

Solid Waste

No significant impacts to solid waste facilities were identified with construction and operation of the proposed power plant on any of three alternative sites.

Land Use

No significant adverse impacts to land use or land use plans were identified with construction and operation of a power plant on any of the three alternative sites.

Noise

No significant adverse impacts from either construction or operational noise from the proposed power plant were identified at any of the three alternative sites.

Visual Resources and Other Values

No significant adverse effects to visual resources would occur if the proposed power plant were built and operated on the Preferred Alternative site. Significant unmitigable adverse effects on visual resources would occur if the proposed power plant were built and operated on either the Alternative Two or Alternative Three sites.

No other adverse effects to wilderness, wild and scenic rivers, or other values were identified with any of the three alternative sites.

No Action Alternative

With the exception of significant adverse socioeconomic impacts, no significant adverse impacts to land, water, air, or other components of the human environment were identified with the No Action Alternative.

Cumulative and Indirect Effects

No significant Cumulative and Indirect Effects were identified with construction and operation of the proposed power plant on any of the three alternative sites.

Growth Inducing Effects

No significant Growth Inducing Effects were identified with construction and operation of the proposed power plant on any of the three alternative sites.

Irreversible and Irretrievable Commitment of Resources

Capital, labor, sand, gravel, cement, bituminous binder and other resources would be irretrievably and irreversibly consumed if the proposed power plant were built and operated on any of the three alternative sites.

Environmental Justice

There would be no environmental justice impacts from the lease of land for construction and operation of the proposed power plant.

Indian Trust Assets

No unmitigable significant adverse impacts to Indian Trust Assets would result from construction and operation of the proposed power plant on the Preferred Alternative site. Unmitigable significant adverse impacts to cultural, visual, and soils resources would occur if the Alternative Two site were selected. No unmitigable adverse impacts to Indian Trust Assets would occur if the Alternative Three site were selected; however, unmitigable adverse impacts to visual resources on nearby Havasu National Wildlife Refuge would occur.

Summary of Unavoidable Adverse Effects

Unavoidable adverse impacts are summarized in Table S-1, below.

Table S-1 Unavoidable Adverse Impacts

Impacts	Preferred Alternative	Alternative Two	Alternative Three	Mitigable
Fire Protection	X	X	X	yes
Hazardous Materials Response	X	X	X	yes
Traffic	X	X	X	yes
Air Quality	X	X	X	yes
Visual Resources	None	X	X	no
Cultural Resources	None	X	None	no
Topography	None	X	None	no

Comparison of Alternatives

A summary comparison of alternatives appears in Table S-2, which presents the environmental consequences of constructing and operating the proposed Southpoint power plant on the Preferred Alternative site, Alternative Two site, and Alternative Three site.

The table shows that the No Action Alternative would have the least overall potential significant adverse effects to the human environment. The No Action Alternative would, however, result in significant adverse socioeconomic effects to the FMIT and its members.

The Preferred Alternative site has the least potential for significant adverse effects to the human environment, followed by the Alternative Three site, then the Alternative Two site.

Committed Mitigation Measures

Traffic

Temporary traffic impacts to CR 227 and SR 95 would occur during construction of the proposed power plant. These temporary impacts will be mitigated to insignificance by positioning flaggers at intersections to control turning movements, by scheduling delivery of materials to the construction site at off peak hours, and by constructing turning bays on CR 227 at the power plant entrance road.

Hazardous Materials Response

The FMIT does not have an adopted emergency preparedness plan, nor a contract with a qualified hazardous materials response entity. Both of these significant public safety impacts will be mitigated by the following measures:

- Formation of a Tribal Emergency Response Committee (TERC) and adoption of an emergency preparedness plan which meets US Environmental Protection Agency (USEPA) guidelines
- Contracting for hazardous materials response services with the Bullhead City Fire Department (BCFD).

In addition to these committed mitigation measures the Arizona Department of Environmental Quality (ADEQ) acts as USEPA's agent to provide emergency response within Arizona, including Indian lands.

Fire Protection

The Preferred Alternative site is outside the service boundary of the FMIT's current fire protection services contract with the MVFD. The FMIT will enter in to a modified contract with the MVFD to extend the service boundary to include the Preferred Alternative site.

Air Quality

Potential air quality impacts will be mitigated by implementation of dust control measures during construction, and by implementation of BACT measures which must be implemented as a condition of the federal PSD permit, which must be secured before the proposed power plant can be constructed and operated.

Plant Decommissioning and Restoration

At the end of the useful life of the proposed power plant, or at the end of the lease term, whichever comes first, the power plant will be removed and the site will be restored to its pre-construction condition. Decommissioning and restoration include removal of the evaporation pond on the top of the bluffs. Any residual accumulated solids in the pond, and the pond liners, would be removed and properly disposed of. The pond will be regraded to approximate the contour of the surrounding land, and revegetated to native species.

Table S-2: Summary Comparison of Alternatives

Potential Impact	Preferred Alternative Site	Alternative Two Site	Alternative Three Site	No Action Alternative
Land Resources				
Topography	No significant impact	Significant impact	No significant impact	No impact
Soils	No significant impact	No significant impact	No significant impact	No impact
Geologic Resources	No significant impact	No significant impact	No significant impact	No impact
Flood Hazard	No significant impact	No significant impact	No significant impact	No impact
Water Resources				
Water Rights	No significant impact	No significant impact	No significant impact	No impact
Surface Water	No significant impact	No significant impact	No significant impact	No impact
Groundwater	No impact on water table	No impact on water table	No impact on water table	No impact on water table
Water Quality	No significant impact	No significant impact	No significant impact	No impact
Air Resources	Significant impact -mitigable	Significant impact - mitigable	Significant impact -mitigable	No impact
Biotic Resources	No significant impact	No significant impact	No significant impact	No impact
Cultural Resources	No impact (avoidance)	Significant impact	No significant impact	No impact
Socioeconomics	Beneficial impacts	Beneficial impacts	Beneficial impacts	Significant impact-unmitigable
Community Infrastructure	No significant impact	No significant impact	No significant impact	No impact
HazMat Response	Significant impact-mitigable	Significant impact-mitigable	Significant impact-mitigable	No impact
Fire Protection	Significant impact-mitigable	Significant impact-mitigable	Significant impact-mitigable	No impact
Resource Use Patterns	No significant impact	No significant impact	No significant impact	No impact
Transportation/Traffic	Significant temporary impact- mitigable	Significant temporary impact- mitigable	Significant temporary impact- mitigable	No impact
Solid Waste	No significant impact	No significant impact	No significant impact	No impact
Land Use	No significant impact	No significant impact	No significant impact	No impact
Noise	No significant impact	No significant impact	No significant impact	No impact
Visual Resources	No significant impact	Significant impact-unmitigable	Significant impact-unmitigable	No impact
Cumulative/Indirect Effects	No significant impact	No significant impact	No significant impact	No impact
Growth Inducing Effects	No significant impact	No significant impact	No significant impact	No impact
Environmental Justice	No significant impact	No significant impact	No significant impact	No impact
Indian Trust Assets	Impacts but mitigable	Some impacts-unmitigable	Impacts but mitigable	No impact

N.B.: Please see Chapter 4 of the EIS for a full discussion of the impacts associated with the Preferred Alternative, Alternatives Two and Three, and the No Action Alternative.

1.0 PURPOSE AND NEED FOR PROPOSED ACTION

1.0 PURPOSE AND NEED FOR PROPOSED ACTION

1.1 Introduction

Calpine proposes to construct on leased tribal trust lands of the FMIR, in Mohave County, Arizona, a natural gas fired combined cycle facility to meet existing demand for electric power in the western states. Construction of an energy production facility on the FMIR would enhance the tribal sovereignty, self-determination and economic development of the FMIT. The proposed power plant would be a source of economic benefit through direct and indirect income to the FMIT from lease payments for land and water, and other direct and indirect economic benefits. Revenues from the proposed lease and other economic benefits would contribute to the FMIT's strategy of using its land and water resources for economic development.

The electric power which would be produced would enter the multi-state federal WAPA power wheeling and distribution facilities, and local facilities such as Arizona Electric Power Co-op (AEPCO), Mohave Electric Co-Op, Aha Macav Power Service (AMPS), and others. The proposed Southpoint power plant would be a "merchant plant," which does not sell power to specific customers but, rather, sells electrical energy on a spot-market basis to public and private utility companies, which would, in turn, distribute the power to end-consumers. An indirect benefit would be more reliable programming of electric service in existing markets.

The proposed Southpoint power plant would produce a nominal 500 megawatts (MW) of power. For comparison, the record peak power demand for metropolitan Phoenix was 4,200 MW (PBS/KAET, "Beat the Heat," Horizon, August 8, 1997). Power from the proposed Southpoint power plant would be equivalent to approximately 12 per cent of the maximum daily demand in the Phoenix area.

At this time, it is anticipated that electric energy produced by the proposed Southpoint power plant would enter the WAPA system via the planned Topock substation and transmission facilities. Access to the WAPA system would provide a means of exporting energy to serve virtually any electric service provider in the Western Systems Coordinating Council grid that includes 14 states and portions of Canada and Mexico. Future load growth in Arizona, Nevada, and Southern California is estimated to be more than 10,000 MW over the next 10 years (DOE/WAPA, Navajo Transmission Project Final Environmental Impact Statement, May 1997). The impending deregulation of electric utilities is expected to result in more opportunities for the sale of bulk power generated by newer, more efficient, reliable, and environmentally compatible power sources. Power produced by the proposed Southpoint plant could potentially be made available to one or more consumers including major manufacturing, processing, or mining facilities, as well as public and private utilities.

1.2 Environmental Documentation Required For Federal Actions

1.2.1 Federal Action: Calpine Lease Approval

The major federal action which requires NEPA-compliance environmental documentation is approval by the BIA of the proposed lease (*Davis v. Morton*, 469 F.2d 593, 597 (10th Cir. 1972)) between the FMIT and Calpine. Calpine and the FMIT propose to enter into a 50 year lease, with an option for an additional 15 years, for approximately 320 acres of land on the FMIR located in the east half of Section 8, Township 17 North, Range 21 West, Gila and Salt River Base and Meridian, Mohave County, Arizona. The FMIT may enter into leases of up to 99 years as per the BIA regulations under 25 CFR,ξ162.8.

The lease would provide for a consumptive use of up to 4,000 acre feet (AF) of water per year from the FMIT's existing Arizona water allocation under *Arizona v. California*.

The proposed lease between Calpine and the FMIT must be reviewed and approved by the BIA in fulfillment of its trust responsibilities for federal Indian lands. Approval of leases of federal Indian trust lands also requires documentation of BIA compliance with NEPA, as amended (40 CFR, 1500 *et seq.*).

1.2.2 National Environmental Policy Act (NEPA) of 1969

Approval of the Calpine lease is a major federal action. A major federal action is one which has "effects that may be major and which are potentially subject to Federal control and responsibility.....Actions include...projects and programs...regulated, or approved by federal agencies..." (CEQ at 1508.18). The determination of whether an action is "major" relates to its potential to significantly affect the quality of the human environment (30 BIAM Supplement 1(2.2)). Major federal actions require documentation of compliance with NEPA. "The NEPA process is used to advise the Bureau [of Indian Affairs] decision maker of impacts on Indian people and their environment." (BIA NEPA guidance memo, October 13, 1994, unpaginated.) Approval of an industrial development lease is one of several BIA actions normally requiring environmental documentation.

As a major federal action, approval of the Calpine lease requires preparation of an Environmental Impact Statement (EIS). The BIA is the lead agency for this EIS, under responsibility delegated by the Department of Interior (10 BIAM 1.10, and DOI Departmental Manual, "NEPA: Implementing Procedures," 516 DM 6, Appendix 4, as revised December, 1996).

This federal EIS has been prepared to comply with the requirements of NEPA to determine the potential environmental effects from the approval of a proposal by Calpine to lease 320 acres of land on the FMIR as the site for a new gas fired combined cycle electric generating plant. Environmental documentation has been prepared under NEPA-implementing procedures adopted by the Department of Interior (DOI Departmental Manual 516 DM, 1-7, and additional provisions specific to the BIA adopted in 1993 as Appendix 4 of the DOI Manual, as amended in 1996).

1.2.3 Bureau of Indian Affairs (BIA) Environmental Requirements

This EIS has been prepared under the BIA's adopted environmental requirements and guidelines under NEPA, found at BIA Manual 30, as supplemented and revised. The EIS analyzes the proposed lease and its associated development for impacts which may affect each component of the human environment. The existing environment is described to provide a baseline against which to gauge the significance of environmental consequences which would result from approval of the proposed lease and construction and operation of the proposed Southpoint power plant. Significance is assessed and evaluated relative to the context and intensity of change which would result from construction and operation of the proposed power plant over the proposed lease term.

Preliminary site development plans, plant design plans, engineering specifications, and relevant information about the construction and operation of similar electric generating plants were used to predict and evaluate these impacts. This environmental documentation provides an analysis of various alternatives which were considered for location and design of the proposed power plant, including a "No Action" Alternative, as required under NEPA. It also includes an account of the environmental factors which were considered; the kinds of site-altering activities which would occur if the proposed project were constructed and operated, and the effects on each component of the human environment which would result; and what steps would be required to mitigate any significant adverse impacts to the human environment.

1.3 Permits Required for the Proposed Southpoint Power Plant

The proposed Southpoint power plant would require a number of federal and tribal permits and approvals. No permits or approvals from the State of Arizona, or county or local jurisdictions, are required because of the FMIT's sovereign status. Congress has not delegated any authority to state or local jurisdictions which would apply to the proposed Southpoint power plant; the FMIT has not entered into any intergovernmental agreements or memoranda of understanding with state or local jurisdictions which would delegate its permitting authority to any entity outside the tribe. The major regulatory approvals required for construction and operation of the proposed Southpoint power plant and the relevant permitting issues associated with each approval are described in this section. A summary of required permits appears as Table 1.3-1.

1.3.1 Tribal Permits

1.3.1.1 Planned Area Development Plan Approval

The FMIT has adopted a unified land development control ordinance rather than Euclidean zoning. The FMIT Planned Area Development and Subdivision Ordinance (PADSO) requires planning, architectural and engineering review and Tribal Council approval of a Planned Area Development Plan before site altering activities may commence.

1.3.1.2 Water Use Permit

The FMIT Water Use Ordinance requires application for, and approval of, a water use permit before water may be used for any development which has an approved Planned Area Development Plan.

1.3.1.3 Building Permit

The FMIT requires application for, and issuance of, a building permit before construction of any development which has an approved Planned Area Development Plan and Water Use Permit. Full review of construction plans is also required, as is construction inspection.

1.3.2 Federal Permits

1.3.2.1 US Environmental Protection Agency (USEPA) Prevention of Significant Deterioration (PSD) Air Quality Permit

Based on the proposed Southpoint power plant's potential emission of air pollutants, the proposed facility would be considered a major new source. An air quality permit known as the PSD is required by the USEPA for all stationary sources of air pollutants that would be generated at the proposed Southpoint power plant.

The proposed power plant must comply with national ambient air quality standards and PSD growth increments. It must utilize the BACT. It must not cause significant impacts to soils, vegetation, and visibility, or cause significant secondary growth. Demonstration that the proposed project would comply with these criteria requires presentation to USEPA of data representative of existing ambient air quality and
meteorological conditions of the sites considered as alternative locations for construction of the proposed Southpoint power plant. The permit application would also include a request for a permit to construct and operate the proposed Southpoint power plant. If the USEPA approves the PSD permit application, permission to construct and operate the proposed power plant is thereby granted.

Application for the PSD permit is not part of this EIS; however, data, modeling, and verification and evaluation of the air quality impacts which would result from construction and operation of the proposed Southpoint power plant, and which would be submitted to USEPA in the PSD permit application, have been used as the basis for evaluation of environmental consequences to air resources in this EIS.

1.3.2.2 US Army Corps of Engineers (USACE) 404 Permit

The USACE regulates the discharge of dredged and/or fill material into waters of the US including wetlands under Section 404 of the Clean Water Act and work and/or structures in or affecting a navigable water of the US (e.g., Colorado River) under Section 10 of the River and Harbor Act of 1899. Activities regulated under Section 404 include, but are not limited to, grading, filling, mechanized land clearing, ditching, or other similar activities which impact a water of the US. Depending on the areal extent of land disturbance, or volume of material added or displaced, activities may be covered under a nationwide permit, or may require an individual permit. Application for a Section 404 permit determination for the proposed power plant will be made by Calpine.

1.3.2.3 USEPA 401 Water Quality Certification

Under Section 401 of the Clean Water Act, the USEPA is the agency responsible for issuing individual 401 water quality certifications for projects on Indian reservations that affect waters of the US. Application for an Individual 401 Certification will be made by Calpine to USEPA Region IX, if required.

1.3.2.4 USEPA 402 National Pollutant Discharge Elimination System (NPDES) Permit

The USEPA has jurisdiction over Indian reservation lands for administration and enforcement of the National Pollutant Discharge Elimination System (NPDES) program under Section 402 of the Clean Water Act. An NPDES permit is required if there is a point source discharge of wastewater into "dry washes or streams, or other waters of the United States". (USACE, October 1993). Notification will be made by Calpine to USEPA Region IX for determination if an NPDES permit is required for the operation of the proposed Southpoint power plant. No determination has been made by USEPA.

An NPDES permit and preparation of a stormwater management plan is required for site alteration and construction activities for projects which would disturb more than five acres. A Notice of Intent for stormwater discharge associated with industrial activity would be submitted by Calpine to USEPA Region IX prior to start of construction.

1.3.2.5 USEPA Acid Rain (Title IV) Permit

One of the new regulatory programs under the Clean Air Act Amendments of 1990 (CAAA) concerns the control of sulfur dioxide (SO_2) and nitrogen oxide (NO_x), both precursors of acid deposition (acid rain). The centerpiece of Title IV is the establishment of an emissions allowance and trading program. The primary goal of Title IV is to reduce annual SO_2 emissions by 10 million tons below 1980 levels. This reduction would be achieved in two phases. Phase I began in 1995 and affects 110 major existing electric utility stations with high SO_2 emissions. Phase II begins in the year 2000 and imposes NO_x emission limitations, further tightens the SO_2 emission limit for Phase I facilities, and sets restriction for other existing and new utility units. The proposed Southpoint power plant would be subject to the Title IV program. Its acid rain permit would be incorporated into its Title V operating permit.

1.3.2.6 USEPA Title V Operating Permit

Title V of the CAAA requires all major sources of air pollution to obtain a permit to operate. The purpose of the operating permit program is to establish a method whereby all existing air permitting requirements can be centralized and enforced more efficiently. The permit is intended to incorporate all applicable requirements, including New Source Performance Standards (NSPS), PSD, and national emission standards for hazardous air pollutants (NESHAPs). The proposed Southpoint power plant would be required to submit a complete Title V application to the USEPA within 12 months of commencing operations. Compliance with Title IV (acid rain) would be incorporated into the Title V permit.

1.3.2.7 Department of Energy (DOE) Coal-Capability Certification

Pursuant to the power plant and Industrial Fuel Use Act of 1978, an owner of a baseload power plant combusting either petroleum products or natural gas as a primary fuel must self-certify with the DOE that the unit is capable of burning coal or a coal derivative as an alternate primary fuel. The coal-capability requirement implements national policy to minimize dependency on foreign petroleum fuels. The self-certification must be completed prior to commencing commercial operation of the facility.

The Southpoint power plant could be converted to burn gassified coal, and therefore meets the criterion for coal-capability certification.

Table 1.3-1 Tribal and Federal Permits Required for Proposed Southpoint Power Plant

Permitting Authority	Permit
FMIT	Planned Area Development Plan
FMIT	Water Use Permit
FMIT	Building Permit
USEPA	Prevention of Significant Deterioration Permit (including Permit to Construct/Operate)
USEPA	401 Water Quality Certification*
USEPA	National Pollutant Discharge Elimination System (NPDES) Permit
USEPA	Acid Rain (Title IV) Permit
USEPA	Title V Operating Permit
DOE	Coal-Capability Certification
USACE	Section 404/Section 10 Permit*

*Determination if either a Section 404 or Section 10 permit would be required has not been made by the USACE. Application for determination will be made by Calpine and the FMIT, as appropriate. If either a Section 404 or Section 10 permit is required, the 401 Water Quality Certification would be required.

1.4 Scoping Process

NEPA requires consultation with the concerned public, including interested federal, state, and local agencies, any affected tribal governments, and other parties to identify issues of concern which may be associated with a proposed project. Determination of issues occurs during a "Scoping Process," in which public and agency comment is requested in order to define the scope of concerns. Through a Notice of Intent (NOI) published in the *Federal Register* on December 1, 1994, the NEPA process commenced with announcement of intent to prepare an EIS for the proposed Southpoint power plant. The NOI also gave notice of the time and place for public meetings where comments could be received. Additional comments could be submitted in writing within a specified time after the notice appeared in the *Federal Register*.

No written comments were received in response to publication of the NOI; all comments resulted from two Scoping Meetings which were held on December 19th and 20th, 1994. The first Scoping Meeting took place in Needles, California and the second was in Bullhead City, Arizona. From public comment during these meetings several issues of concern were identified, and are addressed in this EIS. The issues noted were traffic impacts, visual impacts, economic impacts, water resources impacts, air quality impacts, and impacts to wildlife which might result from the proposed construction and operation of the Southpoint power plant. One additional comment was submitted in writing after the meetings. Appendix A summarizes the results of the scoping process.

The scoping process took place at the time that Nordic Power South Point I Limited Partnership (Nordic) had entered into a lease agreement with the FMIT to construct the proposed Southpoint power plant on the Preferred Alternative site. Approval of the lease was the proposed action before the BIA. Subsequent to the scoping process, Nordic assigned the lease to Calpine.

1.5 Background Description of How Electric Energy Is Produced In a Natural Gas Fired Plant

A general description of how electrical power is made will facilitate understanding of topics discussed in this EIS. This section is included to familiarize readers with basic concepts and terminology.

Electricity can be generated using a variety of mechanisms, the most common being the rotation of a large generator by some type of engine. In a utility, industrial, or commercial application, that engine is typically a combustion turbine (jet engine), steam turbine, or diesel engine.

The proposed Southpoint power plant is composed of two combustion turbine generators (CTG), two heat recovery steam generators (HRSG), and a single steam turbine generator (STG), commonly referred to as a "2 by 1 combined cycle" configuration. Each CTG is comprised of a combustion "jet" engine, which is connected to and drives the three-phase, alternating current generator, producing up to 180 MW of electrical power. Each HRSG is composed of a large, three-pressure boiler which uses the hot CTG exhaust gas to heat water into high pressure steam. The exhaust gas enters the HRSG at 1,100 degrees Fahrenheit and passes through multiple banks of water filled tubes, heating the water into low, intermediate, and high pressure steam. The exhaust gas leaves the HRSG at 200 degrees through a 225 foot high exhaust stack. The steam produced in the HRSG is used to power a single steam turbine, which is connected to another three-phase electrical generator, also capable of producing 180 MW. The electric power ultimately is transmitted to the substation and distributed to the Western Area Power Administration power grid.

After the steam passes through the steam turbine, it is cooled to liquid in the condenser and pumped back to the HRSG to repeat the cycle. The condenser is a large tube and shell heat exchanger which operates at a vacuum on the shell (steam) side. Cooling water flows from the cooling tower, through the condenser tubes at a rate of approximately 117,000 gallons per minute (gpm), picks up residual heat from the steam, and returns to the cooling tower. The cooling tower is a direct contact heat exchanger in which the cooling water is sprayed directly into a moving airstream, evaporating a portion of the water (2,000 gpm at full load), thereby carrying away the heat from the condenser.

Figure 1.5-1 summarizes, in diagrammatic form, the principal processes and components of a natural gas-fired combined cycle electric power generating plant. Figures 1.5-2 (Simple Cycle Combustion Turbine) and 1.5-3 (Combined Cycle Power Generation) diagram electric power production. A detailed description of the proposed power plant appears in Appendix G.

1.6 Project Description

Calpine proposes to construct and operate a nominal 500 MW electric generating facility which is capable of producing up to 540 MW, and may produce less than 500 MW at times, depending on market demands and atmospheric conditions. The proposed power plant would be named "Southpoint". The proposed Southpoint power plant would be built and operated on a 320 acre site located in the eastern half of Section 8, Township 17 North, Range 21 West, Gila and Salt River Base and Meridian, Mohave County, Arizona. The site is adjacent to, and north of, the Davis Dam - Topock Highway, also known as CR 227. The proposed power plant location map is included as Figure 1.6-1.

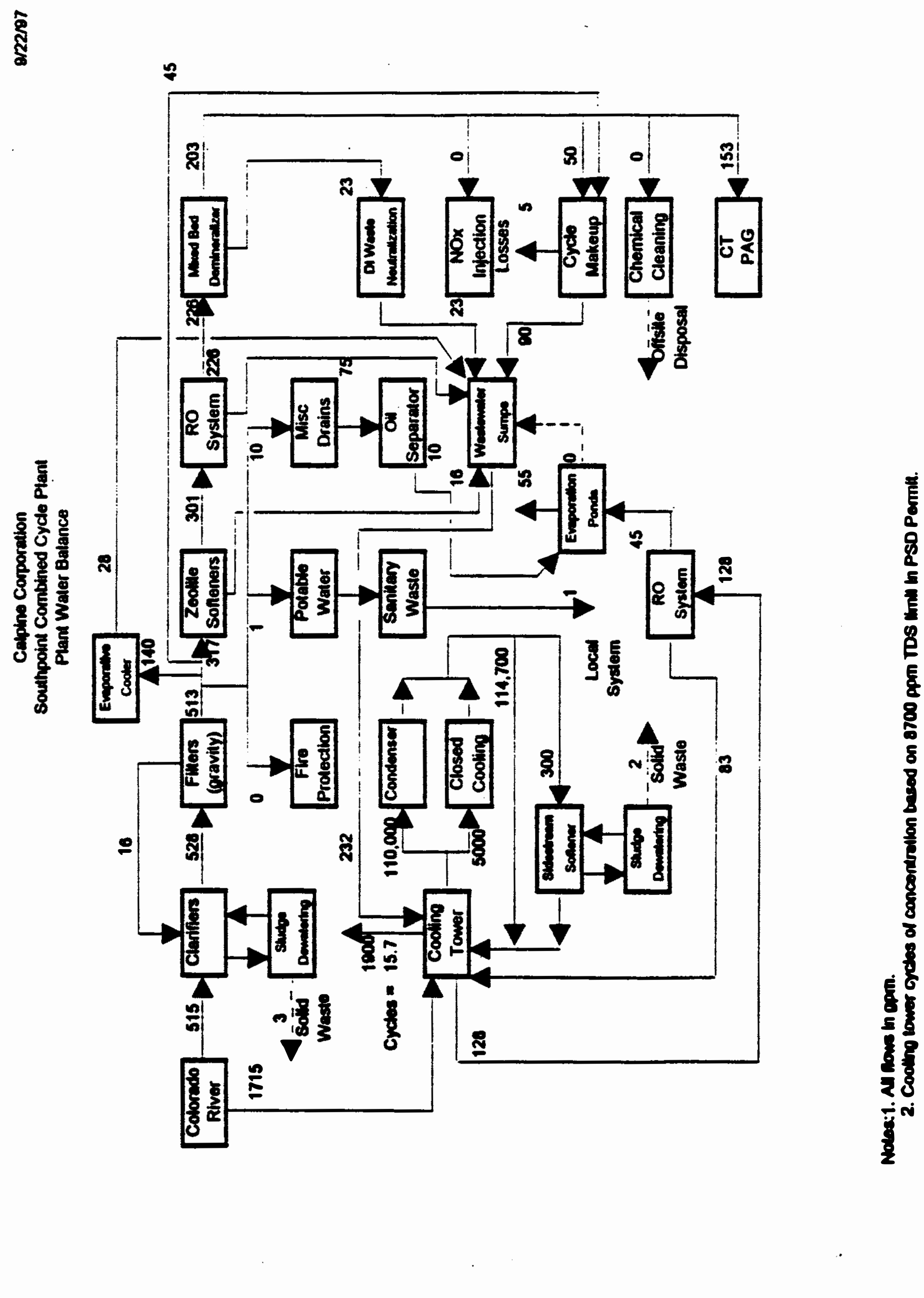
The construction phase of the proposed project would last approximately 16 to 20 months. Construction would require grading approximately 108 acres: 15 acres for the equipment compound, 30 acres for the evaporation pond, about 30 acres for onsite retention basins, 30 acres for storage of untreated process water supply, three acres for temporary storage of process wastewater, and two acres for internal roads. Some 250,000 cubic yards of soil would be moved to create building pads, retention basins and other stormwater management facilities, roadbeds, and the evaporation pond.

The conceptual design of the proposed power plant is based on "state of the art" combustion turbines, with "systems and equipment to make it a safe, reliable facility" (Stone and Webster, 1997). The electric generating equipment would consist of a 500 MW combined cycle power block, comprised of two combustion turbine generators, two heat recovery steam generators (HRSGs), one steam turbine, and one condenser. The combined cycle combustion turbines would use dry, low NO_x (DLN) combustors in conjunction with selective catalytic reduction (SCR) to control NO_x emissions. CO is controlled by oxidation catalyst. Waste heat would be rejected to the atmosphere through exhaust stacks and a multiple-cell mechanical draft cooling tower. These processes would be controlled by the PSD permitting process.

The proposed Southpoint power plant would burn only natural gas as fuel. The plant would consume 90 million cubic feet of natural gas per day. The natural gas supplier would be responsible for permitting, constructing, and operating any required offsite gas pipeline facilities. These gas pipeline facilities would consist of a tap, meter station, flow control valve, and a lateral pipeline from each of the gas suppliers. There are two gas suppliers: EPNGC and TPC. Both of these suppliers have pipelines on BLM ROWs. EPNGC's pipeline is located approximately one mile east of the eastern boundary of Section 8; TPC's line is approximately six miles north of the northern boundary of Section 8. EPNGC would install a 16 inch pipeline and TPC would install a 12 inch pipeline from their respective main lines to the proposed Southpoint plant. The length of these pipelines would be approximately one mile and six miles, respectively.

The proposed pipelines would cross federal land managed by the BLM in new ROW alignments. ROW acquisition would require documentation of NEPA compliance. This documentation would be prepared by the suppliers, with the BLM as lead agency.

The proposed Southpoint power plant would require construction of an off-site substation and transmission line in order to wheel power to the WAPA distribution grid. An EA for a proposed substation and transmission line to



Notes: 1. All flows in gpm.
2. Cooling tower cycles of concentration based on 8700 ppm TDS limit in PSD Permit.

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Fig. 1.5-1 Power Plant Processes and Water Mass Balance

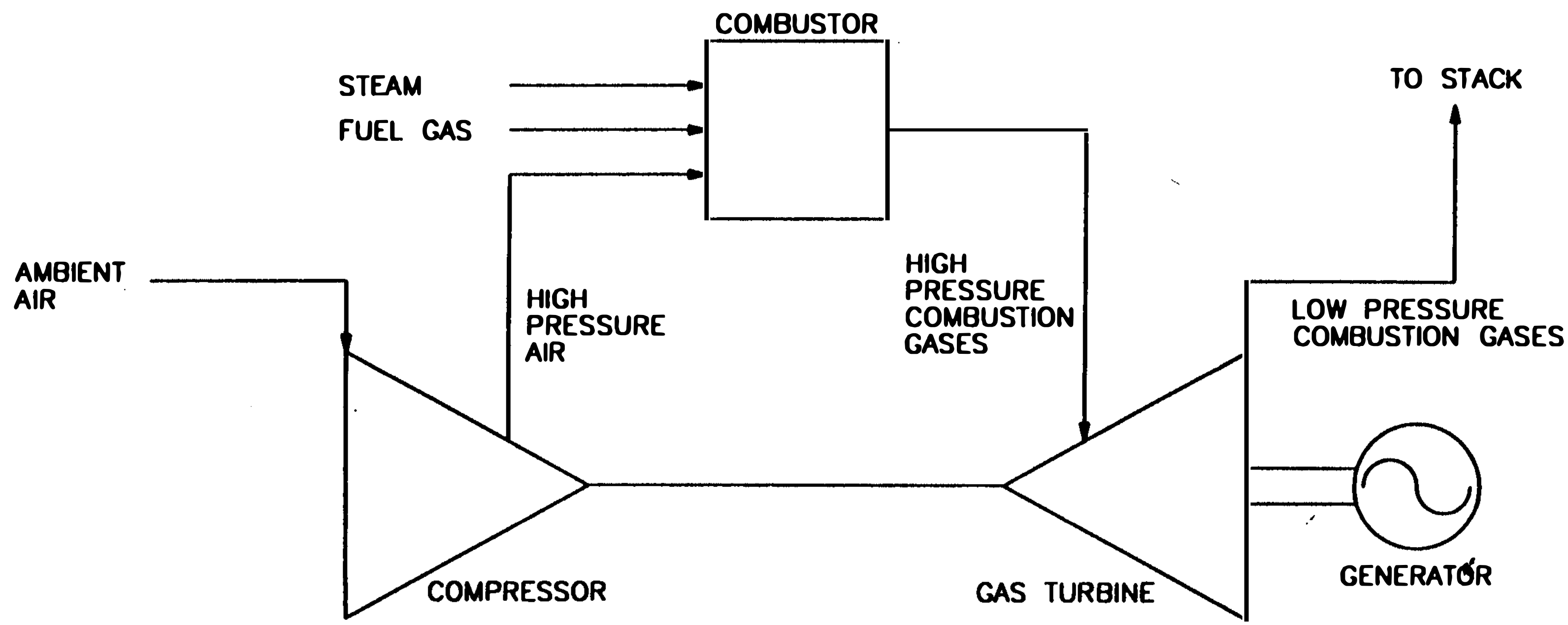

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Fig. 1.5-2 Simple Cycle Combustion Turbine

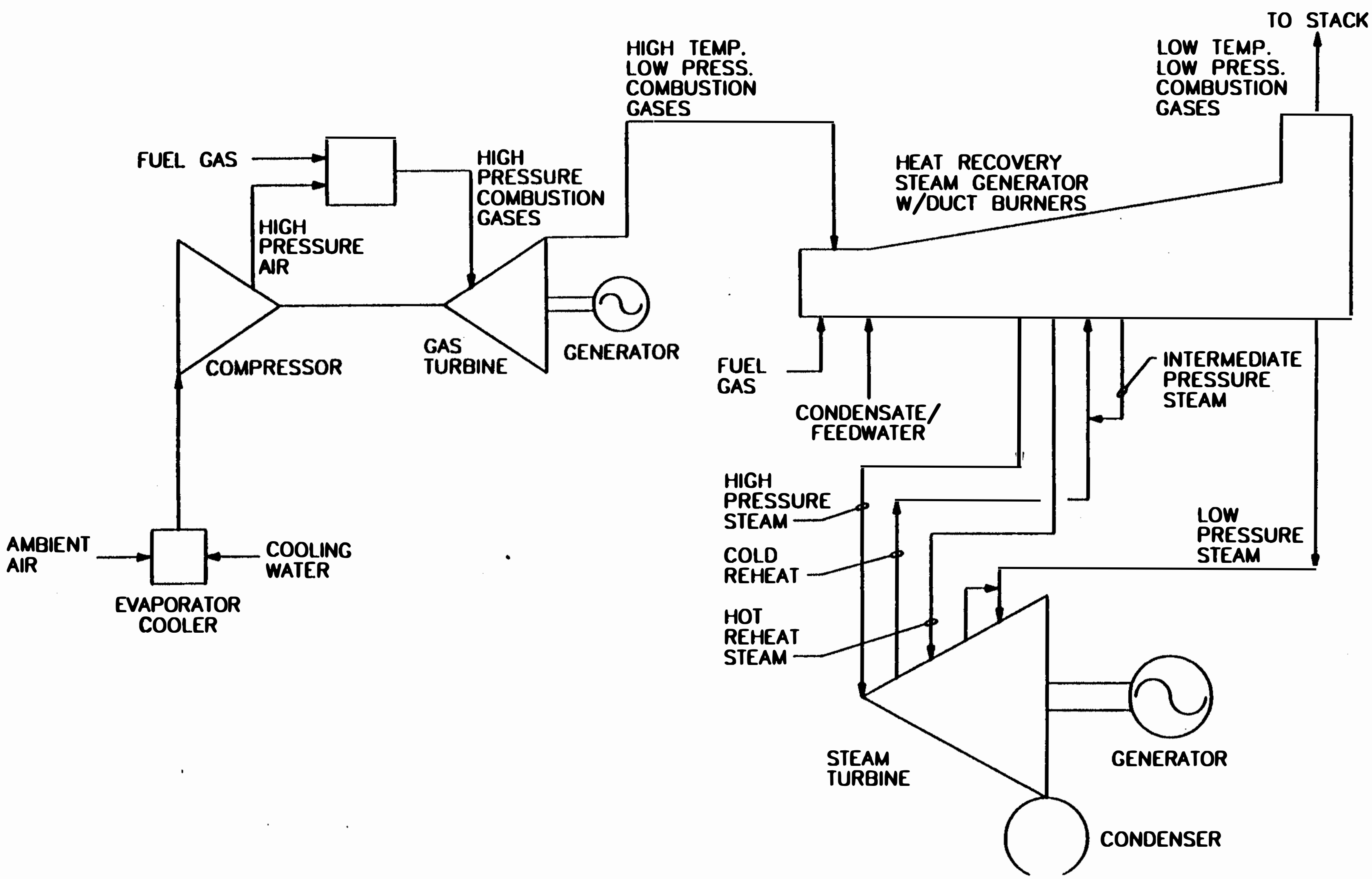

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Fig. 1.5-3 Combined Cycle Power Generating Cycle serve the proposed Southpoint power plant was prepared with the BLM as the lead agency and WAPA as a cooperating agency. The EA is titled "Topock substation and Transmission Line Project," Project Number EA-AZ-025-97-066, and is available at the BIA: Colorado River Agency and Phoenix offices, and the BLM: Kingman, AZ office. A FONSI and Decision Record was approved on December 2, 1997.

The proposed Southpoint power plant would use water withdrawn from the Colorado River and piped to the plant in an underground line on FMIT land as the primary source of water for the steam turbine and cooling towers. Two onsite wells would provide a backup water supply. The majority of water consumed in the production of electric energy is lost as fugitive vapor.

River water or pumped well water would be treated by reverse osmosis (RO). Treatment chemicals would be added to water used in the circulating water and service water systems and supplied to the cycle makeup treatment systems. The proposed power plant would divert up to 4,000 AF per year. (An acre foot is the amount of water which would cover one acre (43,560 square feet) evenly to a depth of one foot. An acre foot of water is equivalent to 325,851 gallons). Evaluation of the environmental consequences of construction and operating the proposed power plant was based on an assumed consumptive use of 7,500 AF per year. This estimated consumptive use has been revised downward to 4,000 AF per year. The expected daily average withdrawal rate is 2,514 gpm, which equates to approximately 11.1 AF per day, for an estimated average annual consumptive use of water of 4,000 AF. A maximum withdrawal rate of approximately 4,308 gpm, or approximately 19 AF per day, would be required for the nominal 500 MW facility (based on the Guarantee Water Mass Balance use rate plus a design margin of approximately 30 per cent to account for short-term flow requirements to the water treatment system).

Domestic service water for employees' needs and landscape irrigation would be supplied from the onsite wells and chlorinated. Although potable, the chlorinated water would be unpalatable. Therefore, drinking water would be supplied by a bottled water contractor.

Two plant processes produce wastewater which would be piped to an evaporation pond for disposal. The majority of wastewater requiring disposal is produced by cooling tower blowdown. (Blowdown is removal of some process water so that fresh water can be added to maintain desired mineral and chemical concentrations). A lesser source of wastewater is reject water from the reverse osmosis (RO) treatment equipment. This RO equipment is used to remove impurities from the raw water to make the water suitable for process use. The impurities are flushed away with the reject water.

Approximately 30,660,000 gallons per year, or 94 AF, of process wastewater would be discharged into an onsite evaporation pond. Discharge temperatures of process wastewater are anticipated to be near the ambient air temperature of the cooling towers, which ranges from an average of 60^{0} F to 86^{0} F. Process wastewater would undergo some pretreatment for oil/water separation and neutralization before being pumped to the evaporation pond, which would be approximately 30 surface acres in size. The evaporation pond would be constructed with five cells. Maximum depth of the pond would be 9.25 feet. Each cell would have a double geomembrane of high density polyethylene to contain any leaks. Incoming process wastewater would evaporate into the atmosphere. The pond would be located on top of the bluffs to minimize hazard from stormwater damage. Sections 2.5.1, 2.6, 2.9.2, 4.3.5.3, 4.7.8.2, and 5.2 of the EIS provide more detailed information on wastewater disposal.

Process wastewater would be stored temporarily in a three acre pond excavated to a depth of two feet before being pumped to the main evaporation pond on top the bluffs. The pond would be lined in the same manner as the main pond. A pond of this size could hold slightly more than two days' wastewater output.

Wastewater would be lifted in a six inch diameter pipe approximately 180 feet to the evaporation pond on the bluffs by a 30 to 40 horsepower (HP) pump run during night hours, when demand on electric power is off-peak.

Domestic wastewater (sewage) from the proposed Southpoint plant would not be discharged into the evaporation pond. Domestic wastewater would be discharged to a holding tank for periodic collection by a licensed sanitary waste hauler.

Stormwater would be retained in onsite retention basins. Soil excavated from the basins would be used as fill to create a buildable area for the power plant equipment block, administrative offices and other site structures, and internal roads and parking areas.

The proposed power plant's structures would be colored in tones similar to those found in the surrounding desert landscape, which has a color palette principally of tan, sand, and buff. An exception would be any color mandated by regulation, for instance, safety.

Figure 1.6-3, Southpoint Site Plan, depicts the conceptual site layout for project facilities. The Southpoint power plant would consist of the following major components (Table 1.6-1), which also appear with reference keys on Figure 1.6-4, Power Block Arrangement. A conceptual drawing of the proposed Southpoint power plant appears as Figure 1.6-5, East Elevation.

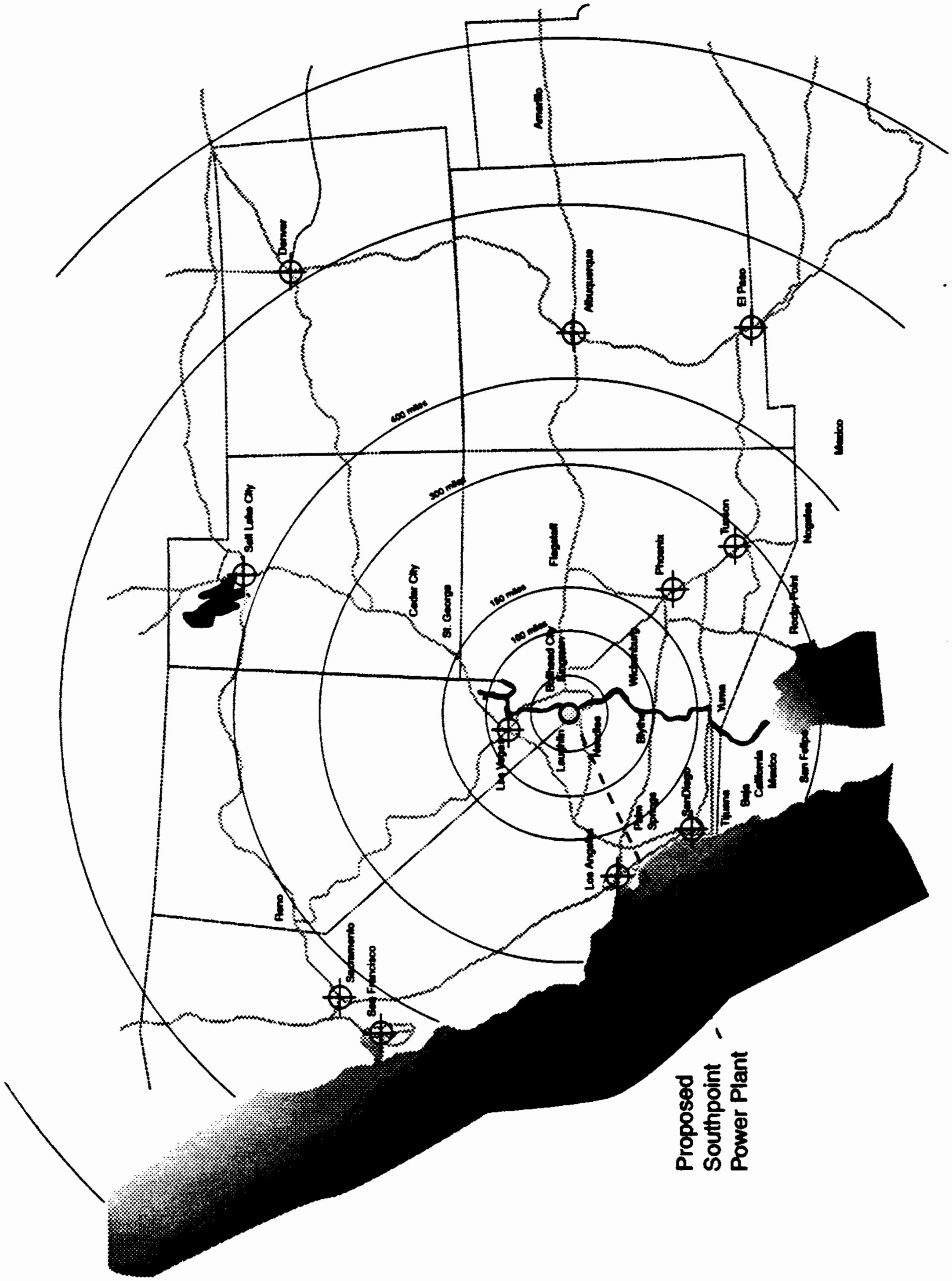
1.6.1 Preferred Alternative Project Site - Section 8

The proposed power plant complex would occupy approximately 108 acres within the 320 acres proposed to be leased on the FMIR in the east half of Section 8, Township 17 North, Range 21 West, Gila and Salt River Base and Meridian, Mohave County, Arizona. This location is the Preferred Alternative site, which is within the Mohave Valley. The Mohave Valley is a distinct geographical feature of the Lower Colorado River drainage basin, and is defined by parallel mountain ranges in Nevada and Arizona which frame the flood plain of the Colorado River. The Mohave Valley is part of the Mohave and Sonoran Deserts, which are on the west and east side of the Colorado River, respectively. Large portions of the Mohave Valley are in irrigated agricultural production. Rapid urbanization for residential and commercial development is converting non-irrigated desert to low density urban uses. The Preferred Alternative site is located in undeveloped desert.

Table 1.6-1 Summary of Power Plant Site Development

Item	Size	Qnty
Combustion Turbine Generators	2,750 SF	2
Heat Recovery Steam Generators	9,000 SF	2
Steam Turbine Generator	3,200 SF	1
Electrical Switchyard	190,000 SF (4.4 acres)	1
Well Water Supply Facility	200 SF	1
Water Treatment Facility	6,000 SF	1
Wastewater Evaporation Pond	30 surface acres	1
Cooling Tower	17,500 SF	1
Retention Basins	30 acres	N/A
Administration and Maintenance Building	6,000 SF	
Construction Parking, Laydown Area (Temporary)	135,000 (3 acres)	1
Security Fence	12,000 linear ft. 7' high	N/A
Access Roads and Parking	48,000 SF	N/A
Balance-of-Plant Equipment	25,000 SF	N/A

The Preferred Alternative site has two distinct topographic features: valley floor, and bluffs. Steep bluffs rise approximately 150 feet above the valley floor. The power plant area would occupy approximately 15 acres on the valley floor at the base of the bluffs. Onsite retention basins would require approximately 30 acres to the west of the proposed power plant. An evaporation pond would be constructed on the bluffs above the power plant area and would occupy approximately 30 acres. The Davis Dam-Topock Highway, also known as CR 227 bounds the site on the south. A short entrance road would be constructed from CR 227 to the proposed power plant complex. The proposed plant would be constructed above the 100 year floodplain. The building pad for the power plant would be constructed on fill excavated from a 30 acre onsite stormwater retention basin. Buildings and critical equipment would require a Finished Floor Elevation (FFE) of approximately 467.5 feet above mean sea level. The elevation of a 100 year flood has not been defined for the proposed site by the Federal Emergency Management Administration (FEMA), but is estimated to be at 466 feet above mean sea level (Gookin Engineers 1997). The remaining 212 acres of the 320 acre proposed Preferred Alternative lease site would not be developed, but would serve as a buffer surrounding the power plant. (See Figure 1.6-1, Proposed Project Regional Context; Figure 1.6-2, Proposed Project Alternative Sites Locations).



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1" = 200 Miles

Fig. 1.6-1 Proposed Project Regional Context

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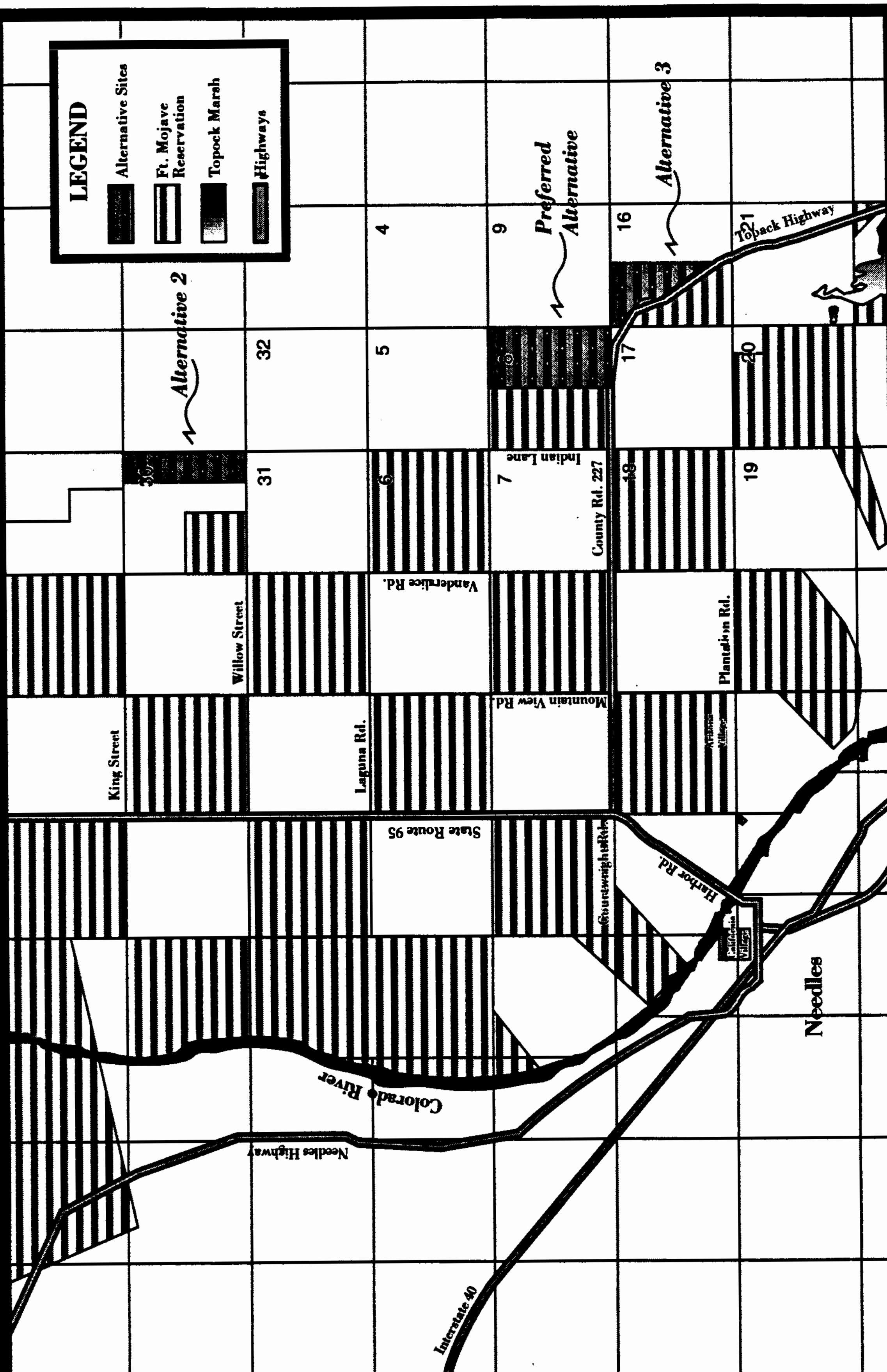

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Fig. 1.6-2 Proposed Project Alternative Sites Location

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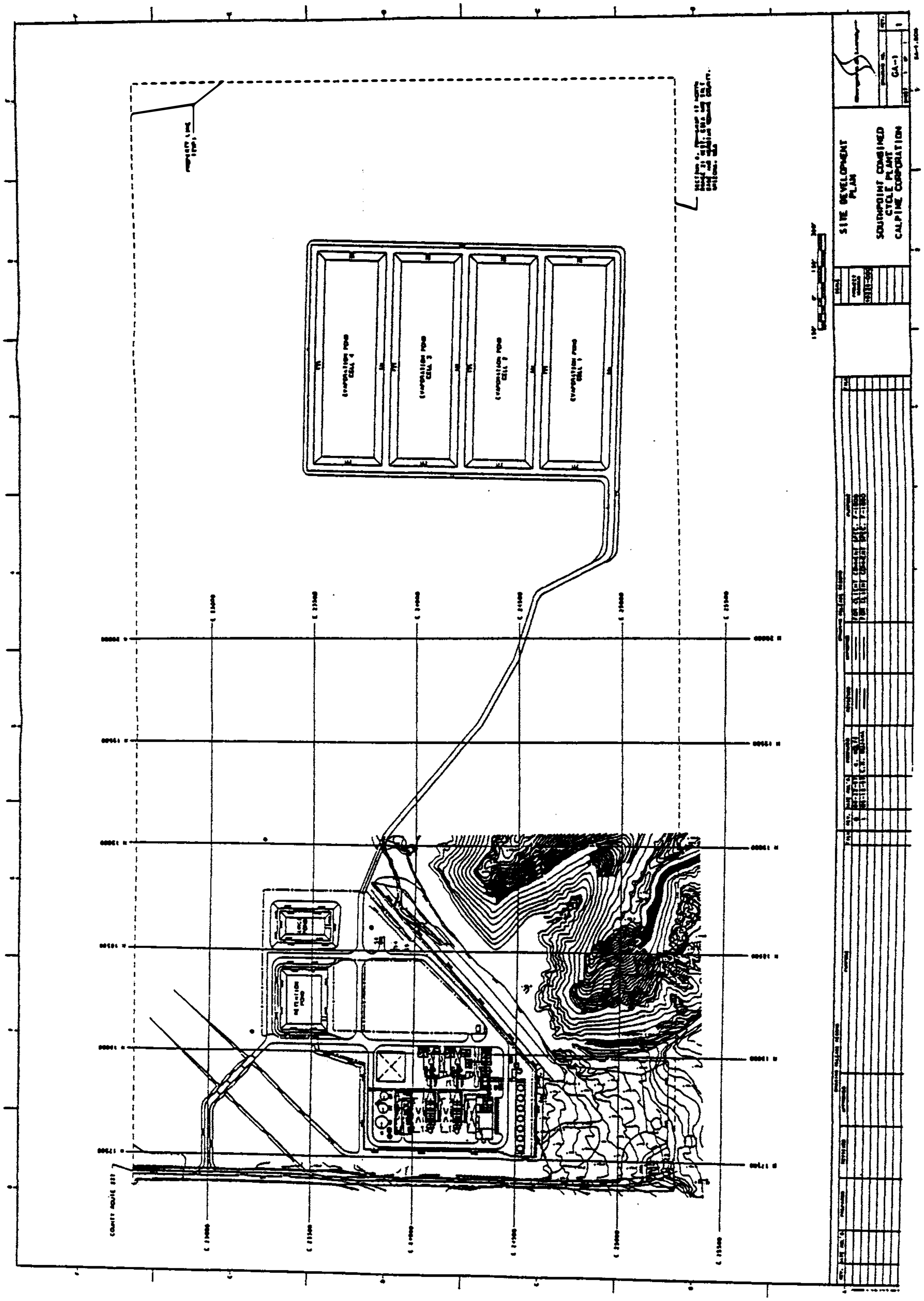

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Fig. 1.6-3 Southpoint Site Plan

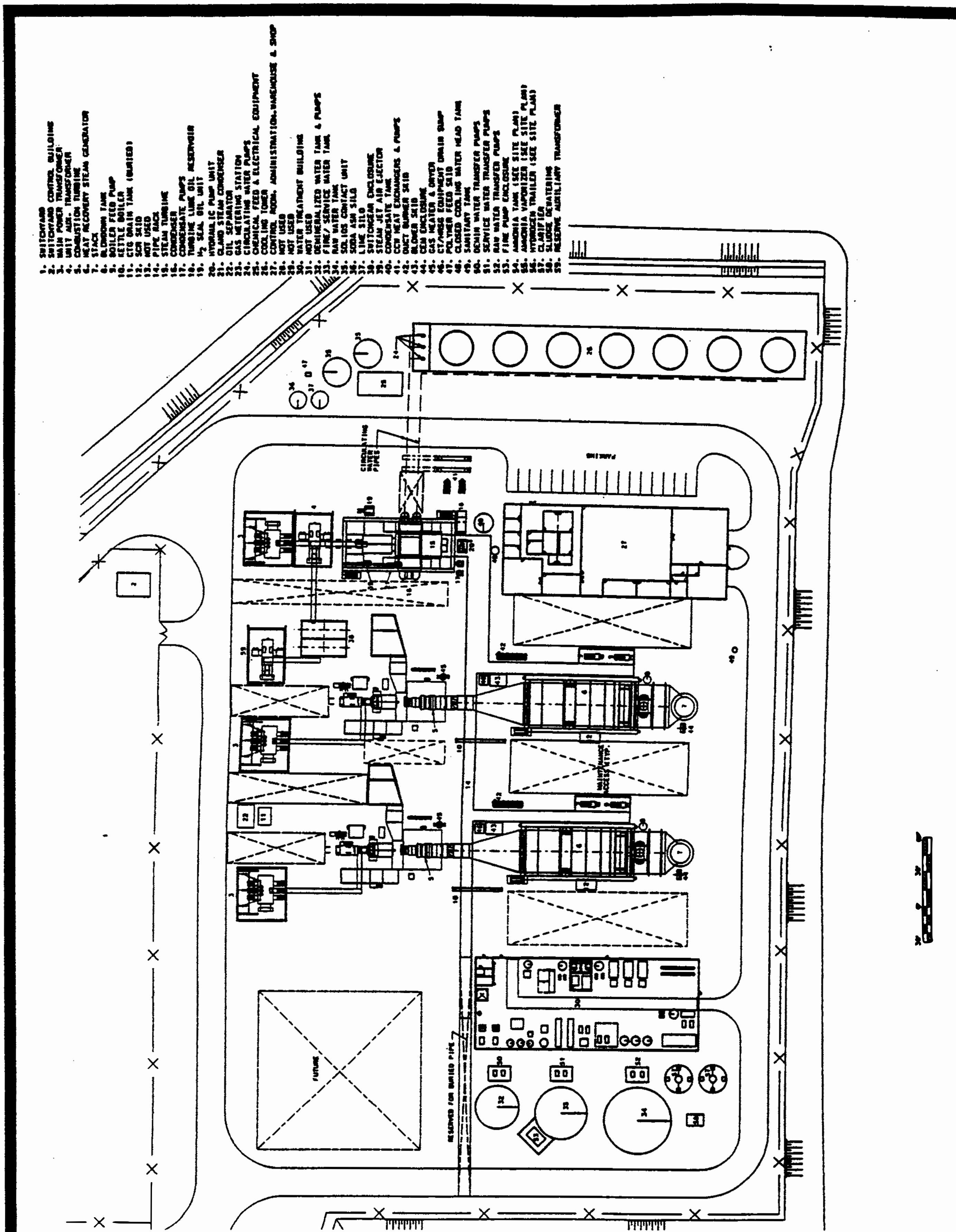

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Fig. 1.6-4 Power Block Arrangement

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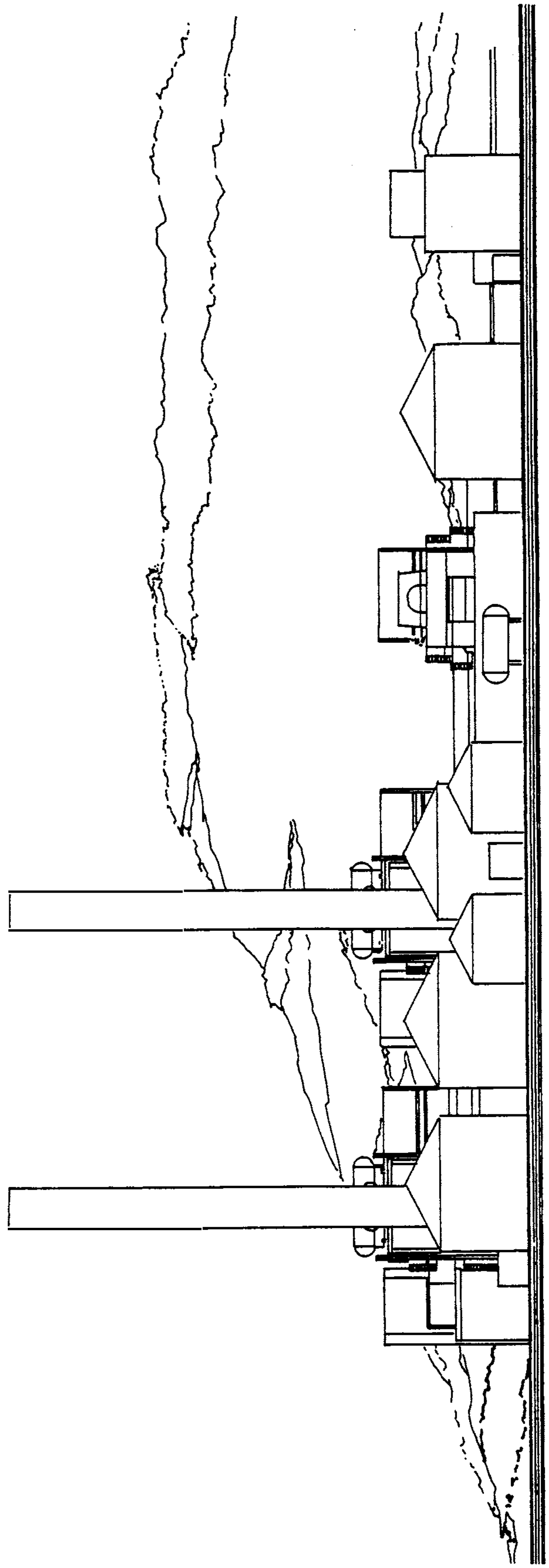

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Fig. 1.6-5 Proposed
Power Plant East Elevation

1.6.2 Transmission Line Corridor

Power would be delivered from the proposed Southpoint power plant to a point of connection on the WAPA transmission system. Several alternative transmission routing options were considered for this purpose and evaluated in the Topock substation and Transmission Project EA (BLM 1997). The selected route would consolidate the transmission lines in a single utility corridor that crosses BLM lands between the proposed power plant site and the Topock substation. Within this utility corridor, two 69kV powerlines and the Topock substation would be constructed by AEPCO and MEC to improve local electric service. The EA also addressed the inclusion of the two 230kV transmission lines, in addition to the two 69kV lines and the Topock substation, as part of the proposed action.

The Topock substation site is located in the northwest corner of Section 31, T18N, R20W. This substation would be the point of connection to the WAPA system. Two 230kV transmission lines would be constructed to connect the proposed plant to the proposed substation within the approved corridor. Additional equipment would be installed at the Topock substation to complete the 230 kV connection as described in the EA document. This configuration would meet the purpose and need for power delivery from the proposed Southpoint power plant to the WAPA system.

The proposed transmission line and substation would be built within existing BLM ROW granted to the AEPCO. The ROW would be widened from its present 125 feet up to a maximum 300 feet to accommodate the new transmission lines depending on the alternative selected. Documentation of NEPA compliance has been completed. The BLM was lead agency, with WAPA participating as a cooperating agency, for preparation of an EA. A FONSI was issued in 1997 and appears as Appendix I.

The transmission line would be constructed using wood, steel, or concrete poles approximately 80 feet to 120 feet tall. The poles would be spaced about 400 feet to 1,000 feet apart, depending on the topography of the selected line route. Each installed pole would disturb less than 100 square feet of land.

In addition to the Topock transmission corridor, other power paths may be considered in the future that could serve potential loads. If it is determined that additional transmission corridor(s) would be needed at a future date, the construction of transmission line(s) to serve that purpose would be subject to evaluation, and a separate environmental analysis would be conducted to comply with NEPA, FLPMA, and other relevant federal, state, tribal, and local regulations.

1.6.3 Natural Gas Pipeline Corridor

Calpine's proposed Southpoint power plant would require a natural gas supply from EPNGC and TPC. The EPNGC pipeline is approximately one mile east of the power plant's proposed location in the southeast quarter of Section 8, and the TPC pipeline is approximately six miles north of the proposed power plant site. A tap, meter station, and one mile of 16 inch underground pipeline would be installed by EPNGC to the east boundary of Section 8. An estimated service of 90,000 million British Thermal Units per day (MBtu/d) flow rate at a minimum of 450 pounds per square inch gauge pressure (psig) would be supplied by the 16 inch EPNGC pipeline. TPC would install a tap, a turbine meter, flow control valve, and six miles of 12 inch underground pipeline. TPC's pipeline would deliver an estimated 450-500 psig with a capacity for 90,000 MBtu/d.

The buried pipelines would cross land owned by the BLM, the State of Arizona, and private owners. The gas pipeline corridors to the boundary of the reservation are not part of this project. A number of possible routes for natural gas delivery could be designed; construction and operation of the proposed Southpoint power plant is not dependent on a specific pipeline alignment. Where the ROW crosses federal lands, an EA would be required. It would be prepared by the pipeline company, with the BLM as lead agency. The Federal Energy Regulatory Commission (FERC) may be a cooperating agency in preparation of the pipeline EA. Supplemental environmental documentation would be prepared to address the environmental consequences of the pipeline corridor segment which would be located within the Calpine lease area on the FMIR at the time connection to the off-reservation pipeline(s) becomes necessary.

1.6.4 Water Supply and Treatment

Raw water would be obtained by withdrawal from the Colorado River and piped to the proposed project site, and from two backup wells onsite. This conjunctive use of water would be capable of meeting all facility water and domestic service water requirements.

Colorado River water piped to the proposed Southpoint power plant would be the primary water source. Wellwater would be pumped only if river water became temporarily unavailable. Water would be withdrawn directly from the river by pumps mounted on a platform. The pumps and platform would be located at the FMIT's central irrigation pumping complex immediately west of the terminus of Willow Drive. Water would be conveyed in a buried pipeline routed parallel to existing tribal irrigation canals. Total pipeline length would be approximately 7 miles. The pumps, platform, and pipeline would be constructed, operated, and owned by the FMIT. No federal permit or NEPA compliance would be required.

The pumping rate for each of the proposed wells would yield an average flow rate of about 2,514 gpm, although the maximum flow rate may be as high as 4,308 gpm. Each well would be screened in the younger and older alluvium and the average depth may range from 100 to 200 feet and would use a 16 to 20-inch diameter casing. One of the proposed wells would be capable of meeting water demand for the proposed power plant. The second well would be available as a backup supply source in the event the first well was out of service.

Raw water for plant processes water would be stored in a 55,000 gallon raw water tank prior to demineralization and RO treatment. Demineralized water, and RO treated water, would be stored in separate 55,000 gallon tanks. Purified plant process service water would be stored in a 55,000 gallon tank, which would also provide a fire protection source.

Water for domestic uses such as restrooms and landscape irrigation would be supplied by chlorinated well water stored in a 20,000 gallon tank. Although this water would be potable after treatment, its taste is predictably poor because of high mineral content. Therefore, drinking water would be provided by contracting with a local bottled water supplier.

Total water storage capacity onsite would be 240,000 gallons in five tanks, augmented by a three day supply of untreated water stored onsite in a pond of approximately 30 acres in area.

1.6.5 Process and Domestic Wastewater Treatment and Disposal

Generation of electricity produces wastewater at various stages of the power generation cycle. This wastewater is called process wastewater, and is treated and disposed of on site. Process wastewater passes through a series of onsite systems which collect, treat, store and dispose of wastewater originating in the generating facility. Evaporation from an open pond is the preferred disposal method.

Power plant employees would produce up to 1,440 gallons per day of domestic sanitary wastewater. Domestic wastewater would not commingle with process wastewater. It would be collected in a 5,000 gallon septic tank, and held until pumped out twice weekly and trucked to the FMIT's wastewater treatment plant, which is located approximately five miles from the proposed Southpoint lease site.

1.6.5.1 Process Wastewater Sources

Process wastewater would be collected from the following major sources: sludge thickener overflow, filter backwash, filter press filtrate, cooling tower blowdown, oil/water separator effluent, combustion turbine wash water, and equipment drains. The plant drain system would convey washdown water, wastewater, waste oily water and hot drain wastes. Bell-ups (flared-end pipes) would be provided to receive wastewater, waste oily water, and hot drain wastes from the combustion turbines and accessory equipment. Drainage piping would connect to floor drains and bell-ups and would be routed to the evaporation pond. Wastewater which has the potential to contain oily waste would be routed through an oil/water separator prior to disposal.

1.6.5.2 Process Wastewater Disposal

Process wastewater would be pumped from the power equipment block in an above ground pipeline parallel to the secondary access road connecting the valley floor and the top of the bluffs. Process wastewater would be discharged into a 30 acre evaporation pond located on the bluffs above the proposed power plant. It could accommodate more than the 30,660,000 gallons (the equivalent of about 94 AF) which would be an average annual wastewater volume. The pond allows solids to settle out of the wastewater during the evaporation process. The pond would be sized to allow for accumulation of solids, and for seasonal variations in the evaporation rate.

The pond would be built by excavating and building a containment bank around the perimeter of the pond. A berm beyond the bank would also be built to contain wastewater in the event of a bank breach. The pond would be lined with two flexible geomembrane liners placed on a prepared subgrade to prevent leakage into surrounding soil. The pond would be divided into five separate cells. Accumulated precipitates in the bottom of the pond cells would be removed as needed during the life of the proposed Southpoint power plant to assure adequate wastewater storage capacity. These activities would be subject to all federal and Tribal laws applicable at the time the activities are to occur.

An interim storage pond approximately three acres in size would be used to hold up to three days' output of process wastewater before it was pumped to the evaporation pond. The interim storage pond would be constructed at the base of the bluffs near the power generating equipment. This pond would also be lined with two flexible geomembrane liners.

1.6.6 Transmission Lines

1.6.6.1 Onsite Transmission Line

The onsite transmission line from the power generating machinery to the Section 8 boundary would be designed, constructed, and owned by Calpine. The double-circuit 230 kV overhead transmission line would utilize aluminum conductors supported by poles and polymer or porcelain insulators. It would be located entirely on the acreage proposed to be leased for the proposed Southpoint power plant.

1.6.6.2 Offsite Transmission Lines

Electrical energy produced at the proposed Southpoint power plant would be delivered to the WAPA system through AEPCO's proposed substation. The existing corridor for the Topock substation connection is discussed in the Topock substation and Transmission Project EA (BLM 1997). Alternative connections to the WAPA system are discussed in the BLM EA.

1.6.7 Road Access and Internal Circulation

The Southpoint site would be accessible from CR 227. A main entrance road 24 feet in width would be built to the major complex of plant equipment and buildings. A loop road would encompass the facility, and spur roads would be constructed to provide access to each major building. In addition, a parking lot would be built near the control/service building. The entry road, loop road, all access roads, and all parking would be asphalt surfaced. Any secondary access roads would be aggregate surfaced.

An access road to the evaporation pond on the bluffs would be graded on the south slope of the largest drainage in Section 8. It would be located well above any stormwater channel in this small valley. The pipeline used to transport process wastewater from the plant to the evaporation pond would parallel this road.

1.6.8 Cost of Facility

The total estimated construction cost of the proposed Southpoint power plant would be between $200 to $250 million. This estimate includes all offsite facilities (i.e. transmission lines, natural gas line, etc.). Operation costs are anticipated to be between $3 to $6 million per year. Funding would be provided by private financing obtained by Calpine.

2.0 ALTERNATIVES

2.0 ALTERNATIVES

2.1 Introduction

Discussion of alternatives in the following sections includes evaluation of each major element of the proposed Southpoint power plant, and records the reasons why a Preferred Alternative was selected for each element. For example, a number of methods for process wastewater disposal were explored, with an evaporation pond emerging as the Preferred Alternative for that project element. A second evaluation process determined that the preferred location for the evaporation pond is on the bluffs above the proposed power plant, where it would be less attractive to migratory waterfowl and would be out of the 100 year floodplain. Taken together, all of the Preferred Alternatives for project elements form the Preferred Alternative for the proposed Southpoint project. The proposed action is BIA approval of a lease which would allow Calpine to construct and operate the Preferred Alternative.

2.2 Alternatives Including the Preferred Alternative

2.2.1 Preferred Alternative Site- Section 8

The Preferred Alternative site is approximately 320 acres located in the east half of Section 8, Township 17 North, Range 21 West, Gila and Salt River Base and Meridian, Mohave County, Arizona. The Preferred Alternative site is adjacent to and north of CR 227.

The power plant proposed to be built on the Preferred Alternative site would occupy approximately 15 acres at the base of the bluffs along the east edge of the section. An additional 30 acres would be required in the western part of the proposed lease area to site retention basins. A 30 acre evaporation pond would be located on the top of the bluffs. The power plant and its associated facilities would require about 108 acres out of the 320 acres which Calpine proposes to lease from the FMIT. The access road to the site would be built due north of CR 227. The road would be approximately one quarter mile long.

Natural gas supply for the plant would be through branch lines from the main EPNGC and TPC pipelines which lie about one mile east, and six miles north of the proposed power plant site, respectively. The EPNGC line is located in Section 9, Township 17 North, Range 21 West; the TPC line is located in Section 9, T18N, R21W. These lines are on land under BLM jurisdiction.

Calpine has proposed the Topock substation and the transmission corridor west of the Preferred Alternative site to which the proposed power plant could connect. NEPA compliance for these proposed facilities was documented in a BLM EA and FONSI.

2.2.2 Alternative Two Site - Section 30

Alternative Two is approximately 160 acres on the FMIR in the east half of the east half of Section 30, Township 18 North, Range 21 West, Gila and Salt River Base and Meridian, Mohave County, Arizona. The Alternative Two site is adjacent to and north of the Willow Drive alignment, and adjacent to and south of the King Street alignment. Primary access to the site would be from Willow Drive.

The power plant proposed to be built on the Alternative Two site would be identical in size to the plant proposed for the Preferred Alternative. All plant facilities, except access roads, would be located on the top of the bluffs. Natural gas would be available to the plant from the same sources as for the Preferred Alternative and would require construction of two branch lines across BLM land to the FMIR's boundary. The Alternative Two site would connect to the proposed Topock substation and transmission corridor.

2.2.3 Alternative Three Site - Section 16

The Alternative Three site is approximately 160 acres on the FMIR in the western half of Section 16, Township 17, North, Range 21 West, Gila and Salt Base and Meridian, Mohave County, Arizona. It is adjacent to and south of CR 227, immediately to the east and south of the Preferred Alternative site.

The power plant proposed to be built on the Alternative Three site would be identical in size to the plant proposed for the Preferred Alternative. It would occupy the same number of acres. However, all facilities would be located on the valley floor because CR 227 splits the site in half, making it very difficult to site facilities on the bluffs. Natural gas would be available to the plant from the same source as the Preferred Alternative and would require extension of two branch lines across BLM land to the FMIR's boundary. The Alternative Three site could connect to the proposed Topock substation and transmission corridor.

2.2.4 No Action Alternative

The environmental consequences of a No Action Alternative, in which the proposed Southpoint project would not be built, are considered for each component of the human environment, as required under NEPA. A No Action Alternative would not meet the underlying need for electric power to supply existing demand locally and in the region. The purpose of enhancing the FMIT's sovereignty, self-determination and economic development would not be met. Undeveloped land would remain in its natural desert condition. The FMIT would not commit 4,000 AF of consumptively used water from its Arizona allocation of Colorado River water. No alteration of the existing condition of biologic, abiotic, or socioeconomic components of the human environment would occur. The proposed Topock substation would be built to serve the Mohave Electric Company (MEC). Calpine would not build two 230 kV lines in the ROW corridor; however, MEC would build its two 69 kV lines.

2.3 Comparison of Alternatives

The proposed lease between Calpine and FMIT is the basis for defining the Preferred Alternative of this EIS. The Preferred Alternative is construction and operation of the Southpoint power plant, as described in Chapter 1, on 320 acres of land proposed to be leased in the east half of Section 8 T17N R21W, Gila and Salt River Base and Meridian, Mohave County, Arizona, which is located within the exterior boundaries of the FMIR.

Two other alternatives and a No Action Alternative are discussed. Alternative Two is construction and operation of the proposed Southpoint power plant on 160 acres in the east half of the east half of Section 30 T18N R21W, Gila and Salt River Base and Meridian, Mohave County, Arizona, which is located within the exterior boundaries of the FMIR. Alternative Three is construction and operation of the proposed Southpoint power plant on 160 acres in the west half of Section 16 T17N R21W, Gila and Salt River Base and Meridian, Mohave County, Arizona, which is located within the exterior boundaries of the FMIR. The elements of the proposed Southpoint power plant would be essentially the same if it were built on any of the three alternative sites. Comparison of the existing conditions and environmental impacts of constructing and operating on each of the three sites, and of a No Action Alternative, appears below.

Table 2.3-1 summarizes the environmental consequences of the Preferred Alternative, Alternative Two, Alternative Three and a No Action Alternative. It demonstrates in summary form that the Preferred Alternative is the environmentally preferred alternative because it has the fewest environmental impacts. A full discussion of the environmental impacts associated with the Preferred Alternative, Alternative Two, Alternative Three and a No Action Alternative appear in Chapter 4. Three alternative sites, each on the FMIR in Arizona, are considered in this EIS. The locations of the three alternative sites are shown in Figure 1.6-2.

2.4 Alternatives Considered But Eliminated From Further Consideration

2.4.1 Site Alternatives

2.4.1.1 Yucca Site

Calpine considered building a power plant on private land in Mohave County, Arizona near the town of Yucca. This plant would have been very similar to the plant Calpine proposes to construct on land leased from the FMIT. Only one power plant would be built, either at the Yucca site or on the FMIR. The Yucca site would require sale or lease of water from the FMIT, or another supplier, as this site does not have an adequate water supply for a power plant. The Yucca site was rejected from further consideration because a plant that is not located on reservation lands cannot fulfill the intended purpose of the proposed action, which is to enhance the self determination and the economic development of, and maximize economic benefit to, the FMIT. A major portion of the economic benefits, such as taxes or land lease or purchase monies, of

Table S-2: Summary Comparison of Alternatives

Potential Impact	Preferred Alternative Site	Alternative Two Site	Alternative Three Site	No Action Alternative
Land Resources				
Topography	No significant impact	Significant impact	No significant impact	No impact
Soils	No significant impact	No significant impact	No significant impact	No impact
Geologic Resources	No significant impact	No significant impact	No significant impact	No impact
Flood Hazard	No significant impact	No significant impact	No significant impact	No impact
Water Resources				
Water Rights	No significant impact	No significant impact	No significant impact	No impact
Surface Water	No significant impact	No significant impact	No significant impact	No impact
Groundwater	No impact on water table	No impact on water table	No impact on water table	No impact on water table
Water Quality	No significant impact	No significant impact	No significant impact	No impact
Air Resources	Significant impact -mitigable	Significant impact - mitigable	Significant impact -mitigable	No impact
Biotic Resources	No significant impact	No significant impact	No significant impact	No impact
Cultural Resources	No impact (avoidance)	Significant impact	No significant impact	No impact
Socioeconomics	Beneficial impacts	Beneficial impacts	Beneficial impacts	Significant impact- unmitigable
Community Infrastructure	No significant impact	No significant impact	No significant impact	No impact
HazMat Response	Significant impact-mitigable	Significant impact-mitigable	Significant impact-mitigable	No impact
Fire Protection	Significant impact-mitigable	Significant impact-mitigable	Significant impact-mitigable	No impact
Resource Use Patterns	No significant impact	No significant impact	No significant impact	No impact
Transportation/Traffic	Significant temporary impact- mitigable	Significant temporary impact- mitigable	Significant temporary impact- mitigable	No impact
Solid Waste	No significant impact	No significant impact	No significant impact	No impact
Land Use	No significant impact	No significant impact	No significant impact	No impact
Noise	No significant impact	No significant impact	No significant impact	No impact
Visual Resources	No significant impact	Significant impact- unmitigable	Significant impact- unmitigable	No impact
Cumulative/Indirect Effects	No significant impact	No significant impact	No significant impact	No impact
Growth Inducing Effects	No significant impact	No significant impact	No significant impact	No impact
Environmental Justice	No significant impact	No significant impact	No significant impact	No impact
Indian Trust Assets	Impacts but mitigable	Some impacts- unmitigable	Impacts but mitigable	No impact

N.B.: Please see Chapter 4 of the EIS for a full discussion of the impacts associated with the Preferred Alternative, Alternatives Two and Three, and the No Action Alternative.

the proposed power plant would go to Mohave County and private owners instead of to the FMIT.

A second reason for rejection of this alternative is FMIT water policy. The Tribal Council has a policy of putting all of its water entitlement to use on the reservation, and will not lease or sell water for off reservation uses. This policy is implemented in the FMIT Water Ordinance and Water Budget, which commit the tribe's entire allocation of Colorado River water to existing and planned reservation development.

2.4.1.2 Bureau of Land Management (BLM) Site

A possible siting on BLM property adjacent to the reservation was considered in principle, and rejected for two reasons. One, there is no known source of groundwater to supply the approximately 4,000 AF consumptive requirement of the proposed power plant. The BLM does not have a surface water right to Colorado River water in this quantity (*Arizona v. California*, 1969) and FMIT policy precludes sale or lease of its water for off reservation use. Two, as in the case of the Yucca alternative, a BLM site would not meet the purpose of tribal self-determination and economic development.

2.4.2 Plant Design Alternatives

2.4.2.1 Air Cooled Power Plant

Dry, air cooled condensers can be used at sites such as the Yucca and BLM alternative sites which do not have adequate water to meet cooling needs. However, use of air cooled condensers at sites with inadequate water, or in lieu of water for the proposed Southpoint power plant at any of the three alternatives sites on the FMIR, is not feasible because of economic considerations. The choice to use an air cooled condenser in this application would result in a 10 per cent increase in project capital cost, in addition to a 10 per cent decrease in power output during the hottest portions of the year, when the power is most critical. Hence, with the availability of process water at the Preferred Alternative, and Alternative Two and Alternative Three sites, the choice of using air cooled condensers at the Yucca and BLM sites becomes economically unfeasible, and added a third reason for their rejection from further consideration.

2.4.2.2 Larger or Smaller Power Plant

The proposed Southpoint power plant would use two F-class combustion turbines and one steam turbine in a 2 x 1 configuration, with an economical output of 500 MW. This output is based on manufacturers' design and therefore has little flexibility. The F-class machines are the most efficient proven technology available in terms of megawatts of energy produced per cubic foot of natural gas consumed, and pollution control (Ron Sichau, Project Engineer, Calpine, personal communication). In the 2 x 1 configuration, the plant would be able to cycle within a range of 120 to 540 MW to meet spot market demand for electricity.

The Preferred Alternative site for the Southpoint power plant combines adequate land area, natural gas fuel availability, nearby transmission capacity, and a reliable supply of water to support the operation of a nominal 500 MW plant. A smaller power plant would underutilize the resources available at the Preferred Alternative site.

Moreover, the shortfall of electric energy produced by a smaller plant, compared to the size proposed to be built, would be filled by some competing facility (Maurice Richard, Program Manager, Calpine, personal communication). Realization of FMIT economic development goals would be diminished. Construction and operation of a 500 MW plant would have substantial economic benefits to the FMIT through land lease revenues, water lease payments, potential wheeling agreements, and employment opportunities.

A smaller power plant would diminish these economic benefits. Lower land lease and water usage payments would result, as well as a smaller work force requirement during construction and operation. A smaller plant, therefore would not as completely satisfy the underlying purpose of and need for the proposed project, and was rejected from further consideration based on evaluation of technology and economics.

A larger plant, such as a 1,000 MW facility, would generate more power than could be marketed profitably, according to feasibility studies performed for Calpine (Maurice Richard, Program Manager, Calpine, personal communication). This alternative was, therefore, eliminated from further consideration.

2.5 Alternatives for Process Water Supply

2.5.1 Preferred Alternative for Process Water Supply–Conjunctive Use of Surface and Groundwater

The Southpoint power plant would require a constant supply of water. Interruption of supply would be unacceptable. The power plant would also require water within certain quality parameters, particularly total dissolved solids (TDS). River water has better quality than well water. The Colorado River is not a completely reliable constant supply source because river operational regimes can result in wide fluctuations of water level, with very low flows sometimes occurring. Conversely, flood events present conditions which could limit ability to withdraw water. These supply constraints occur only occasionally. Although well water has lower quality than river water, pumping from deep wells would be reliable and constant.

The Preferred Alternative for meeting process water supply is to pump Colorado River water, when river flows allow, because of its superior quality. Two wells each capable of pumping an average of 2,514 gpm and a maximum of 4,308 gpm continuously would be drilled as a backup supply in case river water could not be pumped, or repairs and maintenance of the delivery system connecting the river to the proposed Southpoint power plant caused temporary loss of service.

As an additional backup supply, storage tanks onsite with combined 240,000 gallon capacity, and a 30 acre pond with a holding capacity of three days' water supply, would provide a source of process water, as well as provide domestic service water for landscape irrigation and other uses, including fire protection.

Colorado River water would be pumped with a 100 HP electric pump mounted on a platform in the river immediately west of the terminus of Willow Drive. This location was selected because it is uncontestedly on the reservation. (Two other sites from which tribal agricultural water is pumped are on private land, and on disputed land in an accreted bank area, respectively.) The Willow Drive site also has an existing platform for tribal pumps totaling 700 HP which supply a major irrigation canal. The site is served by AMPS.

Water would be wheeled in a new, buried 24 inch ductile iron pipe. To serve the Preferred Alternative site, the pipe would follow an eight mile corridor illustrated in Figure 2.5-1. This route would allow use of existing ROWs, and would not require additional land. The entire length of the proposed pipeline would be in either existing FMIT irrigation ROW, or ROW set aside from existing land leases and reserved for FMIT use, or on tribal land which has no planned development. Road crossings would use encroachment permits for construction, commonly granted reciprocally by the FMIT and adjacent jurisdictions to resolve the problems created by the checkerboard ownership pattern of the Mohave valley. The pump, its platform, and the pipeline would be paid for by Calpine, but would be given to the FMIT and maintained and operated by the FMIT.

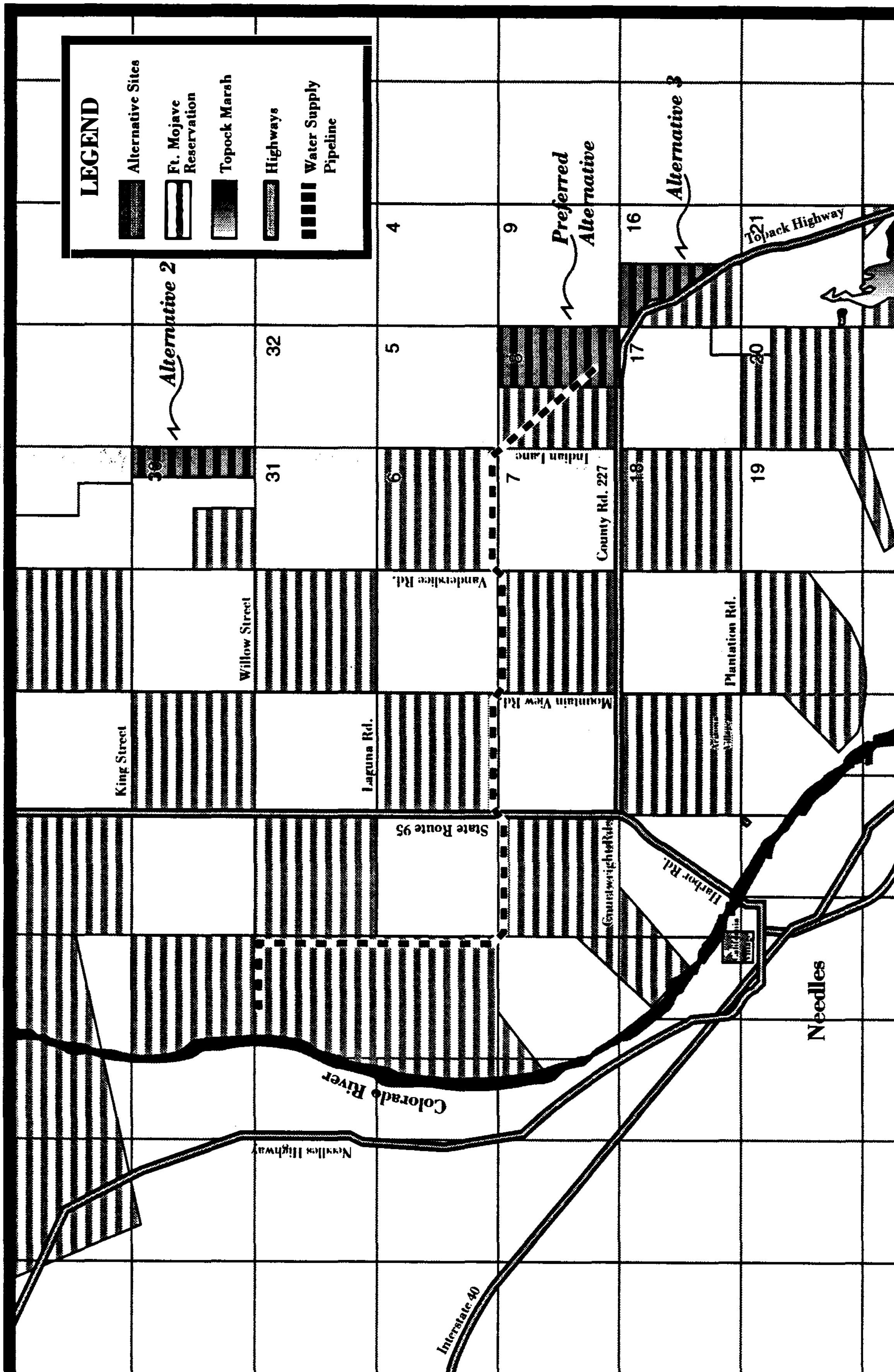
A similar pipeline route entirely on existing ROW or on tribal undeveloped land could serve the Alternative Three site. The Alternative Two site could not be served without acquiring new ROW across private land.

The proposed water pipeline also takes advantage of the difference in height between the river and any of the three alternative power plant sites. A drop of approximately 20 feet would allow an economical gravity feed line (John Algots, FMIT Physical Resources Director, personal communication).

2.5.2 Alternatives Considered for Process Water Supply But Eliminated From Further Consideration

2.5.2.1 Wellfield Development Only

Electric power generation using steam turbine generators requires a reliable source of a large quantity of water. Wells capable of supplying an average withdrawal rate of 2,514 gpm and a maximum withdrawal rate of 4,308 gpm are required. The maximum pumping rate would occur only occasionally when the proposed power plant was running at full power output concurrent with refilling the storage pond and the boiler makeup tank. This volume of water could be pumped from a well or wells drilled onsite at any of the three alternative locations. Groundwater is significantly higher in TDS than surface water from the river (Dames and Moore, June, 1997). The higher TDS concentrations would require more extensive and costly pretreatment before



CALPINE

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planning ● land design ● environment ● tourism

Fig. 2.5-1 Proposed Water Supply Pipeline Corridor well water could be used for process water. Higher TDS also limits the number of cycles that can be completed before water becomes too high in mineral content to be used (Ron Sichau, Project Engineer, Calpine, personal communication). Primarily because of water quality considerations, a "well water only" supply was rejected from further consideration.

2.5.2.2 Colorado River Water Only

Using the Colorado River as the sole supply source was rejected because of the operational regime of the river. Water levels in the channel can have wide variations, depending on power production, irrigation, and environmental needs of users up and down the river. There are times when the water level is so low that most of the river bed is exposed (John Algots, FMIT Physical Resources Director, personal communication). The power plant would need a constant, reliable water supply source; direct pumping from the river could not always meet this need. A" river water only" alternative was rejected from further consideration because of its potential to be unavailable at times.

2.5.2.3 Effluent Water From the Fort Mojave Tribal Utility Authority

The Fort Mojave Tribal Utility Authority (FMTUA) operates a secondary wastewater treatment plant (WWTP) approximately four miles west of the Preferred Alternative site. The WWTP has a design capacity of one million gallons per day (mgpd), but has never exceeded 500,000 gallons per day (Bob Lane, Manager, FMTUA, personal communication) . This quantity of effluent produced by the WWTP is insufficient to supply the needs of the proposed power plant. Cost and reliability considerations also were factors in eliminating this alternative from further consideration.

2.6 Domestic Service and Drinking Water for the Power Plant

Domestic service water is water required for toilet flushing, building maintenance, landscape and other activities associated with use of the plant office and grounds. No potable water utility serves the Preferred Alternative, Alternative Two, or Alternative Three sites. The cost of connecting to the nearest service providers was prohibitive when compared to using water from the onsite wells which would be drilled.

Domestic service water for the proposed power plant would be supplied by the same onsite wells which would supply power generation. Domestic service water would be stored in a 20,000 gallon tank on site. Water would be chlorinated as it entered the storage tank. The stored water would supply restroom, irrigation, and other domestic service needs, but would not be used for drinking water. Although it would meet USEPA standards for potable water and would not pose any health risk, it would be undrinkable for aesthetic reasons, namely, the unappealing taste which is caused by high natural chemical content. Drinking water for plant employees and visitors would be provided by a bottled water contractor.

2.7 Alternatives for Process Water Disposal

A certain portion of process water in the boiler and cooling tower cycles is disposed of as wastewater. A constant stream of make-up water is added to each boiler to account for water that is lost at valve packings, pump seals and minor leakages throughout the system. The make-up water contains minute traces of mineral content, which if left unchecked, would concentrate in the boiler piping and cause scaling problems. The most common minerals found in plant process water are calcium, magnesium, and silica. To maintain a constant level of mineral concentration in the boiler water, approximately one per cent of the boiler flow, called the "boiler blowdown," is drained continuously from the boiler steam drum to the evaporation ponds. Boiler blowdown equals about 100 gpm, total, for both boilers.

Similarly, the cooling tower loses approximately 2,000 gpm of cooling water to the atmosphere through evaporation. As water is evaporated from the cooling tower, the mineral concentrations in the cooling tower would concentrate. Therefore, 50 gpm of cooling tower blowdown is pumped to the evaporation ponds in order to maintain the cooling water mineral concentrations, while make-up water is added to keep the water level constant.

A detailed description of the proposed disposal method is found in Section 4.7.8.3 The volume of water which must be disposed of is approximately 30.6 million gallons per year, or approximately 94 AF per year.

2.7.1 Preferred Alternative - Evaporation Pond

The preferred alternative for disposal of wastewater is the use of an onsite evaporation pond. Up to 87,840 gallons of process wastewater would be discharged per day from the facility. Based on two CCCTs operating for an average of 8,322 hours per year, approximately 30.6 million gallons of wastewater would be collected in the evaporation pond per year. Based on an design evaporation rate of 3.5 feet per year the pond would cover approximately 30 acres.

The pond would be developed by excavation, and by constructing an earthen bank around the perimeter of the pond. The pond would be lined with two geomembrane liners to prevent groundwater contamination. The geomembrane liners would each meet a permeability standard of 1×10^{-6} centimeters per second (cm/sec). The pond would be divided into five separate cells.

The evaporation pond would be located on the bluffs which form the eastern half of Section 8. The southern part of the bluffs contain archaeological sites potentially eligible for inclusion in the National Register of Historic Places. There is an additional site on the northern edge of the bluffs. The sites would be left undisturbed (see Section 4.5.1). There is ample space in which to construct the pond and avoid the archaeological sites; it would be constructed at the northern end of the bluffs because this location affords the best access. Location on the bluffs also would remove the pond from areas on the valley floor which are subject to flood hazard.

Up to three day's output of process wastewater would be stored temporarily in a three acre pond excavated to a depth of two feet before being pumped to the main evaporation pond on top the bluffs. The pond would be lined in the same manner as the main pond. A pond of this size could hold slightly more than two days' wastewater output.

Wastewater would be lifted in a six inch pipe approximately 180 feet to the evaporation pond on the bluffs by a 30 to 40 HP pump run during night hours, when demand on electric power is off-peak.

2.7.2 Process Water Disposal Alternatives Initially Considered But Eliminated From Further Consideration

2.7.2.1 Location of Evaporation Pond West of Proposed Power Plant

Based on flood hazard analysis, and depth to groundwater data, locating the proposed 30 acre evaporation pond to the west of the proposed Southpoint power plant became unfeasible. The pond would have had to have been raised to a top of bank height of approximately 470 feet to protect against estimated 100 year flood elevations. Construction of the bank to this height would require an excessive amount of earthwork. Shallow depth to groundwater, which can be as little as six feet below ground surface (John Algots, FMIT Physical Resources Director, personal communication), constrained the depth to which the pond could be excavated, and posed constraints for successfully lining the pond with a geomembrane liner because of possible hydrostatic pressure, which could displace the pond liner. Also, the evaporation pond would occupy land needed for retention basins and other stormwater management facilities. Consequently, the Preferred Alternative for siting the evaporation pond is the bluffs above the proposed power plant, which have minimal flood hazard, no depth to groundwater constraints, and would not consume areas needed for onsite stormwater retention basins and other facilities.

2.7.2.2 Treatment at Wastewater Plant

Plant process wastewater could be piped to an offsite WWTP. The nearest such facility is the FMIT's WWTP in Arizona, located approximately four miles west of the Preferred Alternative site. The WWTP was designed for residential and commercial wastewater treatment. It was not designed to treat industrial wastewater. Although the power plant would not produce industrial wastewater which contains unusual or toxic components, it would produce wastewater with very concentrated dissolved minerals, such as calcium, sodium, chloride and nitrates. Because of the relatively low volumes of residential and commercial wastewater presently processed at the FMIT's plant, the addition of a large volume of wastewater from the power plant, with its high TDS, would result in a blend of wastewater with overall TDS too high to be treated economically (Bob Lane, Manager, FMTUA, personal communication).

Thus, although the WWTP has uncommitted unused capacity which could accommodate the volumes of wastewater the proposed power plant would produce, it could not remove the high TDS in the effluent to achieve appropriate water quality for secondary-treated effluent. The WWTP has uncommitted unused capacity because of slower than projected tribal economic development, and because of unanticipated reluctance of non-Indian residents in the Mohave Valley to connect to a facility operated under tribal jurisdiction (Bob Lane, Manager, FMTUA, personal communication).

In order to use the FMIT's WWTP for wastewater disposal, an onsite wastewater pretreatment plant would have to be constructed adjacent to the power plant which could pre-treat the industrial brine to a condition which would allow the treated water to be piped to the FMIT's WWTP for secondary treatment, after which it would become reusable water as part of the FMIT plant's output of irrigation water supplied to tribal lands leased for agriculture.

The cost of constructing and operating an onsite pretreatment plant, plus the cost of sewerage connection and user fees to the FMIT plant, caused this alternative to be rejected from further consideration for economic reasons.

2.7.2.3 Treatment At Power Plant

A "package plant" for process wastewater treatment could be located onsite. However, a standard WWTP is incapable of processing high TDS levels. To treat the power plant's effluent would require an RO process, which would be very costly. This alternative was eliminated for economic reasons and on the basis that it would consume large quantities of energy to operate an RO process (Ron Sichau, Project Engineer, Calpine, personal communication).

2.7.2.4 Supply Topock Marsh

Topock Marsh is approximately 1.5 miles south of the Preferred Alternative site and about one mile south of the Alternative Three site. It is a National Wildlife Refuge managed by the US Fish and Wildlife Service (USFWS). The marsh suffers from an inadequate water supply because of alterations to the Colorado River channel made for flood control in the 1960's. Channel realignment and bank stabilization cut off natural inlets which supplied the marsh, leaving a single inlet at its south end. Additional water entering the marsh from a point other than the present single inlet would improve water quality and supply, and would enhance wildlife habitat. Process water from the proposed Southpoint power plant could be reused as an auxiliary water supply source for Topock Marsh if the water quality was satisfactory. In order to be acceptable, the industrial brine would require pretreatment before entering the marsh's ecosystem. Achieving a satisfactory water quality would require levels of treatment that would be prohibitively expensive (Ron Sichau, Project Engineer, Calpine, personal communication). This alternative was discussed with the Refuge manager, who also rejected it as unfeasible (Jim Goode, USFWS, personal communication).

2.7.2.5 Agricultural Irrigation

Using the process wastewater for irrigating the tribe's farmland was considered but rejected because of water quality considerations. The process wastewater is too high in TDS to be usable for irrigation, even on highly salt-tolerant crops such as alfalfa; the process wastewater would be in the 7,700 TDS range. No commercial crop species commonly grown in the Mohave Valley can tolerate TDS this high. Blending process wastewater with other sources of lower-TDS irrigation water was not practical. Increased leaching requirements, and possible contamination of groundwater with increased concentrations of dissolved solids, are additional reasons why direct reuse for agricultural irrigation is not a practical alternative to disposal of process water (John Algots, FMIT Physical Resources Director, personal communication).

2.7.2.6 Injection Well

Use of injection wells to dispose of brine is common in many parts of the US. However, such wells normally are permitted only where there is little probability that aquifers would be adversely affected by the injected brines. The water table in the Mohave Valley is relatively shallow, ranging from approximately five feet below the ground surface in areas near the river, to as much as 300 feet below ground surface in some areas along the toe slopes of bluffs east of the old river floodplain (USGS, 1994). Because of the generally shallow water table, injection wells would pose a risk of contaminating groundwater with highly concentrated dissolved solids, and are therefore not considered an acceptable alternative to process water disposal.

2.7.2.7 Return Flow Through Natural Drainages

Process wastewater could be channeled to undisturbed natural drainages to be carried offsite by gravity. This alternative was dismissed from further consideration because of the possibility of percolation into groundwater, or conveyance to irrigation channels or the Colorado River, which might result in TDS contamination of surface and/or groundwater or could damage crops or native vegetation and wildlife. Soils could also be contaminated by highly saline leachates.

2.7.2.8 Trucking to Off-Site Disposal Facility

Process wastewater could be contained, transferred to tanker trucks, and transported offsite to an appropriate waste disposal facility. The cost of containment, transfer, and trucking would be excessive, compared to other alternatives. Traffic impacts would be significant and unmitigable. No known disposal facility exists which could accept approximately 94 AF per year of liquid waste; regional landfills in La Paz and Clark Counties which can accept large volumes of waste are designed to receive solid, not liquid, waste. No WWTPs capable of treating this volume of wastewater are within 10 miles of the Preferred Alternative site. Because of the very large volume of process wastewater which would be generated, and excessive cost to truck to remote locations, trucking would not be a feasible alternative.

2.8 Domestic Wastewater Disposal Alternatives

2.8.1 Preferred Alternative - Offsite Disposal

The preferred alternative for disposal of domestic wastewater is construction of a holding tank and contracting with a sewage hauler for regular pumping. Sewage could be delivered to the FMTUA WWTP, or another facility, for sanitary disposal.

2.8.2 Alternatives For Domestic Wastewater Disposal Considered But Eliminated From Further Consideration

2.8.2.1 Onsite Package Treatment Plant

A small capacity package treatment plant could be installed to treat domestic sewage produced by plant employees and visitors. Treated effluent could be used in a variety of ways. The volume of waste was considered insufficient to make this alternative practical when compared to offsite disposal. (Stanley Rasmussen, Senior Environmental Attorney, Black and Veatch, personal communication).

2.8.2.2 Septic System

The Mohave Valley has experienced an increase in nitrate levels of groundwater because of many failed residential septic tanks (John Algots, FMIT Physical Resources Director, personal communication). A moratorium on new septic tank permits was considered by the Mohave County Board of Supervisors, but was not officially enacted. Instead, a de facto moratorium is in place because of requirements to meet stringent percolation test standards before a septic tank permit will be issued. Mohave County's requirements do not apply to the FMIR. The jurisdictional limits imposed by the checkerboard ownership pattern of the Mohave Valley do not alter the fact that both the Tribe and the County withdraw water from a common source. Because of the deteriorating groundwater quality caused by non-Indian septic systems (tribal residences are connected to the FMTUA WWTP), a septic system to handle domestic waste at the proposed power plant was rejected from further consideration.

2.8.2.3 Connection to FMIT Wastewater Treatment Plan

The cost of acquiring right of way across private land, and of installing sewerage approximately four miles long to connect the proposed power plant to the FMTUA WWTP is very high in relation to the small volume of domestic wastewater to be treated (Ron Sichau, Project Engineer, Calpine, personal communication). This alternative was rejected for economic reasons.

2.9 Fuel Supply Alternatives

2.9.1 Preferred Fuel Supply Alternative - Natural Gas

Natural gas was selected as the only fuel for the facility. The choice was based on the resultant low air emissions, availability and reliability of the fuel supply, safety, and economics associated with the use of natural gas.

2.9.2 Fuel Supply Alternatives Considered But Eliminated From Further Consideration

2.9.2.1 Fuel Oil

Fuel oils No. 2, No. 4, and No. 6 were deemed not feasible because they are not amenable to high efficiency combined cycle equipment and emit higher levels of sulfur dioxide and particulate matter than natural gas (Ron Sichau, Project Engineer, Calpine personal communication). Moreover, fuel oil would have to be transported by rail to the nearest dock, located approximately six miles south and west of the Preferred Alternative site in Needles, CA, and then off-loaded and trucked to the proposed power plant. Because of air quality, transportation cost, and potentially adverse traffic impacts, fuel oil was rejected from further consideration as a fuel source.

2.9.2.2 Other Gasses

Liquid natural gas, liquid propane, and hydrogen gas are possible alternatives, but were not acceptable because of safety, transportation, economic and availability considerations. For example, hydrogen gas is not a cost effective fuel; it costs more in Btu's to produce hydrogen gas than it would produce if used to fuel electric energy production. It is highly explosive and less safe to ship or store.

Propane is unacceptable because it burns at temperatures too low to fire the turbines. Even if this shortcoming could be overcome, propane could not be shipped or stored in sufficient volumes to fuel the turbines.

Liquid natural gas must be stored under great pressure and transported in special pressurized containers; it is not normally transmitted by pipeline. (The same is true of liquid propane). The necessary pressurized containment vessels for the quantities required render this fuel source impractical.

In the quantities which would be required to fuel the proposed Southpoint power plant, these forms of fuel are not as readily available, or as economic to use and store, as natural gas. Transportation of these three gaseous fuels would be by truck, which would increase traffic in the proposed project vicinity, and would create and additional risk through transportation of large quantities of explosive materials over area road networks. (Ron Sichau, Project Engineer, Calpine, personal communication).

2.9.2.3 Coal

Coal is a proven alternative fuel, but despite advances in emission control technology, coal does not burn as cleanly as natural gas (Ron Sichau, Project Engineer, Calpine, personal communication). It was also deemed not feasible because of the large space requirements for operation of a coal fueled facility, transportation requirements, and because of the significant levels of solid waste generation. Flyash must be disposed of in a sanitary landfill; some waste flyash could be disposed of by an alternate means by incorporating it into products such as lightweight concrete or asphaltic paving, if local demand provides a market.

3.0 DESCRIPTION OF AFFECTED ENVIRONMENT

3.0 DESCRIPTION OF AFFECTED ENVIRONMENT

3.1 Land Resources

3.1.1 Topography and Physiography

3.1.1.1 Geographic Setting

The FMIR lies in the Mohave Valley of the lower Colorado River drainage. The Reservation is in the Basin and Range Physiographic Province, whose elevations range from 400 feet to 3,500 feet above mean sea level. This area is characterized by extreme aridity. Surrounding mountain ranges have formed vast alluvial fans of debris transported over thousands of years by the desert's typically severe rainstorms, forming a rugged local topography characterized by long tongues of unconsolidated sands and gravels, some of which form bluffs and mesas where they have been transected by the cutting and flooding actions of the Colorado River. The Dead Mountains in California and Nevada form the western edge of the Mohave Valley. The Black Mountains in Arizona form the eastern edge of the Mohave Valley. These mountain ranges are nearly devoid of vegetation but display an array of colors ranging from ochre to fuchsia as a result of their rich igneous and metamorphic rock mineralization. The Colorado River has created a distinct linear riverine oasis in the otherwise arid environment of the Mohave Desert. The Reservation has few significant geographic features other than the Colorado River, which no longer flows between natural banks, but is contained, instead, in an engineered flood control channel with dikes and levees.

3.1.1.2 Topography of the FMIR

The FMIR is characterized by flat river bottom lands and moderately steep alluvial outwash fans of fine and coarse unconsolidated sands and gravels. Most of the Reservation is between 460 and 480 feet above sea level with the alluvial fans on the edge of the floodplain being some 200 feet higher. Drainageways display the flat beds and near-vertical banks typical of dry desert washes. Bluffs formed by the river's cutting action before channelization can rise 150 above the adjacent floodplain.

3.1.1.2.1 Preferred Alternative Site - Section 8

The Preferred Alternative site (Section 8) has two distinct topographic features created by the wetter climate of the Pleistocene Epoch, and the historic Colorado River. During the Pleistocene Epoch, massive amounts of debris were transported from the surrounding mountains and deposited as deep alluvial fans in the river valley. When the river was unchannelized it carved away the toe of these fans, creating steep bluffs. The western portion of the Preferred Alternative site is deep alluvium of the river valley floodplain; the eastern portion is bluffs. The difference in elevation between the plain and the top of the bluffs is approximately 150 feet. (See Figure 3.1-1, Topography of Preferred Alternative Site).

3.1.1.2.2 Alternative Two Site - Section 30

The same relationship between valley floor and bluffs that defines the Preferred Alternative site's topography also characterizes the Alternative Two site which is located in Section 30.

3.1.1.2.3 Alternative Three - Section 16

The Alternative Three site (Section 16) is similar to the Preferred Alternative, but the bluffs are deeply incised and rugged.

3.1.2 Geologic Setting

The project area lies within the Basin and Range Lowlands Province. The Province occupies the southern and western sections of Arizona. This province has fault block mountain ranges separated by valleys that usually contain thick deposits of alluvium. The Mohave Valley region is geologically complex. The underlying geology is igneous, but has been altered by the cutting and depositional actions of the Colorado River, which has created a deep alluvial plain. Volcanic buttes and plugs form conspicuous regional features. The igneous origin of the Black Mountains is evident in historic gold mining activity in the ghost towns between the Colorado River and Kingman to the northeast of the Reservation.

The oldest rocks that form the basement for the basin and the mountains are of Precambrian age. These rocks form the mountainous areas that run north and south along the edges of the valley. These mountainous areas extend to an altitude of 3,000 ft. In the Paleozoic Era, seas encroached upon the land and deposited thick layers of marine sediments. After the seas retreated, upheavals folded and faulted the rock. At the end of the Cretaceous Period, extensive volcanism deposited lava and magma in large areas. The lowlands began to fill with erosive materials from the surrounding mountains. As the conditions varied, the type of fill within the area varied. This fill represents many ages and environments consisting of varying interleaved lenses. Layers of gravel, sand, clay, and silt of varying thicknesses exist. The deposits near the mountains are generally coarse sediments. The deposits near the center of the valley are generally fine grained sediments.

Basins usually consist of three layers: bottom, middle, and top. The bottom has semi-consolidated or tightly packed layers that generally provide moderate quantities of poor quality water. The middle layers are often lake bed clay layers. The top layer consists of sand, silt, and gravel beds. Most of the basin fill alluvium was deposited before the basins were drained, when runoff went to the center of the basin. After the basins were filled, drainage between basins was established and cut into this alluvium. The flood plains of the active river consist of gravel, sand, and silt. This recent alluvial fill is generally the best source of groundwater in the basin. In the Mohave Valley, the distinction between the floodplain, younger, or Holocene alluvium and the older alluvium is clear in the topography of the land. A high terrace occurs to the east of the Colorado River. The lands to the east of that terrace forms the older alluvium. The land between the Colorado River and that terrace is the younger or floodplain alluvium. The three alternative sites each occupy a transitional area between young alluvium on the floodplain, and older alluvium forming the bluffs. (See Figure 3.1-2, Generalized Geologic Cross Section of Mohave Valley).

3.1.2.1 Preferred Alternative Site - Section 8

The Preferred Alternative site has geologic conditions typical of valley floor and bluffs. Deep, unconsolidated alluvium characterizes the site, with younger alluvium present on the valley floor, and older alluvium present on the bluffs.

3.1.2.2 Alternative Two Site - Section 30

The Alternative Two site has geologic conditions nearly identical to the Preferred Alternative site, with young and old alluvium occurring on the valley floor and bluff portions of the site, respectively.

3.1.2.3 Alternative Three Site - Section 16

The Alternative Three site is entirely on the valley floor, hence its characteristic geology is deep, young alluvium.

3.1.3 Soils

3.1.3.1 Mohave Valley Soils

The surface geology of the southern Mohave Valley, AZ consists, generally, of two types of alluvium. Dominating the area is the younger or Holocene alluvium. It is unconsolidated sand, silts, and gravels as noted in Figure 3.1-2. The younger alluvium is deposited on flood plains, alluvial slopes, and stream channels. It underlies the floodplain of the Colorado River. Outside this geologic zone are older alluviums of Pleistocene, Pliocene, and Miocene Epochs. They are weak to moderately consolidated gravels, sands, silts and clays of local origin, deposited in alluvial fans interbedded with rounded gravels, sand, silt, and clay deposited by the ancestral Colorado River.

This surface geology is the parent material for Mohave Valley soils. The Colorado River has created a wide floodplain of deep alluvial clay silt soils on bottom lands, and coarse, unconsolidated sands and gravels on uplands. These soils are semi-arid and subject to wind and water erosion. Almost pure sand may occur in some areas which were part of the riverbed in the past.

General soil maps and interpretations for Mohave County provide soil descriptions. The soil types found in the Mohave Valley are Hypothermic Arid Soils. The hypothermic soils are characterized by slopes of zero to two per cent on the floodplain, and slopes of zero to eight per cent on terraces above the floodplain, which also can include short slopes of up to 50 per cent.

The soils on the floodplain are generally loam to sandy loam. There is a low hazard of water erosion due to the flat slope of soils located on the floodplain. When irrigated these soils generally have medium to high crop production. Natural vegetation supported by these soils consists of dense thickets of mesquite and salt cedar in areas of high water tables with arrowweed and salt grass in better drained regions. Cattails sometimes occur in marshy areas.

Soils located on the terraces above the floodplain are generally loamy with limited susceptibility to flooding. Depending on the specific soil type, the potential for irrigated crop land can vary dramatically. The native vegetation includes a sparse growth of creosote bush, filaree, bursage, palo verde, catclaw, weeds and grass. These soils are typically used for rangeland with limited seasonal grazing.

A distinctive characteristic of old desert soils is the formation of desert pavement. As wind (eolian) erosion carries away the finer soil material, sharp rock fragments and cobbles remain. Over a long time span, the rock and cobbles form an almost complete layer on the land surface. Once formed, desert pavement acts to prevent significant wind erosion, so that soils become quite stable as long as the pavement remains undisturbed. However, disturbance of the pavement results in exposure of subsurface soils to winds, beginning anew the process of erosion and formation of desert pavement. The bluffs on each of the alternative sites have some areas of disturbance caused by off highway vehicles, and are beginning to erode in areas of vehicular travel.

3.1.3.2 Mohave County Soils Survey

The Natural Resource Conservation Service, or NRCS (formerly the Soil Conservation Service (SCS)) published a soils survey for Mohave County in 1996. The survey maps soils units, and provides a summary of major physical characteristics for each unit, with management recommendations.

In the land capability classification system used by NRCS, soils are grouped by Soils Capability Class. A Soils Capability Class indicates limitations for practical use for food, fiber, or forage production. Classes are designated by Roman numerals I through VIII, with additional coding by subclass indicated by lower case letters. Class I is least restricted; Class VIII is severely limited and nearly precluded from use for commercial crop production. Prime soils are those located on land which has a combination of physical and chemical characteristics best suited to produce forage, feed, food, and other crops. The land must also be available for agricultural use (SCS 1990). Soils Capability Class I and II soils form prime crop and pasture land, which, under provisions of the Farmland Protection Policy Act of 1980, must be evaluated in implementation of NEPA for potential environmental effects if they are to be used for non-agricultural development. Based on information from the NRCS soils survey, Soils Capability Classes on the three alternative sites range from II to VII. No prime agricultural soils occur on the Alternative Two and Alternative Three sites, which have soils in Capability Classes III to VII. Approximately eight acres of prime soils occur in the southwest corner of the Preferred Alternative site, which has Capability Classes ranging from II to VII.

Soil units are designated on soils maps by a number, e.g., 3A, which corresponds to a named soil, e.g., Carrizo, which is described in the supporting text of the NRCS soils survey. Soil units for all three alternative sites are illustrated on Figures 3.1-3, Soils - Preferred Alternative Site, and 3.1-4, Soils - Alternative Two and Three sites. Soil characteristics are summarized in tables accompanying the description of soils on each of the three alternative sites (Tables 3.1- 1, 3.1-2, and 3.1-3). In the following sections, both the soil unit name and map unit number are provided for ease of reference to figures and tables.

3.1.3.3 Alternative Sites Soils

3.1.3.3.1 Preferred Alternative Site - Section 8

Six soil units occur on the Preferred Alternative site. They are Carrizo very gravelly loamy sand (3A); Gadsden silty clay (4); Kofa silty clay (8); Indio silt loam (13); Rositas family-Superstition family and Torriorthents soils (19A); and Holtville silty clay (43). Only Indio (13) soils are prime soils (NRCS, 1996). Indio soils comprise approximately eight acres in the southwest corner of the Preferred Alternative site. Desert pavement, largely undisturbed, covers the surface of the bluffs on this site. Soils units are mapped on Figure 3.1-3. Characteristics of these soils units which have relevance for engineering are summarized in Table 3.1-1

3.1.3.3.2 Alternative Two Site - Section 30

The Alternative Two site contains five soils units: Carrizo (3A); Ripley silt loam (16); Rositas-Superstition-Torriorthents (19A); Huevi very gravelly loam (58A); and Coolidge family-Denure complex (72A). Capability Classes range from VI to VII. There are no prime soils.

Desert pavement occurs on the Alternative Two site's bluffs. Some erosion is evident because of vehicular disturbance of the pavement. Soils units are mapped on Figure 3.1-4. Characteristics of these soils units which have relevance for engineering are summarized in Table 3.1-2 .

3.1.3.3.3 Alternative Three Site - Section 16

Three soils units occur on the Alternative Three site. They are Rositas family-Superstition family and Torriorthents soils (19A); Holtville silty clay (43); and Coolidge family-Denure family (72A). Capability classes range from III to VII. There are no prime soils. Desert pavement covers the bluffs on this alternative site, and shows evidence of vehicular disturbance. Soils units are mapped on Figure 3.1-4. Characteristics of these soils units which have relevance for engineering are summarized in Table 3.1-3 .

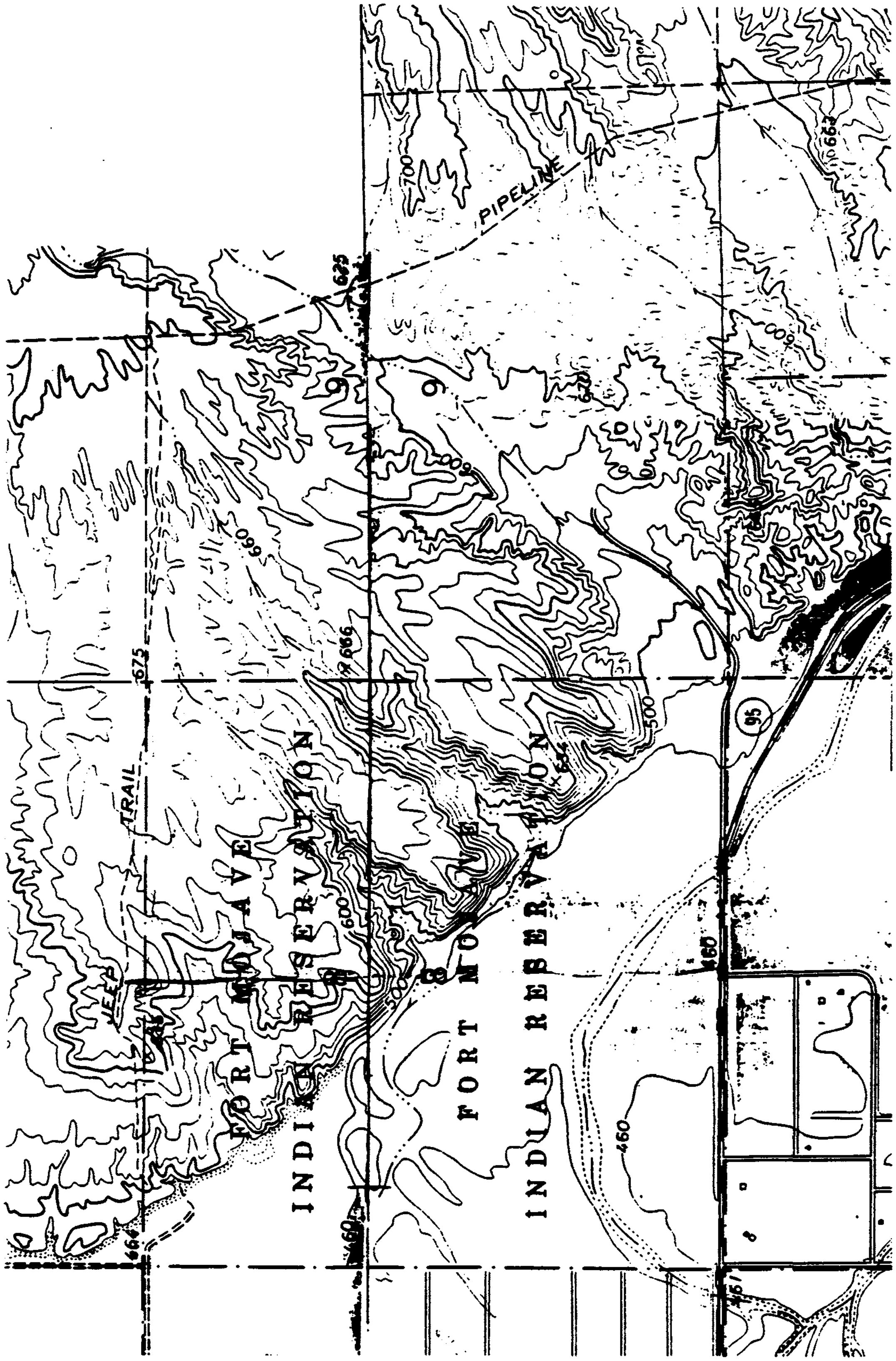

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Fig. 3.1-1 Topography of Preferred Alternative Site

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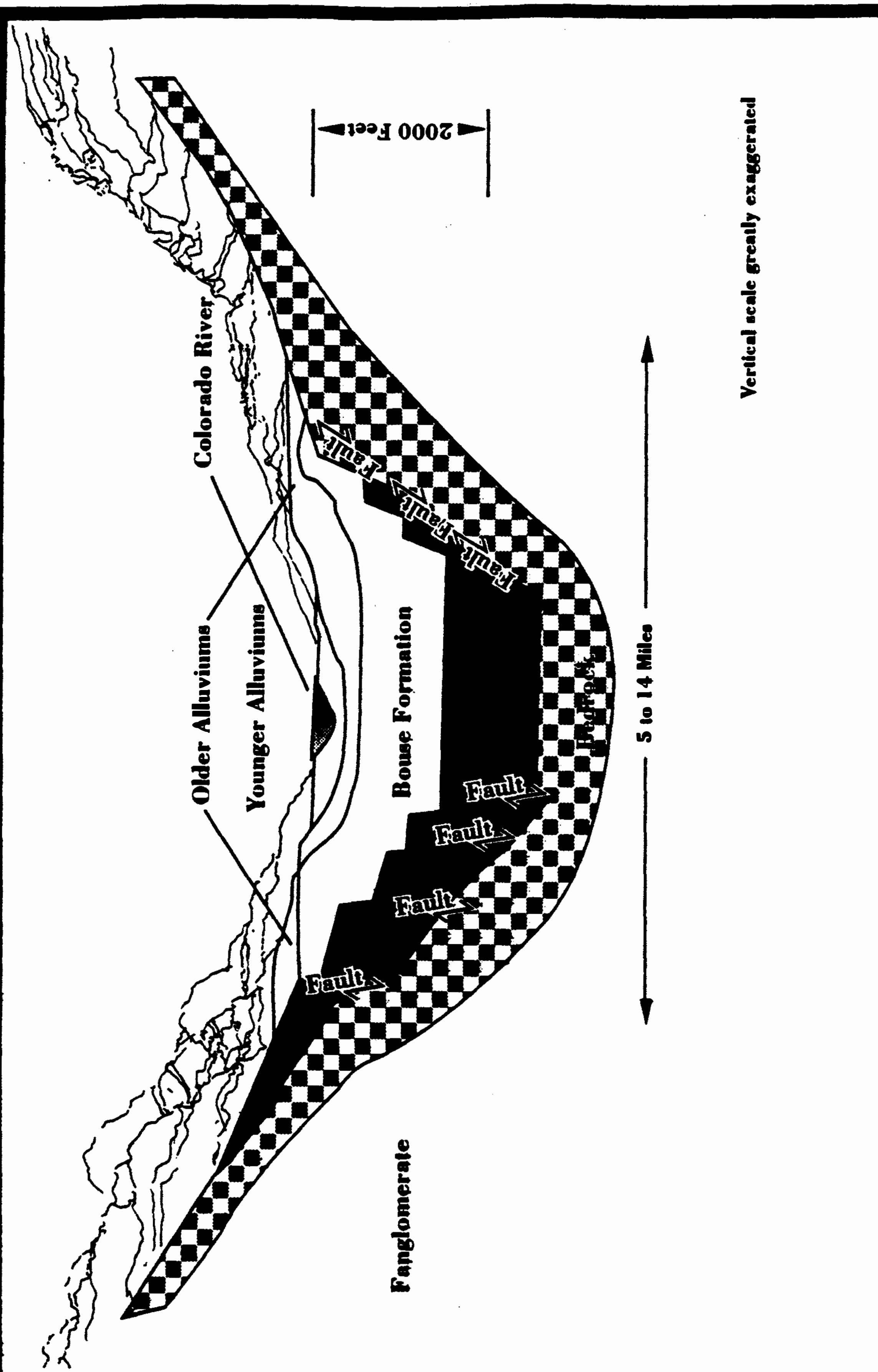

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Fig. 3.1-2 Generalized Geologic Cross Section of Mohave Valley

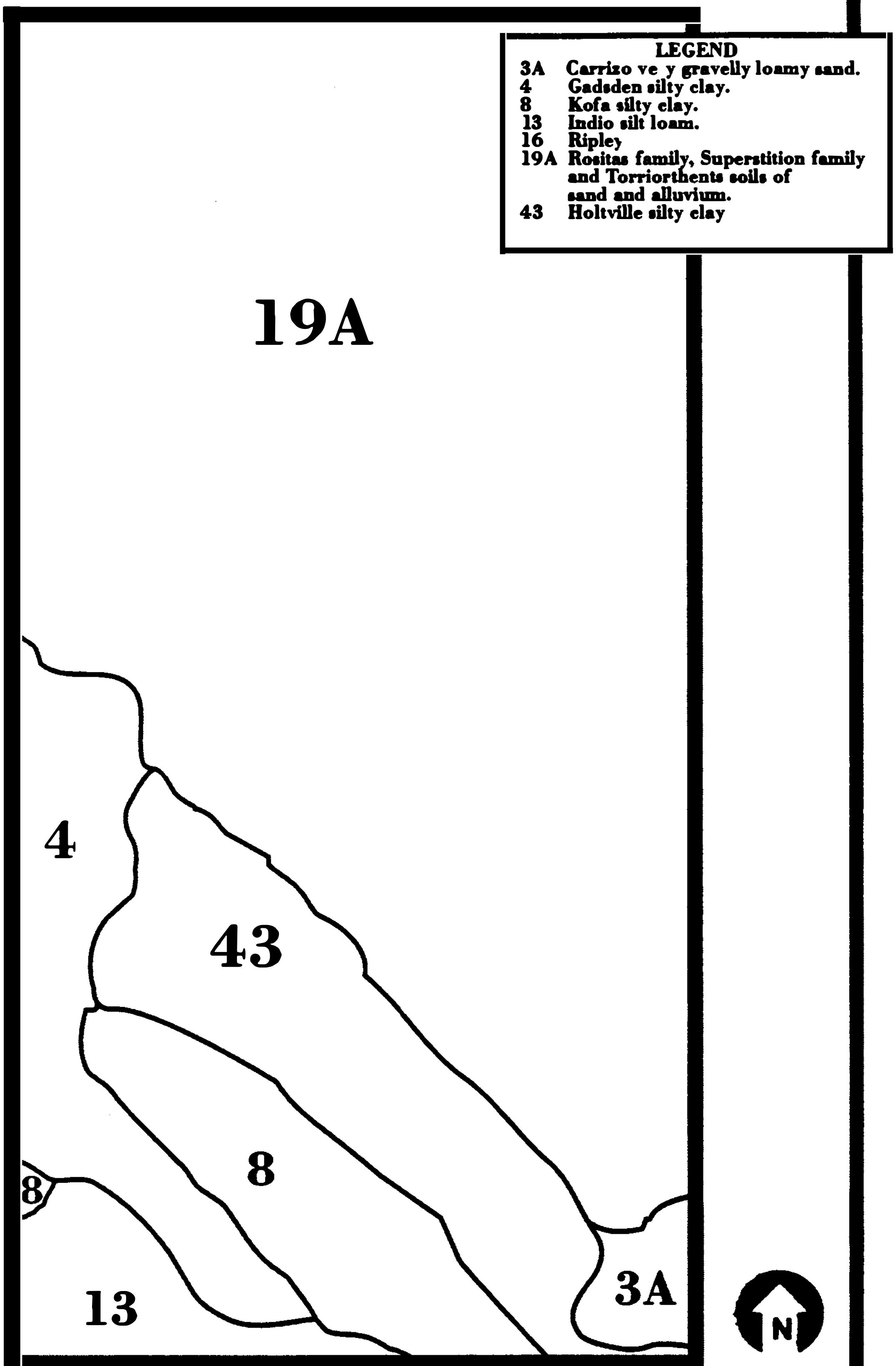

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Fig. 3.1-3 Soils: Preferred Alternative Site

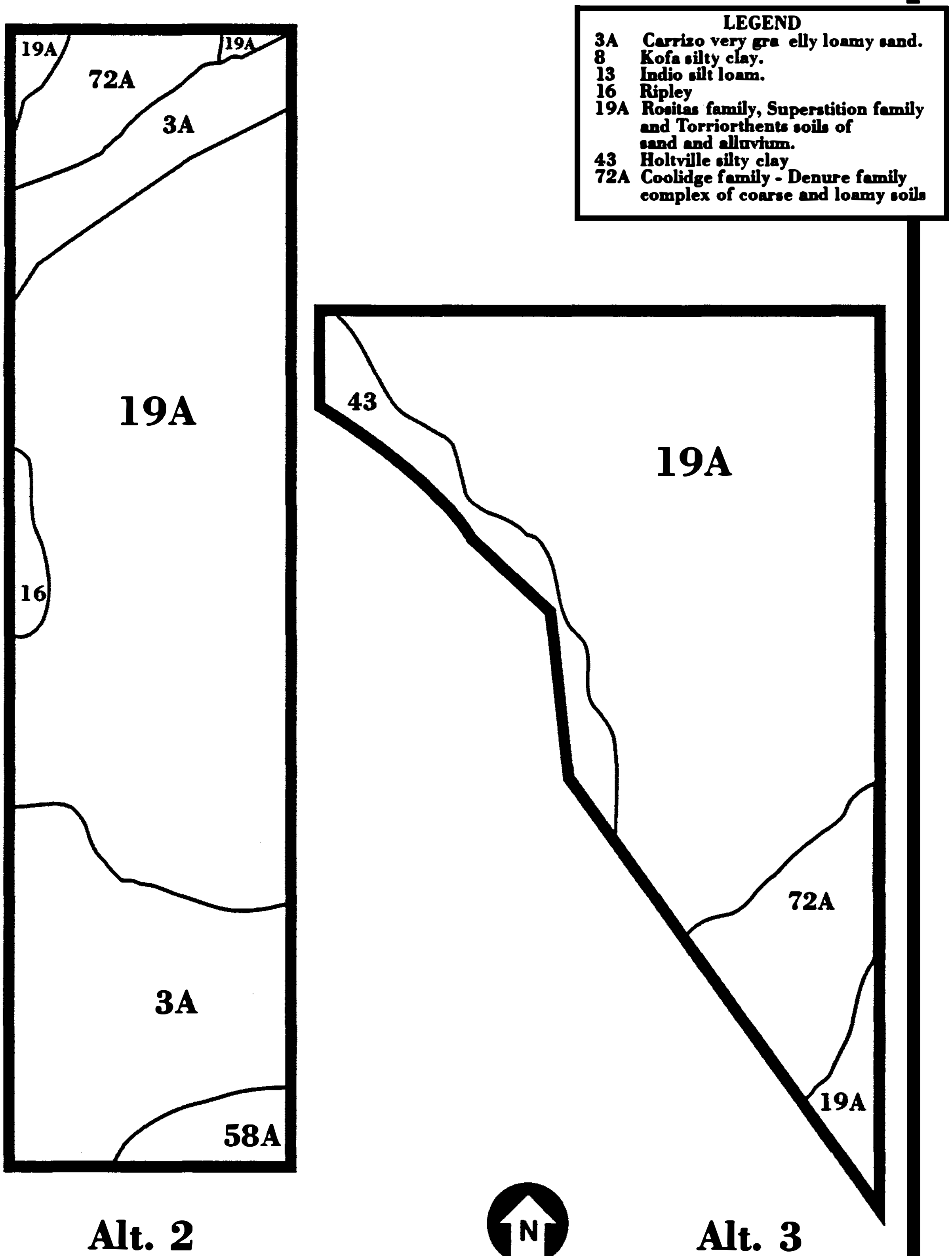

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Fig. 3.1-4 Soils: Alternative Two and Three Sites

Table 3.1-1
Preferred Alternative Site Soils

Soils / Factor	Carrizo 3A	Gadsen 4	Kofa 8	Indio 13	Rositas, Superstition 19A	Torriorthents 19A	Holtville 43
Flooding	Frequent	None to rare	None to rare	None to rare	None	None	None to rare
Drainage	Excessively drained	Well drained	Well drained	Well drained	Somewhat excessively drained	Well drained	Well drained
Permeability	Very Rapid	Slow	Slow	Moderate	Rapid	Moderate	Slow
Salinity	N/A	Slightly to moderately, 2 to 12 dS/m	Slightly to moderately, 2 to 12 dS/m	Slight to moderate, 2 to 12 dS/m	N/A	N/A	Nonsaline to moderately
Hazard of water erosion	Slight	Very slight	Very slight	Slight	Slight	Moderate	Very slightly
Hazard of wind erosion	Slight	Moderate	Moderate	Slight	Very high	Very slight	Moderate
Shrink/swell	Low	High	High	Low	Low	Low	High
Capability Class	VIIw, nonirrigated	IIIs, irrigated	IIIs, irrigated	IIs, irrigated	VIIs, nonirrigated	VIIs, nonirrigated	IIIs, irrigated

Table 3.1-2 Alternative Two Site Soils

Soils / Factor	Carrizo 3A	Ripley 16	Rositas, Superstition 19A	Torriorthents 19A	Huevi 58A	Coolidge 72A	Denure 72A
Flooding	Frequent	None to rare	None	None	None	None	None
Drainage	Excessively drained	Well drained	Somewhat excessively drained	Well drained	Well drained	Well drained	Somewhat excessively drained
Permeability	Very Rapid	Moderate	Rapid	Moderate	Moderate	Moderately rapid	Moderately rapid
Salinity	N/A	Saline to moderate, 2 to 12 dSm	N/A	N/A	N/A	N/A	N/A
Hazard of water erosion	Slight	Slight	Slight	Moderate	Moderate	Slight	Slight
Hazard of wind erosion	Slight	Slight	Very high	Very slight	Slight	Slight	Slight
Shrink/swell	Low	Low	Low	Low	Low	Low	Low
Capability Class	VIIw, nonirrigated	VIs, irrigated	VIIs, nonirrigated	VIIs, nonirrigated	VIIs, nonirrigated	VIIs, nonirrigated	VIIs, nonirrigated

Table 3.1-3
Alternative Three Site Soils

Soils / Factors	Rositas, Superstition 19A	Torriorthents 19A	Holtville 43	Coolidge 72A	Denure 72A
Flooding	None	None	None to rare	None	None
Drainage	Somewhat excessively drained	Well drained	Well drained	Well drained	Somewhat excessively drained
Permeability	Rapid	Moderate	Slow	Moderately rapid	Moderately rapid
Salinity	N/A	N/A	Nonsaline to moderately	N/A	N/A
Hazard of water erosion	Slight	Moderate	Very slightly	Slight	Slight
Hazard of wind erosion	Very high	Very slight	Moderate	Slight	Slight
Shrink/swell	Low	Low	High	Low	Low
Capability Class	VIIs, nonirrigated	VIIs, nonirrigated	IIIs, irrigated	VIIs, nonirrigated	VIIs, nonirrigated

3.1.4 Natural Drainage and Floodplain Determination

3.1.4.1 Mohave Valley Floodplain

Before the Colorado River was detained by a series of upstream dams and contained between engineered levees, it presented a serious flood hazard in the Mohave Valley. Evidence of the river's flood activities is clear in the Mohave Valley, which was shaped by the combined actions of alluvium transported to the valley from adjacent mountain ranges, and the carving action on that alluvium by the river. With the river contained, the natural floodplain and drainage patterns of the valley have changed substantially. The river no longer floods the valley, and the levees act as dams, preventing overland flow from reaching the river. The most serious flood hazard in the Mohave Valley is now presented by overland flows which move toward the river, but cannot find an outlet. Land alteration for urbanization, particularly large housing subdivisions, has exacerbated the problem by concentrating flows which once traveled as sheet flows over large pervious surfaces.

3.1.4.2 Federal Emergency Management Agency (FEMA) Flood Hazard Classifications

The degree of flood hazard presented by overland flows has been mapped by the FEMA in large areas of the Mohave Valley. The Mohave Valley has two distinct topographic features, the terrace and the floodplain. There is a sharp drop off from the terrace to the floodplain. This drop off is 50 feet or more depending on the exact location. Water entering the Mohave Valley comes almost exclusively from side washes. These washes flow in a generally westerly to southwesterly direction across the terrace slopes. The slopes on the terrace are steep, leading to high water velocities as the water flows across the terrace. The water then loses definition as a wash and joins the general floodplain flows. Flood Insurance Rate Maps (FIRM) prepared by FEMA show that many areas in the Mohave Valley have been designated as Zone A. Some areas are designated Zones B or C.

Zone A is defined as "areas of 100 year floods: base flood elevations and flood hazard factors not determined." Zone B is "areas between the limits of 100 and 500 year floods: or areas subject to 100 year flood frequency with average depths less than one foot; areas with a small contributing drainage area; or areas protected by levees from the base flood." Zone C is described as "areas of minimal flooding." (FEMA FIRM Community Panel Number 040058 2610 C, of 3450, 1988).

Water generally drains from east to west through the terraces and then north to south through the floodplain. Due to the construction of levees along the Colorado River, the potential of flooding from the Colorado River is small. However, the levees impound and redirect surface flows, as they can no longer drain into the river. All surface flows in the vicinity of the three alternative sites is forced to drain south into the Topock Marsh. During storms, water accumulates rapidly in very steep well-incised channels that occur in the terraces. The water flows through these channels very rapidly to the floodplain area. Due to the flat slope and lack of well-defined channels in the floodplain area, sheet floods are a common phenomenon.

During floods from these washes on the terrace, silt production is high. Examination of flood control projects routing terrace outflows through the floodplain shows that many projects have completely silted up from just one or two storms. The primary point at which silt drops occurs where the flows exit the terrace and enter the floodplain. The slope of the watershed declines abruptly and therefore the velocity of the water slows abruptly. Since the carrying capacity of water for sedimentation varies with the velocity, large amounts of silt are deposited at this point.

Specific flood hazard conditions for each of the three alternative sites is discussed below.

3.1.4.3 Flood Hazard of the Colorado River

Construction of the Mohave Levee, which consists of two identical levees paralleling the river; channelization of the Colorado River banks; and construction of Davis Dam has minimized flood hazard from the Colorado River. Because the Colorado River now flows in an engineered channel, the floodplain of the river is defined by the channel. The elevation of the levee due west of the Preferred Alternative site at River Mile 247.7 (the measurement at the end of Courtwright Road) is 488.83 feet above sea level

Record flood levels on the Colorado River in 1983 brought widespread damage to areas downstream of Needles, but did not affect the Tribe's lands on either side of the Colorado River. A 100 year flood flow for the Reservation reach of the Colorado River is defined by the US Bureau of Reclamation (USBOR) as 40,000 cubic feet per second (cfs). A flood of this magnitude would have an elevation of 474.0 feet above sea level; the levee, with an elevation of 488.83 feet would provide at least 14 feet of freeboard over a 100 year flood. The flood of record, which occurred in 1983, slightly exceeded this volume for a brief period. (See Table 3.1-4).

3.1.4.4 Colorado River Probable Maximum Flood (PMF)

Although the 1983 flood reached levels which established it as the flood of record for this reach of the Colorado River, there exist a set of circumstances with very low probability of occurring which could cause a probable maximum flood (PMF). The set of circumstances requires three factors all occurring within a short time of one another. They are: extremely deep snowpack in the mountains which contribute snowmelt to the Colorado River; reservoirs behind dams at full storage capacity; and warm spring rains which melt the deep snows. If snow were to melt at rates far greater than normal because of warm rains, and the resulting snowmelt entered the river system at a time when reservoirs were already full to capacity, then it would be necessary to spill one or more dams to protect the integrity of the dam(s) from rising reservoir waters impounded behind them. If the necessary conditions existed and dams from

Hoover Dam in the north to Imperial Dam in the south had to spill simultaneously, a PMF would result. The volume of this PMF has been calculated by the USBOR in a report entitles "Summary Report: Inundation Mapping - Colorado River Dams to the United States-Mexico Border" (USBOR 1993).

Table 3.1-4 100 - Year Water Surface Elevations

River Mile	100 - Year Elevation	River Mile	100 - Year Elevation
260.0	485.0	238.0	464.3
259.0	484.1	237.0	463.3
258.0	483.2	236.0	462.5
257.0	482.2	235.0	461.6
256.0	481.5	234.0	463.0
254.0	479.7	233.0	460.7
253.0	478.6	232.0	460.2
252.0	477.9	231.0	459.1
251.3	478.6	230.0	458.4
251.0#	477.9	229.0	457.6
250.0	475.7	228.0	457.1
249.0	474.9	227.0	456.4
248.0*	473.8	226.0	455.8
247.0*	472.7	225.0	455.3
246.0	471.8	224.0	454.8
245.0	471.1	223.0	454.2
244.0	470.1	222.0	453.4
243.0	469.0	221.0	452.6
242.0	468.2	220.0	451.7
241.0	468.5	219.0	450.9
240.8	468.6	218.0	449.0
240.0	466.8	217.0	445.8
239.0	465.4	215.0	445.0

#River mile measuring site nearest to Alternative Two site.
*River mile measuring sites nearest to the Preferred Alternative and Alternative Three sites.

The USBOR report was prepared as an aid to community emergency preparedness planning. If a PMF were to occur, the existing levee system which contains the Colorado River in the Mohave Valley would fail. It is predicted that the entire valley would be flooded. It is presumed that the flood water would follow the approximate boundaries of the historic floodplain of the pre-channelized Colorado River through the Mohave Valley. Depth of flood water cannot be foretold precisely, but may be as much as 200 feet USBOR 1993). "The events used to determine inundated areas have a very small probability of occurrence" (USBOR 1993, p. 4). The possibility of a PMF occurring is remote, and is a risk which cannot be predicted. The combination of factors which would trigger a PMF have not occurred in the 62 years since completion of Hoover Dam.

3.1.4.5 Flood Hazard of Topock Marsh

During the 1983 flood of record (estimated to be slightly less than a 500 year flood by the USBOR), water levels in Topock Marsh rose to an estimated 462 feet. At that time, the normal water level in the marsh was 455 feet. Thus, the water level rose approximately seven feet. This conclusion is reached from the fact that the North Dike at the time had an elevation of 460 feet, as did the crown of Topock-Davis Dam Road. Water from the marsh overtopped the North Dike, and stood at a depth of two feet on the highway. The dike was raised to an average elevation of 463.5 feet. The South Dike, at the southern end of the marsh, was also raised, which in turn raised the water level in the marsh from 455 feet to 456.7 feet. Although the new height of the North Dike offers greater flood protection, the higher water level in the marsh results in a net increase in flood hazard. There may be segments of the dike which may be lower than 463.5 feet (Greg Wolf, Manager, Havasu National Wildlife Refuge, personal communication.) Freeboard on the dike ranges from about six to six and a half feet.

If another flood event of a magnitude equivalent to the 1983 flood of record were to occur, the marsh level would rise seven feet, to a level of 463.7 feet. The low spots in the dike, plus the higher normal water level in the marsh, lead to the conclusion that there is no net improvement in flood protection when compared to the elevations of dike and marsh which existed when the marsh flooded land to its north, including the Preferred Alternative site, in 1983. A flood water elevation of 463.7 can be assumed for the 1983 flood of record event, based on the above data.

Raising North Dike created a second change in flood hazard conditions. The increase in height of approximately 3.5 feet allows impoundment of water flowing toward the dike from the north to greater depths. If more water is dammed by the dike before it can flow into the marsh, the depth of floodwater on the Preferred Alternative site would increase. Topock-Davis Dam Highway would be under water, as would the existing terrain below the bluffs on Section 8. Impounded water could rise to an elevation which would flow over the dike into the marsh (Gookin Engineers 1997).

If the North Dike were to fail, the water released from Topock Marsh would spread to areas with elevations lower than the water level in the marsh at the time of failure.

3.1.4.6 Drainage and Floodplain Determination of Alternative Sites

3.1.4.6.1 Drainage and Floodplain Determination of the Preferred Alternative Site - Section 8

The proposed power plant would be sited in the southeast quarter of Section 8. The quarter is divided diagonally into northeast and southwest halves by a steep bluffs and terrace floor. Construction would be limited to the southwest half of the lease area, where the terrain is nearly flat. This building area is in Zone A, for which the flood hazard has not been investigated but is classed as subject to 100 year flood hazard (FEMA, 1988). Most of the natural site elevation is above 458 feet, with some above 460 feet. The majority of the buildable area is at a lower elevation than the probable 100 year flood.

A 100 year flood elevation was calculated specifically for the proposed power plant site in the southeast quarter of Section 8. A computer model using the HEC-2 program set the 100 year flood elevation at 466 feet (Allen Gookin, PH, Gookin Engineers, personal communication). Although no FEMA classification exists for the site, there is accurate data for topography mapped at two foot contour intervals, and data for floodplain elevations of adjacent Sections 5, 7, 9, and 17, which are under Mohave County jurisdiction. The two foot contour mapping extends 100 feet into Section 8. Available data include the two foot contour maps and five foot contours for adjacent BLM lands. Additional data came from field investigation and records of water levels during the 1983 flood of record, when the Topock Marsh rose, overtopped the North Dike, and also overtopped Topock-Davis Dam Highway, which was under two feet of water (John Algots, FMIT Physical Resources Director, personal communication). These data were the basis for the computer model.

The elevation of the top of the Colorado River levee at a point due west of the Preferred Alternative site is approximately 483 feet. The site is, therefore, about 20 feet lower in elevation than the levee and would be inundated if a MPF were ever to occur.

Two catchment areas from the upland terraces to the east empty into the site. The smaller of the two catchment areas drains about one square mile through three washes which carry storm water to the base of the bluffs, where it then flows northwesterly across the site, then turns and drains to the southwest, where it joins a larger drainage. The larger drainage forms an inverted "U," suggesting that it may be in a depression created by an old meander scar created by the historic Colorado River.

The larger catchment area, draining about four square miles, carries flows in a channel along the north side of a closed landfill located in Section 9. The channel has been graded to turn due south along the Section 8 east boundary. The channel appears to have been relocated from its natural course. The 1977 USGS topographical map for the area indicates a channel south of the present location. The channel stops at the embankment of CR 227. The bluffs occupying the east half of the proposed lease area have a very low flood potential.

The upland drainages flowing from the bluffs onto Section 8 have the potential to transport approximately 566 AF of water during a 100 year storm (Gookin Engineers, 1997, p. 1). (Figure 3.1-5, FEMA Flood Hazard Zones).

3.1.4.6.2 Drainage and Floodplain Determination of the Alternative Two Site - Section 30

This area of tribal land is narrow and elongated and is dominated by the upland terrace. The bulk of the site is in flood Zone C which is classed as having minimal flooding potential. A small area in the southern part of the section contains a wash which is classed as Zone A.

3.1.4.6.3 Drainage and Floodplain Determination of the Alternative Three Site - Section 16

The west half of Section 16 lies in two FEMA flood zone classifications: A and C. Those portions of the site which occupy the upland terraces, or bluffs, are in Zone C, which is virtually flood free.

3.1.5 Other Hazards and Nuisances

In addition to flooding, there are other natural hazards and nuisances which are components of the affected environment. They are described briefly below.

3.1.5.1 Sedimentation

Soils on the alluvial fan terraces are unconsolidated. As a result, runoff from storm events can pick up these unconsolidated soils and transport them. Intense storm events carry sediment down the alluvial fans. When runoff reaches the flat valley floor, transported debris is immediately deposited. The volume of material can be very large. According to Arizona State Department of Water Resources data, the average sediment load per square mile drained is 0.2 to 0.5 acre foot. In a 100 year flood, up to 10 per cent of the volume of runoff would be silt. (Gookin Engineers, 1997, p.2).

3.1.5.1.1 Sediment Hazard of the Preferred Alternative Site - Section 8

The topography, soils, and natural drainage patterns of the Preferred Alternative site create conditions in which substantial sediment transport and deposit could occur. The bluff-and-mesa landform on the east edge of the site have unconsolidated soils and steep slopes, so that soils from the top of the mesa could be picked up and transported at high velocity down the bluff face until reaching the flat area at the toe of the bluffs, where change in gradient would cause rapid slowing of flood waters and consequent sediment deposition. The quantity which could be transported would depend on storm intensity, duration, and catchment area drained. As storm flows concentrate in incised drainages in the bluff face, sediment is deposited where the drainages transition to the toe of the escarpment. The Preferred Alternative site has three major washes exiting the bluffs, and therefore has potential for considerable sediment transport and deposition.

The anticipated volume of sediment has been calculated. Approximately 2.5 million cubic feet of sediment would be deposited on the site during a 100 year flood (Gookin Engineers, 1997, p. 2).

3.1.5.1.2 Sediment Hazard of the Alternative Two Site - Section 30

Sediment collection, transport, and deposition would be very similar in context and intensity to the Preferred Alternative site, as soils, drainage, and topography are similar.

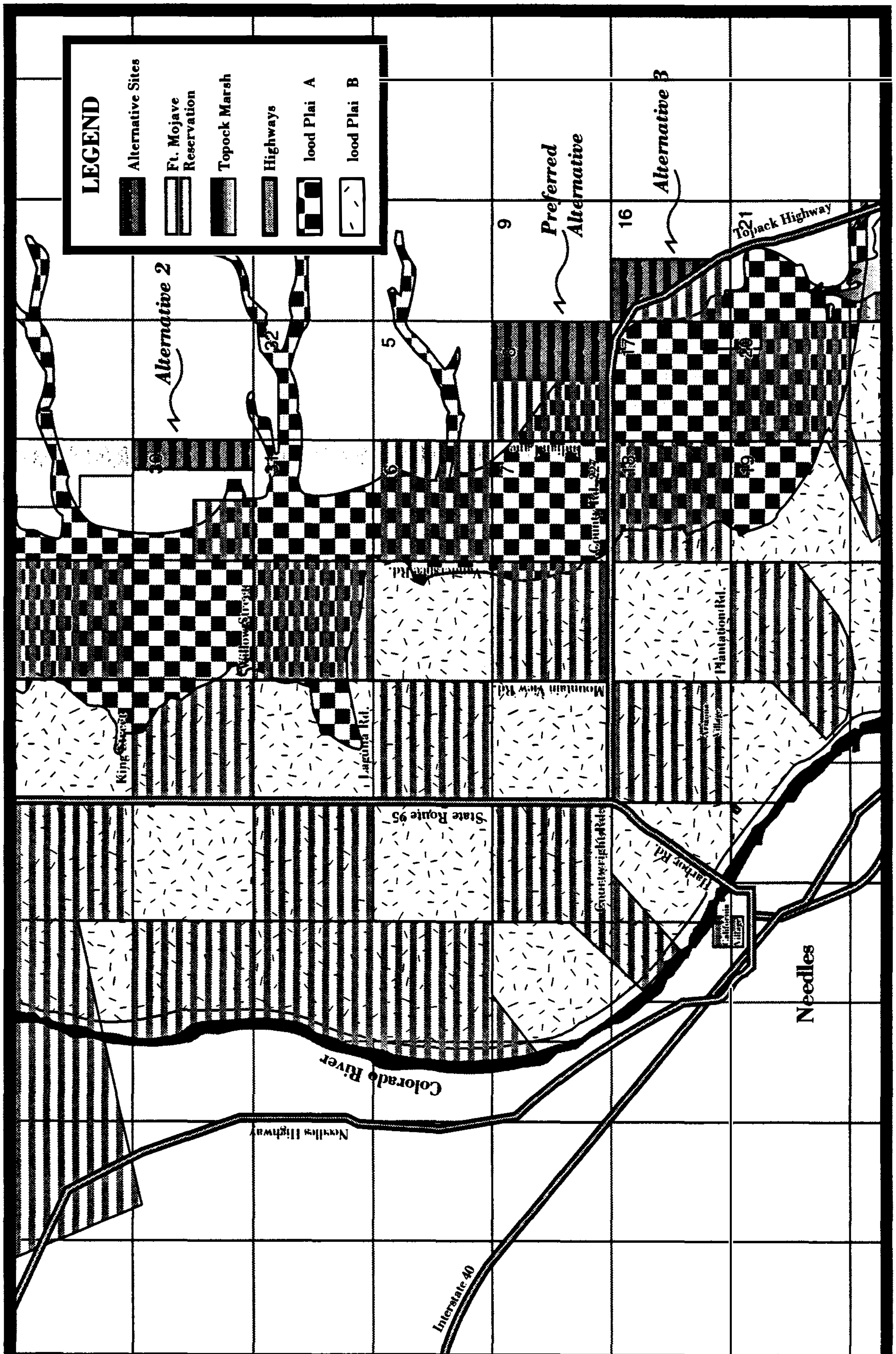

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Fig. 3.1-5 FEMA Flood Hazard Zones

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3.1.5.1.3 Sediment Hazard of the Alternative Three Site - Section 16

Sediment collection, transport, and deposition would be very similar in context and intensity to the Preferred Alternative site, as soils, drainage, and topography are similar.

3.1.5.2 Seismicity

According to the Uniform Building Code (1991) the Preferred Alternative, Alternative Two, and Alternative Three sites are in seismic zone 2B with a zone factor of 0.2. Seismic zone 2 is a zone of low to moderate severity.

3.1.5.3 Liquefaction

Liquefaction of the soil can occur in two ways. One condition occurs as a result of heavy rain after which the soil becomes saturated. In unconsolidated soils, especially where underlain by an impermeable layer, the entire mass can become fluid and on slopes can become a mud slide.

Soil liquefaction can also occur in seismic conditions. It is a temporary transformation of saturated, cohesiveless material from a relatively stable, solid condition to a liquefied state as a result of increased soil pore water pressure (City of Chula Vista 1994). Soil pore water pressure is the water pressure between soil particles. Liquefaction can occur if three factors are present: seismic activity, loose sand or silt, and shallow ground water.

Earthquakes of magnitude 6.0 or more on the Richter scale commonly induce liquefaction. Shallow soils of sand or silt, Holocene fluvial and deltaic deposits, and poorly compacted artificial fill have the highest susceptibility to liquefaction. On the upland terraces they would tend to move like a viscous fluid, perhaps exposing and displacing foundations. On the floodplain, soils would also tend to become semi-liquid, potentially threatening foundations. Recorded seismicity in the Mohave Valley has not been high enough for this to be a likely hazard, though in principle it could affect all three sites being considered for the location of the proposed power plant as all conditions could be present, given a severe earthquake (Allen Gookin, PH, Gookin Engineers, personal communication).

3.1.5.4 Dust Storms

As a result of the region's arid climate and the presence of exposed sand and fine soils over much of the unirrigated Mohave Valley area, there are occasional severe dust storms in and around the reservation. Such storms represent a hazard for some components of the power plant, especially intake systems. Dust storms also pose a hazard to workers and to traffic operations. The hazard from dust storms is greatest in late summer and early fall and would affect each of the alternative sites equally.

3.1.5.5 Hazardous Materials

3.1.5.5.1 Hazardous Materials Site Reconnaissance

Hazardous materials are those substances which have the potential to harm biota, or which may pollute or contaminate abiotic sources on which biota depend. Field reconnaissance of each alternative site was performed in the fall of 1994. All three alternative sites have surface evidence of household refuse dumping. None had evidence of change in soil color or vegetation which would suggest the presence of soil contaminants. No abandoned transformers or other industrial debris was observed. Based on field observations and data base searches, no known hazardous materials are present on any of the three alternative sites.

3.1.5.5.2 Potential Transport of Possibly Hazardous Materials Onto Preferred Alternative Site - Section 8

Land immediately to the east of the Preferred Alternative site (Section 8) was used as a Mohave County solid waste disposal site. The site was an unstaffed, and unmanaged community dump for an unknown period before it came under Mohave County management in 1985. It is now closed, and signs instruct dumpers to use a new designated refuse disposal site. However, common household refuse continues to be dumped at the old site because the road to the dump area is still traversible.

Mohave County officials do not know of or suspect that there are any hazardous materials in the closed landfill; however, their presence or absence has not been determined. (Mike Hendricks, Mohave County Public Works Department, personal communication.) There is a possibility that floodwater in the channel along the north side of the closed landfill could transport buried solid waste, which may include potentially hazardous materials, onto the Preferred Alternative site.

3.2 Air Resources

3.2.1 Regional Climate of the Mohave Desert

The following description of the climate and meteorological data of the Mohave Desert in the vicinity of the project site was obtained from the air quality analysis prepared for the project in order to apply for a PSD Permit with the USEPA. The climatological and meteorological data presented here were utilized in the air dispersion modeling performed for the project under an approved EPA workplan (see Appendix B, Prevention of Significant Deterioration Air Permit Application for South Point Generating Plant, Black & Veatch, June 1997).

The climate in the vicinity of the project site is typical of a low elevation desert characterized by extreme aridity, wide diurnal temperature variations, an extended growing season, and high intensity, short duration storms.

Based on the meteorological data obtained from Needles, California, the extreme maximum and minimum temperatures are 120 degrees Fahrenheit (F) and 21 degrees F, respectively. The average daily high and low temperatures are 85 degrees F and 60 degrees F, respectively. The growing season is approximately 257 days. Rainfall occurs during two distinct seasons. Winter rains are driven by storms originating in the Pacific Ocean. Summer rains are driven up from the Gulf of California. Rainfall ranges from 2 inches to 6 inches annually. Average rainfall is 4.4 inches per year.

Based on the Fort Mohave meteorological data used in the air dispersion modeling for the project, wind speeds in the area are 10 knots or less for approximately 78 percent of the year and greater than 21 knots for less than one percent of the year. The wind direction is predominately southerly (SSE through SSW). Winds from the north (NNE through NNW) occur approximately 30 percent of the year. Because winds are the primary dispersal factor for emissions generated by sources, the wind patterns in the project vicinity are of particular importance to the assessment of the potential air quality impacts of the proposed power plant. Figure 3.2-1 illustrates the annual windrose for Fort Mohave from 1989 through 1993 (Source: Section 5.2, Appendix B).

3.2.2 Existing Regional Air Quality

Regional air quality is influenced by a number of factors, including but not limited to, the area meteorology, topography, emissions from stationary, mobile, and other sources in the area, and pollutant transport into the region from other surrounding areas. Air pollutants monitored in the project area include the five criteria pollutants identified under the NAAQS which were established for the protection of public health. The NAAQS for the five criteria pollutants are summarized in Table 3.2-1. The criteria pollutants include:

1. Ozone (O_3);
2. Nitrogen (NO_2);
3. Sulfur Dioxide (SO_2);
4. Carbon Monoxide (CO); and
5. Particulate Matter less than 10 microns (PM_{10}).

These five criteria pollutants would be emitted by the proposed project and are the focus of the air quality impact analysis contained in Appendix B.

January 1-December 31; Midnight-11 PM

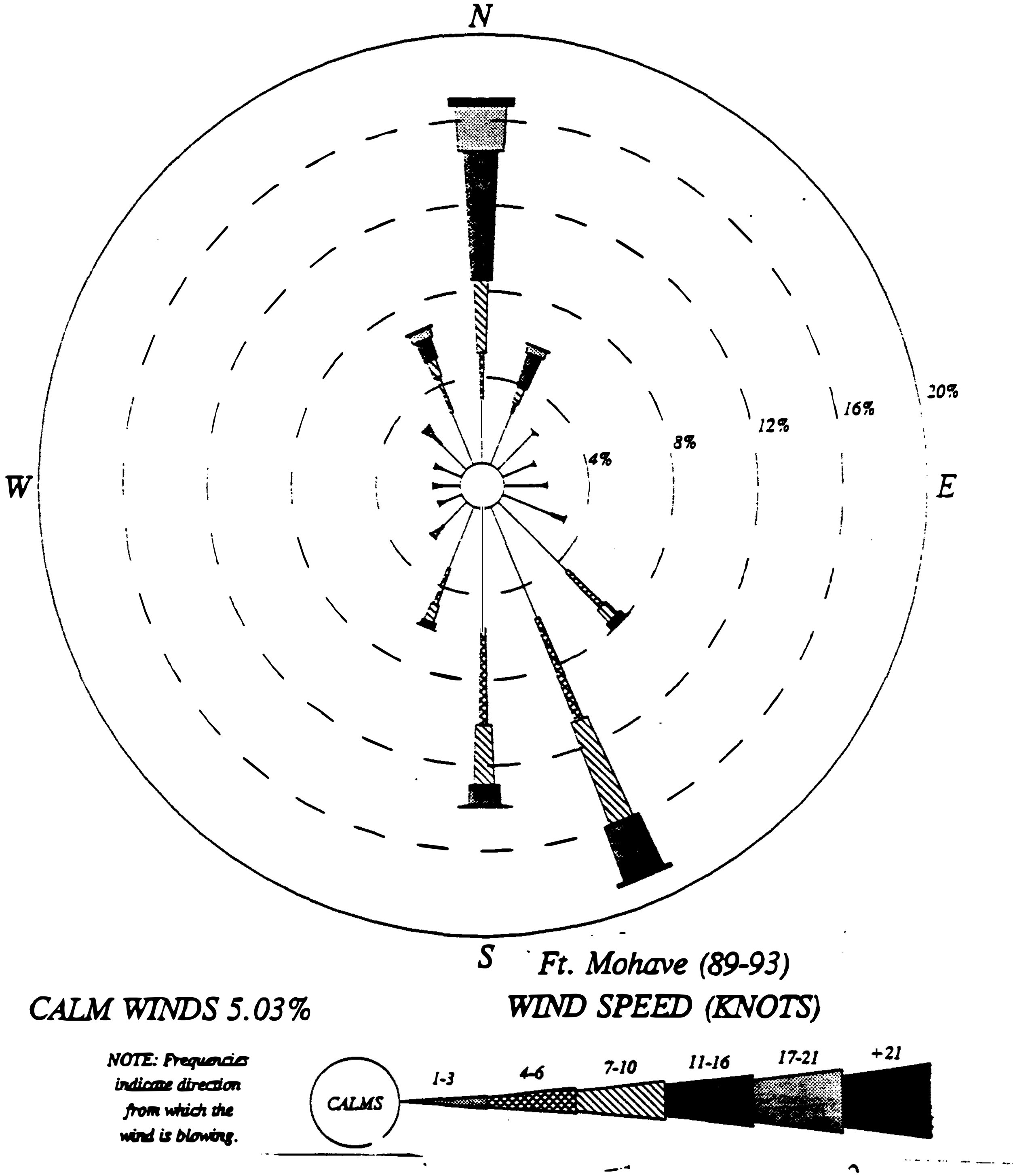

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Fig. 3.2-1 FMIR
Wind Rose

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Table 3.2-1
National Ambient Air Quality Standards

Pollutant	Averaging Period	Primary	Secondary
Ozone	1 Hour	0.12 ppm (235ug/m^3)	0.12 ppm (235ug/m^3)
Carbon Monoxide	1 Hour	35 ppm (40mg/m^3)	—
	8 Hour	9 ppm (10mg/m3)	—
Nitrogen Dioxide	Annual Mean	0.053 ppm (100ug/m^3)	0.053 ppm (100ug/m^3)
Sulfur Dioxide	3 Hour	—	0.5 ppm (1300ug/m^3)
	24 Hour	0.14 ppm (365ug/m^3)	—
	Annual Mean	0.03 ppm (80ug/m3)	—
Particulate (PM10)	24 Hour	150 ug/m3 (.08ug/m^3)	150 ug/m3 (.08ug/m^3)
	Annual Mean	50 ug/m3 (.03ug/m^3)	50 ug/m3 (.03ug/m^3)

ug/m^3 = micrograms per cubic meter
PPM = parts per million; 1 ug/m_3 = 5.3x10^{-4} PPM

The air quality of a given area is designated as either being in attainment for a pollutant if the monitored concentrations of that pollutant are less than the applicable NAAQS. An area is classified as nonattainment for a pollutant if the monitored concentrations of that pollutant in the area are above the NAAQS. Areas categorized as "unclassified" for a particular pollutant are subject to the permitting and siting regulations imposed on attainment areas. The air quality emissions from the project area were determined by the air quality impact analysis prepared for the project (See Appendix B, Section 5.1) to potentially affect the air quality in two geographical areas that include the western portion of Mohave County, Arizona and the extreme eastern portions of San Bernardino, California. Table 3.2-2 summarizes the USEPA Region IX air quality attainment designations for each criteria pollutant for these regions. Figures 3.2-3, 3.2-4, 3.2-5, and 3.2-6 show the air quality attainment designations near the project site for Ozone, Carbon Monoxide, Nitrogen Dioxide, and Particulate Matter, respectively.

EPA Region IX Class I area locations with respect to the project site are identified in Figure 3.2-2. Areas not designated as a Class I area are Class II areas by default (Doug McDaniel, Air Division, USEPA Region IX, personal communication). The nearest EPA Class I areas to the project site are approximately 80 miles (125 km) away and include the Grand Canyon National Park and the Joshua Tree Wilderness Area. Class I areas are Congressionally designated for protection of aesthetic air quality criteria, such as visibility. Class I areas are generally National Parks, National Monuments, and wilderness areas greater than 5,000 acres and wildlife refuge areas greater than 6,000 acres. Class I designated areas are pristine areas which are of special natural, recreational, historic, or scenic value. Visibility within Class I areas must be protected and allowable increases in pollution are lower for Class I areas than for Class II areas.

Table 3.2-2
Air Quality Status - National Air Standards

Pollutant	Clark Co. Nevada	Mohave Co. Arizona	San Bernardino Co. California
Ozone	Attainment	Unclassified	Unclassified
Nitrogen Dioxide	Attainment	Unclassified	Unclassified
Carbon Monoxide	Attainment[1]	Unclassified	Unclassified
Sulfur Dioxide	Attainment	Unclassified	Unclassified
Particulates	Attainment[2]	Unclassified[3]	Moderate Non-Attainment

1 Potential impact area is attainment, Las Vegas area to the north is non-attainment.
2 Potential impact area is attainment, Las Vegas area to the north is non-attainment.
3 Potential impact area is unclassified, Bullhead City area to the north is non-attainment.

Table 3.2-3
Air Quality Monitoring Stations

Pollutant	San Bernardino Co.	Mohave County
PM10	Barstow 29 Palms	Bullhead City Holiday Shores Riviera Kingman McConnico Alonas Way
Ozone	None	Holiday Shores Alonas Way
Nitrogen Dioxide	None	Bullhead City Holiday Shores Alonas Way
Carbon Monoxide	Barstow	None
Sulfur Dioxide	None	Bullhead City Riviera Holiday Shores Alonas Way

Source: Black and Veatch, 1997

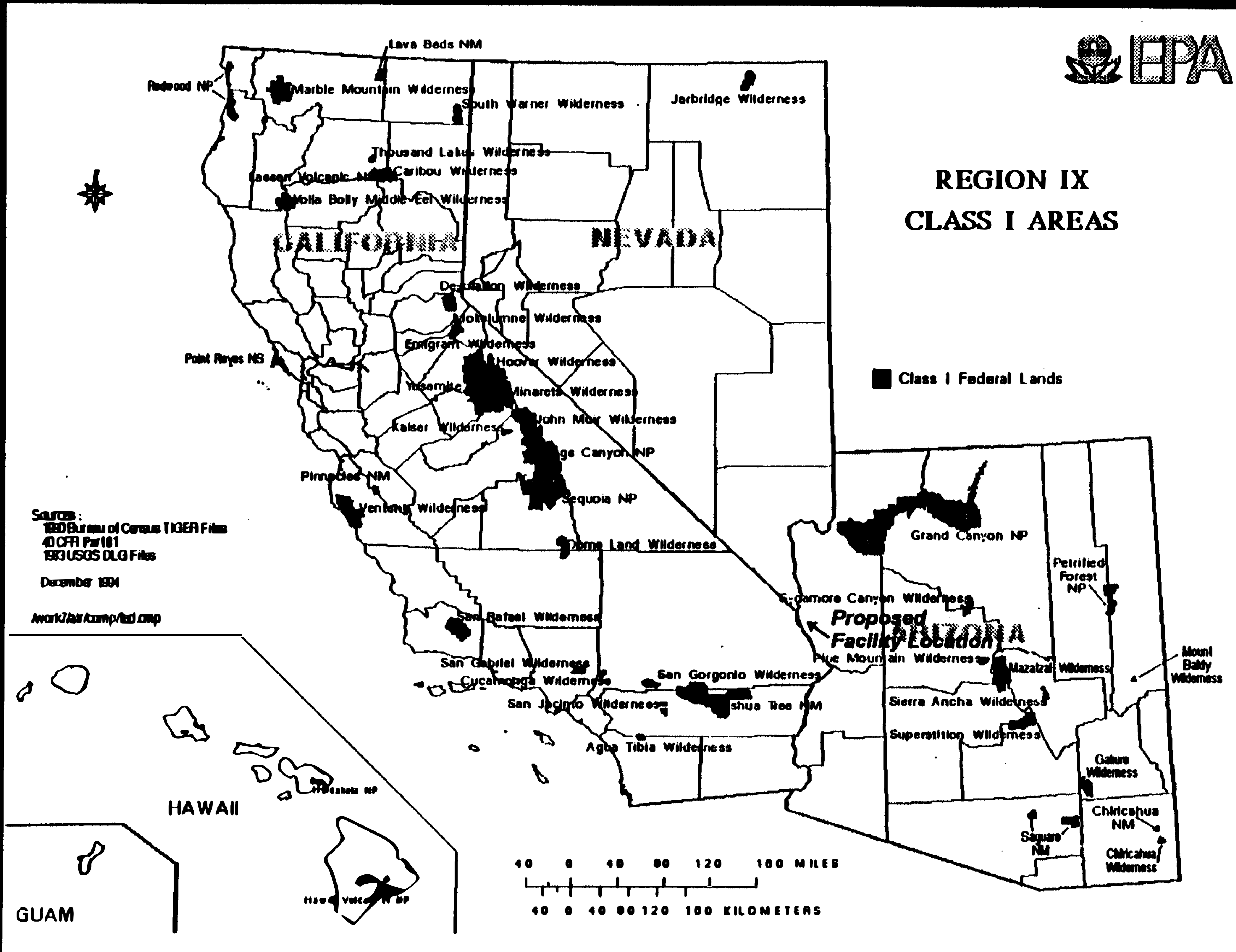

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Fig. 3.2-2 USEPA Class I Air Quality Sensitivity Areas

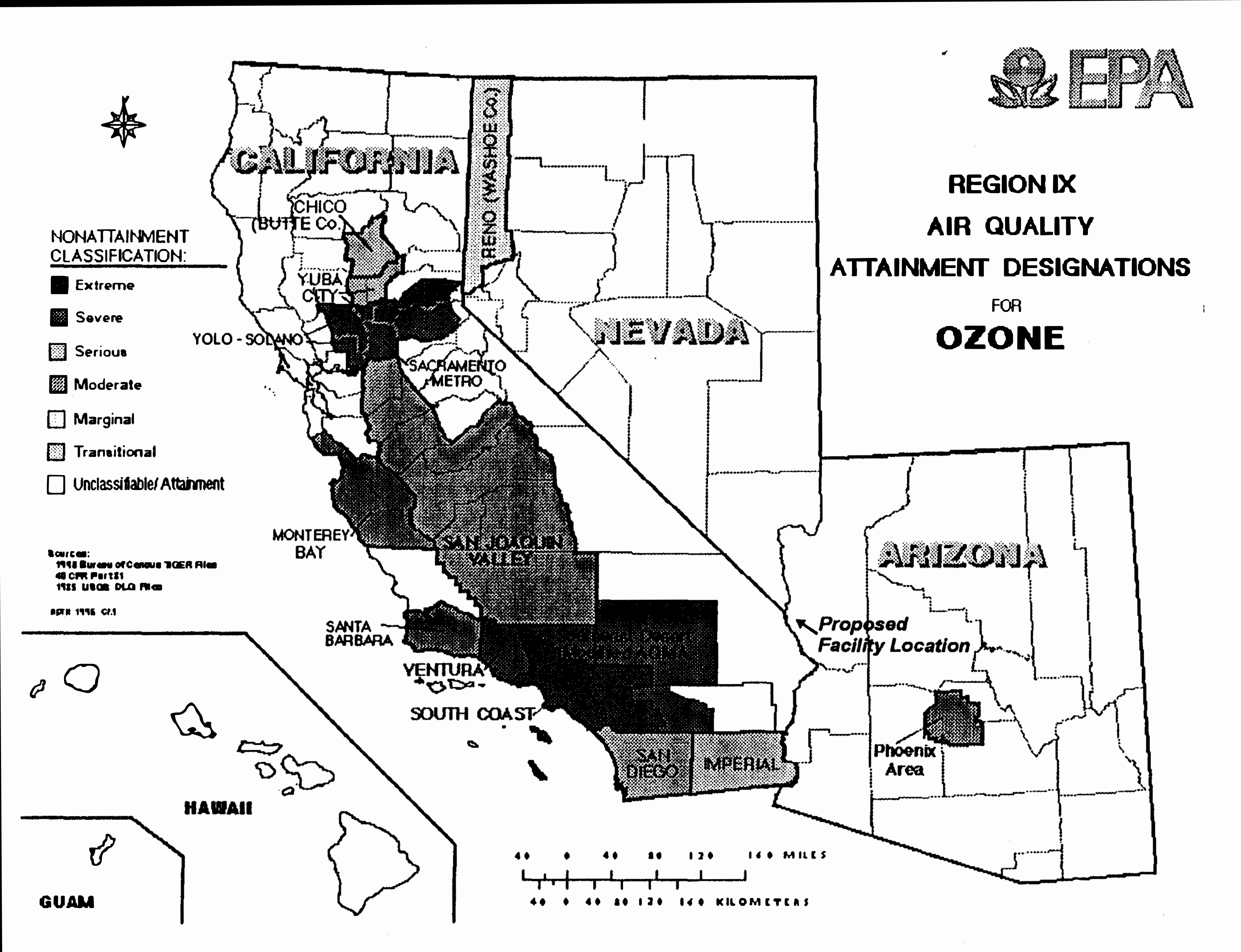

Fig. 3.2-3 USEPA Region IX Air Quality Attainment Ozone

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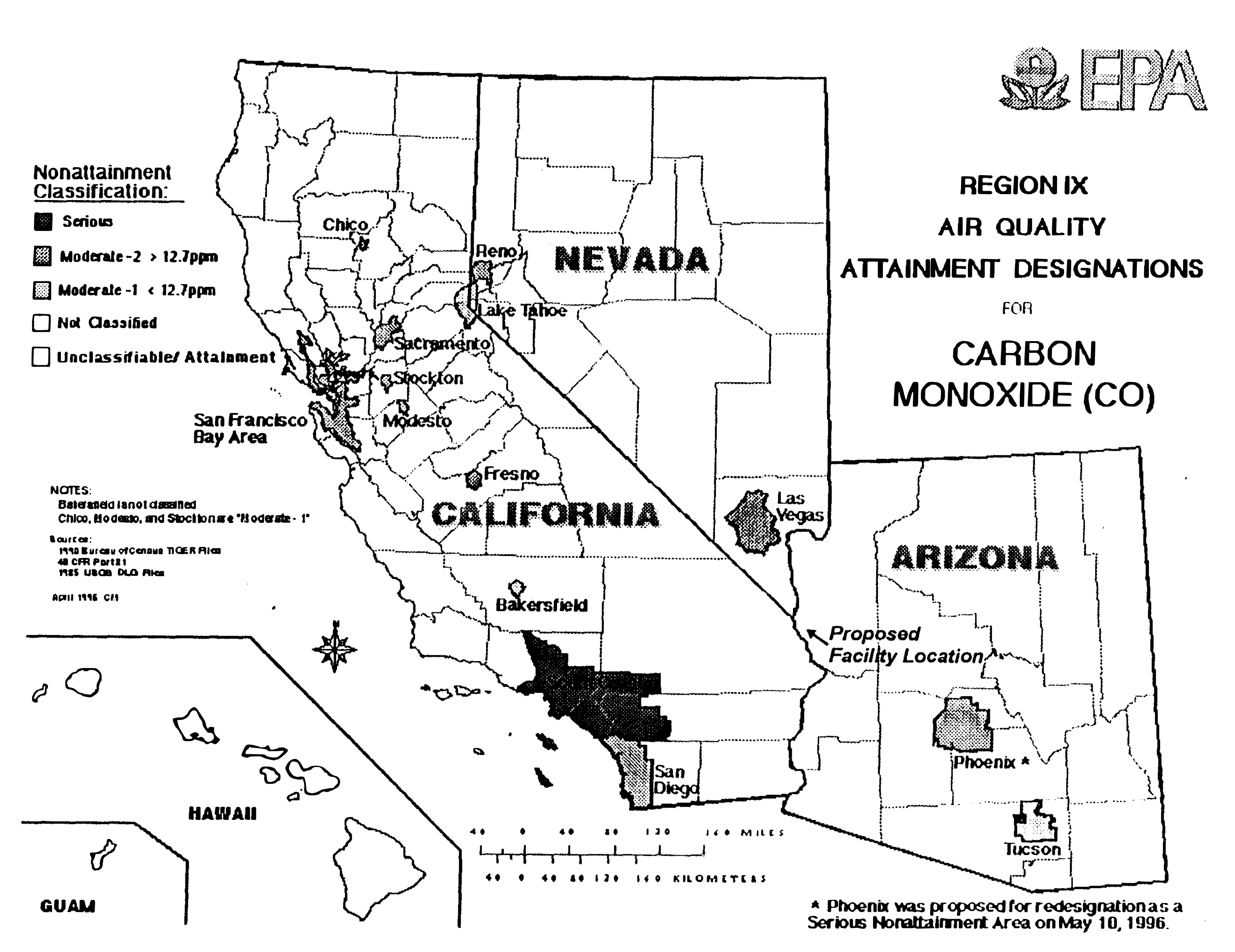

Fig. 3.2-4 USEPA Region IX Air Quality Attainment Carbon Monoxide

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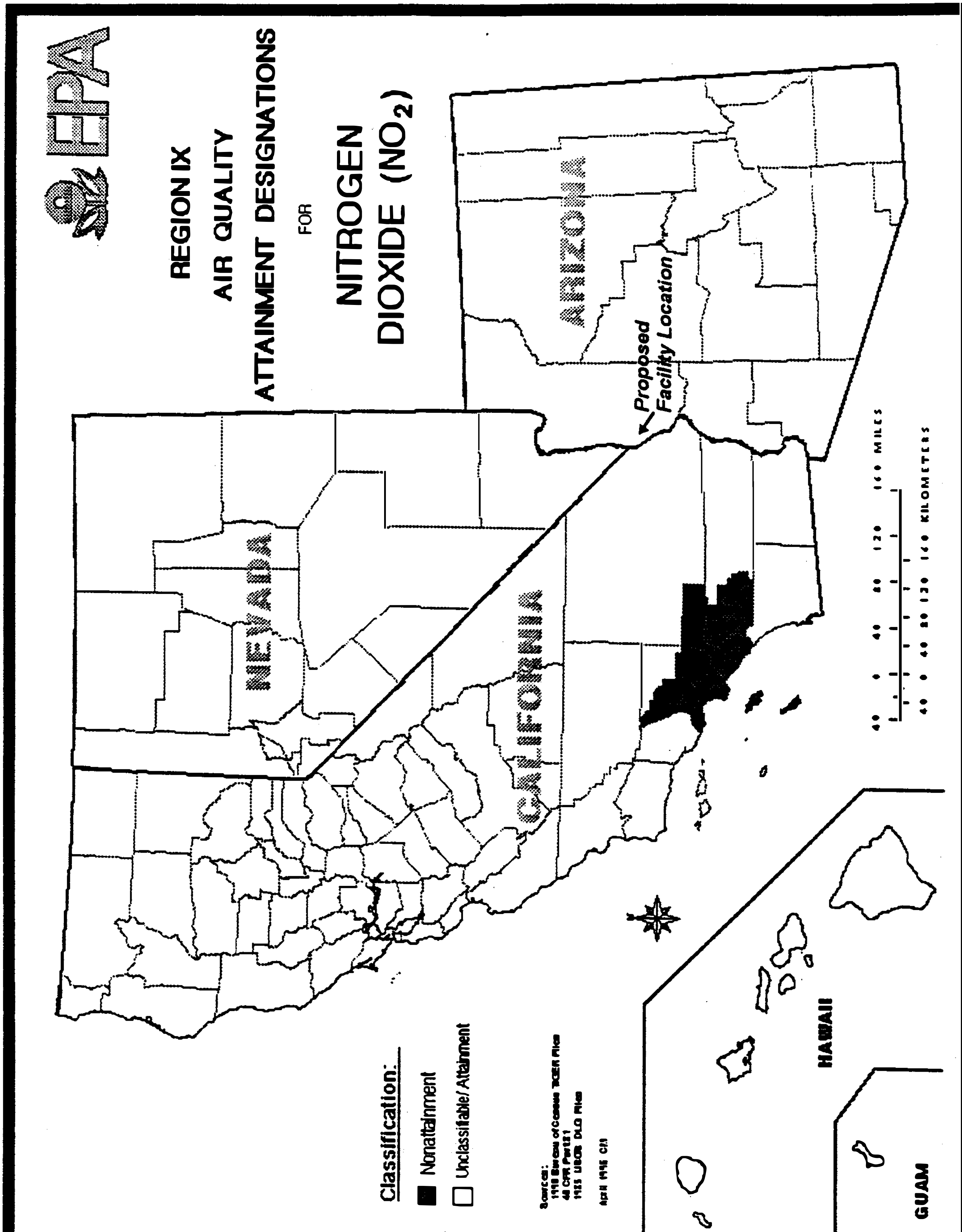

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Fig. 3.2-5 USEPA Region IX Air Quality Attainment Nitrogen Dioxide

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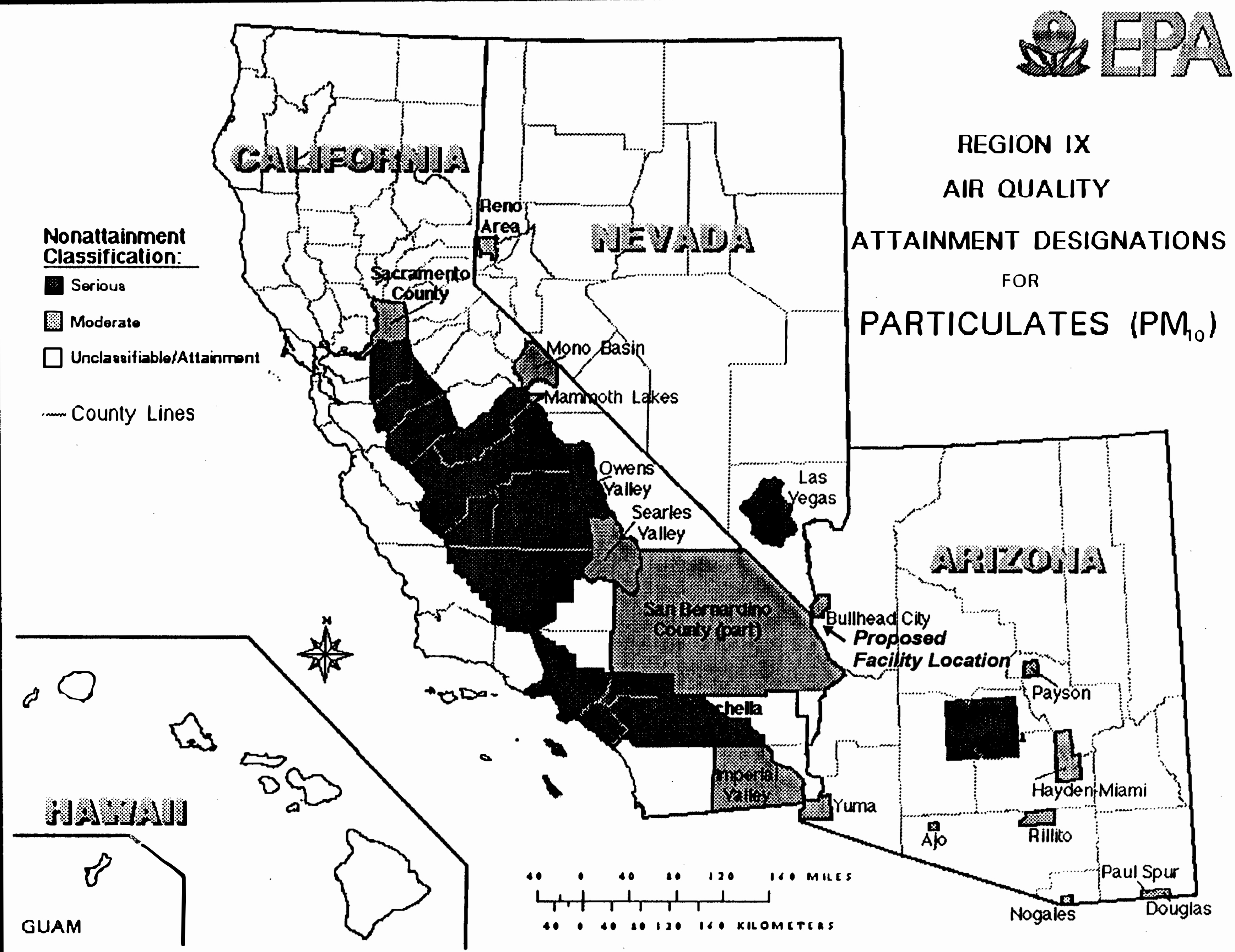

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Fig. 3.2-6 USEPA Region IX Air Quality Attainment Particulates (PM_{10})

Five years of air quality data (1991 through 1995) were gathered from various monitoring sites in the project vicinity. Table 3.2-3 summarizes the applicable monitoring sites within each county and the monitored pollutants. Tables 3.2-4 through 3.2-8 summarize the air quality data for 1991 through 1995 for the areas that would potentially be affected by project emissions.

Characterization of the regional air quality establishes the baseline air quality. The air quality impact study for the proposed project established the characterization of the regional air quality from the various monitoring stations.

Table 3.2-4
Ozone Air Quality Data (PPM)

Averaging Period	Year	Monitoring Site		NAAQS ($PPM/ug/m^3$)
		Alonas Way	Holiday Shores	
1-Hour	1991	—	0.09	0.12 ($235 ug/m^3$)
	1992	—	0.09	0.12 ($235 ug/m^3$)
	1993	—	0.10	0.12 ($235 ug/m^3$)
	1994	—	0.11	0.12 ($235 ug/m^3$)
	1995	0.08	—	0.12 ($235 ug/m^3$)

Source: Black and Veatch

Table 3.2-5
Nitrogen Dioxide Air Quality Data (ug/m^3)

Averaging Period	Year	Monitoring Site			NAAQS
		Bullhead City	Alonas Way	Holiday Shores	
Annual	1991	34	------	23	100
	1992	26	------	24	100
	1993	28	------	19	100
	1994	26	------	26	100
	1995	32	15	------	100

Source: Black and Veatch

Table 3.2-6
Carbon Monoxide Air Quality Data (PPM)

Averaging Period	Year	Barstow	NAAQS (PPM/mg/m³
1-Hour	1991	5	35/40
	1992	6	35/40
	1993	5	35/40
	1994	8	35/40
	1995	6	35/40
8-Hour	1991	3.9	9/10
	1992	3.4	9/10
	1993	3.5	9/10
	1994	3.1	9/10
	1995	3.0	9/10

Source: Black and Veatch

Table 3.2-7
PM10 Air Quality Data (ug/m³)

Averaging Period	Year	Bull-head City	Alonas Way	Holiday Shores	Riviera	McConnico	King-man	Barstow	Twenty nine Palms	NAAQS
24 Hour	1991	188	—	149	367	—	82	197	297	150
	1992	96	—	42	59	26	29	68	46	150
	1993	64	—	44	61	28	45	49	39	150
	1994	86	—	44	66	—	38	140	79	150
	1995	73	49	—	—	—	32	34	85	150
Annual	1991	34	—	29	37	—	16	36.2	40.4	50
	1992	30	—	22	23	15	17	31.4	25.6	50
	1993	31	—	22	23	0	12	27.3	20.8	50
	1994	34	—	23	25	—	8	28	20.9	50
	1995	36	24	—	—	—	9.1	16.7	15.8	50

Source: Black and Veatch

Table 3.2-8
Sulfur Dioxide Air Quality Data (ug/m^3)

Averaging Period	Year	Monitoring Site				NAAQS
		Bullhead City	Alonas Way	Holiday Shores	Riviera	
3-Hour	1991	186	—	136	126	1,300
	1992	123	—	147	160	1,300
	1993	129	—	155	165	1,300
	1994	100	—	217	118	1,300
	1995	157	139	—	—	1,300
24-Hour	1991	34	—	29	29	365
	1992	24	—	39	34	365
	1993	34	—	29	37	365
	1994	21	—	37	34	365
	1995	34	39	—	—	365
Annual	1991	3	—	3	3	80
	1992	6	—	6	4	80
	1993	8	—	8	8	80
	1994	3	—	5	8	80
	1995	3	8	—	—	80

Source: Black and Veatch

Data for the calendar Year 1993 were not available from the monitoring stations in Arizona or Nevada. Data for 1993 (January to June) were incorporated into the tables. Ambient ozone data collected by the Mohave Pipeline Company in Topock, Arizona during 1993 showed a maximum 1-hour average ozone value of 0.07 PPM. This value is below the NAAQS for Ozone (0.12 PPM).

The air quality data summarized in Tables 3.2-4 through 3.2-8 indicate that with the exception of PM10, air quality in the areas potentially affected by project emissions are generally below the NAAQS for O_3, NO_2, CO, and SO_2. This conclusion is consistent with data evaluated by DRI (1989) which indicates that due to the recreational and retirement focus of the area and the lack of heavy industrial development, the overall air quality of the lower Colorado River Basin is good. Table 3.2-7 shows that in 1991 the 24-hour average PM10 exceeded the NAAQS in Bullhead City, Barstow, and Twentynine Palms. The annual averaging period for PM10 in these areas did not exceed the NAAQS. The Bullhead City area is currently classified as a moderate nonattainment area for PM10. The principle sources of PM10 in the Bullhead City area are believed to be windblown dust, agricultural activities, construction activities, mobile sources, and unpaved roads. In addition, PM10 emissions from the Mohave Generating Station may also be contributing to a localized PM10 problem.

The proposed project alternative sites are located two or more miles south of the identified PM10 nonattainment area boundary. The PM10 data used to establish the regional baseline air quality in the impact assessment for the project incorporates the PM10 from the nonattainment area in Bullhead City and was applied to the potential impact area outside of the designated nonattainment area. The USEPA has proposed and finalized the PM10 nonattainment designation for the Bullhead City, Arizona area (2-4-94, 59 FR 5332). The USEPA based its nonattainment designation on data generated in 1989. The PM10 designation became effective on January 20, 1994. The boundaries of the area are identified as Bullhead City, Arizona (Mohave County), T21N - R21W, excluding the Lake Mead NRA, T20N - R20W to R22W, and T19N - R21W to R22W. This area excludes the Ft. Mojave Indian Reservation. Therefore, the Preferred Alternative site is located in an attainment area for PM10.

3.2.3 Sensitive Receptors

No sensitive receptors such as schools or hospitals are located within five miles of the proposed project Preferred Alternative Site. The nearest residences are located within a half mile of the boundary of the proposed lease area of each of the three alternative sites. Class I wilderness areas in the region are discussed in Sections 3.2.2 and 3.8.1.

3.3 Water Resources

3.3.1 Water Rights

3.3.1.1 *Arizona v. California*

Fort Mojave's rights to waters of the Colorado River were determined in *Arizona v. California*, which allocated the Tribe early, or very early, priority to 103,535 AF for its Arizona lands. Additional allotments granted the Tribe by *Arizona v. California* are 13,698 AF for its California lands, and 12,534 AF for its Nevada lands. The total water right for the entire reservation is 129,767 AF. Water may not be transferred from one state to another, so that the FMIT may not use its Arizona allotment on its Nevada lands, for example.

The priority dates for the FMIT's water are for a quantity 27,969 AF with a date of 1890, and 75,566 AF with a date of 1911 for Arizona lands; 13,698 AF with a date of 1890 for California, and 12,534 AF for Nevada, with a priority date of 1890. The dates of priority establish the FMIT, and other tribes using Colorado River water, as some of the earliest right holders. In the event that there is not enough water to satisfy the rights of all water users, the FMIT, other tribes, and other present perfected right holders, must be satisfied first. (Jeanne Whiteing, attorney at law, Whiteing and Thompson Attorneys, personal communication). Conversely, any water not diverted or marketed by the FMIT becomes available to users with later priorities, subject to approval by the Secretary of the Interior.

The FMIT's water may be used for any beneficial purpose, including municipal and industrial uses. The USBOR manages the waters of the Colorado River, and determines allotments each year. Allotments are based on diversion right, not on total water right. That is, diversion of water assumes that a portion of that water will return to the river and be available for downstream users. The consumptive use allowed for the FMIT is based on an irrigation requirement, which for planning purposes, equates to approximately 70 per cent of the user's total water right. Therefore, the amount of water which the FMIT may consumptively use on its Arizona lands is approximately 72,475 AF.

3.3.1.2 Law of the River

Use of Colorado River water is governed by a complex group of Acts, Contracts, and Decrees that collectively are called the "Law of the River". These documents are: the Colorado River Compact of 1922, the Boulder Canyon Project Act of 1928, the Boulder Canyon Adjustment Act of 1940, the Mexican Water Treatment Act of 1945, the Supreme Court Decree in *Arizona v. California* of 1964, the Colorado River Basin Project Act of 1968, and the Supplemental Decrees in *Arizona v. California* of 1979, and 1984

The Law of the River provides for priorities in how the water is allocated. The water has been divided by the FMIR, other Indian Reservations, and holders of Present Perfected Rights whose diversions come first. Following that are other rights of the individual states. The water in the river has been divided among the three states of Arizona, California, and Nevada as follows: Arizona 2.8 million AF, California 4.4 million AF, and Nevada 300,000 AF. Shortages in the river are under the terms of the *Arizona v. California* Decrees as supplemented. Pursuant to the Colorado River Basin Project Act (CRBPA), the Central Arizona Project (CAP) in Arizona has the last priority.

3.3.1.3 FMIT Water Use Ordinance

In 1996 the FMIT adopted a Water Use Ordinance (April 29, 1996) to assist in orderly allocation of water within the reservation, and to provide a more accurate system of accounting for water use as large scale housing, industrial, and commercial land developments are added to the traditional agricultural water uses. The Water Ordinance requires issuance of a Water Permit before water may be used on any development approved under the FMIT's Planned Area Development and Subdivision Ordinance.

In 1997 the FMIT Tribal Council adopted a policy that no rights to tribal water would be sold or leased long term off the reservation (Nora Helton, FMIT Chairperson, personal communication).

3.3.1.4 FMIT Water Budget

In 1994 the FMIT prepared a water budget for the entire reservation as a resource management tool. The water budget allocated water available as a diversion right in each of the reservation's three states. The diversion right allocation was refined by preparing a budget for existing and planned land uses within each of the three states. The proposed power plant was included in the industrial land use category for the Arizona lands water budget. It was assigned a budget figure of 7,500 AF consumptively used.

The FMIT water budget has not been formally adopted, although the Water Ordinance requires that the (draft) water budget be used in determining whether a water permit will be issued.

3.3.2 Surface Water

3.3.2.1 Colorado River

The Colorado River separates the Arizona lands of the FMIR from the reservation lands in California and Nevada. The Colorado River is under the management authority of the US Secretary of Interior. The natural river regime has been altered permanently by construction of Davis Dam approximately 30 miles upriver from the Reservation and by extensive channelization and levee construction for flood control by the USBOR along the entire reach of the Colorado River between Davis Dam and the City of Needles.

Surface water carried in the river channel occurs only as released flows or spills from water in Lake Mead stored behind Hoover Dam. There are significant fluctuations in demand for water caused by power production scheduling and by downstream users. Consequently, the water level in the artificial channel that carries the Colorado River can have extreme variations in water surface elevations, at times revealing most of the river bed.

3.3.2.2 Ephemeral Streams

No perennial drainages directly supply any rivers or major creeks, or directly contribute to a major watershed through this reach of the Colorado River. Existing tributaries are ephemeral washes with flows entirely dependent upon precipitation within local catchment areas.

Ephemeral stream flows occasionally occur in washes on the Reservation following storms. Flow volume and duration have wide variations. Most washes in the area have been artificially channeled or diverted as part of land subjugation activities in the proposed project area.

There are no perennial streams on the Preferred Alternative, Alternative Two, or Alternative Three sites. Indeed, there are no perennial streams on the entire Reservation.

The Preferred Alternative and Alternative One and Two sites are unaffected by flows in the Colorado River. However, local surface water courses through each of the three sites in ephemeral streams supplied by occasional storm events. On exiting the sites, these flows do not enter the Colorado River. Natural drainage is interrupted by the river's dikes and levees, which act as dams and prevent runoff from entering the river. Subsurface flows of the river move away from the river to the east, west, and south, carrying any percolating stormwater away from the river channel. FMIT water quality protection practices prohibit entry of stormwater or irrigation flows into the river. Tribal engineering review of proposed projects assures compliance with this policy as part of the planning and building permit process (John Algots, FMIT Physical Resources Director, personal communication).

A dike (North Dike) across the end of Topock Marsh contains the marsh, but also acts as a dam preventing overland flows from draining into the marsh. Unable to drain to either river or marsh, runoff from the three alternative sites concentrates and ponds in Sections 20 and 21, located two miles due south of the Preferred Alternative site. The water impounded by North Dike evaporates. A major contributor to local flood flows is an unnamed wash which bisects Section 9 (immediately to the east of the Preferred Alternative site) and which flows to the southwest. Water from this wash occasionally loops north onto Section 8, crosses that section's southwest corner, and then drains south toward North Dike. Thus, Section 8 has two potential sources of storm runoff flows: the channel which flows south through the site along the base of the bluffs, and the unnamed wash which backwaters north of the site. (John Algots, FMIT Physical Resources Director, personal communication).

3.3.2.3 Lakes, Ponds, and Marshes

One artificial lake and several small marshes occur in the proposed project vicinity in Arizona and California. They are lands of the FMIR immediately adjacent to the river channel. Two small marshes in Nevada were designated jurisdictional wetlands (Mojave Valley Resort EIS, pp. 3-25 and 4-57, 1991).

3.3.3 Ground Water

3.3.3.1 Legal Definition of Subsurface Flow and Groundwater

Considerable controversy of the legal status of the groundwater in the Colorado River's floodplain existed prior to 1994. The United States Supreme Court in *Arizona v. California* ruled as to water rights on the Colorado River but excluded from consideration any tributary flows. The USBOR has historically taken the general view that pumping from the floodplain alluvium constitutes depletion of the Colorado River under the terms of the Decree, and that pumped water is part of the allocation of surface water. The legal right of the FMIT to pump from the groundwater is unquestioned. The only question in the past has been whether unrestricted pumping of percolating groundwater counts against the surface water decreed rights as provided in *Arizona v. California*, or whether it appears as additional rights under the "reserved rights" of the Winters Doctrine.

This question of whether water pumped from the floodplain is subflow of the river, or groundwater percolating from other sources, has been answered technically by the US Geological Survey (Wilson and Owen-Joyce 1994) which acknowledges that the river aquifer hydraulically connects the Colorado River itself and the surrounding partly saturated sediments and sedimentary rocks. It is a performance approach to establishing whether wells which are outside the floodplain of the lower Colorado River are yielding water that is replaced by water from the river. The method provides a uniform criterion of identification for all users pumping water from wells by determining if the elevation of the static water table at a well is above or below the accounting surface. Groundwater at elevations at or below the accounting surface is considered subflow, that is, part of the Colorado River. It is the accounting surface which dictates whether water is pumped surface water or whether it is replaced by precipitation and tributary inflow, unrelated to the flood plain's Colorado River, and therefore is groundwater and not subsurface flow. Almost all of the FMIR lies at or below the elevation which determines subflow of the Colorado River; the exception is the bluffs on the extreme eastern edge of the reservation. The USGS report establishes that there may be, in a legal sense, no "groundwater" on the reservation, even though underground water is abundant.

The USGS hydrological report for the Mohave Valley utilizes an accounting surface to distinguish the boundary between surface water subflow, and groundwater. The report defines all underground water in the Mohave Valley as surface water subflow for purposes of allocation of Colorado River water.

The USGS report establishes an "accounting surface" --that is, the elevation (measured in feet above mean sea level) below which all underground water is considered subflow of the Colorado River. Water at elevations above the "accounting surface" is classed as groundwater, and, if pumped, is not part of the Colorado River allocation. The accounting surface elevation in the vicinity of the three alternative project sites is 474 feet above mean sea level. (USGS, 1994.) The accounting surface is applied by the USBOR in allocating Colorado River water to users, including the FMIT. This application of USGS data to water management is an administrative decision which has not been upheld legally. The establishment of an accounting surface to allow debiting pumped well water against surface water allocations is not an official act of the USBOR, as it has not been noticed in the Federal Register. To date, the FMIT has acquiesced to the USGS and USBOR accounting system. However, its right to pump from well locations where groundwater is available from above the accounting surface has not been determined. Users of Colorado River water, other than Indian Tribes, must sign an annual contract for their allocations. Tribes are not required to sign annual water contracts with the USBOR, and are not subject to water management schemes prepared by Arizona or other states. As a practical matter they cooperate with the USBOR in scheduling water deliveries and reporting water diverted each year. The FMIT reported a diversion of approximately 65,000 AF in 1996 under its Arizona priority.

3.3.3.2 Subsurface Hydrology

Typical depths to subsurface flows in the Mohave Valley are 15 feet to 100 feet, although locations very close to the Colorado River can have a water table of less than 10 feet below the surface. Depth to water in areas near the Colorado River can be affected by the river level; three foot to four foot rises in the water table can occur in less than 24 hours after the channel begins to carry maximum flows.

Subsurface flows generally move away from the Colorado River as pressure forces water into the adjacent floodplain alluvium. The subflow also moves downgradient parallel to the Colorado River. Disruptions in the flow patterns can and do occur due to manmade activities such as water pumping. CH2M Hill (1989) documented that the floodplain alluvium has a high hydraulic conductivity, probably at a minimum of 1,200 gallons per day per square foot (gpdpsf).

Topock Marsh lies at the south end of the Mohave Valley and defines the point at which the Colorado River exits the valley. Topock Marsh serves as a drain for the valley. Subsurface water contours show that the water table low occurs at the headwaters of Topock Marsh. Subsurface water elevations in that area are 452 feet above mean sea level.

3.3.3.2.1 Preferred Alternative Site - Section 8

Depth to water lying beneath the Preferred Alternative site is approximately 10 to 15 feet below ground surface. (Dames and Moore, p. 7).

3.3.3.2.2 Alternative Two Site - Section 30

Depth to water lying beneath the Alternative Two site is approximately 10 to 15 feet. (John Algots, FMIT Physical Resource Director, personal communication).

3.3.3.2.3 Alternative Three Site - Section 16

The water table beneath the Alternative Three site is approximately 10 to 15 feet below the land surface. (John Algots, FMIT Physical Resource Director, personal communication).

3.3.3.3 Consumptive Use of Water in the Mohave Valley

Water use is reported to the USBOR by water rights holders who consumptively use surface diversions or pumped groundwater. USBOR issues an annual report which summarizes consumptive use, and return flows. A near complete record of surface diversions and pumped groundwater is also reported. In 1995, the total water diverted between Davis Dam, and Topock, Arizona was 202,000 AF. Over half this amount came from wells in the Colorado River floodplain. The total flow of water passing Davis Dam in 1995 was 8,316,700 AF. The most recent estimate of groundwater in storage in the Lake Mohave Basin (defined as the basin defined by Davis Dam at the north, and Lake Havasu at the south) is 1,200,000 AF. (Dames and Moore, 1997, p.8). Water use in 1995 is summarized in Table 3.3-1.

Agriculture consumes the great majority of water on the FMIR. Commercial and residential uses are a very small part of the water budget. Of the total 65,152 AF used by the FMIT in Arizona in 1995, perhaps 1,100 AF was commercial and residential consumption. Water supply for irrigation comes from direct withdrawals from the river, extracted by platform-mounted pumps which discharge into canals. Wells located throughout the reservation also discharge into the canal system. Water is wheeled through the canal system and a network of distribution ditches. Potable water supply is drawn from wells operated by the FMTUA.

Table 3.3-1 Mohave Valley Colorado River Water Diversions in 1995 - Davis Dam to Topock, AZ (ac-ft/yr)

Water Users, Listed by State	Water Diverted or Pumped from the River	Water Pumped from Wells in the Floodplain	Total Water Diverted	Comments
Arizona				
Bullhead City	77	6,914	6,991	
Mohave Water Conservation		564	564	
Brook Water	377		377	
Mohave Valley IDD		38,398	38,398	
Fort Mojave Indian Reservation		65,152	65,152	SW/GW proportion unknown
Golden Shores WCD		589	589	
Havasu National Wildlife Refuge	49,446		49,446	Return flows subtracted
Arizona Subtotal	49,900	111,617	161,517	
California				
Fort Mojave Indian Reservation	21,364		21,364	
City of Needles		1,412	1,412	Return flows subtracted
California Subtotal	21,364	1,412	22,776	
Nevada				
Southern Nevada Water Authority	13,281		13,281	
Big Bend Water District	4,367		4,367	Return flows subtracted
Other Users		22	22	
Nevada Subtotal	17,648	22	17,670	
GRAND TOTALS	88,912	113,051	201,963	

Source: Dames & Moore, 1997 from USBOR, 1996.

3.3.4 Water Quality

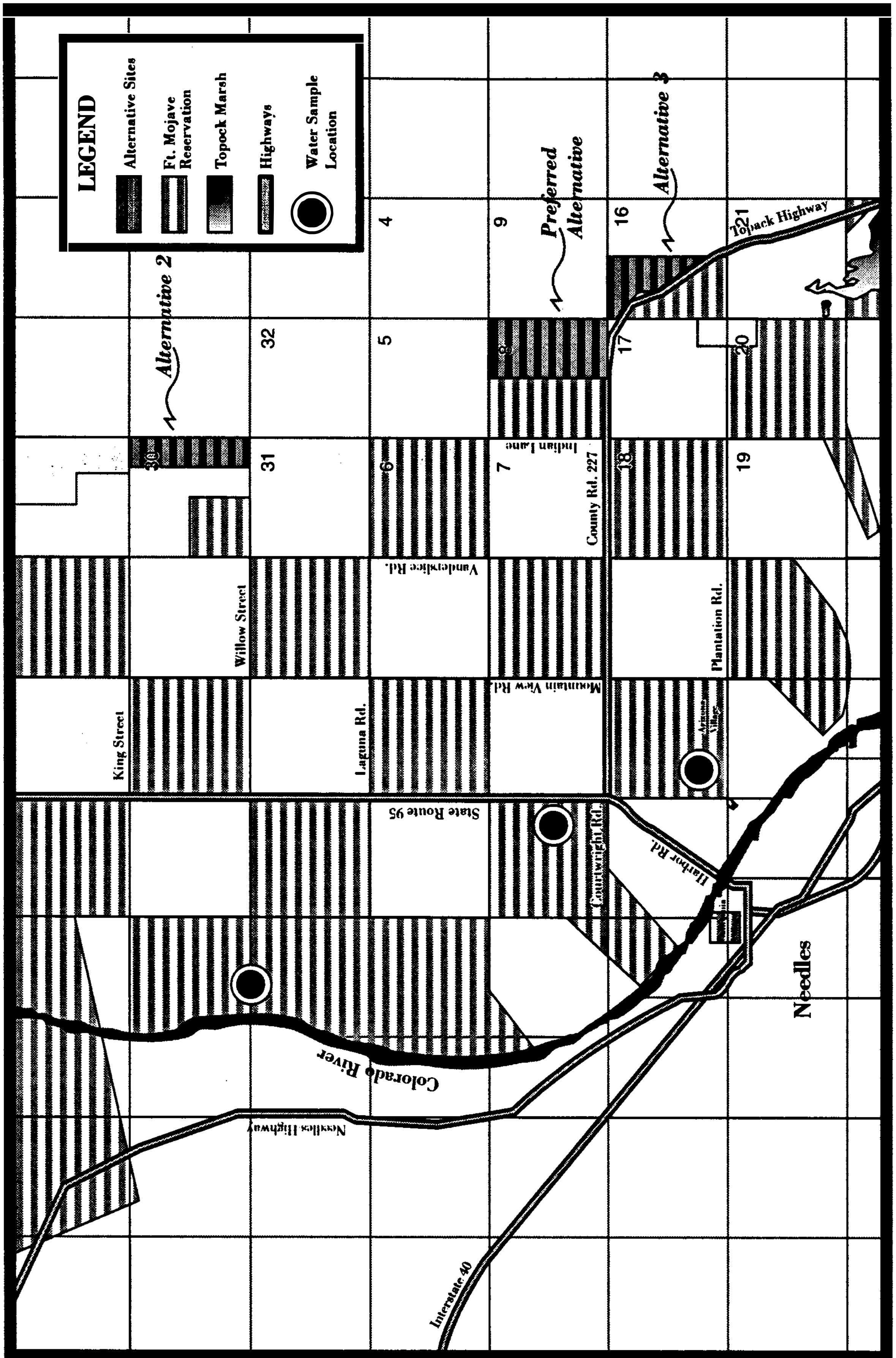
The Colorado River has significantly different water quality characteristics than subflow water in the Mohave Valley. Surface flows have lower TDS, and lower concentrations of individual chemical components. The difference is explained by the fact that water originating from the Colorado River which flows underground as subflow picks up minerals from the soil and rock of the valley's alluvium.

As an example of the qualitative differences between surface flow and subflow, Table 3.3-2 presents sampling results from water collected at the Colorado River intake pumps at the end of Willow Drive, and at a well located at Courtwright Road and SR 95, approximately two miles from the river channel. Figure 3.3-1 indicates sampling locations.

Table 3.3-2 Surface and Subflow Water Quality Comparison

Parameter	River Sample	Well Sample	Units	Analyzed
Aluminum	0.115	0.200	mg/L	06/97
Antimony	<0.003	<0.003	mg/l	06/97
Arsenic	<0.025	<0.025	mg/L	06/97
Barium	0.085	0.036	mg/L	06/97
Beryllium	<0.001	<0.001	mg/L	06/97
Cadmium	<0.001	<0.001	mg/L	06/97
Calcium	75	160	mg/L	06/97
Chromium	<0.010	<0.010	mg/L	06/97
Copper	<0.010	<0.010	mg/L	06/97
Iron	<0.050	0.650	mg/L	06/97
Lead	<0.020	<0.020	mg/L	06/97
Magnesium	27	53	mg/L	06/97
Manganese	<0.010	0.684	mg/L	06/97
Mercury	<0.0002	<0.0002	mg/L	06/97
Nickel	<0.010	<0.010	mg/L	06/97
Potassium	<5.0	7.0	mg/L	06/97
Selenium	<0.025	<0.050	mg/L	06/97
Silver	<0.010	<0.010	mg/L	06/97
Sodium	92	400	mg/L	06/97
Thallium	<0.001	<0.001	mg/L	06/97
Vanadium	<0.010	<0.010	mg/L	06/97
Zinc	<0.050	<0.050	mg/L	06/97
Alkalinity	138.	292.	mg/L	06/97
Chloride	76.	358.	mg/L	06/97
Conductivity	917.	2610.	us/cm	06/97
Fluoride	0.4	0.9	mg/L	06/97
pH	8.35	7.67	S.U.	06/97
Sulfate	227.	682	mg/L	06/97
Total Dissolved Solids	575.	1840.	mg/L	06/97
Algae (motile)	4	<4	per ml	06/97
Algae (non-motile)	104	<4	per ml	06/97
Algae (diatoms)	12	<4	per ml	06/97
Silica	8.4	26.1	mg/L	06/97

N.B.: <x.xx Indicates sample values are below detectable levels
Source: Dames & Moore, 1997



CALPINE

hallock/gross inc.

planning ● land design ● environment ● tourism

0 .5 1 Miles

Fig. 3.3-1 Water Quality Surface and Subflow Sampling Locations

3.3.4.1 Surface Water: Colorado River

Water quality in the Colorado River is generally poor when compared to river water quality in a humid environment. This is because, in the arid climate region through which the Colorado flows, the river accumulates increasing levels of dissolved minerals as it flows from its headwaters to its outlet. This natural phenomenon is accelerated by return flows to the river from agricultural irrigation, which adds additional minerals leached from farm fields. Despite the tendency to concentrate dissolved solids, the TDS of Colorado River water in the Mohave Valley area is not extreme when the standard of comparison is arid region rivers.

TDS levels of surface water are characteristically high, as is typical in most arid regions. Sampling done in 1991 (Paulson et al. 1992) reveals levels ranging from 583-966 mg/L. Data for surface water show that the TDS in 1993 remained very consistent at approximately 650 to 685 mg/L (Gookin Engineers, 1995). High alkalinity is also typical for arid regions, with pH ranging from 7 to 8. (See Appendix C, Water Quality Tables.) High alkalinity levels pose no health risk, but do shorten the life of metal plumbing fixtures. Polyvinylchloride (PVC) pipe material is typically used as a substitute to avoid corrosive effects of water in the area.

The water quality of the river has been relatively consistent on a year round basis since the completion of Hoover Dam in 1936. Water quality has been degrading over time. In 1983, there was one exception to this trend. Unexpectedly large snow melt runoffs caused reservoirs to spill. The unregulated flows diluted and flushed the salts from the system. However, this effect is suspected to be short term and is reversing.

Salinity in the Colorado River has become an issue of increasing concern over the years. Two programs were introduced to help alleviate the salinity problem: Title Two of the Colorado River Quality Control Act of 1974, and Federal Pollution Control Standards under the Clean Water Act of 1977. Programs adopted because of these activities may serve to limit the decline of water quality in the future.

An USEPA-funded water quality assessment of the Colorado River reach through the reservation conducted in 1992 establishes and evaluates baseline measurements of river water quality. The study concluded that water quality of the approximately 19-mile reach of the river through the reservation achieved "fishable and swimmable goals of the Clean Water Act" and that there were "no indications of serious water quality problems from toxic or non-toxic pollutants" (Paulson et al., 1992: 1). Table 3.3-3, FMIT Colorado River Water Quality, displays the constituents which were measured, and the results of those measurements, during conduct of this assessment in the months of August and September, 1991.

Legislative standards apply to drinking water and may mandate treatment. Water quality may not be suitable for certain industrial or commercial purposes without pre-treatment.

Table 3.3-3: Water Quality in the Colorado River

Constituent	Number of Observations	Concentration Range	Average Concentration Difference	Average per cent Difference
Fecal Coliform Counts (mpn/100ml)	6	<2-23	8.8	94.6
Turbidity (NTU)	11	2-4	0.3	11.9
Biological Oxygen Demand (mg/l)	11	<1-3	0.3	21.2
Total Dissolved Solids (mg/l)	11	583-966	30.0	4.3
Total Suspended Solids (mg/l)	11	<1-10	2.5	108.9
Alkalinity (mg/l)	11	66-133	1.3	1.2
Bicarbonate (mg/l)	4	160-162	4.3	2.7
Calcium (mg/l)	3	74-77	3.1	2.2
Chloride (mg/l)	4	85-87	0.8	0.9
Magnesium (mg/l)	4	27-31	0.7	2.6
Potassium (mg/l)	4	5.4-6.2	0.1	0.9
Sodium (mg/l)	4	80-95	2.7	3.1
Sulfate (mg/l)	3	248-278	3.0	1.2
Ortho-Phosphorus (ug/l)	11	0-4	0.3	29.3
Total-Phosphorus (ug/l)	11	2-24	1.5	16.8
Ammonia (ug/l)	9	0-26	3.0	28.5
Nitrate+ Nitrate-Nitrogen (ug/l)	11	5-239	3.2	4.4
Total-Nitrogen (ug/l)	11	306-597	76.5	15.9
Chlorophyll-a (ug/l)	11	0.3-5	0.2	39.1
Temperature ©	10	11.8-21.1	0.1	0.4
Dissolved Oxygen (mg/l)	10	7.9-12.5	0.1	1.2
Conductance (um/cm)	10	1000-1404	2.1	0.2
pH (Std. Units)	10	7.63-8.56	.02	0.2

Source: Paulson et al. 1992

3.3.4.2 Quality of Subflow of the Colorado River

Subflow water quality near the surface flow of the Colorado River is considered good, with no treatment required. The quality of the subflow water is maintained because it is hydraulically connected to the river. Water is pumped from shallow wells drilled through the pre-historic bed of the Colorado River. Such wells are part of the underground flow of the Colorado River, and, therefore are subject to constant recharge which maintains water quality. Subflow in the region generally has increased dissolved solids as the distance to the east from the river increases (Metzger and Loeltz 1973: J.43).

Groundwater quality in the eastern part of the reservation is significantly poorer. Table 3.3-4 below illustrates TDS data supplied by Gookin Engineers (1995) for the checkerboard area of FMIT and private land in Mohave County.

Table 3.3-4: Total Dissolved Solids - Wells in Immediate Vicinity of Alternative Sites

SITE	TDS LEVEL (mg/l)
Fort Mohave	840
Bermuda Water Company	820
Section 27, T17N, R21W	1230
Section 10, T17N, R22W	2960
Section 25, T18N, R22W	3510
Section 15, T17N, R22W	3730

Sources: Nolan 1988 and FMIT 1995

Additional data, presented in Table 3.3.5, regarding the chemical constituents in area wellwater show the ranges for calcium, magnesium, chloride, and sulfate.

Table 3.3-5: Chemical Constituents in Mohave Valley Subflow - (54 wells sampled)

Chemical Constituent	Low (mg/l)	High	Average
Calcium (ca)	21	240	137
Magnesium (mg)	4.3	106	45
Chloride (Cl)	77	1,390	247
Sulfate (SO_4)	33	930	391
Total Dissolved Solids (TDS)	314	3,290	1,196

Source: Dames and Moore, 1997

All existing Indian housing and commercial development on the Arizona side of the Reservation is connected to a central sewer, with wastewater treatment provided by the Tribal plant. The Tribe's wells are located in the Colorado River bed, or in inland locations not subject to contamination from septic systems. Through an intergovernmental agreement (IGA), the Tribe's public water system is monitored by the Arizona Department of Environmental Quality. No water quality problems, organic or inorganic, have been reported through routine monitoring.

3.3.4.2.1 Mohave County Limitations on Septic Systems

The relatively shallow depth to ground water poses some management problems for a rural area where most residences are on septic tanks. Some local contamination of ground water has been reported, resulting in well shut downs at two locations in the northern Mohave Valley on non-Indian land. The problem has become more severe. High nitrate and coliform bacteria levels are a direct result of leakage from septic tanks which are the only means of sewage disposal for the development on private land in the Mohave Valley. A moratorium on new septic tanks came before the Mohave Board of Supervisors but was not approved. Instead, stringent percolation test requirement for septic system permits were imposed. The effect of the new standards is to limit new septic system installations, as soils preclude meeting the standards in many instances.

3.3.4.2.2 Alternative Sites -Water Quality

3.3.4.2.2.1 Preferred Alternative Site - Section 8

No test wells have been drilled which would allow assessment of the water quality at the Preferred Alternative site. It is presumed that water quality is very comparable to that of wells in the vicinity. The TDS of wells sampled in the vicinity ranges from a low of 820 TDS to a high of 3,730 TDS. Wells were sampled in 1988, 1995 and 1997.

3.3.4.2.2.2 Alternative Two Site - Section 30

No test wells have been drilled on the Alternative Two site. It is assumed that water quality would fall in the range of 820-3,730 TDS, based on wells sampled in the immediate vicinity.

3.3.4.2.2.3 Alternative Three Site - Section 16

No test wells have been drilled on the Alternative Three site. It is assumed that water quality would fall in the range of 820-3,730 TDS, based on wells sampled in the immediate vicinity.

3.4 Biological Resources

3.4.1 An Overview of Flora and Fauna

All three alternative power plant sites, and the entire reservation, lie within the same environmental area, Zone 30E1 (University of Arizona 1973). The zone is known as the Mohave Desert Shrub. Vegetation is predominantly annual grasses, forbs, and desert shrubs. Characteristic species are the creosote bush, bursage, smoketree, screwbean mesquite, and big galleta. Other common species are bush muhly, fluff-grass, and spike dropseed. Numerous annuals, including sand verbena and other species that produce spectacular flower shows in high rainfall seasons, are present. Cacti of several species may also be present in favorable locations (Lowe and Brown 1973).

Production of range fodder is very low so that native herbivores cannot be supported in any number.

The vegetation in the southern Mohave Valley is characterized by dense stands of mesquite, salt cedar, and arrowweed in the large open drainage bottoms. Sandy and hardpan caliche covered hillsides and smaller drainages were characterized by creosote bush, white bursage and indigo bush.

Thousands of acres of reservation lands have been cleared and put into agriculture. An extensive area of irrigated cropland lines much of the main water course in the region, the Colorado River. Displacement of native vegetation has also been accompanied by invading exotic species, especially salt cedar. It tends to displace bosques of native mesquite in unfarmed areas along the river which have a high water table. The mesquite tree is of cultural significance to the Mojave people and is still used by tribal members as fuel for special ceremonies, and as cooking fuel for family and tribal outdoor feasts. The mesquite tree has many other historical uses as a source of medicine, hair dye, and food which are introduced as part of cultural heritage education.

The Colorado River defines the boundary between the Sonoran Desert in Arizona, and the Mohave Desert in California and Nevada. The distinction is somewhat arbitrary, and there is considerable overlap of the species which inhabit both deserts in the Mohave Valley. Animals of the desert include insects, snails, mollusks, fishes, frogs and toads, reptiles, birds, and mammals. These fauna have evolved in close harmony with the desert flora. For example, colonies of black harvester ants (*Messor pergandei*) establish near Atriplex species which provide seeds. Other closely related ant species depend on wild buckwheat and filaree instead of Atriplex, demonstrating how finely tuned adaptations of desert creatures to their floral resources can be.

Desert reptiles have many representative species. Lizards occur in many varieties, including the banded gecko (*Coleonyx variegatus*). The Mohave Desert has its own subspecies of rattlesnake, the olive green Mohave rattler (*Crotalus scutulatus*). The desert tortoise occurs as two distinct populations, one occurring in Arizona, and the other in Nevada. The Nevada population is endangered, while the Arizona population is not.

Birds include those adapted to survival in an arid environment, and those which require riverine or marsh habitats.

Mammals of the desert include many species of rodents, bats, kit fox, skunks, and feral burros.

Vascular plants observed within the proposed project sites and in the vicinity were generally native and nonnative desert scrub vegetation (see Appendix D). Vertebrates expected to occur in the proposed three alternative sites are also listed in Appendix D.

3.4.2 Federal Policy Regarding Endangered Species Act and American Indian Tribal Rights

On June 5, 1997, the Secretaries of Interior and Commerce Departments signed a Secretarial Order entitle "American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act." The Order establishes a policy of harmonizing responsibilities under the Endangered Species Act with the federal policy of government-to-government relationships with tribes, federal trust responsibilities, tribal sovereignty, and other areas "to avoid or minimize the potential for conflict and confrontation." (S.O. June 5, 1997). In summary, the Order seeks to establish federal-tribal relationships and partnerships "to promote the conservation of sensitive species ... and the health of ecosystems on which they depend." Implementation and enforcement of the Endangered Species Act on tribal lands must take into account tribal sovereignty and culture, and must be coordinated with tribal resource management plans and policies.

At this time, the FMIT does not have a resource management plan or policy for wildlife or ecosystem conservation which would be affected by the Order.

3.4.3 Endangered Species In the Area

There are two fish and four bird species that may occur in the project area which have been classified by the US Fish and Wildlife Service (USFWS) as being endangered (Biological Assessment, EcoPlan Associates, 1995, supplemented 1997). They are listed in Table 3.4-1 below.

Table 3.4-1: Endangered Species with Potential to Occur In the Project Vicinity

Species	Common Name	Species Status
Fish		
Gila elegans	bonytail chub	Endangered
Xyrauchen texanus	razorback sucker	Endangered
Birds		
Empinodax traillii	Southwestern Desert Willow Flycatcher	Endangered
Falco peregrinus anatum	American Peregrine Falcon	Endangered
Haliaeetus leucocephalus	Bald Eagle	Endangered
Rallus longirostris yumanensis	Yuma Clapper Rail	Endangered

3.4.3.1 Endangered Fish

The razorback sucker and bonytail chub occur within the Colorado River system. The Razorback sucker migrates to spawn through the reach of the Colorado River which flows through the FMIR. No resident population of razorback suckers would likely be present because of rip rap river banks. The bonytail chub's population is found both in Lake Mohave above Davis Dam (Mojave Valley Resort EIS, 1991, p. 3-36) and Lake Havasu (USFWS AZ Fishery Resources Office, Parker, AZ). The Preferred Alternative site at its closest point is approximately five miles from the river channel. The Alternative Two site is four miles east of the Colorado River and the Alternative Three site is no perennially flowing water on any of the sites where razorback sucker or bonytail chub could occur.

The proposed water supply pump on the Colorado River would be screened to prevent fish and other aquatic species from intake.

3.4.3.2 Endangered Birds

Southwestern Desert Willow Flycatchers are potential summer migrants to the Mohave Valley. Thickets of willow, button bush, seep willow, salt cedar or other larger trees, with dense vegetation from the ground up to approximately 13-23 feet, characterize potential habitat for this species. Emergent vegetation like giant reed, cattails, and rushes may also be present. Surface water, boggy or swampy conditions, or saturated soil underlying or adjacent to potential stands during the midsummer breeding season is also needed (Tibbits et al. 1994). Dense salt cedar and mesquite was found in the southwest quarter of the Preferred Alternative site but no areas of standing water exist. Suitable habitat is not available on the other two alternative sites and no Southwestern Desert Willow Flycatchers were observed during the field survey.

In 1995 the FMIT conducted a reservation-wide biological survey to determine if Southwestern Desert Willow Flycatchers were present. A supplemental survey was conducted in 1997. No Southwestern Willow Flycatchers were found in either survey (Biological Assessment, EcoPlan Associates, 1995, 1997).

The American Peregrine Falcon is known to inhabit areas with cliffs and steep terrain at elevations of 3,500-9,000 feet (USFWS 1991). The Preferred Alternative, Alternative Two and Three sites are below 1,000 feet. There is no appropriate nesting habitat within or near any of the proposed sites and there are no cliffs or steep terrain in the immediate vicinity of the proposed sites. It is unlikely that Peregrine Falcons inhabit the vicinity or would be affected by the construction and operation of the proposed Southpoint power plant if they existed in the area. No Peregrine Falcons were observed on any of the alternative sites during the field survey.

Bald Eagles generally transit the Lower Colorado River during winter months (USFWS 1991). They are not known to breed in or near any of the proposed power plant alternative sites. It is unlikely that any of the three sites are suitable habitat for Bald Eagles as they are several miles from the Colorado River. No Bald Eagles were observed during the field survey.

Yuma Clapper Rails are known to nest in suitable wetlands along the Lower Colorado River from Needles, Arizona to the international boundary. This species prefers relatively large areas of contiguous wetlands with non-fluctuating water level that support dense stands of bulrush and cattail (USFWS 1991). Due to the lack of permanent water within the proposed activity area it is unlikely that Yuma Clapper Rails utilize any areas connected with the three proposed power plant sites for nesting or foraging. No Yuma Clapper Rails were observed during the field survey.

The proposed water supply pump on the Colorado River would use an existing pumping platform, and the new water pipe would be laid adjacent to existing water pipes. There is no critical habitat at, or in the vicinity of, the existing pumping platform on which the proposed new pump would be mounted. The pumping platform is located in a reach of the Colorado River which has been channelized and riprapped, therefore, no native habitat areas exist in the pumping platform vicinity. The existing water pipelines are in a corridor which has been cleared of native vegetation, and do not contain any native habitat.

3.4.3.3 Critical Habitat

No critical habitat for any special category species exists on any of the three alternative sites. Figure 3.4-1 depicts wildlife refuges in the vicinity of the three alternative sites.

3.4.3.4 Wetlands

The USFWS manages Havasu National Wildlife Refuge at Topock Marsh, a wetlands sustained by backwater flows from the Colorado River. The northern end of the marsh is approximately 1.5 miles south of the Preferred Alternative site, 4.5 miles south of Alternative Two, and about one mile south of the Alternative Three site. No wetlands occur on any of the alternative sites. A wetlands occurs at Twin Lakes, approximately three miles northwest of the Preferred Alternative site. No jurisdictional wetlands are located within six miles of the water supply pumping platform in the Colorado River on which the proposed new 100 HP pump would be built by the FMIT.

3.4.4 Biological Site Assessment

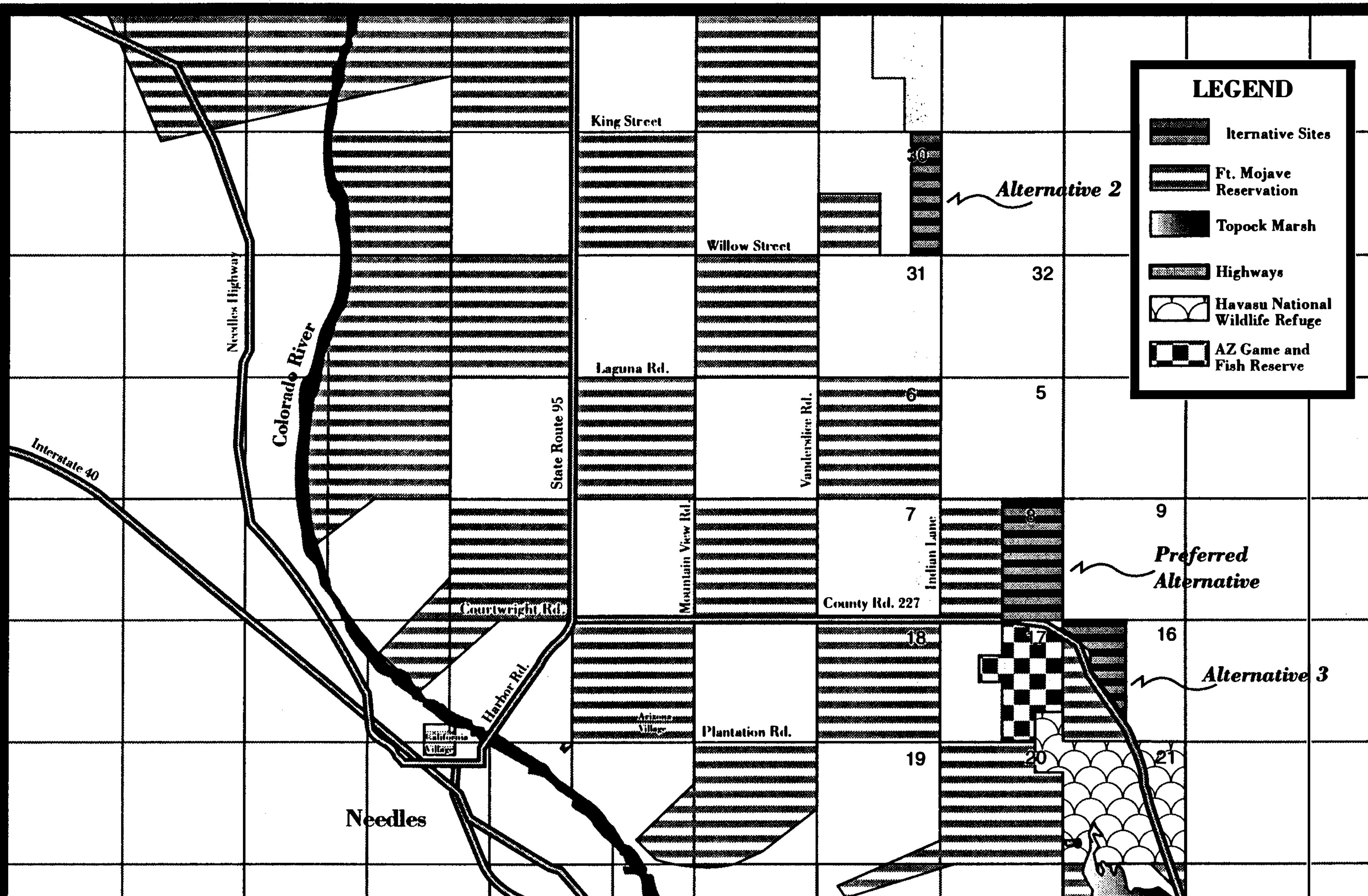
A detailed biological assessment of the alternative sites was conducted by EcoPlan Associates in 1995 as part of this environmental evaluation. A follow-up assessment was made in July, 1997 to evaluate the effects of the fire which swept the Preferred Alternative site in 1995. The full 1995 biological assessment is included as Appendix D, in which the 1997 follow-up assessment also appears.

3.4.4.1 Vegetation

3.4.4.1.1 Preferred Alternative Site - Section 8

Vegetation on the Preferred Alternative at the time of the 1995 biological assessment was characterized by creosote bush, white bursage, range ratany, and some dense stands of salt cedar, mesquite, and arrowweed (Appendix D). The southwestern half of Section 8 was comprised mainly of salt cedar mixed vegetation.

After the biological assessment was prepared, the Preferred Alternative site was swept by a wildfire in the summer of 1995. The fire began in Topock Marsh and spread north, destroying vegetation on more than 2,000 acres. Because of the high fuel load in the area burned, the fire was intense and vegetation was burned out completely. All vegetation on Section 8 below the bluffs was consumed.



CALPINE

hallock/gross inc.
planning ● land design ● environment ● tourism

0 .5 1 Miles

Fig. 3.4-1 Area Wildlife Refuges

N

After two years, some regrowth is evident. A site inspection in May, 1997 revealed that salt cedar has reestablished in dense, young stands along the toe of the bluffs and along the western edge of the section. Old mesquite trees survived the bum and have put out new crown growth. They occur in a distinct "T" shaped pattern which follows the crescent shaped drainage line that arcs across the site from south east to northwest. Some shrubs have colonized the site, but most of the site remains bare soil. The intense heat generated by the fire probably destroyed all organic matter in the soil. The soil surface is covered by a layer of ash; there is very little evidence that shrubs, forbs or grasses have successfully begun to reestablish themselves on the site. A ghost forest of dead trees covers most of the site. A large area remains bare. It is located in the midsection of the site in lowlying areas between the bluffs and the western boundary.

3.4.4.1.2 Alternative Two Site - Section 30

Alternative Two borders agricultural areas on its western side. Along this boundary large mesquite and salt cedar areas were found. The rest of the surveyed area consisted of the caliche hardpan hills, sandy draw bottoms, with creosote mixed vegetation.

3.4.4.1.3 Alternative Three Site - Section 16

Alternative Three in Section 16 borders Havasu National Wildlife Refuge. This area was characterized by thick stands of salt cedar and associated species. This site was burned in 1995, with near total destruction of vegetation. There is little regrowth except for salt cedar, and some mesquite which survived the fire. Dead trees cover most of the site.

3.4.4.2 Fauna

On all three alternatives white-tailed antelope squirrel (*Ammospermophilus leucurus*) sites were found, and one squirrel was seen on the Preferred Alternative site. Rabbit pellets and tracks, coyote and fox tracks were found on all three sites. Numerous desert iguanas were observed on all three sites. Western whip tails and zebra-tailed lizards were also seen. Birds seen in all three sites included mourning doves, black throated sparrows, turkey vultures, and lesser nighthawks.

Desert tortoises (*Gopherus agassizii*) occur in creosote bush, cactus and shad scale habitats, and Joshua tree woodlands (USFWS 1991). It is unlikely that desert tortoises would be found in the areas in which the salt cedar associations were found. The creosote areas on this site consisted of scattered rocky areas, with mostly sandy soils. No suitable boulder piles were found within the creosote areas, so this area would also be unsuitable habitat for desert tortoises. No desert tortoises were observed during the field survey.

Chuckwallas (*Sauromalus obesus*) occur in open flats and rocky areas, especially near boulders (MacMahon 1987). None of the three sites examined have many rocky areas and there are no significant boulder piles. It is unlikely that chuckwallas would be found in the area. No chuckwallas were observed during the field survey.

No large areas of free-standing water exist for razorback sucker, bonytail chub, or any other fish species on any of the three alternative sites. Fish species occur in the Colorado River in the vicinity of the proposed water supply pump.

3.4.4.2.1 Preferred Alternative Site - Section 8

One squirrel was seen on the Preferred Alternative site. Loggerhead Shrikes (*Lanius ludovicianus*) occur along roadsides, in thickets, savannas, desert, or open country with high perch lookouts (MacMahon 1987). Loggerhead Shrikes probably winter on the Preferred Alternative site. No loggerhead shrikes were observed during the field survey.

3.4.4.2.2 Alternative Two Site - Section 30

No noteworthy fauna were observed on the Alternative Two site.

3.4.4.2.3 Alternative Three Site - Section 16

A desert wood rat (packrat) (*Neotoma lepida*) nest was found along the boundary with the wildlife refuge in Alternative Three.

3.5 Cultural Resources

3.5.1 History of the Mojave Indians

Cultural resources are those manifestations, both tangible and intangible, which represent periods and events from the past. Prehistory dates back to the pre-Colombian times, the period preceding the discovery of North America by Europeans. Research into the prehistoric era allows us to enrich our understanding of how people lived in the past and perhaps gain direction for the future.

The Mojave Indians lived in small villages along the Colorado River valley from where the river emerges from the Grand Canyon to present-day Parker. They called themselves the Aha Macav, "the people by the river." The most heavily populated area was the river section now known as the Mohave Valley, spanning present California, Nevada, and Arizona. The name "Mojave" (Smith 1977) may have come from the native word "hamakhave" which means "three mountains" in the dominant Yuman language of the region. It probably refers to the sharp pointed peaks near Needles, California. (By Tribal Council Resolution, the FMIT adopted the spelling, "Mojave" while geographic nomenclature in the area uses the spelling "Mohave.")

The Mojaves were great travelers in the Colorado River corridor and had frequent trading and friendship contacts with the Yuma who lived farther south. They also ventured west across the Mohave Desert and traded with the coastal Indians as far away as Santa Barbara, California. Using a steady jogging gait, the hardy and redoubtable Mojaves could travel distances on foot of nearly 100 miles per day.

With this very active sphere of influence, it is unsurprising that the FMIR contains many examples of prehistoric occupation as well as much evidence from the post-Colombian or European period. There are also palaeontological remains of mammoths and mastodons in the general area. They are associated with the terraces of an old lake bed (LeForge 1988). However, only the more important archeological and historical elements are described below. The overview is based on extensive contact with archeological specialists knowledgeable about the area. The sources are listed in Appendix E.

Few cultural resources have been identified on the actual flood plain of the Colorado River (Bureau of Indian Affairs 1991) though many have been located on the terraces cut into the alluvial fans above the main stem of the river. There have been two extensive archeological investigations on the reservation. One covers the right of way for the north-south portion of State Routes 95. Only four sites were identified in this corridor. All are thought to be potentially significant and eligible for nomination to the National Register of Historic Places (NRHP) or the Archeological Register (Spalding 1994). The second is the survey of much of the Nevada portion of the reservation. It was done as part of the environmental investigation preceding development projects there. Out of 19 sites identified, 12 were recommended as eligible for the NRHP (Bureau of Indian Affairs 1991).

On the other hand, many lithic scatters, shards, the remains of campsites, artifacts, and rock cairns have been discovered on the upland terraces bordering the flood plain and the potential for other archeological sites is considerable. Flood plain villages have been excavated and cremation sites exist on the north side of former SR 95, now dedicated as CR 227 (LaForge, 1988). Tribal representatives have described a pre-historic campsite on Section 8, on the bluffs of the Preferred Alternative site. The campsite has been destroyed by mining operations there may be other campsites overlooking the flood plain in this vicinity, based on evidence of campsites occurring on bluffs and terraces throughout the Mohave Valley. (Elda Butler and John Algots, 1995, personal communication).

Abundant archaeological sites give evidence of long term human habitation of the area which is now the FMIR. For example, many macroflakes litter the valley, the result of reducing huge, one-meter boulders into chunks which could then be transported to villages for forming into metates and pestles. A large intaglio occurs near the site of Fort Mohave. (Llewellyn Barrackman, FMIT Vice-Chair, 1997). Of regional interest are the trading trails used by the Indians in their commercial and recreational contacts in the Colorado River valley. These same trails were used to a degree by the colonizing Europeans. (Elda Butler, 1995, personal communication).

Undoubtedly some of the Indian trails were used by early explorers and the old Mojave Trail to Fort Mohave is one example of this (Smith 1977). The survey route identified by Lieutenant Whipple in 1841 for a railroad connection between Arkansas and Los Angeles crossed through Mojave villages in the vicinity of present day Needles, California. The alignment of the railroad passes about one mile to the north of the Alternative Two site. Before it was constructed, part of the railroad line was used as a wagon route which crossed the Colorado in 1859 at a point which was to become Fort Mohave. The railroad was abandoned in 1890 but parts of the alignment are still visible between sections which have been washed out.

Fort Mohave was completed in 1859. It played an important role in pacifying the area partly because soldiers prevented Indians from gaining access to essential water from springs in the area. The fort is one of the more distinctive historical sites on the reservation. The mining railroad constructed to carry ore from Oatman, Arizona, some 15 miles west to the Colorado River is an important reminder of the past (Elda Butler, 1995, personal communication).

3.5.2 Archaeological Survey

3.5.2.1 Preferred Alternative Site - Section 8

A Class III (Intensive Field Inventory) non-collective survey for 100 per cent coverage of the 320 acres of FMIR land at the Preferred Alternative site (E2 of Section 8, T17N, R21W) was completed. A records check of the Arizona State Museum (ASM) and the State Historic Preservation Office (SHPO) was completed to determine if any cultural resources had been recorded within or adjacent to the project area. Historic maps from the Government Land Office (GLO), BLM and BIA - PAO were also reviewed for evidence of historic sites or structures in the vicinity of the project area.

The survey was conducted with authorization of the FMIT and under ASM permit no. 95-07. Findings were recorded on USGS 7.5 minute quad maps and described in written notes.

Document review and historic map review noted no sites reported on or immediately adjacent to the Preferred Alternative lease area. However, as a result of the Class III survey, three archaeological sites and four isolated artifact/feature occurrences were recorded. One of the isolated artifact locations has the potential to contain buried cultural remains.

The three archaeological sites are: 1) a small lithic scatter, 2) a cobble feature representing a shrine or trail marker, and 3) a group of nine small rock clusters or cairns that may delineate an activity area possibly associated with ceremonial activities. All three sites are considered potentially eligible for the National Register.

Three of the four isolated artifact/feature occurrences do not warrant further preservation treatment as they do not represent National Register eligible cultural resources. Isolate 4, while not containing sufficient surface material for site designation, shows ceramic sherds and lithics in animal burrow spoil. These materials could represent a buried site (Wright, 1995).

3.5.2.2 Alternative Two Site - Section 30

A Class III (Intensive Field Inventory) non-collective survey of 100 per cent coverage of the 160 acres of FMIR land referred to as Alternative Two (E2 of the E2 of Section 30, T18N, R21W) was completed. A records check of the ASM and SHPO was completed to determine if any cultural resources had been recorded within or adjacent to the project area. Historic maps from GLO, BLM and BIA - PAO were also reviewed for evidence of historic sites or structures in the vicinity of the project area.

The survey was conducted with authorization of the FMIT and under ASM permit no. 95-07. Findings were recorded on USGS 7.5 quad maps and described in written notes.

Document review showed no archaeological sites had been recorded within the alternative area, one site had been identified immediately adjacent to the project area. It is a large area on both FMIT and BLM lands containing a continuous distribution of cultural remains. Historic maps showed no evidence of historic structures or features within the study area.

As a result of this survey, five archaeological sites and two isolated artifact/feature occurrences were recorded.

The five archaeological sites are: 1) a large artifact scatter with lithic reduction and ground stone manufacturing, 2) a small lithic scatter, 3) a possible geoglyph with nearby artifacts, 4) a large lithic reduction and ground stone manufacturing area, and 5) a large lithic reduction and ground stone manufacturing area. All five sites are considered potentially eligible for National Register listing.

The two isolated artifact/feature occurrences do not warrant further preservation treatment (Wright, 1995).

3.5.2.3 Alternative Three Site - Section 16

A Class III (Intensive Field Inventory) non-collective survey for 100 per cent coverage of the 160 acres of FMIR land referred to as Alternative Three (W2 of Section 16, T17N, R21W, lying East and North of the Lake Havasu/Parker Dam Road [old US95]) was completed. A records check of the ASM and SHPO was completed to determine if any cultural resources had been recorded within or adjacent to the project area. Historic maps from GLO, BLM and BIA - PAO were also reviewed for evidence of historic sites or structures in the vicinity of the project area.

The survey was conducted with authorization of the FMIT and under ASM permit no. 95-07. Findings were recorded on USGS 7.5 quad maps and described in written notes.

Document review and historic map review noted no archaeological sites reported on or immediately adjacent to the Alternative Three site. Tribal representatives from the Aha Macav cultural society have made reference to the past importance of the Alternative Three site and its current importance to some tribal elders. It is considered sensitive. As a result of the Class III survey, three archaeological sites and seven isolated artifact/feature occurrences were recorded.

The three archaeological sites are: 1) a three meter diameter rock ring, 2) extensive artifact scatter with associated features, and 3) extensive artifact scatter with associated features. All three sites are considered potentially eligible for the National Register.

The seven isolated artifact/feature occurrences recorded in the survey areas do not warrant further preservation treatment (Wright, 1995).

3.5.3 American Indian Religious Freedom Act

The American Indian Religious Freedom Act requires consultation with tribal antiquities authorities (36 CFR 800.10). Within the FMIT, the Aha Macav Cultural Society fulfills the role of tribal authorities on questions of cultural and historical significance to the tribe. Consultation was made through Ms. Elda Butler, Society Chairwoman, pursuant to Executive Order 13007. (Appendix E, Section 106 Correspondence).

3.6 The Social and Economic Environment

3.6.1 Regional Economy

3.6.1.1 Regional Economic Base

The tri-state area of Laughlin, Nevada; Needles, California; and Bullhead City, Arizona forms a single economic region centered on the Mohave Valley. Gaming is the chief component of the region's economic base with ancillary growth resulting from the multiplier effect being concentrated most exclusively in the service sector. One large secondary employer is the Mohave Generating Station, but the majority are small businesses, focused in the retail and service industries. Area businesses line SR 95 in a strip-commercial pattern without a central core. Tourism which is not oriented towards gaming, and retirement in-migration are relatively small elements of the region's economic base. Although the region is overwhelmingly dependent on the gaming industry, other forms of economic activity contribute to the overall economy. Agriculture is a significant activity, as is housing construction and sales.

The City of Needles remains relatively economically depressed in an otherwise growing area (Martin Bailey, Director, Needles Chamber of Commerce, personal communication). Growth concentrates in a cluster of travel-related services at the west edge of town which cater to traffic on I-40.

3.6.1.2 Population and Employment Trends

Table 3.6-1 shows that the population of the region was about 60,000 in 1990. It has grown rapidly in the last decade. The region is defined as the City of Needles, Laughlin, Bullhead City, the extreme western part of Mohave County, and the reservation itself.

Mohave County has experienced rapid subdivision since 1985. Mohave Valley accounted for 39 per cent of all permits issued for new construction between 1985 and 1993 (Mohave County 1994). Recent growth can be attributed to retirement of seniors, increased tourism, and economic growth connected with the gaming industry.

Table 3.6-1: Population of the Fort Mojave Region, Present and Anticipated

	FMIT	Bullhead City	Laughlin	Needles	Mohave Valley	Regional Total
Population 1990	850	25,617 (3)	7,474 (4)	6,865 (1)	8,000 (5)	59,806
Population 2000	2,000	34,900	--	--		
Population 2010	38,800 (6)	46,100	29,500	14,500 (2)	19,100	148,000

Notes:

1. 1986 number from the Needles General Plan for the City of Needles (4,498) plus the surrounding sphere of influence.
2. This is a projection from the General Plan for the year 2005 for the City of Needles as well as the surrounding area.
3. Population for 1993, from the Bullhead City Economic Development Plan
4. Population for 1991 from the Laughlin Land Use and Development Plan
5. Estimates from the Colorado River Regional Transportation Study
6. Estimates based on strategic plans being prepared for the FMIT

3.6.2 Economy of the FMIT

The FMIR was created in 1911 by Executive Order. The FMIR is approximately 33,000 acres of desert land which lies within the states of California, Nevada, and Arizona. Needles, California is the location of the tribal administrative headquarters, although most of the Tribe's land and tribal members are in Arizona.

Needles was a major freight transfer point on the Southern Pacific Railroad system during the early years of the FMIR. Tribal members had a long period of near full employment first working on steamships which brought supplies up the Colorado River, then constructing and working for the railroad. When rail transportation declined in national importance, unemployment began to rise. Decline in employment accelerated by concurrent decline in farm jobs as farming became increasingly mechanized. This decline affected the region as well as the reservation. Thus, local employment opportunities were very limited. Tribal unemployment became chronic in the 1960's. This hardship was offset, to some degree, by increased federal spending for Native American programs, which created modern tribal bureaucracy as a major employer of tribal members.

The loss of unsubsidized employment base and increased dependency on subsidized federal programs resulted in declining economic self-sufficiency for individual tribal members, and the Tribe as a whole. The FMIT struggled with these problems for nearly two decades before undertaking a major restructuring of tribal management and economic resources.

3.6.2.1 Tribal Economic Base

FMIR lands in Arizona and California are used for irrigated farming, for tribal housing developments, and for small-scale commercial activities. FMIR lands in Nevada have been master planned to be a self-contained new town of almost 4,000 acres with casino resort-hotels and 20,000 single and multi-family dwellings units, commercial areas, and a civic center.

Agriculture and commercial ventures are the principal non-federal income sources of the FMIT. The FMIT has approximately 15,800 acres in agriculture, although most of the farms are operated by non-Indian tenants. Lease income from farm land, and profits from land which the tribe farms, are major income sources for tribal government. The FMIT's commercial ventures include the Avi Casino and Hotel in Nevada, two smokeshop/convenience stores, and a JB's franchise restaurant. Miscellaneous land leases for commercial activities conducted by non-Indians on reservation land include an airport, a housing subdivision, an automobile racetrack, and an 18 hole golf course.

3.6.2.2 Tribal Population and Employment Trends

The population of the reservation as a whole is the subject of varying estimates but at the 1990 census there were 850 people, the majority of whom are Mojave Indians. About 20 per cent live in Needles Village, the location of the tribal headquarters. The balance of the Fort Mojave tribe live in Arizona Village, immediately across the Colorado River, in Arizona. Tribal population is growing at three per cent per year (Goforth 1995) and is likely to reach 1300 by the year 2010. This would not be the population of the reservation, however. Developments in Aha Macav alone would add substantially to the total population. The number of residents on the reservation in 2010 is projected to total 38,000 and it is likely to grow beyond that in following years as real estate development projects dominated by housing subdivisions are implemented. (See Table 3.6-1 Population of the Fort Mojave Region, Present and Anticipated)

Median age of the Mojave Indians living on the reservation is 26, with the mean number of people per family being 4.1 and people per household being 7.0 (BIA, 1991). Educational level is not high, with 31 per cent of people aged 25 or more not having completed high school.

Mean household income for tribal members residing in Mohave County, Arizona was $17,869. This compares to a non-Indian household mean income of $32,309 in the unincorporated area of Mohave County known as Mohave Valley, which is a rural residential area of about 19,000 people. (1990 US Census). Extrapolating from these figures, Indian household income is 55 per cent that of non-Indian household income in the same rural area of Mohave County. Tribal data suggests that median household income for all 204 tribal families in 1989 was $8,275. The Fort Mojave Housing Authority reported that median household income was just under $10,000 in 1992.

Unemployment was constant at about 36 per cent from 1982 to 1992. (BIA Report on Service Population and Labor Force, February, 1992).

Approximately 60 per cent of the workforce is employed by the tribe. In 1993 the Bureau of Indian Affairs reported that the resident Indian population on the FMIR was 739 people. The labor force was estimated at 199 and was evenly split between males and females. Of the 199 in the labor force, 142 were employed. Hence the unemployment rate was 28.6 per cent (Bureau of Indian Affairs 1991). The FMIT has a Tribal Employment Rights Ordinance which mandates preference in hiring for qualified tribal members and other Native Americans for job openings on the reservation.

The Avi Casino and Hotel and other smaller tribal enterprises such as the JB's Restaurant and the second smokeshop/convenience store opened in 1993. The result was a dramatic change in the tribal employment condition. Unemployment dropped to near zero due to the effects of an aggressive tribal economic development strategy which has created more jobs than can be filled by tribal members. In fact, the FMIT became the southern Mohave Valley's largest employer in 1996, employing a workforce of more than 750 people.

3.6.2.3 FMIT Economic Development Strategy

The FMIR's location within a rapidly developing region means that it would influence and be influenced by regional land use and economic growth. The tribe has taken regional growth potential, and its own abundant land and water resources, into account when preparing an economic development strategy which has as its goal tribal self-sufficiency.

The annual tribal budget is $3.5 million. Two million dollars come from federal or other government sources, and $1.5 million come from tribal revenues. The tribal revenues share has increased from $500,000 in 1985 to the present $1.5 million, while the federal and other government share has remained constant over the same period at $2.0 million. Delays in receipt of obligated federal funding, with lag times of as much as eight months in recent years, has forced the Tribe to carry the entire cost of programs with negative effects on fiscal planning and management.

In addition to its role as social service provider to tribal members, the Tribe's activities as a business entity have been dependent on federal sources for seed money to start or expand profitable ventures. The FMIT has taken advantage of almost all available funding sources, but federal funding does not begin to meet potential development finance needs. Lack of leveraging inhibits ability to increase revenues and insufficient capital curtails the FMIT's ability to create profit generating capacity through successful commercial ventures.
To become financially self-sufficient, the FMIT has set in motion an ambitious economic development strategy which builds on current successes while opening major new revenue sources. Long range goals are to increase the amount available to support tribally provided services to members, and to build working capital with which to start or expand profitable commercial ventures.

Results of the strategy are already evident in the success of the tribal farm, which was reorganized in 1986. Three thousand acres are in production, generating gross revenues of $1.58 million and an annual profit of $450,000 in 1990 (Source: Single audit ending December 31, 1991). Profit in 1996 reached

$650,000. (John Algots, FMIT). Additional success is evident in the Tribe's Arizona convenience store/smoke shop, which had gross sales of $9.2 million in 1991, with a net profit of $655,000 (Source: unaudited tribal records, through September 30, 1991.) This tribal operation may be the highest grossing convenience store in Arizona. It was financed with a BIA guaranteed loan; loan payments have been made in full and on time for each of the three years the loan has been in place. The majority of profits from both the farms and the smokeshop/convenience store have been reinvested in those enterprises or retained as working capital; about one third of the profits is returned to tribal government. Other land leases and development fees make up the balance of the tribal revenues.

The tribal farms and the smokeshop/convenience store are close to maximum revenue output for the Tribe. The tribal farming enterprise cannot expand its acreage until land under lease to non-Indians reaches the end of the lease period; most leases have another eight to 12 years before expiration. With large acreages approaching the end of their lease terms, tribal strategy is to wait until they expire and not renew them, rather than subjugate additional land for production.

The tribe's Arizona smokeshop/convenience store has been very profitable, but is probably close to sales maximum because of the inventory capacity of the present building area, and market limitations. Sales may reach as high as $12 million a year before plateauing (Gary Goforth, FMIT Tribal Administrator, personal communication).

A US Department of Housing and Urban Development (USDHUD) Community Development Block Grant assisted the Tribe in building a franchise JB's Restaurant in Arizona. Its profitability is expected to increase with the area's population growth. A subsequent USDHUD grant funded construction of a second smokeshop/convenience store adjacent to the Avi Casino in Nevada.

The FMIT operates a casino named "Spirit Mountain" under a compact with the State of Arizona. It is located adjacent to the smokeshop/convenience store complex on the southwest corner of SR 95 and Willow Drive.

Key to future economic independence is large scale real estate development in Nevada and Arizona. The first non-Indian subdivision on tribal leased lands has over 100 houses. A riverfront subdivision on approximately 1,000 acres is in final planning stages. Aha Macav, the Tribe's planned 4,000 acre new town on the Nevada lands, is still in early stages of development. The FMIT has aggressively pursued innovative and traditional funding opportunities to carry it to the present point. For example, BIA loan guarantees and debt restructuring have been used to the maximum available to support commercial ventures; awarded and pending grant funds would aid the Tribe in maintaining and building administrative capabilities needed to keep pace with land development.

In 1994 the FMIT secured a $33 million development loan underwritten by a BIA loan guarantee. This capital paid for roads, water, sewer, and other infrastructure in Aha Macav, and construction of the Avi Casino, the first hotel-resort on FMIR lands in Nevada. After financial and managerial restructuring, the casino began operating in the black in early 1997.

Various market forces have caused a decline in gaming activities and revenues in Laughlin. The Avi's financial difficulties, and the general downturn of the area gaming market, have frustrated plans for constructing additional casino-hotels in Aha Macav. Other construction continues. A new 18 hole golf course opened in Fall 1997. One recreational vehicle park in Arizona opened in 1997. It is located behind the smokeshop/convenience shop. A second recreational vehicle park is under construction adjacent to the golf course. A 400 unit housing development is schedule to start construction in Aha Macav in 1997. Long term prospects for the success of Aha Macav are good if the Tribe holds to its vision of building a resort-oriented gaming community. An independent feasibility study predicted that Aha Macav would continue to capture gamblers from the declining Laughlin market if it offered an attractive resort-style alternative (FMIT, 1996).

3.6.3 Community Infrastructure

3.6.3.1 Schools

Education is available for pre-school through community college in the Mohave Valley area. The City of Needles has schools for grades K-12. The Mohave Valley School District has elementary, junior high, and high schools in the vicinity of Willow Drive and AZ 95. Mohave County operates a community college in Bullhead City, Arizona and there is also a large high school there. Because of its proximity to the Laughlin gaming industry, the community college offers vocational-technical courses uniquely designed to train casino workers.

The Arizona side of the FMIR uses schools in Mohave Valley. An elementary school provides places for 75 Indian children and a high school accommodates about 13 Indian students. About 126 Indians living at Needles Village use the Needles Unified School District facilities. Needles Village contains a community building, a gymnasium, the tribal administration building, and a youth shelter. The tribe runs a day care center in Arizona Village.

3.6.3.2 Libraries

The nearest major public libraries are located at Bullhead City and Needles. There is a small branch library operated by Mohave County at King Street and SR 95.

3.6.3.3 Parks

The Avi Casino has a five acre marina and beach on the Colorado River which is open to the general public for a fee. There are no other developed recreation sites on tribal river frontage, although informal use areas exist.

Developed recreation areas on the reservation are located within the two tribal villages as part of the housing complexes. They offer baseball, basketball, and play equipment. Nearby in the City of Needles, there is a community swimming pool and formal recreation programs, as well as an 18 hole golf course. An 18 hole golf course opened in Aha Macav in 1997.

3.6.4 Tribal Attitudes, Expectations, Lifestyle and Culture

Both the tribal government, and individual tribal members, participate in area political and social activity. Tribal children attend local area schools; many tribal members are employed by local businesses. Tribal farmlands commingle seamlessly with privately owned lands as part of the region's agricultural economy. The tribe has adopted plans and policies which have charted an aggressively pro-development course based on legal casino gambling in Nevada, and the productivity of its agricultural lands in Arizona and California. Various tribal enterprises capture revenues from the area's growing population and increasing tourist visitation. Altogether, tribal attitudes and expectations are for increasing participation in, and benefit from, the regional economy, with continuation of the long tradition of comfortable coexistence and cooperation with their non-Indian neighbors.

3.6.5 Public Health and Safety

3.6.5.1 Law Enforcement

Enforcement responsibility on the Arizona side of the Reservation is shared by the Tribal Police and the Mohave County Sheriff's Department through a mutual aid agreement. The Tribal Police headquarters is located four miles south west of the Preferred Alternative site, at AZ 95 and Plantation Drive. The Tribal Police headquarters is staffed 24 hours a day with two officers on duty each shift, all of whom are BIA law enforcement qualified and trained as emergency medical technicians (EMT's). The Sheriff's office is located west of the Preferred Alternative site at Topock Road and Vanderslice Road.

3.6.5.2 Fire Protection and Hazardous Material Response

The Mohave Mesa Fire Department (MMFD) is currently under contract to the FMIT to supply fire protection services to the northern parts of the reservation in Arizona. The fire station is about 13 miles northwest of the Preferred Alternative site. Response time is estimated to be 20 minutes (Chief Richard Vickers). Response time to the Alternative Two and Alternative Three sites is estimated to be 15 and 20 minutes, respectively.

A second station is located adjacent to the Avi Casino in Nevada. Response time from this station is estimated to be approximately the same as from the main Arizona station.

The MVFD (MVFD) is located at the intersection of SR 95 and Willow Drive. The MVFD provides service to the southern portion of the FMIR's Arizona lands. The MVFD fire station is staffed 24 hours, with three persons on each shift, at least one of whom is an Arizona-certified EMT. Equipment includes four 5,000 gallon pump fire trucks and two ambulances. Fire protection service is presently on a per-incident billing agreement. Response time to the Preferred

Alternative, Alternative Two, and Alternative Three sites would be approximately 15 minutes.

Regional fire fighters (Needles; Bullhead City; Laughlin) have an agreement to provide reciprocal backup services to assist the primary emergency responder, if feasible.

Wildfire suppression capability is available to any location within the exterior boundaries of the FMIR through the BIA Branch of Forestry. In coordination with other federal agencies, the BIA has a Burned Area Evaluation and Response (BAER) team which can suppress wildfires and recommend appropriate land restoration actions.

The MVFD provides hazardous materials response on that part of the reservation where the three power plant alternative sites are located. The FMIT does not have an emergency plan, or an emergency advisory team.

3.6.5.3 Medical Facilities and Services

Medical services would be provided by the EMT personnel of the MVFD. Response time is approximately 15 minutes. Additional medical emergency response is provided by the Tribal police. Needles Community Hospital is the closest hospital. It is approximately 10 miles from the Preferred Alternative and Alternative Three sites, and 14 miles from the Alternative Two site. Bullhead City also has a community hospital that could provide emergency medical care. It is more than 20 miles north of the three alternative sites. Both hospitals have air evacuation service.

3.7 Resource Use Patterns

3.7.1 Hunting, Fishing and Gathering

Hunting is a recreational pursuit for tribal members. Dove and quail in season are the major game species. There is no commercial fishing on the reservation; sport fishing takes place on the Colorado River.

Gathering is not a significant activity among tribal members. Some individuals may engage in occasional gathering of traditionally used plant materials in small quantities before festivals or other commemorative tribal events. (Elda Butler, FMIT). The Alternative Two site has very limited hunting and gathering potential because of its sparse vegetation. The Preferred Alternative and Alternative Three sites had habitat suitable to quail and dove prior to the 1995 fire, but other areas of the reservation offered better hunting (John Algots, FMIT Physical Resources Director, personal communication).

A few elders collect clay for pottery making at off reservation sites in Nevada where deposits of silica clay are found. (Betty Barrackman, FMIT, personal communication).

3.7.2 Timber Harvesting

There are no timber species on the reservation. Mesquite is harvested for recreational cook-outs, and for traditional ceremonies. (Patricia Madueno, FMIT). The Preferred Alternative and Alternative Three sites had stands of mesquite which was cut for ceremonial purposes, but many of the trees were killed in the 1995 fire.

3.7.3 Agriculture

Because of prime soils, a long growing season, and abundant water, agriculture is a vital part of the economy of the reservation, contributing approximately $650,000 per year to tribal income. There are 15,800 acres of irrigated farmland on the reservation. Agriculture is the dominant land use on the reservation. The tribe leases about 12,400 acres in Arizona and California to non-Indian farmers for agriculture. The FMIT operates the tribal Avi Kwa Ame Farms in Arizona, where 3,400 acres are in production.

The main crop grown is cotton. Alfalfa, wheat, and Sudan grass hay are also grown. Tribal agricultural strategy is not to renew agricultural leases when they expire so that all agricultural production on the reservation would be under tribal control. Most of the present leased acreage would revert to tribal control by 2006. Because of its profitability, and enjoyment of the rural ambiance of large tracts of irrigated land, the FMIT economic development strategy will continue to include large scale commercial agriculture for the foreseeable future.

3.7.4 Mining

Sand and gravel mining is a minor component of the tribal economy. The FMIT is a joint venture partner with Salt River Sand and Rock (SRSR), an Indian-owned firm. SRSR operates a gravel pit located in Section 21, north of El Rodeo Road and approximately 1/4 mile east of the USBOR's levee road along the Colorado River. Rock products for construction on and off the reservation are mined. No mining occurs on any of the three alternative sites.

3.7.5 Recreation

Area recreation resources include the Colorado River, surrounding desert lands, and commercial facilities such as the Laughlin casinos. The natural amenities, as well as the casinos, are major attractions to tourists and recreationists. Boating, fishing and swimming take place on the river year round. Off highway vehicle users, hikers, and others enjoy the desert for a variety of active and passive recreational pursuits. Off highway vehicle users take advantage of the steep climbs afforded by the bluffs along the east edge of the Mohave Valley; evidence of their use is apparent adjacent to the Preferred Alternative and Alternative Two sites. Wildlife viewing, especially birding, is another major recreational activity enhanced by the presence of the Colorado River, which is a flyway, and Topock Marsh, which has a large bird population. Canoeists also use the marsh.

Off highway vehicles occasionally trespass on each of the three alternative sites. The sites are not used for recreation by tribal members.

3.7.6 Transportation Networks

3.7.6.1 Existing Road Network in the Region

3.7.6.1.1 Regional Roads

Interstate 40 (I-40) is an east-west route that passes immediately south of Needles. It has exits to the region's two north-south highways, SR 95 in Arizona, and Needles Highway in Nevada. The segment of I-40 that serves the Mohave Valley region is rural in design and traffic volume. It is the major transportation route connecting the Mohave Valley to the major market in southern California. I-40 is approximately five miles south of the Preferred Alternative and Alternative Three sites, and approximately eight miles south of the Alternative Two site. The existing road network is shown on Figure 3.7-1.

3.7.6.1.2 Local Roads

Public roads on the reservation are constructed and maintained by the BIA, Mohave County, the Arizona Department of Transportation, the California Department of Transportation, and San Bernardino County. Of the 109 miles of public roads serving the FMIR, 35 miles are roads on the BIA's Indian Reservation Roads system. Of the BIA roads, 10.7 miles are paved. Mohave County maintains about 3.6 miles of reservation roads that are on the BIA system and has a total responsibility for 24.7 miles. The USBOR is responsible for 18 miles, all unpaved roads on the Colorado River dikes.

Figure 3.7-1 also shows there are two main regional highways serving the FMIR. They are both north-south arterials. One is SR 95, which parallels the Colorado River in Arizona and the second is Needles Highway , which parallels the river in California and Nevada. SR 95 is the closest highway to the proposed project alternative sites

Mohave County Route 1 (Topock-Davis Dam Road) is maintained by Mohave County, which lists it as CR 227. It is a two lane road which traverses the south side of the Preferred Alternative site, and south of the Alternative Three site.

Collector roads serve the southern Mohave Valley in a rectangular grid. Not all roads on the grid are paved, and some are not continuously paved throughout their length. Access to the Alternative Two site is from an unpaved collector road.

3.7.6.1.3 Traffic Conditions on Local Roads

Figure 3.7-2 shows existing average daily traffic (ADT) on Needles Highway in Nevada and SR 95 in Arizona. The ADT of the corridor between Needles and Laughlin is about 19,000 vehicles. Neither highway approaches its design capacity on a daily basis but both are at level of service (LOS) D for the peak hour of the week. SR 95 is heavily congested in the area of Bullhead City and Mohave Valley

Peak weekend traffic is on average 85 per cent higher than weekday peak traffic volumes and weekend ADT is about 45 per cent higher than average weekday ADT. Data from Fehr and Peers Associates (1994) indicate that 45 per cent of trips on SR 95 are recreational trips and the proportion rises to 60 per cent on Needles Highway. Traffic growth on both highways has been substantial throughout the 1990s with increases on the Needles Highway occurring in direct proportion to the growth of casino rooms in Laughlin during the same period.

A traffic study was prepared for a tribal casino to be built on the southeast corner of the intersection of SR 95 and CR 227. Although the project was abandoned, the study provides the most recent data for this intersection, which would be part of the travel route to and from the Preferred Alternative site for trips originating in reservation villages, Needles, Bullhead City, or Laughlin.

ADT at the intersection of CR 227 and SR 95 was 11,000 vehicles in 1994. LOS was A. (Bolduc-Smiley, 1994)

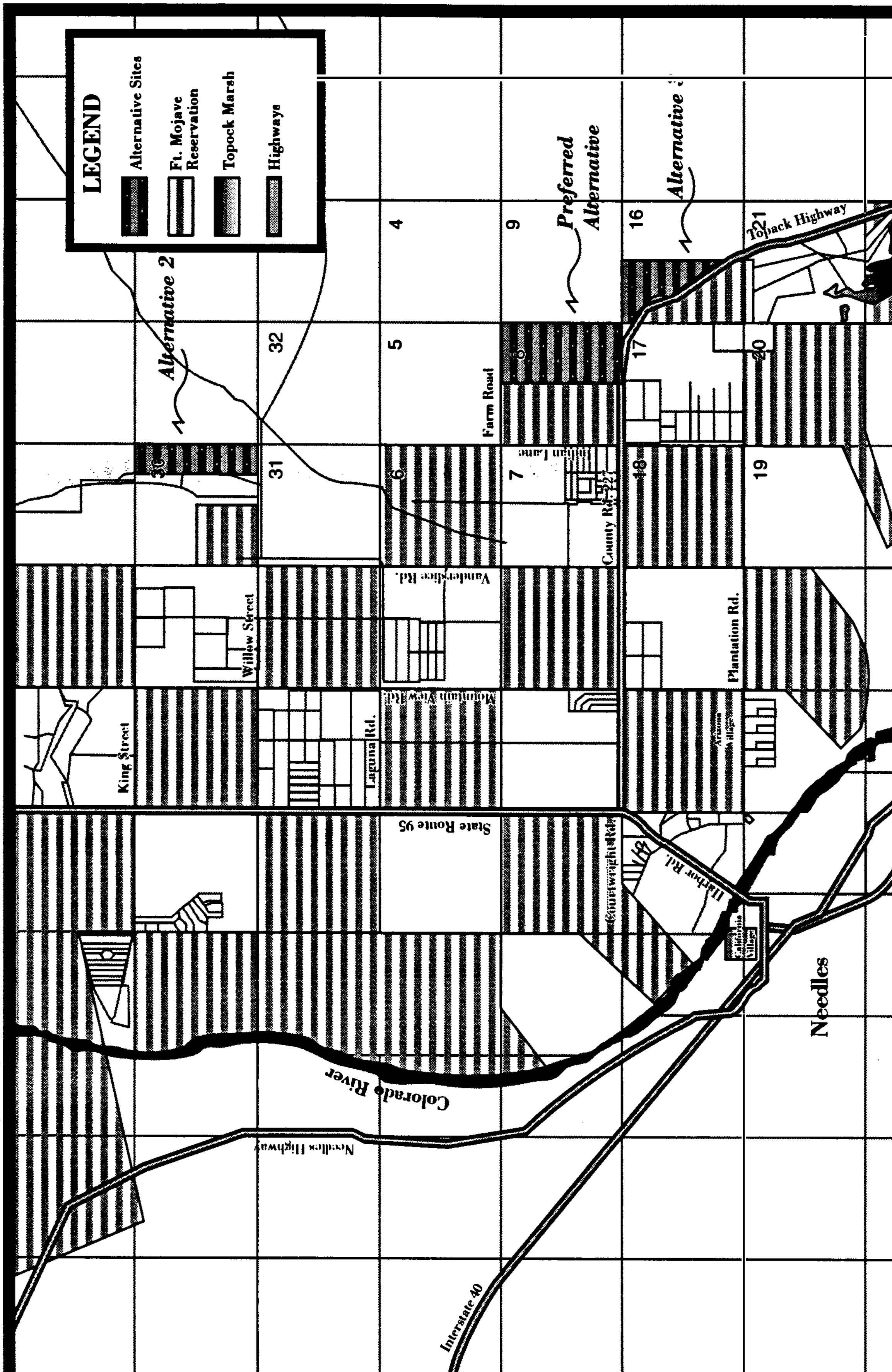
A corridor study prepared by the Arizona Department of Transportation (ADOT) in 1995 identified LOS for turning movements at the SR 95/CR 227 intersection, which is not signalized. Left turns from CR 227 southbound on SR 95 were LOS A. Left turns eastbound onto CR 227 by southbound SR 95 vehicles were LOS D. Right turns were LOS A for north moving SR 95 traffic. (ADOT, 1995)

3.7.6.1.4 Deficiencies of the Regional and Local Road Network

Long term trip projections by Presnell Associates (1994) and ADOT (1995) suggest that SR 95 could not handle traffic demand even with widening to five lanes. The area's rapid growth and the extensive nature of the developments proposed suggest that alternative north-south routes are needed. Mountain View Road, and Vanderslice Road, which are both section line roads east of SR 95, have been proposed, but Right of Way (ROW) complications and lack of construction funds have limited these possible alternative routes to the discussion stage. Another reliever to SR 95 has been proposed farther to the east, parallel to the old Oatman Road which would connect to I-40. It, too, is in early discussion stages.

Clark County, NV is making improvements to Needles Highway from Laughlin to the state line over the next five years. San Bernardino County has insufficient money to make corresponding improvements to the California portion of this road.

For the foreseeable future, SR 95 will continue to be the main traffic corridor through the eastern Mohave Valley. It will continue to deteriorate in LOS as the area grows. Given the region's rapid growth, alternative routes would be needed in the very near future (George Wallace, ADOT, personal communication). See Figure 3.7-3, Projected 2015 Average Daily Traffic.



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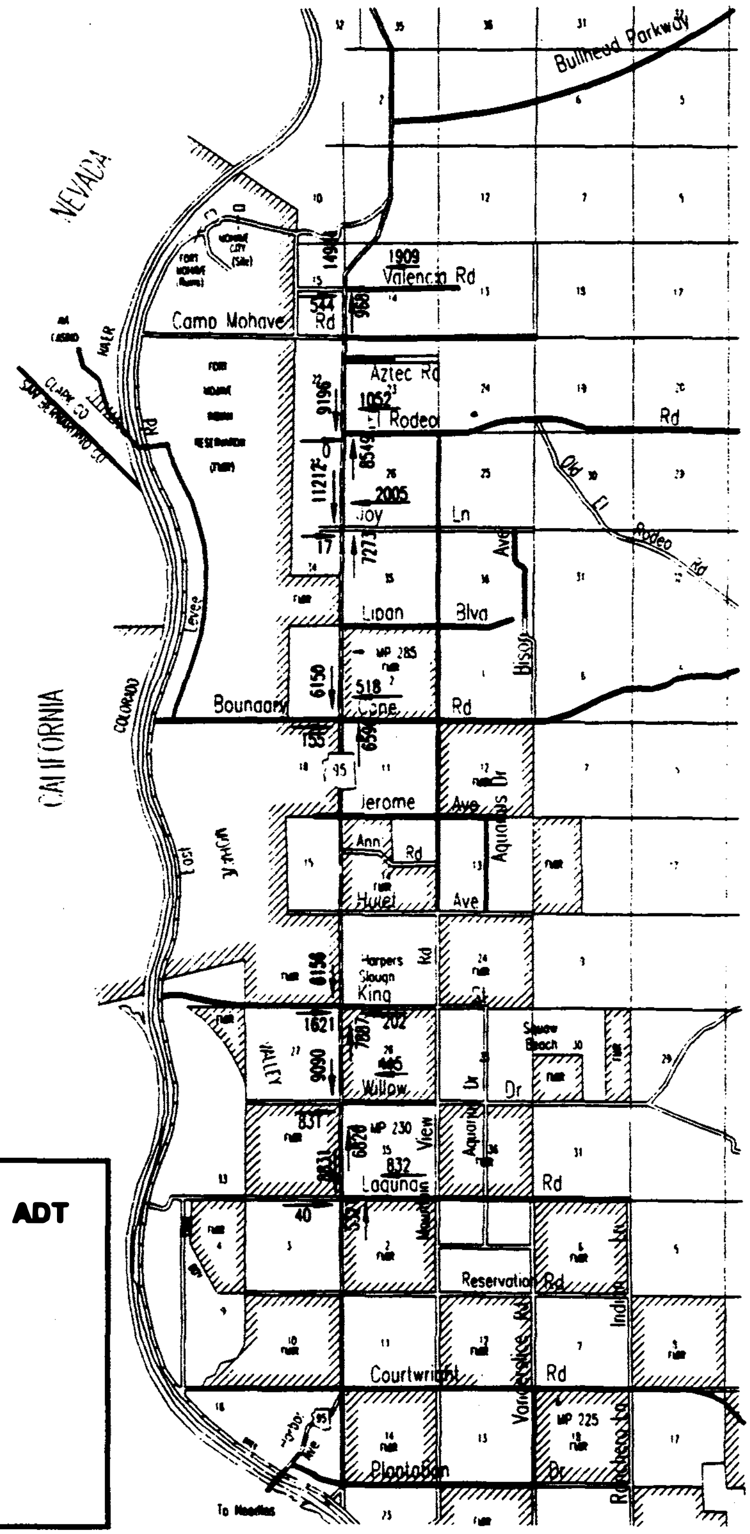
0 .5 1 Miles

Fig. 3.7-1 Regional and Local Roads

N

Average Daily Traffic Volumes



Average Daily Traffic Volumes = ADT

↑ = ADT Northbound

↓ = ADT Southbound

→ = ADT Eastbound

← = ADT Westbound

0 .5 1 Miles

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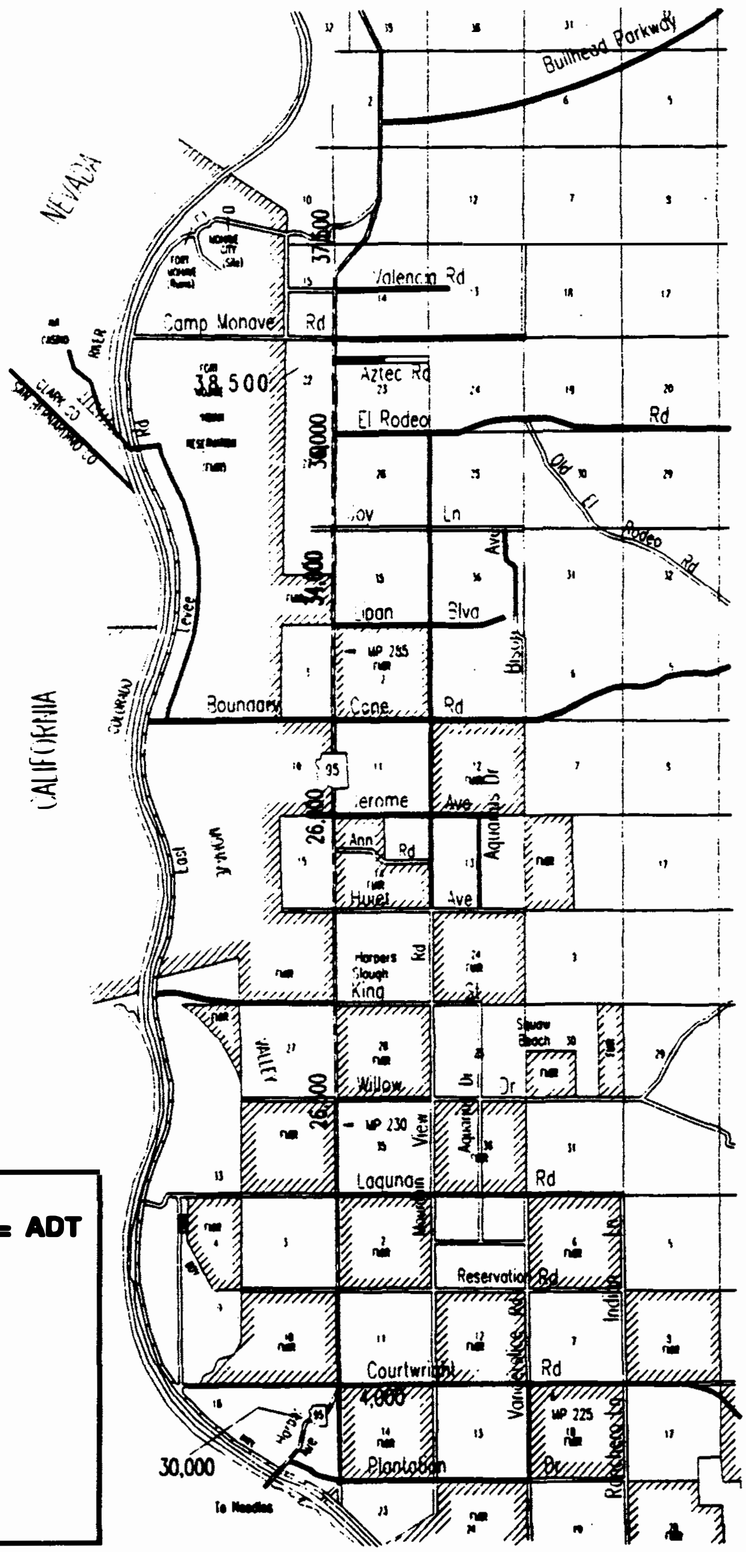
Fig. 3.7-2 1995 ADT (Average Daily Traffic)

N

Projected Design Year 2015 Traffic Volumes



Average Daily Traffic Volumes = ADT

↑ = ADT Northbound

↓ = ADT Southbound

→ = ADT Eastbound

← = ADT Westbound

0 .5 1 Miles

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Fig. 3.7-3 Projected 2015 Average Daily Traffic

3.7.6.1.5 Road Improvement Plans and Projects

SR 95 is in the process of redesign and reconstruction by ADOT. The highway would not be reconstructed in its entirety (from Needles Bridge to the northern edge of Bullhead City) until after 2001. A corridor study and design concept report for SR 95 was completed in 1995. ADOT has budgeted $39 million for major improvements between Needles, CA, and Bullhead City, AZ over the next five years, but the full budgeted amount has not been appropriated by the state legislature. The programmed road improvements would not substantially improve the capacity of SR 95 because ROW for additional lanes cannot be acquired without displacing existing roadside developments. Moreover, there is almost no documented ROW for those segments of the road which cross private land. (ROW was acquired from the FMIT in 1994.)

3.7.6.2 Railroads

One of the main transcontinental railroad lines (Santa Fe Pacific) runs through Needles. There is a passenger service offered by Amtrak generally twice a day. The majority of rail traffic is freight movement. No rail spur connects the Santa Fe Pacific line to the FMIR.

3.7.6.3 Airports

There are several small airports serving the area. Bullhead City and Needles both have airports, though only the former offers a regular commercial schedule. Needles is a municipal airport but has no passenger service. There are also two landing strips located between Bullhead City and Needles airports. One is in Mohave County at the northern end of the Reservation. It is a dirt strip and is used as a crop dusting facility. The second is used by Eagle Aviation and is on leased tribal land north of Laguna Road and west of SR 95. It has an all weather surface and is recognized by the Federal Aviation Administration as a public airport even though there is no passenger service offered. There are hangars for rent and aviation fuel and other light services are available. It is in the process of being expanded (Goforth 1995). The Preferred Alternative site for the proposed power plant is located about four miles southeast of this airport. The Alternative Two and Alternative Three sites are about five miles from the Eagle Aviation complex. Aviation maps for the vicinity verify that none of the alternative sites are within the glide slope, approach, or clear, zones of any area airport. The proximity of the Topock Marsh Wildlife Refuge limits flight altitude to a minimum of 1,000 feet.

3.7.6.4 Transit

Greyhound Busline's service to Bullhead City is the only major busline in the area. There is no other form of public transportation except for shuttle buses which ply between casinos and the two cities of Laughlin and Bullhead City. None of the alternative sites has direct bus service.

3.7.7 Regional Energy Systems

3.7.7.1 Area Electric Power Generating Facilities

Davis Dam impounds Colorado River water to form Lake Mohave just north of Laughlin, Nevada. Water from Lake Mohave is released to fulfill irrigation needs and international treaty obligations with Mexico and power is generated at the Davis Generating Station as a result of these releases. The power is wheeled on the WAPA grid to customers in Arizona, Nevada, and California. The Davis Generating Station is operated by the USBOR.

A second power generating plant is located immediately south of Laughlin, Nevada, approximately 19 miles northwest of the Preferred Alternative site. The Mohave Generating Station is coal-fired, producing electric power from coal slurry conveyed by pipeline from mines on the Navajo Indian Reservation. Water used to make the coal slurry is separated from the coal and then converted to steam. The source of the water is aquifers in the Four Corners area near the Hopi Indian Reservation. The Mohave Generating Station is co-owned by several entities in the Southwestern US and is operated by the Nevada Power Company.

3.7.7.2 Regional Energy Transmission Lines

3.7.7.2.1 Electric

Davis Dam and the Mohave Generating Plant are the two local electric power producers. Regional electric energy is on the WAPA grid. The BIA operates an electric line in Nevada, with power supplied by Boulder Dam Hydroelectric Project in Nevada. Arizona Electric Power Cooperative wheels power acquired from various sources through the Mohave Valley. The tribal electric company, Aha Macav Power Service (AMPS), has a limited power distribution system on the reservation.

A new substation (Topock substation) will be built by AEPCO in the vicinity of the three alternative sites. The Topock substation will be located in Section 31, T18N, R20W, which is two miles north and four miles east of the Preferred Alternative site. The Topock substation connects to the Davis-Parker #1 and #2 230kV transmission lines (BLM 1997).

3.7.7.2.2 Natural Gas

Two major natural gas lines run north-south east of the reservation. Both are on BLM right of way. The lines belong to EPNGC and TPC. The former is approximately one mile east of the reservation boundary; the latter is approximately six miles north and east of the reservation boundary.

3.7.8 Utilities

There is no utility service to any of the three alternative sites. Each site is located well beyond existing tribal utility company service lines for water, sewer, electric, and telecommunications. Some service providers serving private land have lines in the vicinity of the three alternative sites. However, they do not have agreements to provide service to tribal land.

The following sections discuss those utilities which are relevant to evaluation of environmental consequences of the proposed Southpoint project.

3.7.8.1 Wastewater Treatment

The Tribe provides sewer service to Tribal and non-tribal members on the Arizona side of the FMIR, and the Avi Casino and other development in Aha Macav. The Tribe constructed a three million gpd capacity wastewater treatment plant in 1988. This plant is located approximately four miles to the west of the Preferred Alternative and Alternative Three sites, and five miles south of the Alternative Two site. The treatment plant presently treats only 400,000 to 500,000 gpd and would, therefore, have available capacity to receive additional effluent. The plant treats effluent to secondary standards. Treated water is used to irrigate about 10 acres of crop land adjacent to the plant.

Development on private land is not serviced by the FMTUA plant. Many residences in the southern Mohave Valley have septic systems.

3.7.8.2 Solid Waste Disposal

There is no solid waste disposal site on the FMIR. Hauling is provided by a private contractor, Hargus Disposal. The Tribe has set up a Reservation-wide recycling program through a contract with Laidlaw Waste Services, Inc. (Gary Goforth, FMIT Tribal Administrator, personal communication). At present only cardboard from the Avi Casino is recycled.

Solid waste disposal facilities are available at the Mohave Valley Sanitary Landfill, which is operated by Mohave County. It is located 2.5 miles east of SR 95 and north of El Rodeo Road in Arizona. Remaining life is 50 years. This lifespan is predicated on a limit of 200 tons per day. Landfills with larger capacity exist in the region at Parker, Arizona, and Las Vegas, Nevada, as well as several other sites. (Mike Hendricks, Mohave County Public Works Department, personal communication).

3.7.8.3 Electricity

Electricity is now provided to the Arizona tribal lands by AMPS via a 69 kV transmission line located two miles east of AZ 95 on Mountain View Road. This line is within 2.5 miles of each of the alternative sites. AMPS is constructing new transmission lines to wheel power to planned development on the FMIR so that its service area can expand.

3.7.8.4 Telecommunications

Telecommunications, including fiber optic cable, satellite connection, and cellular communications are available from Fort Mojave Telecommunications, Inc. (FMTI). The main fiber optic line on the reservation lies on the alignment of Mountain View Road. A one mile link extends to the Citizens Utility Services at the junction of SR 95 and Reservation Road, where FMTI telecommunications lines inter-connect with the remainder of the region. FMTI has already extended its fiber optic network to the Avi Casino and would shortly have a link to tribal administration buildings in California Village, Needles. FMTI has the capability to serve the entire FMIR, including the Preferred Alternative and Alternative Two and Three sites.

3.7.9 Land Ownership and Jurisdiction in the Vicinity of the Proposed Southpoint Project

3.7.9.1 Tri-State Region

The FMIT has sovereign lands in the three states of California, Nevada, and Arizona which are under tribal jurisdiction. State, county and federal jurisdictions abut the reservation. In California, land adjacent to the reservation is under the jurisdiction of the State of California and San Bernardino County. In Nevada, land adjacent to the reservation is under the jurisdiction of the State of Nevada and Clark County, while adjacent Arizona land is under the jurisdiction of the State of Arizona and Mohave County.

Various federal and state land management agencies also have authority over land in the tri-state region of the reservation. The BLM, USBOR, and USFWS are the major federal land managing agencies in the FMIR's vicinity. Some miscellaneous jurisdictions also exist; the Colorado River Commission of Nevada has responsibility for a tract adjacent to the reservation in Nevada.

State land management agencies in Arizona are, principally, the Arizona Game and Fish Department, and the Arizona State Land Department. Corresponding state agencies have authority over some California and Nevada land near the reservation.

There are three urban jurisdictions near the reservation. These are the Town of Needles, California, Bullhead City, Arizona, and Laughlin, Nevada.

No state, county, or city jurisdictions have authority over sovereign tribal lands. The principal federal agencies with permitting or other authority applicable to tribal lands are USEPA, USFWS, and the USACE.

3.7.9.2 Fort Mojave Indian Reservation

The FMIR is held in trust for the FMIT by the US government. There are no individual allotments on the FMIR. The FMIR comprises approximately 33,000 acres situated in three states: Arizona, California, and Nevada. Part of the Arizona portion of the FMIR has an unusual land ownership pattern in which every other square mile is tribal land under the jurisdiction of the FMIT, alternating with land in private ownership under the jurisdiction of Arizona and Mohave County. This part of the Mohave Valley is referred to as having "checkerboard ownership." Major blocks of land owned by the States of Nevada and Arizona, and land managed by the BLM, abut the FMIR. Figure 3.7-4 depicts the land ownership of the FMIR.

3.7.9.3 Mohave County Checkerboard Area

The checkerboard area in Mohave County occupies about 30 square miles. Figure 3.7-5, Land Ownership, shows that all three alternative power plant locations are part of the checkerboard area and are on land sections which are owned by the tribe, but which have privately owned land and public land adjacent to them. Private lands are under the jurisdiction of Mohave County. The county has no jurisdiction over FMIT lands in the checkerboard area, nor does the FMIT have jurisdiction over the private lands which are commingled with tribal lands.

3.7.10 Land Use Plans

3.7.10.1 Fort Mojave Indian Reservation

3.7.10.1.1 Reservation Land Use Plan

The FMIT has a Reservation Plan in draft form, pending Tribal Council action. The Reservation Plan reserves approximately seven sections of land in Arizona for very high density residential development as implementation of Tribal policy to provide affordable housing for Aha Macav's service sector employees. At build out, more than 100,000 people may reside on these planned high density areas. In addition, approximately 3,000 acres of tribal land would be developed at lower suburban densities. Remaining land in Arizona would be reserved for present and expanded agricultural production, and as open space in natural desert. Figure 3.7-6 illustrates FMIT planned land uses in the vicinity of the three alternative sites.

The Reservation Plan includes an industrial land use designation on the Preferred Alternative site for location of the proposed Southpoint power plant. The Alternative Two and Alternative Three sites are designated natural desert/open space. As a complement to the reservation Plan, a water budget for the entire reservation was prepared. The water budget included a quantity of water from the FMIT's Arizona allocation of Colorado River water to support the proposed Southpoint power plant on any of the three alternative sites.

3.7.10.1.2 Aha Macav

In 1991 the FMIT adopted a master land use plan for its 4,000 acres in Nevada to guide development of its planned mixed use development community, Aha Macav. The land use plan includes design guidelines and standards which apply to all development on the reservation. Several ordinances to guide and control development, including a plan approval process, have been adopted to enforce the master plan's policies, guidelines and standards. These guidelines, standards and ordinances apply to the entire reservation, including the three alternative sites for the proposed Southpoint power plant.

3.7.10.2 Land Use Plans of Other Agencies and Jurisdictions

3.7.10.2.1 Mohave County Plan

The County Plan for Mohave County designates the entire area between Camp Mohave Road adjacent to Bullhead City and Ice House Bend as an urban development area (UDA). A UDA allows more intense urban development outside existing cities and may consist of a wide range of land uses and activities, including residential, commercial, and industrial. At a more detailed level, land use designation in most of the checkerboard area in Mohave Valley is a mixture of low and medium density residential development.

There are some small pockets of high density dwellings proposed. Of particular note are three very large designations in the County. One is the area of general commercial, most of which borders SR 95. The second is the large designation of public land which may be the subject of urban development at some stage. The third is the designation of U - Urban - which is a very generalized statement of Mohave County's intentions for about one-third of the Mohave Valley. (Mojave County General Plan, p. 63) The designation "Urban" covers residential development at three development densities. Each density category has a range. If the lowest point in each range is taken as the actual development density, build-out population in this Urban use category produces a population of 115,000. Assuming that the public lands category is not released for urban development, but that the remainder of Mohave Valley develops at gross urban densities of five dwelling units per acre, the approximate development ceiling of the Valley under Mohave County jurisdiction would be about 250,000 at build out. Figure 3.7-7 depicts Mohave County planned land uses in the southern Mohave Valley.

3.7.10.2.2 City of Needles General Plan

The City of Needles has an adopted General Plan. Commercial development is concentrated along the section of Needles Highway that connects the city to SR 95, and along I-40.

3.7.10.2.3 Bullhead City General Plan

Bullhead City has an adopted General Plan. Much of the city was built before planning policies were in place, so the plan principally affects development on the fringes of the city, especially large housing subdivisions to the east, especially along the Bullhead City Parkway.

3.7.10.2.4 State of Arizona Land Management

The State of Arizona is a major landowner in the Mohave Valley. By law state lands must be used to support education. An exception is state lands managed by the Arizona Game and Fish Department, which are specifically for the benefit of wildlife and do not fall in the same category of other state trust lands which may be sold or leased to support education. The state has master planned some of its holdings in the path of growth and offered them for sale or lease. Most lands in the area so affected are near Bullhead City and Laughlin.

State of Arizona land occurs south of the Preferred Alternative site and west of the Alternative Three site, in Section 17. It is managed by the Arizona Game and Fish Department, and abuts the Havasu National Wildlife Refuge. There are no state lands in the immediate vicinity of the Alternative Two site.

3.7.10.2.5 Federal Agencies' Land Management Plans

The BLM is the major land managing federal agency in the vicinity of the three alternative project sites. BLM lands are under a decennial land use plan prepared and revised under the Federal Land Management Policy Act. Topock Marsh is managed by the US Fish and Wildlife Service under a management plan.

3.7.11 Existing Land Use

3.7.11.1 Fort Mojave Indian Reservation

Land use on the reservation west of the river in California is partly in agriculture. The remainder is undisturbed desert. (See Figure 3.7-8, Existing Land Use). The large tract of tribal land not fragmented by checkerboard ownership immediately east of the river in Arizona is largely in agriculture, with some undeveloped desert. In the checkerboard ownership area, the tribe has a few developments consisting of tribal housing, a housing subdivision, and commercial sites clustered near SR 95 and Willow Drive. The remainder of the checkerboarded area is agriculture, or undeveloped desert.

3.7.11.2 Mohave County

Residential building has occurred on County land in the checkerboard as on Sections 21, 27, and 35. The mix of residential, commercial, and light industrial uses which sprawl along both sides of SR 95 on private land in Mohave County is quite distinct. Further south, in the checkerboard area of SR 95, the land ownership pattern adds to the scattered development fronting the highway.

3.7.11.3 Federal Agencies

Existing land uses on federal land are undeveloped desert, or managed wildlife refuge.

3.7.11.4 Land Uses Adjacent to Alternative Sites

Land use in the immediate vicinity of the three alternative locations is shown on Figure 3.7-8.

3.7.11.4.1 Preferred Alternative Site - Section 8

Section 8, the Preferred Alternative site for the proposed power plant, is undisturbed desert. Eight sections of land touch the Preferred Alternative site. Starting in the northwest corner of the Preferred Alternative site and moving counter clockwise, they are Sections 6, 7, 18, 17,16, 9, 4, and 5. Section 6 is

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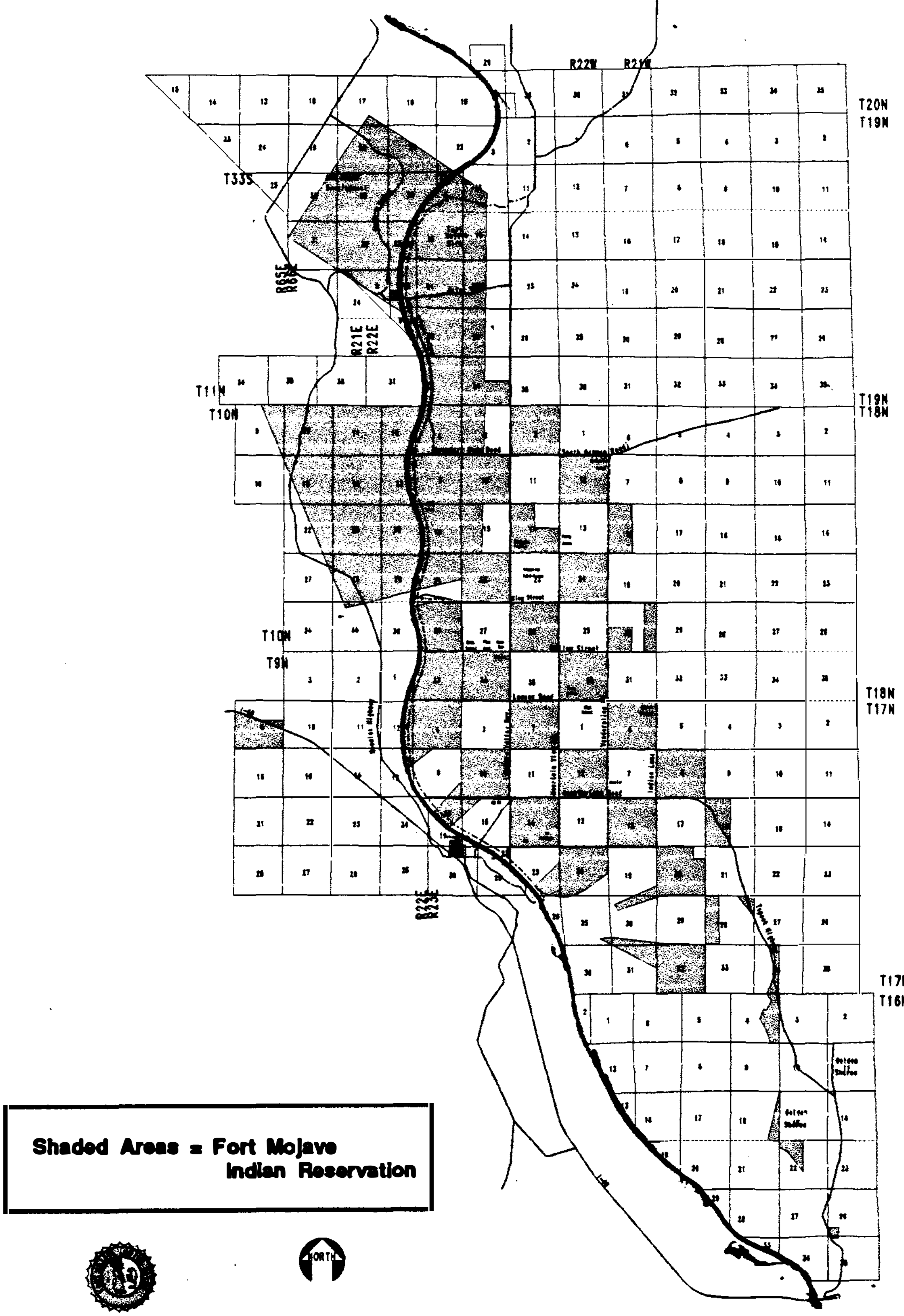

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Fig. 3.7-4 Fort Mojave Indian Reservation

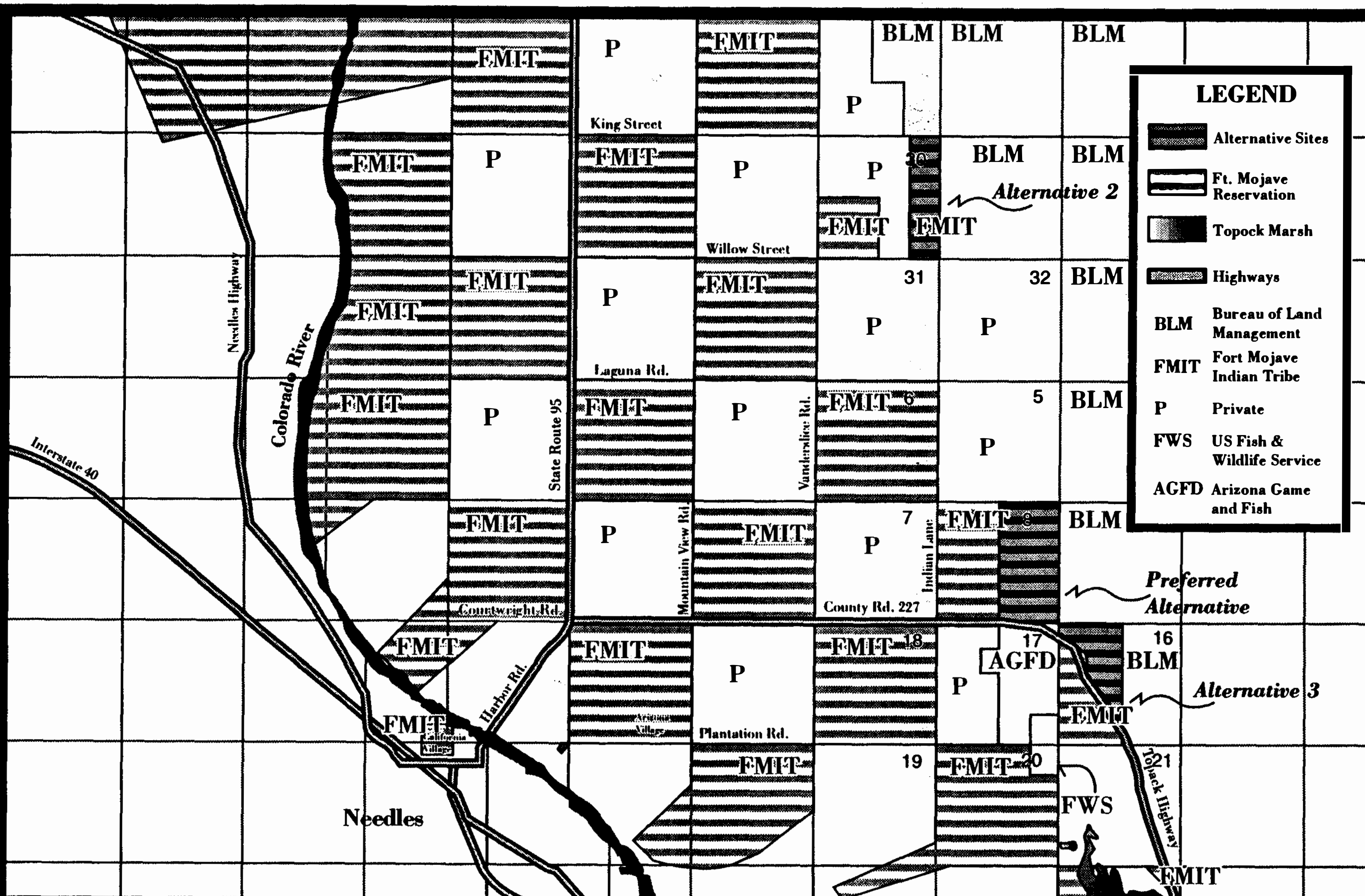

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Fig. 3.7-5 Land Ownership

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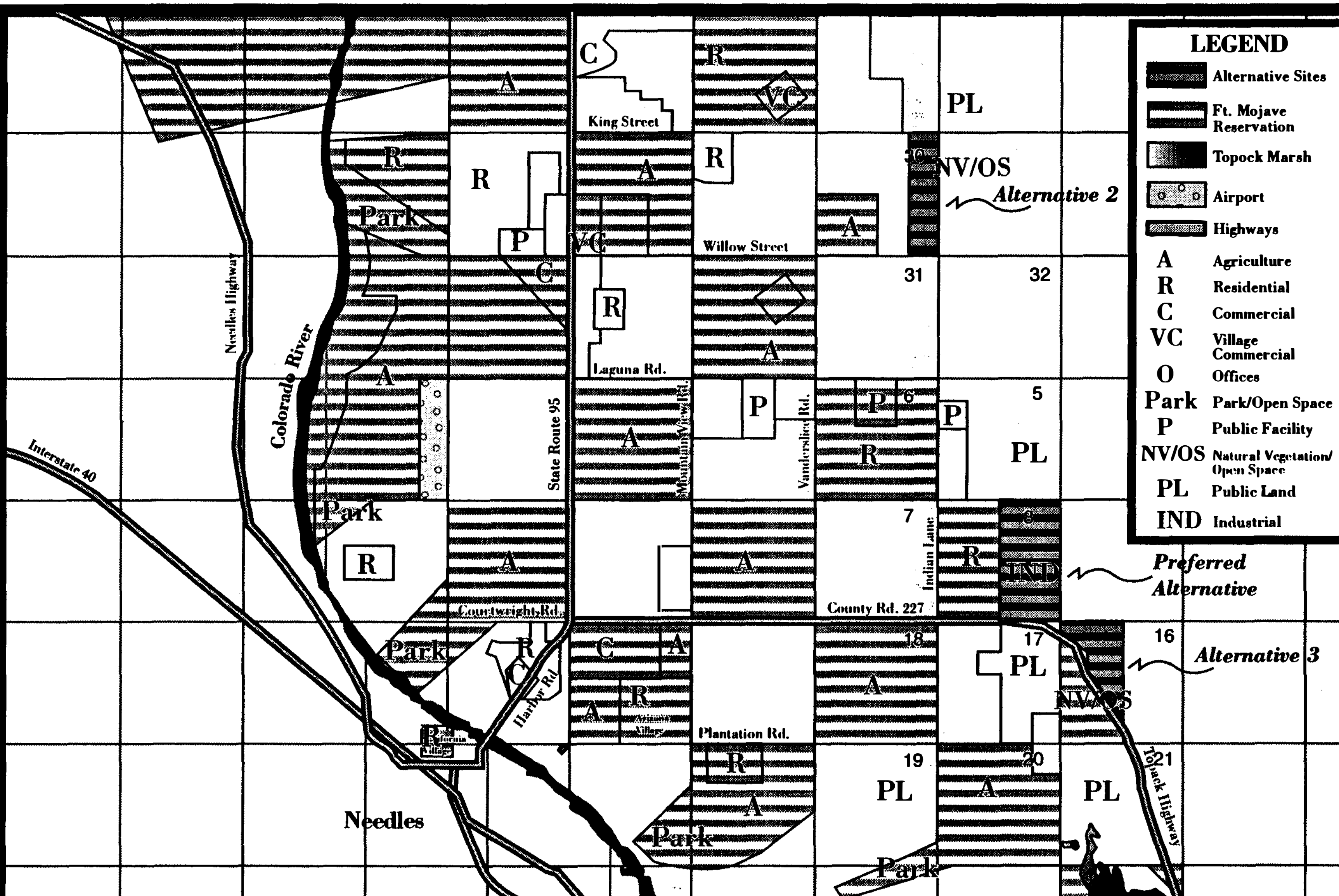

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Fig. 3.7-6 FMIT Planned Land Uses

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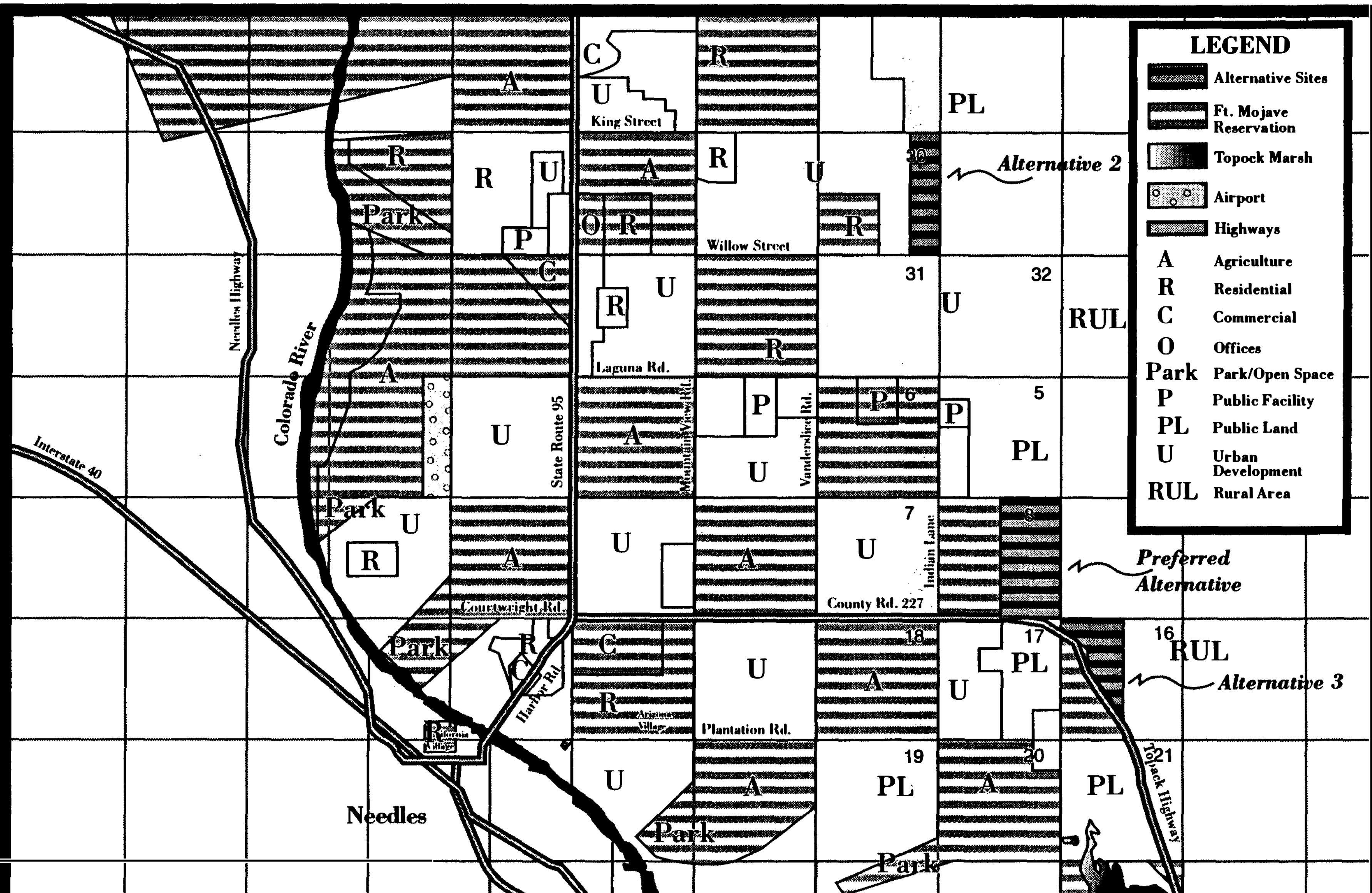

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Fig. 3.7-7 Mohave County Planned Land Uses

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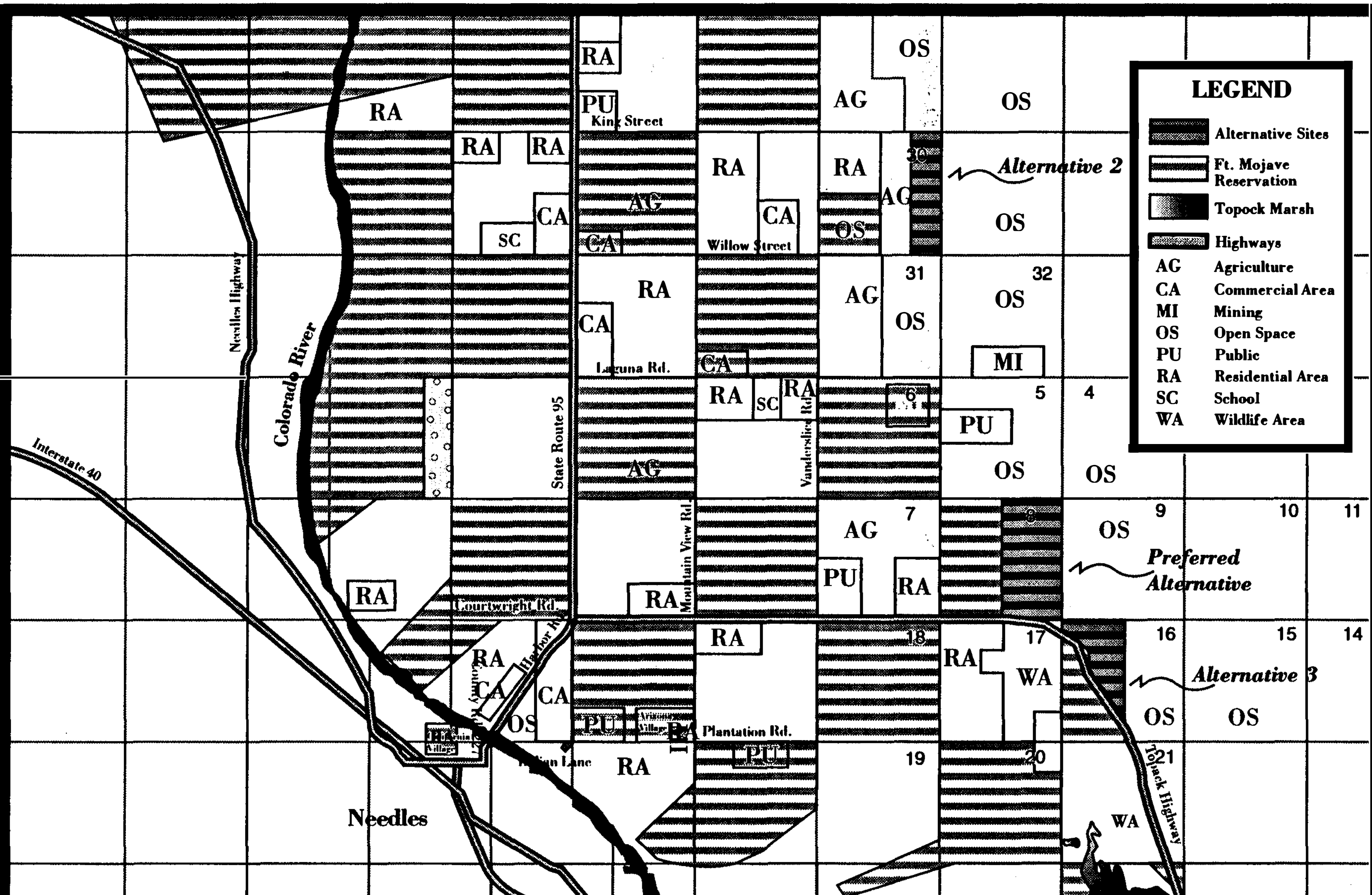

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Fig. 3.7-8 Existing Land Use-
FMIT and Mohave County

Miles

tribal land in undeveloped desert. Section 7 is privately owned. Its southeast quarter has had dirt roads bladed in for a housing subdivision. Two houses have been built. They are approximately six-tenths of a mile from the west boundary of the proposed lease area. The other three quarters of Section 7 are in agriculture. Section 18 is tribal, and is undeveloped. All but 320 acres of Section 17 is privately owned. It has a low density rural subdivision built on its west half; its east half is undeveloped. The nearest residence is approximately one-tenth of a mile south and west of the southwest corner of the proposed lease area. Approximately 20 single family houses on five acre lots have been built. Section 17 includes 320 acres of Arizona Game and Fish Department lands.

The west half of Section 16 is tribal and undeveloped. The east half is under BLM management and undeveloped. Section 5 is privately owned, but undeveloped. Sections 9 and 4 are under BLM management, and are restored desert, and undeveloped desert, respectively. A closed Mohave County landfill occupies several hundred acres in Section 9. This landfill was unregulated and unmanaged, of the class called "frontier landfill". The date it began use is not known. In 1985 Mohave County took over management, with a permit granted under the Arizona Groundwater Protection Act. BLM granted a use permit. From this time until its closure in 1989, it was called the Bermuda City Landfill. Mohave County has no indication that hazardous materials were disposed of in the landfill either before or during County operation, however, this assumption has never been tested. (Mike Hendricks, Mohave County Public Works Department, personal communication.)

There are two pockets of State land near Section 8, but the dominant land owner in the vicinity is the federal government. To the north and east is an extensive area of public lands controlled by the BLM. The northernmost part of Havasu National Wildlife Refuge lies in Section 18, immediately south and east of the Preferred Alternative site. State of Arizona land managed by the Arizona Game and Fish Department abuts the refuge in Section 17, immediately south of the Preferred Alternative site.

3.7.11.4.2 Alternative Two Site - Section 30

The Alternative Two site has approximately 160 acres of actively farmed land occupying the flat old floodplain. The remaining site acreage, approximately 160 acres, is undeveloped desert on the bluffs to the east of the farmland. Land uses adjacent to the Alternative Two site are agriculture and undeveloped desert. Low density housing exists to the northwest and west.

3.7.11.4.3 Alternative Three Site - Section 16

The Alternative Three site is adjacent to Topock Marsh on the south, and to undeveloped desert on the east. A few scattered homes are located to the west. North of the site, the land use is undeveloped desert. Immediately to the east in Section 9 is a closed landfill.

3.8 Other Values and Conditions

3.8.1 Wilderness Areas

The reservation does not contain a wilderness classification. There are no lands within the reservation which have been or are likely to be designated as wilderness areas.

The National Park Service (NPS) and the BLM have reviewed lands in close proximity to the FMIR for their wilderness qualities. The former agency has identified the Newberry Mountains, north of Laughlin, as meeting the wilderness criteria of the Wilderness Act of 1966, but the area has not been designated. The FMIT has met with the NPS to consider becoming the management entity for the Newberry Mountains under recent NPS policy which allows tribes to manage land of cultural significance, although no formal actions have been taken (Nora Helton, Chairperson, FMIT, 1997).

Havasu National Wildlife Refuge (Topock Marsh) has a common boundary with the reservation. Needles Peak Wilderness Area, located approximately 20 miles south and east of the Preferred Alternative site, is part of the wildlife refuge. The Mohave National Preserve (in California) was proclaimed under the California Desert Protection Act of 1994. Its eastern border lies about 10 miles west of the reservation.

The BLM has examined lands in the Dead Mountains in California but has not identified any potential wilderness areas which are in the vicinity of the alternative sites. Four Class II wilderness areas have been added to the Black Mountains in Arizona on BLM lands. They are Warm Springs, Mount Nutt, Mount Tipton, and Wabayuma Peak, which lie north and east of the reservation. The boundary of the nearest is approximately 10 miles east of the Preferred Alternative site.

The classification refers to air quality protection status. Class I includes areas in which visibility and other air quality aesthetic criteria are integral to the quality of the place. Grand Canyon National Park is the Class I area closest to the reservation. It lies approximately 90 miles to the northeast of the Preferred Alternative site. Class II wilderness areas have less stringent aesthetic air quality criteria, and are less than 6,000 acres in size (McDaniel, USEPA Region IX, Section 5, unpaged, November, 1997).

3.8.2 Wild and Scenic Rivers

The Colorado River channel has been extensively modified for flood control purposes throughout the reservation and is not a candidate for Wild and Scenic Rivers classification. There are no other watercourses on or adjacent to the FMIR, and, therefore, no such rivers occur on or adjacent to any of the three alternative sites.

3.8.3 Sound and Noise

An ambient noise survey has been performed at the Preferred Alternative, Alternative Two, and Alternative Three sites. The Noise Monitoring

Locations (NMLs) for the Preferred Alternative and Alternative Three sites appear in Figure 3.8-1. NMLs for the Alternative Two site appear in Figure 3.8-2. During the survey, noise measurements were made at various times to characterize the existing noise environment with respect to time of day and ambient conditions. The noise survey focused upon characterizing the noise environment at neighboring residences and identifying relative contributions from existing industrial and utility noise sources and local traffic.

The site area was surveyed to identify any noise sensitive areas. Noise sensitive areas are those areas where people could be adversely affected by the facility noise emissions. Such areas include residences, parks, schools and other areas where a quiet environment is desirable. All noise sources with the potential to contribute to the ambient noise environment were also identified.

Measurements were taken at each location over a 24 hour period. The measurements represent hourly average sound levels over a continuous time period. The intent of the measurements is to determine the daily variation of noise level and the period of quietest sound levels. The measurements were conducted in accordance with ANSI 13-1986 methods for the measurement of sound pressure levels.

Ambient sound levels were measured in decibels using the A-weighted scale (dBA). The A-weighted scale is preferred for applications such as this because it simulates the frequency response of the human ear. Four types of A-weighted sound levels were recorded to define the noise environment; Leq, and four statistical exceedance levels: L90, L50, L33 and L10. The equivalent sound level, denoted as Leq, is the energy averaged sound level integrated over the measurement period.

The statistical sound levels are useful in describing the time-varying nature of the sound. L90 is the sound level exceeded 90 per cent of the measurement period and is considered to represent the residual background sound level because it effectively "filters out" transient noise events such as traffic passes and dogs barking. The L50 is defined as the sound level exceeded 50 per cent of the measurement period or the median sound level. Similarly, L10 is the sound level exceeded 10 per cent of the measurement period and is sometimes called the intrusive sound level because it represents occasional loud noises, such as traffic passes. Highly variable noise environments would result in a large difference between the measured L90 and L10 noise levels. An ideal steady noise source would result in all noise descriptors being the same.

Because the combustion turbine facility noise is relatively continuous, it is a contributor to the ambient L90 level. Thus any significant noise impact from either the existing or proposed facility would directly affect the ambient L90 sound level in the surrounding areas.

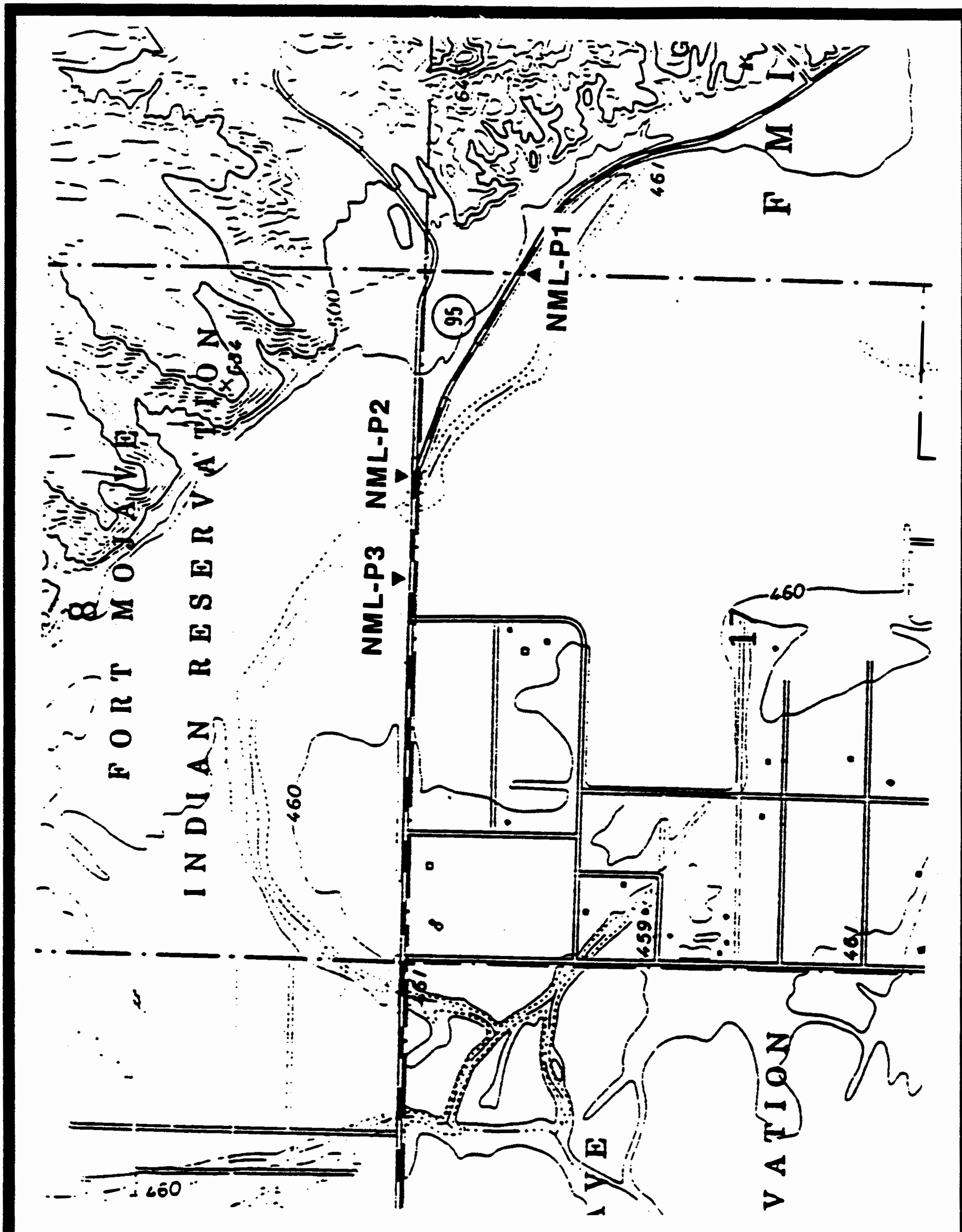

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Fig. 3.8-1 Noise Monitoring Locations for Preferred Alternative and Alternative Three Sites

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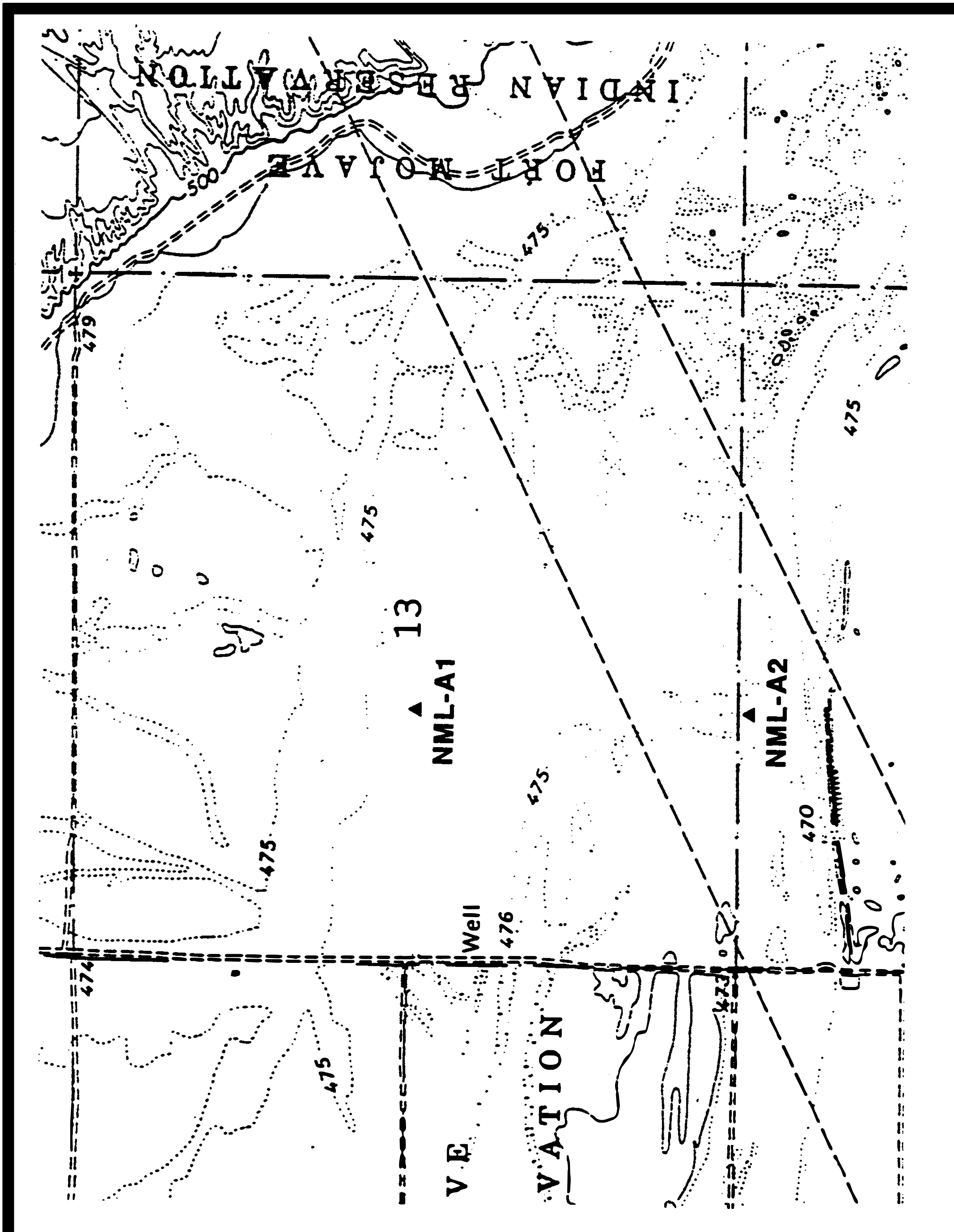

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Fig. 3.8-2 Noise Monitoring Locations for the Alternative Two Site

The equipment used to conduct the continuous measurements were Larson Davis (LD) model 700 ANSI Type 2, hand-held integrating noise meters. The LD700's are capable of continuous acoustic monitoring and providing Leq, and three statistical sound levels for specified time intervals. The equipment was programmed to provide 1-hour Leq, L10, L50, and L90 levels. The meters and field calibrator were laboratory calibrated on June 8, 1994. The meters were field calibrated using the corresponding pistophone calibrator.

3.8.3.1 Ambient Noise Survey - Preferred Alternative Site - Section 8

The ambient noise survey procedure and measurement results for the Preferred Alternative site and Alternative Three site are summarized in the following paragraphs. The Preferred Alternative site and the Alternative Three site are located within close proximity to each other. One noise survey was conducted to characterize both sites.

The Preferred Alternative site and Alternative Three site are located along Topock Highway. There are scattered residences located along Topock Highway and local side roads branching from the highway. The nearest residence is located on a side road approximately 1,500 feet south-southwest of the Preferred Alternative site.

There are no existing community noise sources except for the traffic along Topock Highway. The traffic is quite steady during the daytime periods but tapers off to virtually no traffic during nighttime periods. Other noise influences were due to natural sources such as insects, birds, and wind through trees. The mesquite trees and desert shrubs cause significant whistle noise when the wind is blowing.

Ambient survey measurement procedures typically require that there be no precipitation or wet road conditions during the measurement period and winds must be below 12 mph. Weather conditions were favorable for a majority of the survey. The wind conditions were highly variable. There was very little wind during the daytime periods. In the evening the wind ranged from 10 to 15 miles per hour. The wind conditions influenced the sound level readings during these periods.

All measurement locations at the Preferred Alternative site were along the Topock Highway. The instruments were located approximately 50 feet from the roadway.

NML-P1 is located approximately 1,200 feet east of the proposed facility entrance. This location was chosen when the site location was not firmly established and this area was being considered as an alternate facility location. This location was intended to characterize the noise emissions at the facility site boundary.

NML-P2 is located approximately 500 feet east of the proposed facility entrance along Topock Highway, at the blocked entrance to a closed landfill. This location would characterize the existing sound levels at the facility boundary.

NML-P3 is located approximately 1,000 feet west of the proposed site entrance. This location is also about 1,000 feet east of the nearest residence. This location represents the sound level at the nearest residence to the facility.

The ambient noise survey was conducted at the Preferred Alternative and Alternative Three sites from the morning of Monday, September 19, 1994 to the morning of Wednesday, September 21, 1994. Tables H-1 through H-3 summarize the sound level data collected at each NML (see Appendix H).

Sound levels at each measurement location are generated predominately by traffic along the Topock Highway during the daytime and natural noises at night. Traffic noise is highly variable and tends to influence the Leq, L10 and L33 values, while not having much influence on the L50 and L90 values. This effect is evident by the increase of Leq values during high traffic periods (daytime) and minimum Leq values occurring during low traffic periods (nighttime). In comparison the L90 values--the sound level in between traffic pass--stayed relatively constant during the survey period.

Measurements were taken at NML-P1 from 11:00 a.m. on Monday, September 19, through noon on Tuesday, September 20. The Leq values ranged from a high of 65.0 dBA at 1:00 and 2:00 p.m. Monday (attributable to local traffic), to a low of 52.0 dBA at midnight Tuesday.

The L90 values ranged from a high of 40.5 dBA at 8:00 p.m. Monday (attributable to insect activity) and again at 3:00 a.m. Tuesday (attributable to increased wind during this period) to a low of 37.5 dBA from 11:00 a.m. to 6:00 p.m. Monday. Measurements were taken at NML-P2 from 11:00 a.m. on Monday, September 19, through noon on Tuesday, September 20. The Leq values ranged from a high of 56.0 dBA at noon Monday (attributable to local traffic), to a low of 44.0 dBA at midnight Tuesday.

The L90 values ranged from a high of 39.5 dBA at 8:00 p.m. and 10:00 p.m. Monday (attributable to insect activity) and again at 4:00 a.m. Tuesday (attributable to increased wind during this period) to a low of 37.0 dBA at various times Monday afternoon.

The Leq values are generally lower at NML-P2 than at NML-P1 because the instrument was located further from the roadway and was partially blocked by a berm. The L90 values are virtually identical, thereby indicating the L90 values are not dependent upon traffic noise.

Measurements were taken at NML-P3 from 11:00 a.m. on Monday, September 19, through noon on Tuesday, September 20. The Leq values ranged from a high of 68.0 dBA during various daytime periods on both Monday and Tuesday (attributable to local traffic), to a low of 54.5 dBA at 3:00 a.m. Tuesday.

The L90 values ranged from a high of 41.0 dBA at various times (attributable to insect activity and wind) to a low of 39.0 dBA at various times on Monday afternoon and Tuesday morning.

3.8.3.2 Ambient Noise Survey - Alternative Two Site - Section 30

The survey procedure and results of the noise survey at the Alternative Two site are discussed in the following paragraphs. Alternative Two is also located in a remote open area. There is a residential community located approximately 5,000 feet west of the site in Section 25. The community consists of several scattered houses. The site is quite large and the proposed power plant's equipment can be situated such that the distance to the nearest residence is approximately 6,000 feet.

There are no existing community noise sources except for occasional local traffic within the neighboring residential area and faintly audible distant traffic noise. Other noise influences were due to natural noise sources such as insects, birds, and wind through trees. The mesquite trees and desert shrubs cause significant whistle noise when the wind is blowing.

Ambient survey measurement procedures typically require that there be no precipitation or wet road conditions during the measurement period and winds must be below 12 mph. Weather conditions were favorable for a majority of the survey. The wind conditions were highly variable. There was very little wind during the daytime periods. In the evening the wind ranged from 10 to 15 miles per hour. The wind conditions influenced the sound level readings during these periods. A light rain occurred during the evening of September 20. Occasional lightning and winds occurred during this rain. The lightning and wind had the effect of causing high Leq and L10 values from 11:00 p.m. through 1:00 a.m.

Measurement locations at the Preferred Alternative site were located at various locations on and around the site area.

NML-A1 is along a dirt road which runs through the center of the section. The meter was located along this road approximately 2,000 feet east of the residential area. This location characterizes the noise emissions within the facility site.

NML-A2 is located along a dirt road which runs along the north property boundary. The meter was location approximately 2,000 feet east of the residential area. This location would characterize the existing sound levels along the facility property boundary.

The ambient noise survey was conducted at the Alternative Two site from the afternoon of Tuesday, September 20, 1994 to the morning of Wednesday, September 21, 1994. Tables H-4 and H-5 summarize the sound level data collected at each NML (see Appendix H).

Sound levels at each measurement location are controlled by natural noise sources. There are occasional influences from local residential traffic, though this traffic was very infrequent, and very faint traffic noise from SR 95 highway traffic which is approximately 3 miles to the west.

Measurements were taken at NML-A1 from 3:00 p.m. on Tuesday, September 20, through 10:00 a.m. on Wednesday, September 21. The Leq values ranged from a high of 54.5 dBA at Midnight Wednesday (attributable to thunder); the highest Leq value not associated with the rain period was 43.0 dBA at 8:00 p.m. Tuesday; to a low of 40.0 dBA at 3:00 a.m. and 4:00 a.m. Wednesday.

The L90 values ranged from a high of 42.0 dBA at midnight Wednesday, to a low of 38.5 dBA which occurred at various times.

Measurements were taken at NML-A2 from 2:00 p.m. on Tuesday, September 20, through 10:00 a.m. on Wednesday, September 21. The Leq values ranged from a high of 48.5 dBA at Midnight Wednesday (attributable to thunder); the highest Leq value not associated with the rain period was 45.5 dBA at 6:00 p.m. Tuesday; to a low of 38.0 dBA at 4:00 a.m. Wednesday. The L90 values ranged from a high of 42.0 dBA at midnight Wednesday, to a low of 37.0 dBA at 10:00 a.m. Wednesday.

3.8.3.3. Ambient Noise Survey - Alternative Three Site - Section 16

The Alternative Three site is located approximately 2,500 feet southeast of the Preferred Alternative site along Topock - Davis Dam Highway. The Preferred Alternative and Alternative Three sites are located within close proximity of each other. One ambient noise survey was conducted to characterize both facility sites. See Section 3.8.3.1 - Ambient Noise Survey - Preferred Alternative Site for a description of the ambient noise survey procedures and existing sound levels within the vicinity of the Alternative Three site.

3.8.4 Visual Resources

3.8.4.1 Visual Resource Assessments of Mohave Valley

The visual resources of the Lower Colorado region were evaluated using BLM Visual Resource Management (VRM) methodology. The evaluation included non-BLM lands in the region. It is presumed that the FMIR was included in the inventory but the rating assigned to tribal lands is no longer available from the BLM (Staff, Lake Havasu BLM Office, personal communication).

There is no reservation-specific visual resource analysis of tribal lands except for the 4,000 acre Aha Macav site in Nevada, which was performed by the tribe using a modified application of the BLM system.

3.8.4.2 Methodology for Visual Resource Assessment

The BLM has a VRM assessment methodology developed specifically for arid landscapes such as the Mohave Valley, in which all three alternative sites for the proposed Southpoint power plant are located. Because the BLM's methodology is both well-known and appropriate to evaluation of the scenic resources of desert landscapes, a simplified application of the BLM's VRM system was used in evaluating the visual quality of the three alternative sites, and to evaluate visual effects of the proposed power plant. (See Section 4.8.4 for visual impact assessment).

The BLM's methodology consists of identifying three elements which are ranked and rated to evaluate the visual quality of the landscape:

a) the scenic quality of the landscape;

b) the visual sensitivity of the resource as measured by the volume of users and the duration of observation; and

c) the distance between the users and the landscape elements involved.

The BLM's classification of scenic quality is based on criteria like diversity and distinctiveness, which consider factors such as color, form, line, or texture. Visual sensitivity is based on the capacity of the landscape to absorb alteration without losing visual character.

Visual sensitivity has three classes - high, medium, and low. Measurement is based on four criteria. The first involves the view from key positions. The second is likely viewer attitudes about any changes taking place in the natural landscape. For example, major peaks, water bodies, rock outcrops, and enframed views are likely to focus viewer attention strongly, which would increase viewer sensitivity to change. The third criterion concerns the number of people that are likely to be conscious of an intrusion into the landscape. Lastly, the fourth factor is the time for which the feature, intrusion, or interruption is viewed by the user.

Distance from the viewer to the object viewed is an important factor in assessing landscape quality and sensitivity to change. The visual impact of human activities in the landscape is usually greatest when viewed from close range, and decreases as distance increases. The distance criterion also has three subdivisions. One is the fore and middle ground which extends from the viewer's location for three to five miles. The second is the background zone, ranging from three to five miles out to 15 miles. The third is the seldom seen zone, which covers the zone beyond 15 miles, and any lesser distance from which the landscape feature is concealed.

These criteria are evaluated to arrive at an appropriate landscape quality classification. Classifications range from Class I, landscapes with the highest visual quality, to Class V, degraded landscapes. Changes to the existing landscape would be most intrusive in a Class I landscape, while alteration of a Class V landscape could improve its scenic quality. Class II through Class IV landscapes generally can absorb some degree of change without significant loss of visual quality.

3.8.4.3 Visual Character of the Mohave Valley

The Mohave Valley is a distinct spatial unit with generally high visual quality. The enframing mountain ranges enclose the vast space of the valley floor, providing sharp contrast in form, scale, color, and texture to the flat valley below. Figure 3.8-3 shows the Dead Mountains to the west are less than four miles away from the river yet in excess of 3,000 feet. The Black Mountains some 10 miles east of the river rise to over 4,000 feet. The Colorado River is not generally visible except at close range, nor is its channel defined by the galleria forest typical of natural streams. The river, therefore, is not a major component in the visual experience of the Mohave Valley. Erosion of surrounding

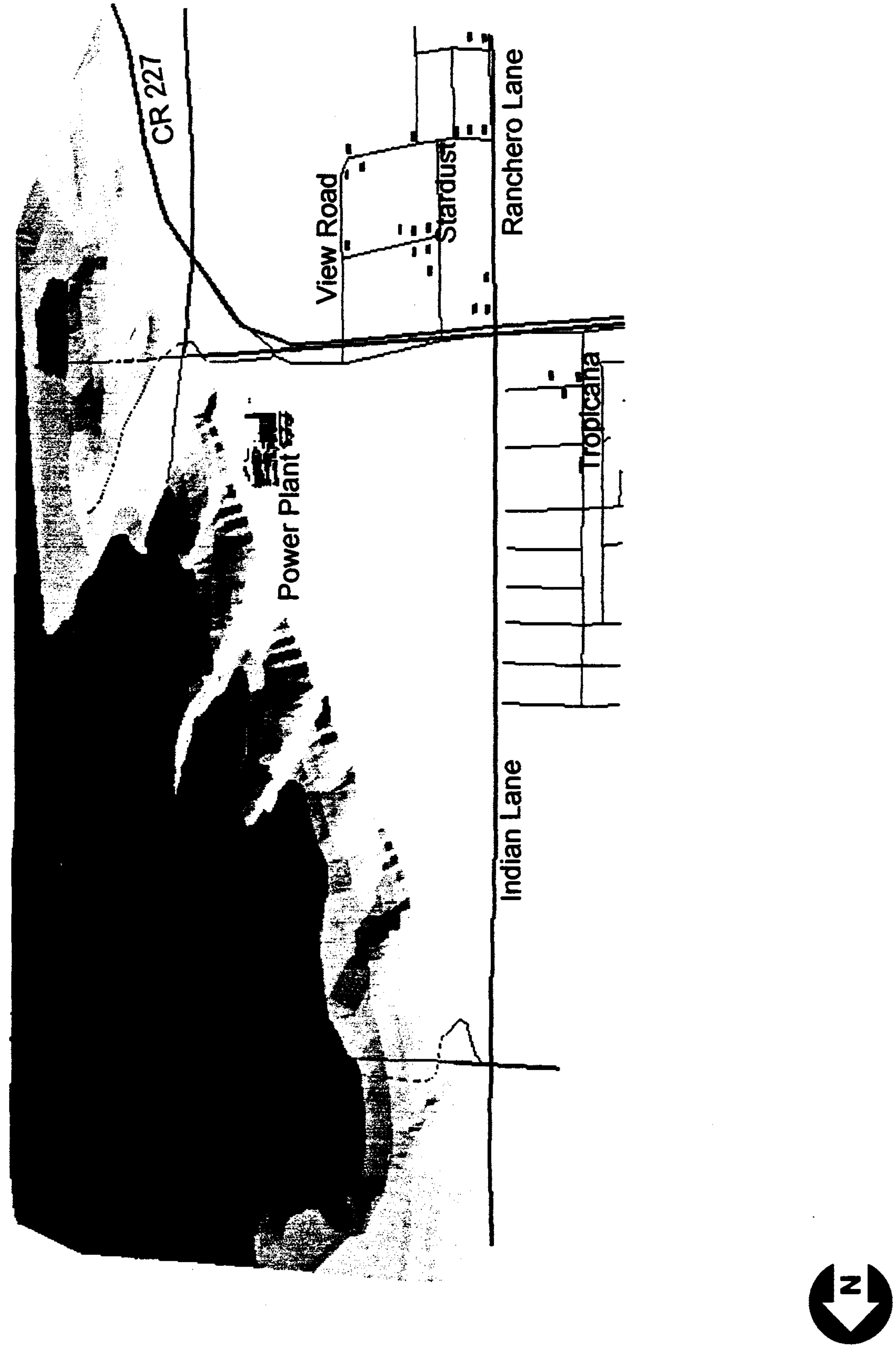

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Figure 3.8-3 Terrain Model Diagram

mountain ranges has deposited vast alluvial fans, or bajadas, of alluvial debris. These bajada landforms are a defining feature of the area's visual character. They create a visual transition between the mountain ranges and the valley. The river's often migratory course and historic pattern of flooding has cut into the alluvial fans, leaving locally rugged river bluffs and terraces rising abruptly from the valley floor. These land forms are shown on Figure 3.1-2. The bluffs can be as much as 150 feet high.

Much of the reservation consists of flat river bottom lands and does not contain strong visual features. Color is an exception. The extensive irrigated agricultural fields on the reservation create an oasis-like appearance, juxtaposing large expanses of green with the subtly-hued exposed rock and soil of the mountains and natural desert.

The immense space of the Mohave Valley is its strongest visual element. Within that space, other visual elements provide diversity but do not compete with space for visual dominance. Long vistas and panoramas define the visual experience. The large scale of the valley and its defining mountain ranges dwarfs built elements such as housing subdivisions and shopping centers.

3.8.4.4 Visual Assessment of the Alternative Sites

As can be seen in the generalized geologic cross section of the Mohave Valley (Figure 3.1-2), there is a common land form on each of the three the alternative sites. Their topography is defined by the historic floodplain of the Colorado River, and bluffs cut into the alluvial fan by the river. The bluffs rise steeply on all three sites, reaching an elevation of 600 feet above MSL or more in a horizontal distance of as little as 200 feet. In the far distance, the Black Mountains are visible, rising several thousand feet above the bluffs.

The bluffs are generally vegetated with a mixture of desert species which are typical of the region. The dominant vegetation color is olive green. Vegetation density is sparse on the slopes, revealing the underlying pale yellow to tan color of the soil and desert pavement. The color is uniform and reflective.

Scenic values in the vicinity of the alternative power plant sites are not as high as for the Mohave Valley as a whole. This is because of the closer viewing range to details in the landscape such as intrusive development, the greater distance from the verdant agricultural expanses near the river, and because of concealment of the framing mountain range by the rise of the bluffs in the foreground. There is a general lack of cohesion to intimate views when compared to large vistas. In the vicinity of the three alternative sites, details dominate what is seen, rather than the harmonious blend of landform and sky into a vast space which dominates panoramic views of the valley.

Visual resource assessment techniques take the duration of view and number of viewers, as well as what is seen, into account when evaluating a particular landscape's sensitivity to alteration. For example, some 15,000 to 20,000 people view the entire southern Mohave Valley each day as they drive north and south along SR 95. Because of this large number of viewers, and the long duration of their viewing time while driving, the panoramas and vistas of the Mohave Valley are relatively sensitive to very large scale visual alterations, for example, permanently flooding the valley floor, or removing large areas of mountain side, say, by mining. Smaller scale alterations, such as buildings or subjugation of new farmland, attracts little viewer attention against the large scale of the surrounding landscape, which is everywhere visible and dominant.

More localized views occur when the viewer is closer to the object viewed, or when the viewers relation to one of the Mohave Valley's landforms, such as bluffs or bajadas, interrupts views of the valley as a whole. Under these conditions, foreground views dominate, rather than the background views typical of the Mohave Valley's visual character. Such localized and more focused views occur for residents of homes, who are stationary, and for travelers who traverse the valley landscape on roads which are aligned east and west, across the narrow width of the valley rather than north south, which allows views of the valley's more than 20 mile length.

For stationary viewers, and travelers oriented toward more localized, foreground-dominated views, alterations to the existing landscape are relatively more apparent than for viewers of the entire valley. Localized, foreground-dominated views are experienced by much lower numbers of viewers, and, generally for shorter viewing times, than panoramic, background-dominant views. The lower number of viewers, and shorter viewing duration of localized, foreground-dominated views offset the greater perceived intrusion of landscape alterations when evaluating landscape sensitivity to change using BLM VRM rating criteria. These latter conditions characterize all three of the alternative sites of the proposed Southpoint power plant, each of which lies within a localized, foreground-dominant viewing area when seen by stationary or east - west travelers. Conversely, each of the three alternative sites is in the middle to background distance when seen by many travelers for long durations, and again falls into a low sensitivity to change category.

3.8.4.4.1 Preferred Alternative Site - Section 8

The visual character of the Preferred Alternative site's landscape is typical of the entire eastern margin of the Mohave Valley. It consists of a level foreplain with steep bluffs beyond it. (See Figure 3.8-3, Terrain Model Diagram.) The fire which destroyed existing vegetation and left burned trees standing lowered the visual quality of the site. Desert plant communities reestablish themselves slowly because of the harsh environmental conditions. It would require decades for a mature plant community to recur on the site which would approximate the visual conditions which existed before the fire (George Ruffner, EcoPlan Associates, personal communication, 1997). Approximately 50 per cent of the site is Class V, degraded. The remainder is Class III, or average visual quality.

The Preferred Alternative site is immediately adjacent to CR 227. Based on traffic volumes, the site is viewed by approximately 2,000 motorists a day. Because of screening provided by the highway's location in relation to the site (the county road makes a right angle curve as it passes the site's south boundary), by roadside vegetation, and by landform, the duration of view would be approximately one minute for motorists traveling west, and five minutes for motorists traveling east. The residents of Topock Lake Ranches, although few in number, have relatively longer duration views, depending on the location of individual residences, and/or orientation of residential streets.

Visual sensitivity of the Preferred Alternative site is moderately low although it is in the foreground for viewers traveling on Topock-Davis Dam Road. The moderately low rating is based on the short viewing duration, lack of key viewing positions, the oblique angle of view from the road, and lack of focus in the context of a common landscape type. The sensitivity is lowered also by the fact that travelers moving from east to west have an exceptionally short viewing period of the Preferred Alternative site, although west to east travelers have a longer view time.

Stationary viewers in the scattered residences near the Preferred Alternative site may have long duration views, depending on the location and orientation of the residence, but the number of viewers is very low, again resulting in a moderately low visual sensitivity rating for the site.

3.8.4.4.2 Alternative Two Site - Section 30

The Alternative Two site consists almost entirely of bluffs which rise above the old floodplain. The site's location 3.5 miles east of SR 95 places it in a middle viewing range for travelers on this road. A minor rural road provides access to the site; views for eastbound travelers on this road focus on the site, which is the terminus of the road. Although the site is highly visible, viewer volume is very low. Some area residents in the low-density housing in the vicinity may have long duration focused views, depending on the orientation of individual residences. Because of relatively low number of viewers and the common character of the site, visual sensitivity is moderately low. The site is Class III, average visual quality.

3.8.4.4.3 Alternative Three Site - Section 16

The Alternative Three site is 4.5 miles east of heavily traveled SR 95. The site occupies a mid- to background zone for viewers traveling SR 95 under BLM's system of visual classification. Viewing duration for southbound drivers is approximately two minutes. Northbound viewing duration is much shorter because of intervening landforms; estimated viewing time is 30 seconds. The site abuts CR 227 on its northern edge. User volumes on the county road are low. The same fire which swept the Preferred Alternative site also consumed vegetation on the Alternative Three site, destroying the vegetative screen which concealed the site interior from view. Views of the site from the county road are in the foreground. Viewing duration is short because of the road's curvature as it passes the site. The site has visual characteristics typical of the area, and is a common landscape of average quality which has been degraded by loss of vegetation from the fire. Given these factors, overall visual sensitivity is moderately low. Fifty per cent of the site is Class V, degraded. The bluffs, which did not burn, are Class III, average visual quality.

4.0 ENVIRONMENTAL CONSEQUENCES

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Land Resources

4.1.1 Topography and Physiography

4.1.1.1 Preferred Alternative Site - Section 8

Construction of a power plant on the Preferred Alternative site would require alteration of the existing topography. Creating a building pad for the proposed power plant and related structures would require substantial cut and fill to elevate the pad above flood hazard levels.

Most of the natural site elevation is above 458 feet above mean sea level, with some above 460 feet. Fill to elevate the site to 467.5 feet (which would be above the 100 year flood level--see Section 4.1.4) would average about nine feet. Fill, including 12 per cent shrinkage, would be 1,000 cubic yards per 4,000 square feet of the area of the site to be filled. The 15 acre plant equipment pad has an area of 653,400 square feet. It would require approximately 245,000 cubic yards of fill to raise it 10 feet above its present elevation.

In order to retain on site any stormwater which would be displaced by the elevated building pad and impervious surfaces such as roadways, retention basins would be excavated (See Section 4.1.4). Material removed would be used as fill for the building pad. The estimated quantity which excavation of the storm water retention basins would yield is 304,920 cubic yards. This quantity, less 36,590 cubic yards as a 12 per cent shrinkage factor, would result in a net excavated quantity of 268,330 cubic yards. Material not required for the building pad would be used for roadways and other site development.

Cut and fill would be balanced, that is, no import or export of material would occur. The existing grade would be lowered approximately six feet over a 30 acre area which would be excavated for stormwater retention basins. The existing grade would be raised approximately seven to eight feet over a 15 acre area which would require fill to create a building pad above the 100 year flood hazard. Approximately six-tenths of an acre would similarly be raised to create a roadbed connecting Davis-Topock Dam Highway and the building site.

Additional alteration to site topography would occur on top of the bluffs to create the process wastewater evaporation pond. A 30 acre site would be excavated to a depth of six to 10 feet and the material removed would be used to build a containment berm around the pond. A road connecting the power plant site and the evaporation pond would be routed along the north side of the middle arroyo which cuts from the top of the bluffs to the valley floor. Alteration of the arroyo would be minor because of its moderate gradient. No high roadcuts would be required for construction. Approximately one-half acre would be regraded to create the roadway. With the exception of the proposed road along the edge of the arroyo, all topographic alteration would occur within the nearly level valley floor. No alteration to the face of the bluffs would be required for construction of the proposed power plant and related facilities.

Proposed topographic alterations would have no significant impact on offsite properties, or on vegetation, wildlife, cultural resources, or other resource values on the Preferred Alternative Site.

4.1.1.2 Alternative Two Site - Section 30

The Alternative Two site has limited flat land available for development. Much of the potential building area is over 500 feet in elevation. The face of the bluffs would have to be cut and recontoured to accommodate the 15 acre plant equipment site. Construction of the proposed Southpoint power plant would, therefore, have significant impacts on site topography. Significant cut and fill would be necessary to provide an adequate area for construction. The natural profile of the alluvial terraces would be changed within the envelope of construction as a result of the need to provide a suitable building pad, a berm around the evaporation pond, and access roads which are above possible flood elevations.

4.1.1.3 Alternative Three Site - Section 16

Construction of the proposed Southpoint power plant on the Alternative Three site would require substantial amounts of cut and fill to provide an adequate building area that is above the 100 year flood elevation. Cut and fill would be balanced, so that no import or export of material would be required. The proposed topographic alterations would have no significant impact on offsite properties, or on the onsite vegetation, wildlife, cultural resources, or other resources values.

4.1.1.4 No Action Alternative

The No Action Alternative would not affect the topography or physiography of the Preferred Alternative site or of Alternatives Two or Three. The natural landform would remain in its present state. No impacts of any kind would occur except those resulting from natural processes of erosion and deposition.

4.1.2 Geologic Resources

4.1.2.1 Preferred Alternative Site - Section 8

There are no geologic features of note on the Preferred Alternative site. Impacts on geologic resources would be minimal and would be limited to the excavation and placement of unconsolidated sand and gravel which would be used for creating building pads above flood elevations. Because cut and fill would be balanced on the site, sand and gravel resources would not be depleted from other reservation sources which are being mined, or could be mined. No significant impacts to site geologic resources would result from construction and operation of the proposed power plant.

Sand and gravel resources from reservation extraction on sites, or other local sources, would be required to produce concrete and asphalt for plant construction and roads. Such rock product resources are abundant in the Mohave Valley. No significant impacts to these off-site geologic resources would result from construction and operation of the proposed power plant.

4.1.2.2 Alternative Two Site - Section 30

There are no geologic features of note at the Alternative Two site. Impacts on geologic resources like sand and gravel would be limited to the resources available on the site because cut and fill would be balanced, and there is adequate material onsite to create suitable building pads above flood hazard. There is abundant sand and gravel available locally to supply rock products required for concrete and asphalt. No significant impacts would result to onsite or offsite geologic resources if the proposed Southpoint power plant were built.

4.1.2.3 Alternative Three Site - Section 16

The Alternative Three site contains no noteworthy geologic features. Sand and gravel would be excavated and placed to create building pads above flood elevations. There is adequate material onsite to meet this need because cut and fill would be balanced. The tribe's commercial sand and gravel operation, or off reservation sources, have adequate supplies of rock products to meet construction needs. Rock products for construction occur in abundance throughout the Mohave Valley, so the impact in this context would be not be significant.

4.1.2.4 No Action Alternative

A No Action Alternative would not affect the geologic resources of the proposed project area in any way. Unconsolidated sand and gravel would remain undisturbed except for natural erosive and weathering actions. No rock products would be required for concrete and asphalt.

4.1.3 Soils

4.1.3.1 Preferred Alternative Site - Section 8

Detailed investigations of soil characteristics, including bearing capacity, would occur before site preparation could start. The Gadsden and Kofa silty clays which occur on the site of the Preferred Alternative site have low to moderate shrink-swell potential. Low to moderate shrink swell potential is a common condition which could be accommodated through appropriate design engineering of the proposed Southpoint power plant. This factor, therefore, is not significant. Both of these soil types are subject to moderate wind erosion hazard, so that a significant increase in aeolian erosion could occur on areas disturbed during construction. Best Management Practices would be implemented to prevent blowing dust during the construction period. The soils at the plant site would be covered by compacted fill, landscape plants, decorative rock, or paving after construction, which should eliminate any type of erosion hazard.

The Farmland Protection Policy Act of 1980 (PL 97-98) requires consideration of impacts to prime agricultural soils which would result from implementation of a proposed project. Prime farmland soils cover much of the Mohave Valley floodplain. Approximately eight acres of prime Indio (13) soils occur in the southwest comer of the proposed lease area. This portion of the site would not be developed, and would remain as an undisturbed buffer area. Therefore, no impacts to prime soils are anticipated.

4.1.3.2 Alternative Two Site - Section 30

Detailed investigations of soil characteristics, including bearing capacity, would occur before the start of site preparation. The Rositas, Superstition, and Torriorthents families of soils which occur on this site are susceptible to wind erosion and Best Management Practices would be implemented to prevent blowing dust during the construction period. The soils at the plant site would be covered by compacted fill, landscape plants, decorative rock, or paving after construction, which should eliminate any type of erosion hazard.

No prime soils occur on the Alternative Two site; therefore, no significant impacts to prime agricultural soils would occur.

4.1.3.3 Alternative Three Site - Section 16

Detailed investigations of soil characteristics, including bearing capacity, would be needed before site preparation could start. Temporary wind erosion could occur during construction and Best Management Practices would be implemented to prevent blowing dust during the construction period. The soils at the plant site would be covered by compacted fill, landscape plants, decorative rock, or paving after construction, which should eliminate any type of erosion hazard.

There are no prime agricultural soils located in the lease area so that the loss of soil resources would not present a significant impact on this alternative site.

4.1.3.4 No Action Alternative

The no action alternative would not affect soils of the project area in any way, other than subjection to presently occurring natural forces of wind and water erosion.

4.1.4 Natural Drainage and Floodplain Determination

Executive Order 11988 (1977) addresses floodplain management. This Executive Order is not applicable to the proposed construction of the Southpoint power plant because it is not a federal project. The proposed power plant is a private action on sovereign Indian land. Nonetheless, the directive of Executive Order 11988 to "avoid adverse impacts and incompatible development" within areas subject to 100 year flood inundations and "to modify or design the project in such a way that minimizes potential harm to or within the flood plain" (30

BIAM Supp. 1, Illus. 5, p.5) has been considered in the following analysis of environmental consequences. Stormwater would be retained onsite in retention basins. An NPDES permit would be required if there is a discharge offsite. However, such discharge is not anticipated.

4.1.4.1 Preferred Alternative Site - Section 8

The proposed Southpoint power plant would be located on the relatively flat former floodplain of the Colorado River at the base of the bluffs which form the eastern half of Section 8. A drainage and sedimentation report was prepared by Gookin Engineers in July, 1997, to assist in plant siting and flood hazard protection. Flood hazard is presented by three sources: washes draining from the bluffs onto the site; sheet flow draining south through the Mohave Valley; and Topock Marsh. These three sources can act either in isolation one from the other, or cumulatively, depending on the circumstances.

There are three drainages exiting the bluffs onto the floodplain. These drainages have the potential to carry significant volumes of sediment-laden runoff during a 100 year flood event. A 100 year flood event for the locale of the proposed power plant is defined as one which discharges 12,000 cfs (Allen Gookin, PH, Gookin Engineers, personal communication). The largest wash enters Section 8 from the east at the southern boundary of the section. This wash has a peak discharge of 2,055 cfs during a 100 year storm, or a volume of 485 AF flowing onto Section 8 during a 23 hour period. The two smaller washes yield a combined 469 cfs, or 80.6 AF during a 23 hour period. It is probable that all three washes would flow at once, producing a combined total of 565.6 AF. For comparison, this volume of water would cover the entire half section (320 acres) of the proposed Calpine lease to a depth of 1.77 feet if it were all contained onsite. In reality, incoming storm flows would partially pond in the lowest areas of the undisturbed site, and partially flow through the site to lower lying areas beyond.

In addition to storm water volume, storm water velocity must be considered. Because of the steep gradients of the washes, velocity is expected to be high, with significant potential erosive force. To protect site structures, armored berms would be required to divert flows, and prevent erosion. Armoring could be in the form of concrete or riprap. The proposed road connecting the power plant site and the evaporation pond located on top of the bluffs would require culverts sized to pass anticipated storm water volumes where the road crosses the toe of the bluffs. Other structures, such as pipelines or buried cable would similarly require design engineering to accommodate anticipated storm flows.

To avoid potential adverse flood impacts to offsite lands, Arizona law mandates that a developed site may not pass more stormwater than exited the site in its pre-development condition. Because the Preferred Alternative site is on tribal land, Arizona law is not applicable. However, FMIT development policy respects the Arizona law regarding passage of stormwater to offsite properties (John Algots, Physical Resource Director, personal communication, 1998). The Southpoint power plant site would be designed so that the rate and volume of stormwater exiting the site would not exceed pre-development conditions. Construction of the proposed Southpoint power plant would require development of approximately 78 acres for equipment, buildings, evaporation pond, and internal roads. Storm water retention basins sized to accept the volume of water displaced by this development would be required. An estimated 189 AF of displaced water would need to be retained, based on a 100 year storm event (Gookin Engineers, 1997, p. 3). This volume could be accommodated in a basin, or basins, with an area of 30 acres, and a depth of six feet. The retention basin(s) would be located west of the power plant equipment compound.

Incoming storm water draining from the north as sheet flow is a second source of flood waters. The amount of water draining from the north is not known and cannot be predicted with accuracy because of continuous alteration of drainage patterns by large scale land development. The entire natural drainage pattern of the Mohave Valley has been altered since the 1960's when the river was channelized and water which once could drain into the river was prevented from doing so by the levees. Numerous other drainage alterations have occurred on large and small scales. Nonetheless, Section 8's location at the southern end of the valley places it at the low point of the drainage system, only slightly higher in elevation than Topock Marsh immediately to the south. This fact has been considered in calculating flood elevations for a 100 year storm.

The potential for overflows from the marsh, as well as the impounding effect of the dike across the marsh's north end, have been estimated. It is possible that the water level in the marsh could rise to a level which would overtop the North Dike, spilling onto the county road and the Preferred Alternative site. For this to occur, the elevation of the Colorado River would have to exceed those which were recorded in the 1983 flood of record. This possibility is considered slight, and, therefore, flood hazard from Topock Marsh is not significant. Water draining to the south could be impounded by the North Dike of Topock Marsh, which would prevent water from draining into the marsh. Water so impounded could back up to cover the county road and re-enter the Preferred Alternative site. The risk of such an occurrence is considered slight, and therefore is not significant.

It is estimated that the plant would need to be at elevation 467.5 feet or higher to be above flood hazard. Raising the built areas of the site to this elevation could be accomplished using fill originating onsite. (See Section 4.1.1.1 for discussion of cut and fill requirements). Placement of adequate fill to achieve this elevation is a component of the proposed Southpoint power plant's design. Some natural drainage patterns would be altered. Engineered drainages would be designed to divert water around the proposed plant to reenter the larger wash in the flood plain at the toe of the bluffs. Site design would result in no change to preconstruction flows. The volume and velocity of water exiting the site would be unchanged because water displaced by built areas would be retained temporarily onsite and allowed to drain offsite at a predicted rate.

With no drainage work, the site fill would force low drainage flows (below 462 feet) northward around the fill, to the western side of Section 8. Although no flow would be added, it is possible that acceleration of the runoff may affect the developed portions of the Southeast Quarter of Section 7 and the West Half of Section 17, and the tribal farming operation being developed in Section 18. Above 462 feet, overflow of the paved road would send part of the flow south toward Topock Marsh. The accelerated rate of runoff would be significant, and would require mitigation through drainage design of onsite stormwater retention basins. Any increase in runoff resulting from site development would be retained in stormwater basins located on site and allowed to percolate or evaporate. Stormwater retention basins are an integral part of the proposed Southpoint power plant's site development engineering. Therefore, no significant impacts to stormwater discharge would occur.

A pad elevation of 467.5 feet would provide 1.5 feet of freeboard above the 100 year flood. Floods above the 100 year would spread over a very large area before reaching elevations greater than 466 feet. With placement of fill to raise the building site at or above 467.5 feet, damage from a 100 year flood should be limited to erosion along the east side of the site, and possibly the north side. Access to the site would be limited during the flood by one foot or more overtopping of the county road, which has a 461.5 feet elevation at the southwest corner of Section 8. The period during which the road would be flooded is estimated not to exceed three days, based on previous observation of intense flood events (John Algots, FMIT Physical resources Director, personal communication). If a flood with a magnitude of four feet above the 100 year flood were to occur, the site would be inundated and erosion could be expected. Equipment damage would be minimal unless foundations are undermined by the current. Currents should not be severe unless even higher flood levels are reached.

Based on this analysis, there is a flood hazard presented by water carried in drainages, and from sheetflow, on the Preferred Alternative site. Flood hazard would be eliminated by project design which would raise building pads above the 100 year flood elevation. Substantial alteration to natural drainage patterns would occur onsite; however, no significant impacts to offsite drainage patterns, or stormwater volumes, would result from construction of the proposed power plant and associated facilities because pre-development rate and volume of stormwater flows would be maintained by the proposed retention basins which would be appropriately sized to contain displaced water, and designed to regulate outflows.

The 1983 flood of record did not overtop the Colorado River levees. Dikes containing Topock Marsh were raised to their present height, and were not overtopped, either. It is therefore presumed that no ordinary flood hazard is presented by the Colorado River. Although it is theoretically possible to have a conjunction of conditions which would result in a MPF which would overtop the river's levees and Topock Marsh's dikes and flood the entire Mohave Valley, the probability is remote, and, therefore, not significant. Risk from such a flood magnitude cannot be eliminated by site design. It is a risk which must be accepted like any other natural disaster, and therefore is not significant.

4.1.4.2 Alternative Two Site - Section 30

The Alternative Two site is the most northerly of the three alternative sites. No hazard of backwater flooding from Topock Marsh is present on this site because of its northerly location several miles from the marsh. Also, no risk of flooding from water impounded by the north side of North Dike would affect this site because of its distance from the marsh. Somewhat less hazard from water draining north to south down the valley exists because less drainage area lies to the north of this site than the other two. Significant site alteration would be required to provide protection against 100 year flood hazard, and to provide for onsite retention of displaced storm flows. Fill would be required to create a 15 acre building pad above the 100 year flood level. Retention basins sized to contain storm water displaced by the building pad would be required. Excavated material from the retention basin would be used as fill to elevate structures above hazard level, and to provide berms around the evaporation pond. Flood hazard would be somewhat less than on the Preferred Alternative site, and it is unlikely that access from Hulet Road would be disrupted by flood waters in the event of a severe storm. Nonetheless, the Alternative Two site is subject to flood hazard. Flood hazard would be eliminated by project design which would raise building pads above the 100 year flood elevation. Natural drainage patterns would be altered substantially on site, but no significant impacts to drainage patterns or stormwater volumes offsite would result from construction of the proposed power plant. Predevelopment flow rates and volumes would be maintained by the proposed retention basins.

4.1.4.3 Alternative Three Site - Section 16

The Alternative Three site is generally the lowest in elevation of the three possible power plant sites. A slightly greater risk of flood from backwater rising out of Topock Marsh exists because the Alternative Three site is the closest of the three sites. Risk from water impounded against the North Dike also exists, and is somewhat greater than for the Preferred Alternative site because of the Alternative Three site's immediate proximity to the marsh. Flood hazard would be eliminated by project design which would raise building pads above the 100 year flood elevation. Construction of the proposed power plant would require raising building pads and other site features above the 100 year floodplain by using fill material excavated on site to create the evaporation pond and retention basins. Adequate fill is available to raise all structures above the 100 year flood level. Natural drainage patterns would be altered substantially on site, but no significant impacts to drainage patterns or stormwater volumes offsite would result from construction of the proposed power plant. Predevelopment flow rates and volumes would be maintained by the proposed retention basins.

The Alternative Three site is very similar in location and elevation to the Preferred Alternative site, and the Colorado River does not present an ordinary flood hazard. The unlikely possibility of an MPF would affect this site, and could not be eliminated by project design.

4.1.4.4 No Action Alternative

There would be no impacts on drainage patterns if the project were not built. Existing conditions would remain unchanged. All three alternative sites would remain subject to their present level of flood hazard.

4.1.5 Other Hazards and Nuisances

4.1.5.1 Sedimentation

4.1.5.1.1 Preferred Alternative Site - Section 8

The natural geomorphological processes which formed, and continue to alter, the Mohave Valley transport and deposit great quantities of sediment. Sediment management is a necessary part of project planning in the area. If the proposed power plant were to be built on the Preferred Alternative site, it would be necessary to determine, and provide mechanisms, to deal with the large sediment loads that would continue to be deposited by existing natural transporting flood flows. Siltation from the escarpment face and from ephemeral washes may be a problem after heavy rain. Construction and operation of a power plant on this site would not alter the natural sedimentation processes, but would have to accommodate this phenomenon in siting and design decisions. Sedimentation is a significant hazard feature which results from the proposed location of the plant on the floodplain just below the alluvial fan escarpment. It is significant for two reasons. First, accumulating sediment has the potential to clog proposed drainageways and storm water retention facilities. This would impair their capacity to provide protection against flood hazard. Second, the anticipated volumes are large, and would have to be removed periodically and transported to an offsite location.

Sediment is estimated to comprise 10 per cent of the total volume of storm water (Gookin, 1997, p.2). The volume of sediment which will be transported onto the site by the three entering washes during a 100 year storm event totals 2.5 million cubic feet, or 278,000 cubic yards, if the entire volume of sediment settled out and deposited on site. For comparison, this would equate to approximately two inches deposited evenly on the entire 320 acres of the proposed lease area. Practically, no sediment would be deposited on the bluffs, so that the sediment would be laid down on the part of the site which was once floodplain. Removing the estimated 78 acres of this flat land which would be occupied by the plant equipment and buildings, the evaporation pond, retention basin(s), and internal roads, the sediment would be deposited on the remaining 85 or so acres. Depth of sediment would be approximately 7.5 inches. This deposited sediment would have to be removed periodically in order to maintain the capacity and function of onsite drainage and retention structures. The sediment would be hauled to landfills or construction projects needing clean fill.

Construction practices and routing all sediment laden water to the proposed retention basin(s) would eliminate any risk of increased quantities of sediment being transported off site by stormwater. Berms and other water diversion structures would be armored to prevent erosion which could contribute to the natural sediment load. With implementation of these project design features, no significant impact to existing siltation processes would result from construction and operation of the proposed power plant.

Its periodic removal would result in offsite impacts to locations to which it could be trucked and spread. Trucking would probably occur sporadically, and over an extended period of time. The frequency and volume of removal would depend on the frequency and intensity of storm events. Severe storm activity which would result in significant sediment transport onto the site may not occur for decades, and would probably occur only one time, or not at all, during the life of the proposed power plant. If a 100 year storm event deposited the maximum anticipated 278,000 cubic yards of sediment, it would require approximately 13,500 truckloads to remove it to offsite locations. This number assumes that approximately 25 cubic yards could be transported per 10 wheel belly dump truck. Onsite impacts would include fugitive dust emitted during sediment excavation activities. Trucking activity will be scheduled to minimize offsite traffic impacts by conducting removal over long periods, such as 12 months or more, and by timing trips to coincide with off peak traffic hours. Other offsite impacts are also anticipated to be minor, as there are many potential beneficial uses for the material, such as cover in municipal landfills, or fill at construction sites or farm fields. With trucking scheduling which responds to traffic conditions and redistribution of the sediment to appropriate offsite locations, impacts would be less than significant.

4.1.5.1.2 Alternative Two Site - Section 30

Site conditions on the Alternative Two site are similar to those which occur on the Preferred Alternative site. The bluffs on this site drain less storm water than on the Preferred Alternative site, and therefore would transport somewhat lower sediment loads. In general, the same natural conditions, and the need for siting and design response to manage sediment, would be required. Deposited sediment would need to be removed periodically to maintain the function and integrity of site structures. The site would not generate sediment that could be transported to another location. Construction practices, and design of site features, would prevent the erosion which produces sediment. Sedimentation is a hazard on the Alternative Two site which would be dealt with through project design and sediment removal strategies. Impacts to existing sediment production, or to offsite locations where sediment would periodically be transported would not be significant.

4.1.5.1.3 Alternative Three Site - Section 16

The Alternative Three site has less sediment transport activity than the other two alternative sites because it has no major contributing washes, and because the geometrics of Topock-Davis Dam Highway interrupt natural drainage patterns. Sediment deposition would be minor. Site development and operation would not produce sediment which could be transported to other locations. Best management practices to control erosion would eliminate sediment production and transport. Sediment would not be a major hazard or significant impact.

4.1.5.1.4 No Action Alternative

Under a no action alternative, natural processes of sediment formation, transport and deposition would continue unaltered on all three alternative sites. No impacts would result.

4.1.5.2 Seismicity

All building components in Seismic Zones 2, 3, and 4 must be deigned to resist the effects of seismic forces and the effects of gravity loadings from dead and live loads. For example, all parts of a structure, need to be interconnected and the connections must be capable of transmitting seismic forces. Concrete frames which are required by design to be part of the lateral force-resisting system must be intermediate moment-resisting frames in Seismic Zone 2. The UBC (1991) also refers to making provision in certain circumstances for the effects of earthquake forces acting in a direction other than the principal axes. The three alternative sites each have the same seismic risk factors: bluffs which could shear, and unconsolidated floodplain sediments which could become unstable because of their lack of cohesion. Evaluation of the particular risks posed by topography and soils would require engineering assessment and appropriate design response as required by applicable building codes and standards of professional practice. Implementation of appropriate engineering design features would reduce potential impacts to below levels of significance.

A No Action Alternative would not require risk assessment or engineering design response.

4.1.5.3 Liquefaction

All three sites have some slight risk of liquefaction. Risk is low because it is unlikely that the exact combination of circumstances which could lead to liquefaction would ever occur in the area, or on any of the alternative sites. A risk assessment and appropriate engineering design response, if any, would be made as required by applicable building codes and standards of professional practice. Implementation of proper design features would reduce potential impacts to below significance.

A No Action Alternative would not require risk assessment or engineering design response.

4.1.5.4 Dust Storms

Dust storms are a naturally occurring area phenomenon. Site management practices such as soil surface compaction of the retention basin(s) and paving internal roads would prevent significant quantities of fugitive dust from originating onsite during a storm event. Approximately 15 acres of any of the three alternative sites would be paved, reducing potential dust sources. Construction and operation of a power plant on any of the three alternative sites would have no significant impact on dust storm intensity.

Under a No Action Alternative, natural dust storms would continue to occur sporadically, as they do at present.

4.2 Air Quality

The following discussions regarding the potential impacts to air quality resulting from the proposed Southpoint power plant are a summary of data and air quality modeling analyses performed under an approved USEPA workplan (Workplan) to prepare a PSD Application for the project (Appendix B). Although the permit application for the project has been withdrawn at this time, meteorological data, existing regional air quality data, plant processes analyzed, assumptions utilized in the model, and the modeling protocol were approved as part of the USEPA Workplan (See Page 1-1, Appendix C, and Appendix E of Appendix C). Therefore, the following summary information and the data contained in Appendix C were prepared in coordination with the USEPA and can be utilized as a reasonable assessment of air quality impacts associated with the Southpoint power plant.

The USEPA maintains the authority for review and issuance of permits under the PSD program as the project is located on sovereign tribal lands. Sovereign Indian tribes are not subject to State jurisdiction. Therefore, State Implementation Plans (SIPs) for air quality are not applicable to Indian reservations. Section 301(d) of the Clean Air Act (CAA) authorizes tribes to be treated as states for purposes of implementing the CAA. Formal application requesting delegation of Federal authority must be made by a tribe to USEPA. The FMIT has not made an application for treatment as a state under the CAA. The USEPA (Region IX) directly administers the CAA on the FMIR, including the issuance of PSD permits and the enforcement of existing Federal standards (Doug McDaniel, Air Division, USEPA Region IX, personal communication).

4.2.1 Project Related Emissions

4.2.1.1 Project Initiation and Source Characterization

The air quality impact analysis contained in Appendix B characterizes source emissions, identifies regulatory applicability, presents representative databases required to appropriately define the baseline air quality characteristics of the proposed power plant's locale, and assesses the level and nature of potential air quality impacts associated with emissions which would be generated by construction and operation of the proposed power plant. The power plant components that would be potential emission sources for the power plant stack and any quantifiable fugitive sources that would generate emissions were identified in the Workplan. Potential emissions from the Southpoint power plant stack were developed from component manufacturer's specifications, data, and published technical sources. This information in conjunction with the analysis of 18 operating scenarios provided an estimate of pollutant emissions for the first operational year and for subsequent years of operation (nine scenarios for the first year, and nine scenarios for subsequent years). Meteorological data utilized for the dispersion modeling analysis of the emissions plume was coordinated with the USEPA and identified in the Workplan for the proposed project (See Appendix B, Section 5.2).

As identified in the air quality impact analysis, the Southpoint power plant project is categorized by the USEPA New Source Review (NSR) and PSD guidelines as a new emission source that would have the potential to emit more than 100 tpy of at least one regulated pollutant and is located in an attainment area for all criteria pollutants. The project site is on the FMIR, which is excluded from the USEPA designated PM_{10} nonattainment area in the Bullhead City area (see discussion in Section 3.2). The proposed Southpoint power plant has the potential to emit substantial amounts of nitrogen oxides, carbon monoxide, volatile organic compounds, and particulate matter (See page 1-2, Section 3.0, Appendix B). The proposed power plant's potential to emit sulfur dioxide would not be substantial, and, therefore, no further analysis is required.

4.2.1.2 Emission Inventory Compilation

4.2.1.2 Emission Inventory Compilation

Emission inventory for the proposed power plant includes a consideration of two major and different activities, construction and operation. Construction related emissions would include the following:

- Fugitive emissions from grading activities and paints, coatings and fuels.
- Tailpipe or vehicle exhaust emissions from construction equipment and worker commute trips.

Fugitive dust is particulate matter which is small enough to be carried by wind. Construction activities at the proposed project site would occur in three phases which include debris removal, site preparation, and general construction. Construction activities in these three phases that would potentially produce fugitive dust include disturbance of surface areas, uncovered storage piles of materials (soils or aggregates), movement of vehicles over unpaved surfaces and earth moving activities for cut and fill (Appendix B1, page 2-2). Fugitive dust emissions can vary substantially from day to day and are dependent upon the level of construction activity and prevailing weather conditions. As discussed previously, the project site is in an attainment area for PM_{10}. PM_{10} only comprises a portion of the total suspended particulate matter in the air.

The fugitive dust analysis assumed that construction of the proposed project will take approximately 20 months. The construction disturbance area was assumed to be a total of 95 acres (Appendix B1, p 4-1). Approximately 500,000 cubic yards of cut and fill will be placed onsite. The fugitive dust analysis included a 52 per cent control efficiency for the normal construction practice of spraying water to suppress dust during grading and other soil disturbing activities. Unpaved roads used during construction onsite would either be covered with crushed stone or sprayed with water. Project construction would potentially emit approximately 338 tons per year of fugitive dust. The inhalable particulates (PM_{10}) fraction of particulate emissions near a "fresh" emissions source is approximately one-third of the total particulate emissions (USEPA, 1985, AP-422, "Compilation of Air Pollutant Emission Factors, 4th Ed.). Therefore, PM_{10} emissions would be approximately 113 tons per year. This annual estimate is conservative as it is based on continuous construction activities occurring within a monthly time period.

During construction vehicles would generate exhaust emissions in addition to fugitive dust emissions. Table 4.2-1 summarizes the total anticipated CO, NO_x, SO_2, PM_{10} and VOCs (Ozone precursors) that would be generated by construction vehicles operating during project construction. Emission factors were obtained from USEPA AP-42 1985(a) and Supplement A, 1991.

For gasoline powered light, medium, and heavy duty trucks, late model vehicles of 1991 through present were assumed. The USEPA emissions factors for these vehicle types were converted to pounds/hour by multiplying the average speeds of the vehicles times the emission factor. For all diesel powered vehicles, the pounds/hour emission factors were used directly. Emissions from the diesel powered vehicles are not substantially dependent on vehicle speed.

The total tons of emissions per month in Table 4.2-1 were based on an assumed hourly vehicle use of 168 hours per month. The vehicle was assumed to work 21 days per month, 8 hours a day. For a conservative estimate, construction equipment was assumed to operate 200 hours per month and trucks were assumed to be operating at either 100 or 150 hours per month.

Operational emissions are expected to include the following:

- Stationary sources, which are identified in the Workplan and are estimated for the maximum potential to emit during the first year and successive years of operation. These emissions are presented in Table 4.2-2 and 4.2-3, respectively.
- Tailpipe or vehicle exhaust emissions from worker commute trips and deliveries to and from the site.
- Fugitive emissions from disturbed land and any other area sources exposed to the air.

It must be noted that, pending the permitting under the PSD program, the specific control technology that would be required at this site is unknown. Control technologies used for this analysis were derived through a preliminary BACT analysis conducted for the proposed project by Black and Veatch (Appendix B).

4.2.1.3 Modeling and Screening Level Analysis

Air dispersion modeling was performed for NO_x, CO, and PM/PM_{10}. The air dispersion modeling analysis was conducted in accordance with the USEPA air dispersion modeling guidelines (incorporated as Appendix W of 40 CFR 51) as well as the Workplan.

The dispersion modeling utilized the USEPA approved Industrial Source Complex Short-Term (ISCST3 Ver. 96113) computer model to predict maximum ground level emission concentrations associated with the project. The model was run in a screening level mode to determine the worst case operating scenario based on the maximum predicted one-hour concentrations and then in a refined mode to determine the maximum predicted impact concentrations. The worst case scenarios from the screening models for NO_x, PM/PM_{10}, and CO were then carried forward into the refined modeling.

4.2.2 Preferred Alternative Site - Section 8

4.2.2.1 Construction Impacts

4.2.2.1.1 Fugitive Dust

Construction activities would occur on and off for a 20 month time period. The fugitive dust particles are generally large and settle quickly and the majority is anticipated to settle out within the project boundary. Therefore, fugitive dust is anticipated to be negligible beyond the property boundary and would be less than the 338 tons calculated.

The anticipated incremental increase in fugitive dust within the Mohave Valley from the project site is not anticipated to be significant due to the sporadic and short term nature of the construction activities and the availability of dust control measures which could be added to watering down disturbed areas. These include soil stabilizers, covering materials piles, and revegetation. Cessation of earth work and other construction activities with the potential to emit dust when wind velocity is high is another available dust control measure. Calpine has indicated that its Best Management Plan would include cessation of earthwork when wind velocity reaches or exceeds 20 mph. Fugitive dust reduction of up to 90 per cent could be achieved with additional measures. Impacts would not be significant with implementation of fugitive dust reduction measures.

4.2.2.1.2 Exhaust Emissions

The anticipated incremental increase in construction exhaust emissions for CO, NO_x, SO_2, PM_{10}, and VOCs (Ozone precursors) within the Mohave Valley from the project site is not anticipated to be significant due to the sporadic and short term nature of the construction activities, and because construction activities occur frequently in this air basin without exceedances of the NAAQS.

4.2.2.2 Operation Impacts

The results of the refined air quality modeling for the first year and successive years of operation include the following information, the maximum predicted impact concentration for each criteria pollutant (except SO_x, which would be emitted in such small quantities as to be insignificant) expected from the project for the first and successive years of operation, and the modeled location for this impact. This information is presented in Table 4.2-4, which

Table 4.2-1 Exhaust Emissions Per Construction Vehicle*

Vehicle Type	Operation (hrs/mos)	Emissions: Carbon Monoxide lb/hr	Carbon Monoxide tons/month	Hydrocarbons lb/hr	Hydrocarbons tons/month	Nitrogen Oxides lb/hr	Nitrogen Oxides tons/month	Sulfur Dioxide lb/hr	Sulfur Dioxide tons/month	Particulates (PM10) lb/hr	Particulates (PM10) tons/month
Light & Medium Truck (gasoline)[a,c]	150	0.331	0.025	0.026	0.002	0.056	0.004	0.025	0.002	0.058	0.004
Heavy Truck (gasoline)[a,d]	100	0.730	1.655	0.037	0.002	0.098	0.005	0.005	0.003	0.128	0.006
Heavy Truck (off-highway)	200	1.794	0.179	0.192	0.019	4.166	0.417	0.454	0.045	0.256	0.026
Light Tractor (track type)	200	0.346	0.035	0.121	0.012	1.26	0.13	0.137	0.014	0.112	0.011
Heavy Tractor (wheel type)	200	3.59	0.359	0.188	0.019	1.269	0.127	0.090	0.009	0.136	0.014
Cranes	200	0.675	0.068	0.152	0.015	1.691	0.169	0.143	0.014	0.139	0.014
Heavy Equipment (miscellaneous)[e]	200	0.675	0.068	0.152	0.015	1.691	0.69	0.143	0.014	0.139	0.014
TOTAL	**1,250**	**8.141**	**2.389**	**0.868**	**0.168**	**10.231**	**1.659**	**0.992**	**0.105**	**0.782**	**0.078**

TOTAL Air Emissions = 4.399 Tons Per Month 52.788 Tons Per Year

[*] All vehicles are diesel powered, except as noted

a For gasoline powered vehicles, emission rate (lb/h) is based on a gram per mile EPA emission factor and the speed shown under footnote c or d.

[b] For diesel powered vehicles, the emission rate shown is the EPA emission factor and is independent of speed (USEPA, AP-42, 1985a).

[c] Assumes an average vehicle speed of 15 mph.

[d] Assumes an average vehicle speed of 10 mph.

[e] Includes trenchers, pavers, and compact loaders.

Source: Black and Veatch

Table 4.2-2 Maximum Potential to Emit (tpy): First Year of Operation

Pollutant	No.1 CCT/HRSG	No. 2 SCCT	Emergency Generator	Diesel Fire Pump	Cooling Tower	Project Maximum Potential to Emit
NOx	71.23	626.93	0.91	0.10	--	699.17
CO	307.92	2,540.25	0.38	0.04	--	2,848.59
SO2	10.63	13.56	<0.001	0.002	--	24.21
VOC	288.20	355.94	0.07	0.001	--	644.21
PM/PM10	81.25	24.38	--	0.008	6.6	112.24

Table 4.2-3 Maximum Potential to Emit (tpy): Successive Years of Operation

Pollutant	No.1 CCT/HRSG	No. 2 SCCT	Emergency Generator	Diesel Fire Pump	Cooling Tower	Project Maximum Potential to Emit
NOx	121.08	121.08	0.91	0.10	--	243.17
CO	336.09	336.09	0.38	0.04	--	672.60
SO2	18.62	18.62	<0.001	0.002	--	37.24
VOC	284.47	284.47	0.07	0.001	--	569.01
PM/PM10	140.10	140.10	--	0.008	6.6	286.81

provides the highest modeled concentration and the modeled location of this concentration for NOx, CO, and PM/PM10. As noted on the table, the maximum project-related concentration of NOx and CO is expected during the first year of operations, while the highest concentration of PM/PM10 is expected during the second and successive years of operation.

Volatile organic compounds (VOCs) are not a criteria pollutant, and the USEPA does not have a general policy that applies to new point sources for modeling purposes. USEPA Region IX does require an impact assessment forsources over 40 tons per year of VOCs. VOCs are known as an ozone precursor because they combine with NOx to form ozone. Region IX recommends that intermediate sources of ozone precursors (i.e., greater than 40 tons per year but less than a few thousand tons) utilize Sheffe tables to determine approximate ozone impacts from the point sources for comparison to the ozone standard. Based on information from Tables 4.2-3, 4.2-4. and 4.2-5 and the Sheffe tables, a conservative, worst case ozone impact of 0.023 ppm was identified for the proposed Southpoint power plant.

In order to determine project related effects, the maximum project related impact concentration was added to the monitored background ambient air quality concentration for each modeled criteria pollutant. Because the modeling to identify project related maximum predicted impact concentrations is conservative, the resulting background plus project concentration is characterized as a worst case impact analysis. Finally, the background plus project air quality concentrations are compared to the national ambient air quality. This is done by providing the NAAQS and comparing how much project related impact concentrations are compared to the difference, or increment, between the NAAQS and existing background concentrations (i.e., Project Concentration/(NAAQS-Background Concentration)).

Table 4.2-5 provides the background air quality, maximum project related concentrations, baseline plus project concentrations, NAAQS, and the per cent of the difference between the NAAQS and existing background concentrations (also known as the NAAQS increment) for the maximum potential to emit.

In all cases, the proposed project would not result in exceedances of NAAQS, and impacts would not be significant. Ozone impacts were determined based on data from the Alonas Way Monitoring Station. There are two additional stations where readings were taken for ozone. These include the Holiday Shores monitoring station located approximately about 20 kilometers to the northwest of the project site and the Mohave Pipeline station located about 20 kilometers to the southeast of the site. The Holiday Shores monitored ozone values range from 0.09 ppm to 0.11 ppm. The highest value recorded at the pipeline station in 1993 was 0.07 ppm. No other data were available from the latter station. Thus it appears that background ozone values are highest near Bullhead City and decrease to the South with distance. It should be noted that while the highest value from the highest year of Holiday Shores data added to extremely conservative Sheffe results based on conservative operating scenarios yields an exceedance of the ozone standard; it is unlikely that these situations would occur concurrently. In addition, the plume transporting the NOx and VOCs from the facility would be at a substantially higher elevation 20 kilometers downstream than the ground level ozone produced by mobile sources. Also, the plume would be substantially dissipated as it nears Bullhead City; therefore, the Alonas Way Monitoring Station ozone data were used to determine ozone background levels and project-related ozone impacts. As state above, ozone impacts would not be significant. These findings of insignificance are based on the assumption that the BACT identified in Appendix B of this EIS will be implemented at the proposed power plant to mitigate air quality impacts. Without mitigation, operation impacts would be significant.

4.2.2.3 Other Air Quality Considerations

4.2.2.3.1 Prevention of Significant Deterioration Program

The federal CAA New Source Review (NSR) provisions are implemented for new stationary sources and major modifications to existing sources under two programs; the PSD program outlined in 40 CFR 52.21 and the Nonattainment NSR program outlined in 40 CFR 51 and 52. The proposed facility is located in an attainment area with respect to all pollutants. Therefore, the PSD program will be applied to the proposed Southpoint power plant as a new major stationary source undergoing construction in designated attainment or unclassifiable areas under Section 107 of the CAA for any criteria pollutants.

The PSD regulations are designed to ensure that the air quality in existing attainment areas does not significantly deteriorate or exceed the NAAQS. A major stationary source is defined as any one of the listed major source categories which emits, or has the potential to emit, 100 tons per year (tpy) of any regulated pollutant, or 250 tpy or more if the facility is not one of the listed major source categories. The proposed Southpoint power plant is included in one of the major source categories and Appendix B identifies that the project has the potential to emit greater than 100 tpy for at least one criteria pollutant. For each criteria pollutant that exceeds the PSD-defined significant emission levels, a PSD review will be conducted.

4.2.2.3.1.1 Air Quality Impact Analysis

Under the PSD program, ambient air quality analysis is generally waived if the predicted sources impact from new sources is less than PSD-defined significant concentrations. These concentrations, along with the proposed power plant's maximum predicted impact concentration and PSD De Minimis Monitoring Level are given in Table 4.2-6. As shown in Table 4.2-6, project related impacts would be less than the PSD-defined significant levels.

4.2.2.3.1.2 Ambient Monitoring

For each pollutant emitted in PSD-defined significant amounts, the source may be required to establish and operate a site-specific preapplication ambient air quality monitoring network for 12 months (a minimum of four months of air quality data will be required). If dispersion modeling results predict that

Table 4.2-4 Comparison of Maximum Predicted Impacts

Pollutant	Averaging Period	Maximum Predicted Impact
NOx	Annual	0.93[a]
CO	1-Hour	900.46[b]
	8-Hour	243.62[c]
PM/PM_{10}	24-Hour	3.88[d]
	Annual	0.61[e]

a From first year operations; 1992 meteorological data; at 726,700 meters East, 3,872,800 meters North UTM coordinates
b From first year operations; 1989 meteorological data; at 725,704.8 meters East, 3,860,777 meters North UTM coordinates.
c From first year operations; 1990 meteorological data; at 725,776.5 meters East, 3,860,777 meters North UTM coordinates,
d From "second" year operations; 1992 meteorological data, at 726,700 meters East, 3,865,300 meters North UTM coordinates
e From "second" year operations; 1989 meteorological data; at 726,700 meters East, 3,865,300 meters North UTM coordinates.

Table 4.2-5 Comparison of Project Impacts and Background Concentrations with the National Ambient Air Quality Standards (ug/m³)

Pollutant	Averaging Period	Baseline Ambient Air Quality (No Action Alt.)	Project Impact	Baseline and Project Concentrations	NAAQS	Percent of Increment $\frac{\text{Project}}{\text{NAAQS - Baseline}}$ x100
NOx	Annual	15-34 a,b,c	0.93	16-35	100	1.1% -1.4%
CO	1-Hour	9,020e	900.46	9,920	40,000	34.4%
	8-Hour	4,400e	243.62	4,644	10,000	4.4%
PM/PM10	24-Hour	26-140 a-f	3.88	30-144	150	3.15 - 38.8%
	Annual	8-36 a-f	0.61	9-37	50	1.5% - 4.4%
SO2	3-Hour	100-217 a-f	NA	100-217	1,300	0%
	24-Hour	21-39 a-d	NA	21-39	365	0%
	Annual	3-8 a-d	NA	3-8	80	0%
Ozone	1-Hour	0.08ppm b	0.023ppm	0.10ppm	0.12ppm	57.5%

Stations with data 1991-1995 considered or analysis:

a Bullhead City
b Alonas Way
c Holiday Shores
d Riviera
e Barstow
f McConnico, Kingman, Twentynine Palms

Note: PM data does not include 1991 data which was anomalously high for all stations. Successive years do not show these high numbers.

the ambient impact from the proposed source will be less than certain threshold levels (i.e., de minimis monitoring levels), the review agency may waive the monitoring requirement and may provide representative data on background concentrations of pollutants.

The proposed power plant's impacts and de minimis monitoring levels are shown in Table 4.2-6. As shown, the maximum predicted concentrations are less than the pre-construction monitoring de minimis levels for each pollutant and applicable averaging period. Commensurate with the Workplan, discussions with the USEPA, and consistent with PSD guidance, pollutants having impacts less than de minimis monitoring levels would not require pre-construction monitoring. Notwithstanding the low predicted project impacts, there have been numerous monitoring sites located in the proposed project's vicinity collecting ambient air quality data for years. Therefore, existing monitored concentrations are used to represent background conditions.

Table 4.2-6 Comparison of Maximum Predicted Impacts with the PSD Class II Significant Impact Levels and the PSD De Minimis Monitoring Levels

Pollutant	Averaging Period	Maximum Predicted Impact	PSD Class II Significant Impact Level	PSD De Minimus Monitoring Level
NOx	Annual	0.93	1	14
CO	1-Hour	900.46	2000	----
	8-Hour	243.62	500	575
PM/PM_{10}	24-Hour	3.88	5	10
	Annual	0.61	1	----

4.2.2.3.1.3 Best Available Control Technology (BACT) Analysis

The 1977 CAA established revised conditions for the approval of preconstruction permit applications under the PSD program. One of these requirements is that BACT be installed for pollutants regulated under the CAA which are emitted in significant amounts from new major sources in attainment areas. As discussed previously, the project is considered a major source in an attainment area. BACT is defined as an emission limitation based on the maximum degree of pollutant reduction determined on a case by case basis that considers technical, economic, energy, and environment considerations. The BACT analysis was performed for the proposed project Combined Cycle Combustion Turbine process, Diesel Fire Pump, Emergency Generator, and Cooling Towers to reduce NOx, CO, VOC, SO_2, and PM_{10} emissions applicable to each process. Reductions range from 20 percent to 92 percent.

The PSD program requires new or modified sources subject to PSD review to use BACT to minimize the emission of each pollutant with a PSD-defined significant emission level. The BACT analysis will result in emissions limits at least as stringent as required for and New Source Performance

Standard (PSPS) or state emission requirements. The BACT requirements are met by the selection of fuel and control equipment for the proposed power plant.

4.2.2.3.1.4 Impacts to Commercial, Residential, and Industrial Growth, Vegetation, Soils, and Visibility

The PSD program requires that air quality impacts resulting from growth in the area of the proposed project be assessed. Types of growth include the associated industrial, commercial, and residential growth that occurs as a result of construction and operation of the facility. In addition, the program requires that impacts on surrounding soils and vegetation be assessed. Furthermore, an assessment of potential visibility impairment in affected Class I areas must be conducted. As shown by the modeling, the low impacts will not adversely affect any of these issues.

4.2.2.3.1.5 Impacts To Class I Areas

Class I areas are areas of special national or regional value from a natural, scenic, recreational or historic perspective such as national parks or some national wildlife refuges. The PSD program provides special protection for such areas by requiring that the applicant demonstrate that the PSD Class I increments will not be exceeded, nor will certain air quality related values (including visibility) be adversely affected. Sources located further than 100 kilometers from a Class I area are often exempted from this requirement. Calpine has addressed all Class I and Class II areas identified by USEPA in the PSD permit application approved methodology, and USEPA's comments on the DEIS (Comment A41a).

4.2.2.3.2 New Source Performance Standards (40 CFR Part 60)

The NSPS were promulgated under Section 111 of the CAA to develop standards of performance for new or modified major sources. These standards define the minimum level of performance for operation of sources and removal of regulated pollutants. Subpart A describes the general provision of the NSPS and how an affected facility must meet he standards applicable to the facility.

Generally, sources subject to the PSD program are required to undergo a BACT determination. The BACT determination must conclude with a level of operation and pollution control criteria which are at least as stringent as the NSPS guidelines. The project's levels of controls would be more stringent than those emission levels required by NSPS. The specific NSPS applicable to each source are describe below.

- Combustion Turbine NSPS

Stationary natural gas fired combustion turbine NSPS are defined in 40 CFR Part 60, Subpart GG. The regulatory emission limits for SO_2 and NO_x from a combustion turbine with a heat input of 250 Mbtu/h or greater is calculated by the following equation:

$SO_2 = 0.015\%$ S by volume (corrected to 15% O_2, dry basis)

NO_x (% by volume) $= \frac{0.0075\ (14.4)}{Y} + F$ (corrected to 15% O_2, dry basis)

Where,

F is NO_x emission allowance for fuel bound nitrogen, and

Y is the manufacturer's rated heat rate at the manufacturer's rated load (kJ/Wh).

There are no emission limitations for PM_{10} listed in Subpart GG. The combustion turbines will comply with these emission limits with emissions of 3 ppmvd NO_x (compared to 75 ppmvd) at base load conditions. The sulfur in the natural gas will be 0.8 grains/100scf, thus complying with the standard.

In addition to emission limits, this subpart specified testing, recordkeeping, and reporting requirements. The proposed Southpoint power plant will comply with these regulations.

- Duct Burner NSPS

Each steam generating unit constructed after June 9, 1989 and having a heat input between equal or greater than 10 Mbtu/hour and less than 100 Mbtu/hour is subject to the provisions under Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. The duct burners during maximum firing will have a heat input from natural gas of 44 Mbtu/hour on each turbine, and would thus be subject to the general provisions of this Subpart. Subpart Dc regulates emissions of SO_2, PM, and opacity. The SO_2, PM and opacity limitations, however, are not applicable to this facility as it fires natural gas exclusively. Therefore, the duct burners are subject only to the reporting and recordkeeping requirements as listed under 40 CFR 60.48c, including:

Submit notification of the date of construction, and anticipated startup, and actual startup in accordance with 40 CFR 60.7;

Record and maintain records of the amounts of fuel combusted during each day;

Track annual capacity factor on a 12 month rolling average; and,

Maintain records for a period of two years.

The proposed power plant will comply with these regulations.

- Fuel Oil Tank NSPS

Standards of performance for volatile organic storage vessels constructed after July 23, 1984 were promulgated at 40 CFR 60, Subpart Kb. The provisions of the subpart are applicable in varying degrees to each storage vessel having a capacity greater than or equal to 40 cubic meters, 75 cubic meters and 151 cubic meters. The diesel fuel oil tank which provides the distillate reservoir for the fire pump is sized for eight hours of approximately 320 gallons, but may be as large as 1,000 gallons. Forty cubic meters converts to 10,582 gallons. Thus, the fuel oil tank, being less than 10,582 gallons in size, will not be subject to the NSPS Subpart Kb.

4.2.2.3.3 Impacts from Hazardous Air Pollutants (40 CFR Parts 61 and 63)

Pursuant to Section 112 of the 1970 CAA, national emission standards for eight hazardous air pollutants have been promulgated. Under these rules, radon-222, beryllium (be), mercury (Hg), vinyl chloride, radionuclides, benzene, asbestos, and arsenic are regulated for specific sources. However, the proposed power plant, as stationary gas combustion turbine and ancillary equipment, is not listed as one of the applicable sources regulated under NESHAPs. Therefore, the project is not subject to the NESHAPs regulated under Part 61. However, additional regulations governing the control of toxic pollutant emissions were promulgated as a result of the 1990 Clean Air Act Amendments (CAAA) and are discussed in the following section.

Title III of the 1990 CAAA established a new regulatory program to augment the previously existing toxics program under 40 CFR 61. Facilities that are regulated under 40 CFR 63 are those that emit (or have potential to emit) one of the 189 hazardous air pollutants identified under Section 112(b) of the CAAA, including any promulgated deletions from the list. Major sources and area sources are regulated under this program. A major source is a stationary source that emits or has the potential to emit 10 tons per year or more of a listed pollutant or 25 tons per year or more of a combination of listed pollutants. Area sources are stationary small emitters. Under FR 3159, dated July 16, 1992, the USEPA identified 174 categories of major area sources of air toxics, eight of which are classified as area sources. Of these categories, combustion turbines are scheduled to be regulated as a source group by November 15, 1999. Industrial process cooling towers are regulated separately under Subpart Q. If applicable, each respective source would be subject to the control provisions under the subpart and additionally the provisions under Subpart B, Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Section, Sections 112(g) and 112(j).

- Combustion Turbines

As stated above, combustion turbines are one of the source groups that are to be regulated. Thus, combustion turbines could be potentially subject to the Maximum Achievable Control technology (MACT) standards unless exempted from these specific requirements. An exemption currently exists for electric utility units. Subsection 112(n) of the CAAA specifically excludes "electric utility steam generating units" from regulation as a major or area source, pending the results of two USEPA studies. One is a study on the hazards to the public health resulting from emissions from electric utility steam generating units, and a separate study of mercury emissions. "Electric utility steam generating units" are generally defined as fossil fueled electric generating units with capacities greater than 25 MW. This same exemption is provided under the listing of the categories to be regulated under 40 CFR 63. As of the date of this EIS, the results of the studies have been delayed. Thus, the utility exemption stands until the USEPA rules otherwise. At such time that the utility exemption is revoked and the MACT standards become applicable to the Southpoint power plant, the proposed project will comply with the applicable requirements in accordance with the regulatory deadlines. It is expected that a natural gas fired unit, however, will have minimal control requirements.

- Industrial Process Cooling Towers

The provisions of Subpart Q apply to each cooling tower constructed after September 8, 1994 that utilized chromium-based water treatment chemicals and are major hazardous air pollutant (HAP) sources or located at major HAP sources. The proposed Southpoint power plant would not use chromium-based chemicals in the water treatment process and therefore is not subject to this NESHAPs.

4.2.2.3.4 Federal Operating Permit Program (40 CFR Part 71)

Areas under federal administration, including Tribal lands, are subject to the federal operating permit program as contained in 40 CFR 71. The effective date of the Part 71 program is November 15, 1997.

Under Part 71, the Southpoint power plant would be required to submit a timely and complete CAAA Title V operating permit application within 12 months after the commencement of operation or an earlier date if so notified by the USEPA.

Because the proposed power plant would emit more than 100 tons per year of a regulated pollutant, it would be subject to the Title V program. As such, a complete and timely Title V application would have to be submitted for the power plant after operation commences.

4.2.2.3.5 Acid Rain Program (40 CFR Parts 72-76)

Title IV of the CAAA imposes stringent requirements on electrical utilities to control emissions of SO_2 and NO_x : these requirements will be enforced through the administration of the Title IV Acid Rain Permit Program. The centerpiece of Title IV of the CAAA is the establishment of an emissions allowance and trading program. The allowance system is administered by the USEPA in two phases to track all SO_2 emissions nationwide.

Title IV requirements are applicable to "affected" units, and units then are classified as Phase I or Phase II. A new (i.e., post November 15, 1990) utility unit would be classified as a Phase II unit. "Utility unit" is defined as any unit owned or operated by a utility which supplies more than one-third of its potential electric output capacity and more than 25 MW output to any power distribution system for sale. The combustion turbines, generating and supplying more than 25 MW to the WAPA grid, would be subject to the provisions of the acid rain program. These requirements, in general, include:

Duty to apply for Acid Rain Permit;
Compliance with SO_x and NO_x emission limits;
Duty to obtain allowances; and
Installation, Operation, and Certification of Continuous Emission Monitoring Systems.

The proposed Southpoint power plant, a "baseload" natural gas fired only facility, would be exempted from some of the acid rain requirements. Specifically, units burning natural gas are exclusively are exempt from SO_2 CEM and opacity monitoring requirements (SO_2 emissions must still be calculated and reported). Thus, the units are required under Part 75 to only install, operate, maintain and certify NOx and diluent gas CEMS. In addition, CO_2 emissions would also need to be quantified, but can be done using either (1) a mass balance estimation, or (2) CO_2 CEMS, or (3) oxygen CEMS in order to estimate CO_2 emissions.

The natural gas only fired unit would also be exempted from NOx emission limitations. The acid rain permit must be submitted by the later of January 1, 1998, or 24 months prior to the commencement of operation. The proposed Southpoint power plant would comply with the applicable acid rain permit and CEM requirements.

4.2.2.3.6 Protection of Stratospheric Ozone (40 CFR Part 82)

Title VI provisions of the CAAA require the gradual phase out of certain CFCs, halons, HCFCs, carbon tetrachloride, and methyl chloroform. Under Part 82, the servicing of motor vehicle air conditioners is regulated in Subpart B, and the servicing and maintenance of other appliances containing these substances in Subpart F. At this time it is not anticipated that these activities would occur onsite, as similar services can be obtained at nearby business establishments.

4.2.3 Alternative Two Site - Section 30

The construction and operation impacts on air quality that were discussed for the Preferred Alternative site would be essentially the same at the Alternative Two site; however, the location of the highest concentration of criteria pollutants would be different. Impacts would be significant without mitigation.

4.2.4 Alternative Three Site - Section 16

The construction and operation impacts on air quality that were discussed for the Preferred Alternative site would be essentially the same at the Alternative Three site; however, the location of the highest concentration of criteria pollutants would be different. Impacts would be significant without mitigation.

4.2.5 No Action Alternative

There would be no impacts to air quality if the project were not constructed. The existing air quality would remain in its present condition provided that there are no changes in emissions from existing sources.

4.3 Water Resources

4.3.1 Water Rights

The proposed Calpine lease provides for a diversion of up to 4,000 AF per year for use by the proposed power plant. This quantity of water would be debited from the FMIT's annual Arizona allocation of Colorado River water. The FMIT has a diversion right in Arizona of 103,535 AF per year. Consumptive use may total 70 per cent of the diversion right, or 72,475 AF per year for FMIR land in Arizona. The proposed power plant's average estimated consumptive use of water would be approximately 4,000 AF per year. The Tribal Water Ordinance allows consumptive use, by permit, of the amount actually required for beneficial use. The estimated consumptive use of the proposed power plant is consistent with the actual need criterion of the Tribal Water Ordinance.

The amount debited for consumptive use by the power plant would equate to approximately 5.5 per cent of the Arizona allocation amount which can be used consumptively. Either extracting groundwater from a newly developed wellfield to serve the proposed power plant, or withdrawing the water from the river, would occur under the FMIT's perfected surface water rights to the Colorado River. Either source of water would be considered to be subflow of the river, and would be accounted as surface water from the Tribe's allocation of Colorado River water by the USBOR, the federal agency responsible for Colorado River management. Therefore the amount of water which might be allocated to support other forms of development would be diminished by this quantity. No direct impact to water rights would result from consumptive uses of FMIT water allocations by the power plant.

There is some potential for indirect impacts to the FMIT's water rights if the power plant is constructed and diverts up to 4,000 AF per year for its operation. At present, the FMIT does not use its entire annual water allocation. Unused water passes on down the river and is available for other users. Major users of this uncalled water are municipal water districts, particularly the Metropolitan Water District in Southern California. The water districts are actively lobbying for changes to the Law of the River which would allow uncalled water to be transferred to junior right holders such as the municipal districts. This "use it or lose it" movement is a potential threat to the FMIT's perfected water rights; actually using its water for a large consumptive and beneficial use like the proposed power plant could safeguard the FMIT's allocation in the future.

A second indirect water rights impact could affect the Central Arizona Project and its users. The CAP is projected by the USBOR to have substantial, albeit not complete, water supplies in every year. Some of this water is uncalled water allocated to senior rights holders such as the FMIT. The CAP has recognized and dealt with the possibility of increased water use by the FMIT and many other entities along the river. The possibility of increased use, which would effectively decrease the supply available to the CAP, has been accommodated by creating a set of CAP contract priorities for water delivery. If a shortfall were to occur, under the contract priority system the impact would be to non-Indian agricultural users. The possible impact to CAP water users from increased consumption of Colorado River water by the FMIT would be at some unknown future time, as the CAP presently cannot sell contracts for the water it has because of the high price. The impact, if any, would occur if the Central Arizona Water Conservation District, which manages CAP water distribution, creates a pricing policy which cause demand for CAP water to exceed supply. For the above reasons, no significant adverse indirect impacts to water rights would result from construction and operation of a power plant on any of the three alternative sites.

4.3.2 Consumptive Use Colorado River Water

The primary water supply source for the proposed Southpoint power plant would be water pumped directly from the Colorado River if the plant were to be built on the Preferred Alternative or Alternative Three sites. Water withdrawn from the river would be conveyed by buried pipeline to the power plant on either of these sites. A secondary, or backup, supply would be available for use from a new onsite well. If the proposed power plant were to be built on the Alternative Two site, the entire water supply would be from two onsite wells. Water taken directly from the river, and wellwater withdrawn from river subflow each would consumptively use Colorado River water.

Evaluation of the environmental consequences of consumptive use of Colorado River water assumed that the proposed power plant would require and estimated 7,500 AF per year. No adverse environmental impacts were associated with consumptive use of this quantity of water. Subsequently, the estimated consumptive use requirement of the proposed power plant was reduced to 4,000 AF per year. Because there were no adverse environmental imparts associated with the larger quantity of water, there are no adverse impacts associated with the reduced quantity of 4,000 AF consumptive use per year.

4.3.2.1 Water Withdrawn From Colorado River and Wheeled In Buried Pipe to Supply Preferred Alternative and Alternative Three Sites

Water directly withdrawn from the Colorado River is the preferred primary water supply source for the Southpoint power plant because river water has better quality than well water. Water would be pumped from the river by equipment installed, operated, and maintained by the Tribe. The platform is immediately west of the terminus of Willow Road.

This platform houses electric powered pumps which supply irrigation water to the tribal farms and to tribal tenant farmers. Its location was chosen as the out-take site for irrigation water because this segment of river bank is entirely free of any questions of ownership related to accretion and avulsion of the river (John Algots, FMIT Physical Resources Director, personal communication). The platform has been in place for many years, and was approved at the time of its installation by river managing entities such as the USBOR and the US Coast Guard, which reviews structures placed in the river for navigational safety. The pump intakes are screened to prevent fish, waterfowl, debris, swimmers, and small craft from being pulled into the pumping zone. No significant adverse impacts to swimmer or boater safety, or to wildlife, would result from placement of a screened pump in the Colorado River.

A new 100 HP pump would be mounted alongside existing tribal pumping equipment. The tribe would install an electric usage meter on the new pump, and would also install a water measuring meter on the pump. Both of these meters would facilitate accurate billing for power and water used.

Water pumped from the river would be wheeled to the proposed Southpoint power plant in a 24 inch buried pipe. The pipe would parallel existing irrigation canals and ditches. Where the pipe would cross public roads it would require an encroachment permit, but ROW acquisition is not required. Landowners in the Mohave Valley routinely deal with the checkerboard land ownership pattern by granting encroachment permits to allow passage from one section of tribal land to the next, and the tribe extends the same practical land management practice of reciprocity to private, state, and county lands (John Algots, FMIT Physical Resource Director, personal communication). The proposed route of the pipeline appears in Figure 2.5-1, Water Pipeline Corridor.

The pipe would serve the power plant exclusively, and would not serve agricultural irrigation. Losses from evaporation would be minimized by wheeling in a closed pipe. A 30 acre storage pond, capable of holding a three day supply of water, or approximately 44 AF, would be built to ensure availability in case of operational changes in the river which would temporarily restrict pumping. In the event no water could be pumped from the river for a period lasting more than three days, a backup supply would be available from new wells to be located in Section 8.

No significant impacts to surface flows in the Colorado River would result from direct withdrawal and wheeling through a buried pipe. Consumptive use would be identical in quantity to water consumed from pumped groundwater, or from conjunctive use composed of a mixture of surface and groundwater. The Preferred Alternative and Alternative Three sites could be served by the piped water.

The Alternative Two site could not be supplied feasibly by Colorado River water because it would require a longer pipe and several miles of new ROW acquired from private landowners. Unlike the route to the Preferred Alternative and Alternative Three sites, a route to the Alternative Two site located entirely on tribal land is not possible. Moreover, a power plant built on the Alternative Two site would be constructed on top of the bluffs, which would require lift stations to pump water uphill. This is not the case for the other two sites, which could be supplied by gravity feed.

Under a No Action Alternative, if surface water taken directly from the Colorado River is not used for power plant purposes, then it remains available for alternative beneficial consumptive uses, and would be used by the tribe at some undetermined future time.

4.3.2.2 Water Pumped From Subflow

Wellwater quality is not as suited to use in the proposed power plant's equipment as surface water from the Colorado River. For this reason, wellwater would be used only as a backup supply on the Preferred Alternative or Alternative Three sites. A backup supply would be needed for those times when surface water pumping and conveyance equipment needed maintenance or repair, or when extremely high or low flows in the Colorado River temporarily precluded surface water pumping. Neither of these instances would likely extend for more than 30 days; historically, river flows too low to allow direct withdrawal of surface water have not lasted more than a week. During the flood of record, pumping was not disrupted (John Algots, FMIT Physical Resources Director, personal communication).

Wells would have water meters installed, as required by tribal ordinance, to record the amount of water withdrawn. Wells would also be metered for electricity use. One-hundred per cent of the withdrawn well water would be used consumptively. Based on an annual capacity factor of 95 per cent, the peak annual well water consumption would not exceed 1.5 billion gallons per year. This corresponds to a daily maximum average withdrawal rate of 2,514 gpm. However, the power plant would be designed to require a peak withdrawal rate of 4,308 gpm.

Withdrawal of 2,514 gpm from one or more wells would not significantly affect groundwater levels in the vicinity due to the proximity of the wells to the Colorado River and the documented transmissivity rate of the aquifer in the southern Mohave Valley. The inflow of groundwater to the Preferred Alternative site is estimated to be about 38,000 AF per year. The conclusion that pumping would not significantly affect groundwater levels is based on a model in which wells supplied 100 per cent of the proposed power plant's needs for a six month period. It is unlikely that groundwater would ever be the source of this percentage of water used over this long a time. The effect of this rate of pumping was to create a drawdown of approximately one foot at a distance of 1,500 to 2,000 horizontal feet from the wells.

The model also simulated a second hypothetical situation in which onsite wells provided 100 per cent of the supply continuously, with no part of the supply from surface water. Under this scenario, a one foot drawdown would extend to a distance of 4,000 horizontal feet from the wells. (Gookin Engineers, 1997, p.8). A conceptual drawing of groundwater dynamics appears as Figure 4.3-1. Figures 4.3-2 and 4.3-3 depict the effects on groundwater pumping under two theoretical scenarios; Figure 4.3-4 shows wellfield zone of influence.

Pumping rates to supply power plant process water would not significantly affect groundwater level within 2,000 horizontal feet of the well site. If the proposed power plant were to be built on the Preferred Alternative site, no significant effect on depth to groundwater in nearby Topock Marsh would be anticipated because the nearest boundary of the marsh is at least 4,000 feet from the nearest possible well which could be drilled on the Preferred Alternative site. If the proposed power plant were to be built on the Alternative Three site, wells could still be located approximately 4,000 feet from the Topock marsh boundary, and no significant effects to marsh groundwater conditions would occur. No effects to the marsh would be anticipated from pumping on the Alternative Two site, which is approximately five miles from the marsh.

The Alternative Two site would require 100 per cent of the proposed power plant's water supply to be pumped from wells on site. Continuous pumping for the estimated 50 year life of the project could be sustained by underground flow because of the very high rate of transmissivity in the southern Mohave Valley. Continuous pumping would result in a drawdown of approximately four feet measured at a 4,000 foot horizontal distance from the

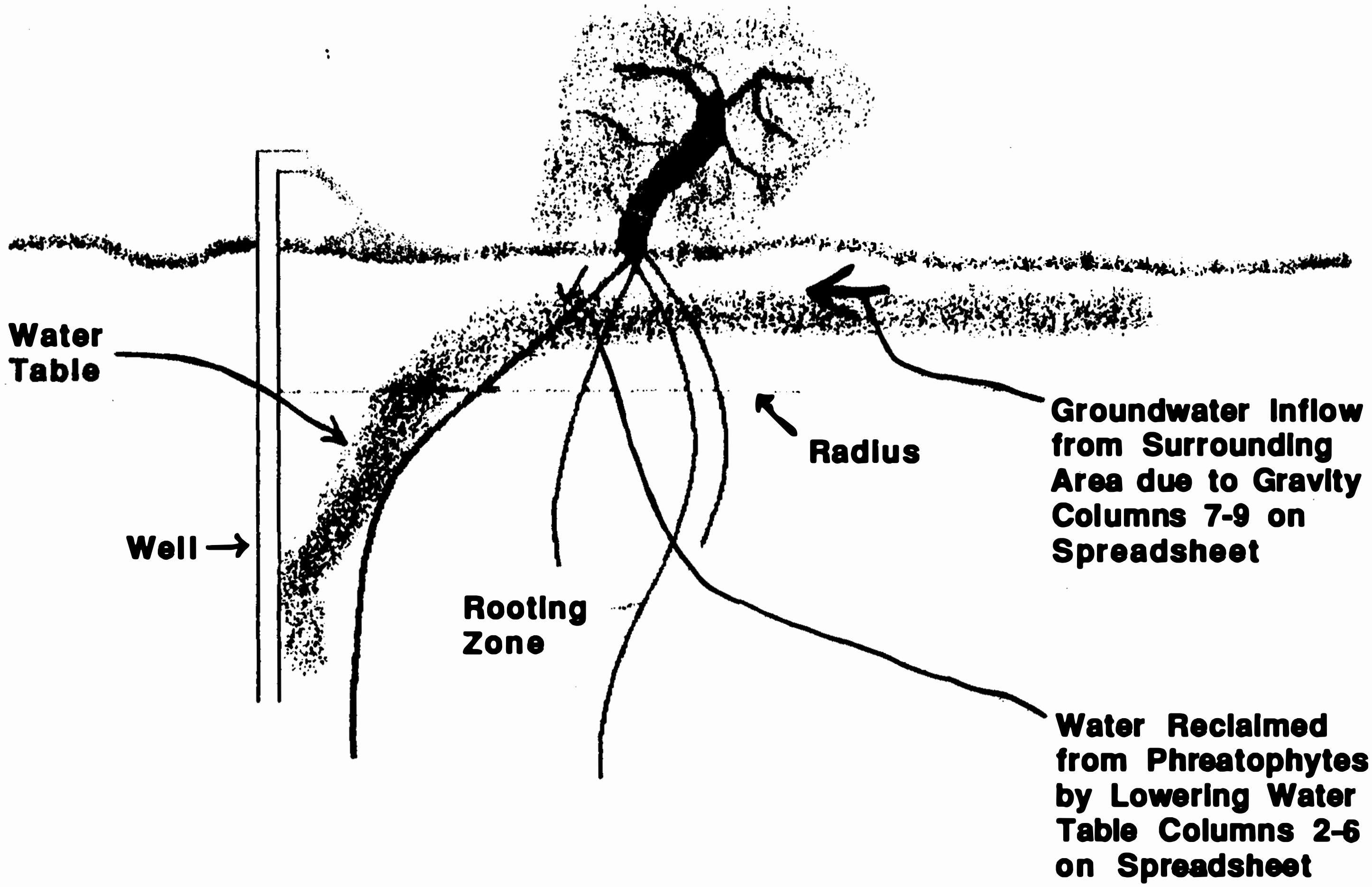

Illustration of Technique for Calculation of Drawdown

Fig.4.3-1 Groundwater Dynamics

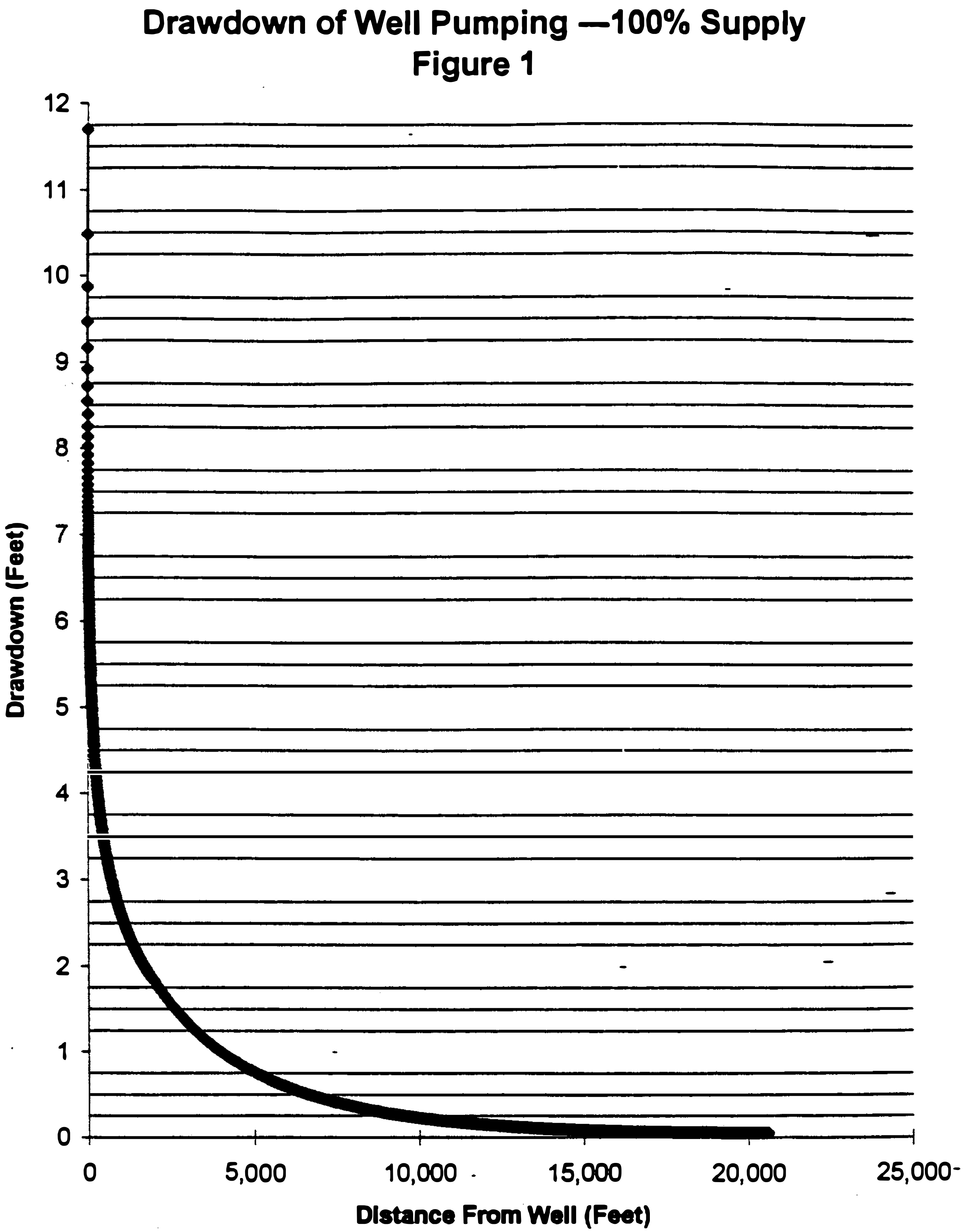

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Fig.4.3-2 Predicted Drawdown - 100% Supply

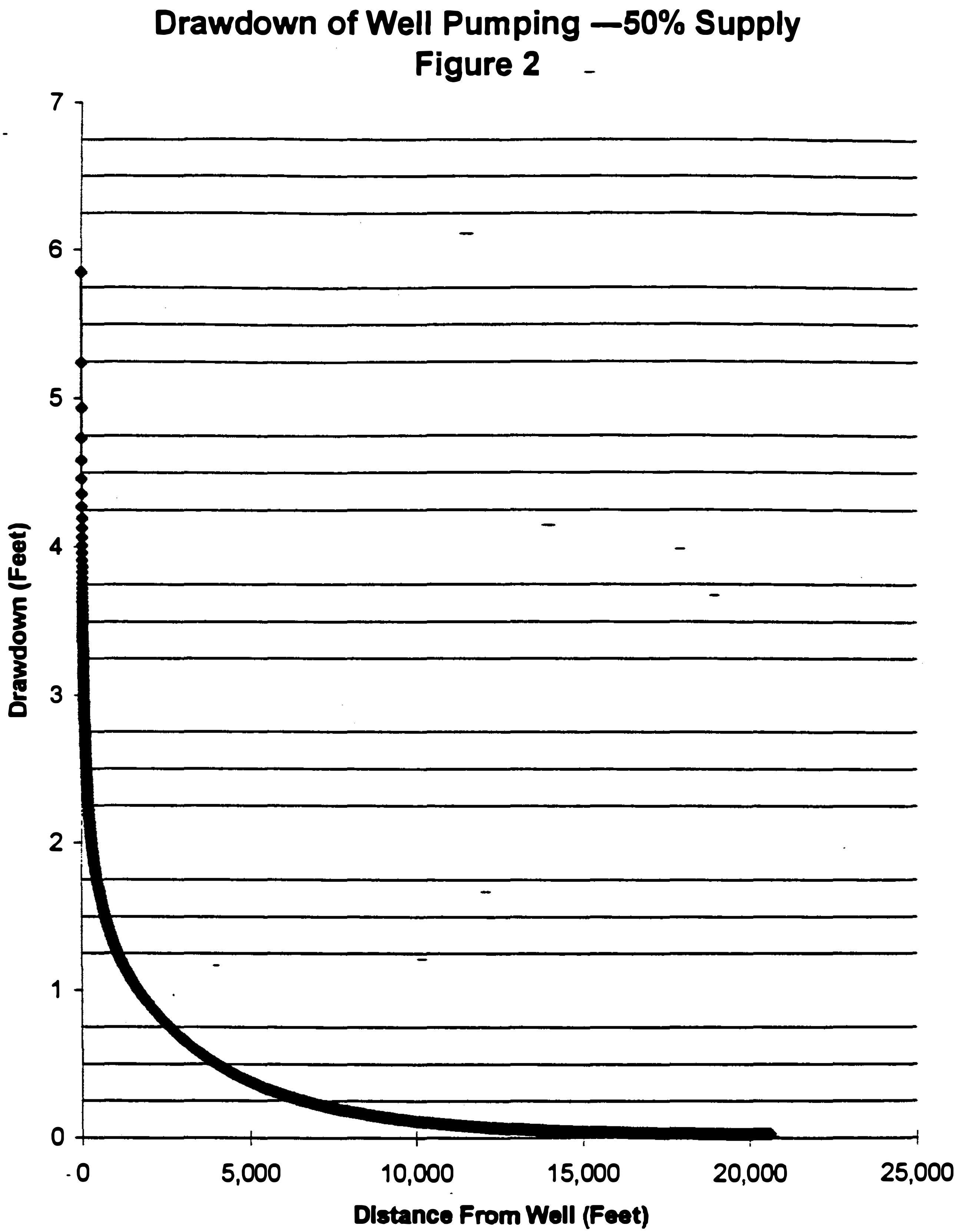

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Fig.4.3-3 Predicted Drawdown - 50% Supply

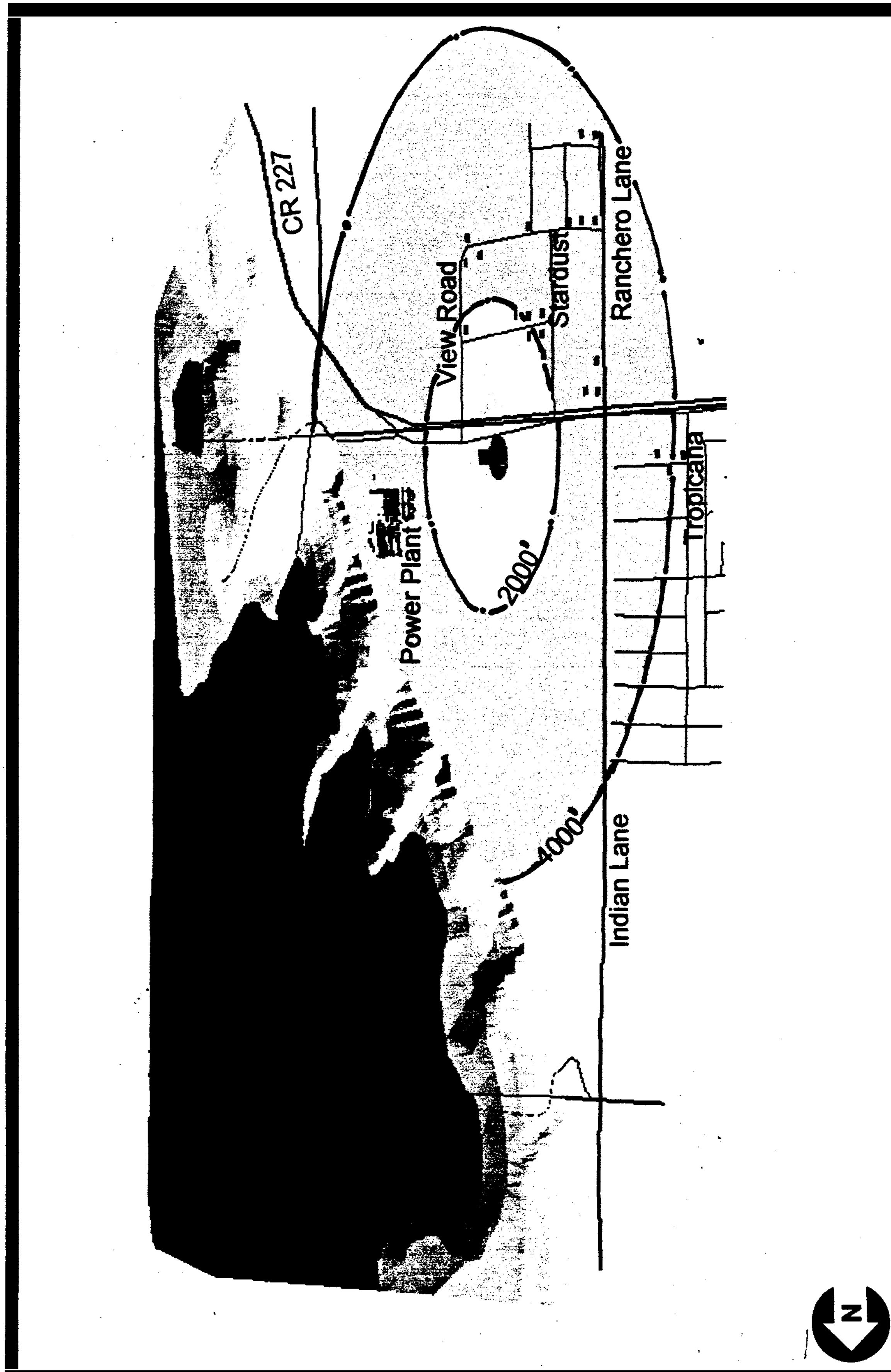

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Figure 4.3-4 Well Field Zone of Influence

well. Impacts on groundwater levels would, therefore, not be significant (Gookin Engineers, 1997).

In summary, because of their very similar hydrogeologic conditions, the effects of pumping under any use scenario is anticipated to be almost identical on any of the three alternative sites. The "Impact of Groundwater Pumping-Southpoint Project" report is included as Appendix F. No significant impacts would occur.

Under a No Action alternative, if subflow water is not used for power plant purposes, the insignificant drawdowns described above would not occur. No impacts to groundwater levels would result from a No Action Alternative.

4.3.3 Water Quality

4.3.3.1 Surface Water Quality

Construction and operation of a power plant on the Preferred Alternative, Alternative Two, or Alternative Three sites would have no significant impacts to surface water quality as the site would be engineered for zero net increase in stormwater volume or velocity exiting the site. Runoff from impervious surfaces such as roads would be routed to catchments where oil or other petroleum based substances would be trapped to prevent transport through the storm drainage system. Spilled or leaked chemical substances originating in the power equipment compound would drain into special catchments designed and located for containment and routine cleaning and appropriate disposal. These project features would reduce potential adverse impacts to below significance.

Storage and transportation of hazardous materials on site would not adversely affect surface water quality because leaks or spills would be contained as prescribed by a Spill Prevention Containment and Control (SPCC) plan, preventing escape to surface water or drainage channels. The SPCC plan is a project feature which would be implemented as part of the proposed power plant's operation. The plan would be prepared by Calpine and approved by the FMIT as a condition of commencement of operation of the power plant. The FMIT Environmental Officer would be responsible for monitoring and enforcing the SPCC plan.

Under a No Action Alternative, no activities would occur. Surface water quality would be unaffected.

4.3.3.2 Ground Water Quality

Pumping up to 4,308 gpm from the subflow of the Colorado River on the Preferred Alternative site would not have a significant effect on water quality because of the very high rate of transmissivity. The Mohave Valley is not a closed aquifer; rather, it is one in which the underground flow is constantly replenished by new surface flows from the Colorado River. The unconfined nature of the aquifer, and the rate of inflow, work to maintain near-constant quality (Allen Gookin, PH, Gookin Engineers, personal communication).

Local area residents expressed concern about the possibility that heavy groundwater pumping could exacerbate the nitrification problems they are experiencing with shallow domestic wells contaminated by septic leachates. It is probable that periodic heavy pumping by the new backup wells at the proposed power plant would have some slight beneficial impact to water quality in shallow domestic wells by increasing the rate of water movement through substrate, which would have the effect of more rapidly dissipating nitrates. This improvement would be somewhat greater at the Alternative Two site than at either of the other alternative sites because 100 per cent of the water supply would be drawn from subflow of the river (Scudder Gookin, PE, Gookin Engineers, 1997, personal communication).

The effects of constructing and operating the proposed power plant would have the same effects to the Alternative Three site as to the Preferred Alternative site. No adverse effects to water quality would result from pumping subflow.

Storage and transportation of hazardous materials on site would not adversely affect groundwater water quality because leaks or spills would be contained as prescribed by the SPCC plan, and thereby prevented from percolating into groundwater. (See Section 4.3.3.1).

Under a No Action Alternative, no impacts to groundwater quality would occur if the proposed power plant were not built. Groundwater quality would remain unchanged on all three alternative sites.

4.3.4 Process Water Disposal

4.3.4.1 Wastewater Quality

4.3.4.1.1 Wastewater Chemical Constituents

Wastewater would be collected from the following major sources: sludge thickener overflow, filter backwash, filter press filtrate, cooling tower blowdown, oil/water separator effluent, combustion turbine wash water, and equipment drains. The plant drain system would convey washdown water, wastewater, waste oily water, and hot drain wastes. Bell-ups would be provided to receive wastewater, waste oily water, and hot drain wastes from the combustion turbines and accessory equipment and from equipment located in the buildings. Drainage piping would connect to the floor drains and bell-ups and would be routed to storage sumps prior to being pumped to the evaporation ponds.

Wastewater which has the potential to contain oily waste would be routed through an oil/water separator prior to reuse as cooling tower makeup. This separation is part of the water quality control measures needed for optimal plant operation. Separated oils would be collected for disposal at an oil recycling facility. These prevention and safe disposal measures are part of the proposed power plants engineering design features. Therefore, less than significant levels of oily wastes would be present in wastewater routed to the evaporation pond.

The major groups of solids which would result from evaporation of Colorado River water would be sodium sulfate (Na_2SO_4), sodium chloride

(NaCl), with minor salts being magnesium sulfate ($MgSO_4$) and calcium sulfate ($CaSO_4$) (W&EST, 1997, p. 2). Precipated briny solids would contain low concentrations of some metals, such as manganese and aluminum. However, such evaporite is benign and is not anticipated to be hazardous (W&EST, 1997, supplemental memo, p.2.)

Selenium and arsenic were targeted for specific review of their potential to be present in concentrations which could be hazardous. Selenium (Se) is somewhat similar to sulfur, but not as common. Evaluation of water quality data for Colorado River water, wellwater, and canal water indicated selenium levels less than the detection limit used for the source. The lowest limits reported were less than .025 or less than .050 milligrams/liter (mg/L), depending on the date and source. These levels led to the conclusion that "Selenium [Se] is not a problem in the potential intake sources of water. Assuming there may be very low levels in the supply, there is a possibility that there may be a measurable concentration in the evaporation ponds. If Se is a concern, it is recommended that a periodic monitoring (annually) be conducted." (W&EST, supplemental memo dated March 10, 1998.) Levels of arsenic, similarly, were less than detection limits for the source. No significant adverse effects are anticipated from either selenium or arsenic concentrations in process wastewater. However, as a water quality assurance measure, the recommended annual monitoring will be conducted by Calpine as part of its maintenance and operation of the evaporation pond. The FMIT Environmental Officer will review the annual selenium and arsenic monitoring reports and will initiate appropriate enforcement action if level exceed federal RCRA thresholds for these potentially hazardous substances.

Table 4.3-4 provides estimates, based on engineering experience, of the quality characteristics of wastewater from cooling tower blowdown, the cleanup RO system, and which would be routed to the evaporation pond.

Table 4.3-1 Wastewater Chemical Constituents

Constituent	Analysis
Calcium, mg/l as $CaCO_3$	700
Magnesium, mg/l as $CaCO_3$	2,130
Sodium, mg/l as $CaCO_3$	13,270
M-Alkalinity, mg/l as $CaCO_3$	307
Sulfate, mg/l as $CaCO_3$	10,630
Chloride, as mg/l as $CaCO_3$	5,165
Nitrate, mg/l as $CaCO_3$	1
Silica, mg/l as SiO_2	96
TDS, mg/l as such	21,270

Source: Sargent and Lundy 1997

4.3.4.1.2 Wastewater Odor

No organic matter is contained in the process water to be evaporated from the ponds. The high chemical constituent levels in the evaporative pond water would prevent growth of algae. In the absence of organic matter, no odor would be produced by the ponds from decaying organic materials. Sulfates are present in the process wastewater, however, quantities are not great enough to produce aesthetically offensive odor (Ron Sichau, Project Engineer, Calpine, personal communication). The evaporative ponds would not produce unaesthetic smells as a byproduct of the evaporation process. No significant adverse impacts from odors are anticipated.

4.3.4.2 Evaporation Pond

4.3.4.2.1 Pond Design

Process wastewater would be piped from the generating equipment to a pond with 30 surface acres located on the bluffs. The evaporation pond would be constructed using balanced cut and fill. (Domestic wastewater would be held separately in a septic holding tank and would not be pumped to the evaporation pond). The pond would be divided into *five* lined cells to facilitate maintenance and to allow draining a cell if a leak occurred. The purpose of constructing the pond in multiple cells is twofold. The first purpose is to facilitate removal of precipitated solids from one or more cells while leaving other cells of the pond operational. The second purpose is to facilitate installation of netting to exclude waterfowl, if warranted.

Pond sizing was determined based on engineering analysis of the rate of inflowing process wastewater. Inflow would average 51 gpm. An allowance of an additional 10 gpm was factored, for a total average inflow rate of 61 gpm. Based on plant operating hours per year, and other operational characteristics, pond inflow would total 94.09 AF per year (Sargent and Lundy Engineers, Aug. 29, 1997).

The evaporation pond would be designed for a minimum capacity of 30 years' accumulation of precipitated solids. A design allowance of 20 per cent was added to this volume to determine pond sizing and capacity. Final pond design assumes 34 AF of salt at the end of 30 years. Because the pond would be cleaned periodically to remove and dispose of accumulated solids during the operational life of the proposed power plant, the design capacity of the pond would never be reached. By way of illustration, if precipitated solids were allowed to accumulate for 30 years, the accumulated solids would attain an estimated volume of 27.86 AF. At that time, slightly more than one vertical foot of salt would cover the pond bottom. This deposition would not occur because of periodic cleaning. Therefore, the ponds could receive incoming wastewater for evaporation for the entire operational life of the proposed power plant.

The evaporation pond would have five cells. Sides slopes would be 2.5 horizontal feet by one vertical foot. This ratio was selected for stability during earthquake. The surface of the pond would be more than two times larger than the floor. The pond would have 34 inches of freeboard, a five inch allowance for rain from a 100 year storm event, a 15 inch allowance for storage during slower-evaporation winter months, and additional storage for water storage variation and accumulated salt. The pond would have banks seven vertical feet high, measured from the toe of slope. The floor of each cell would have a trough aligned with its longest dimension; at its center this trough would be 2.25 feet lower than the toe of the slope.

The cells would be lined with two highly impervious geomembranes made of 60 mil High Density Polyethelene (HDPE) laid on a 12 inch prepared subgrade. Side slopes of the cells would have 18 inches of soil cover to prevent damage; the HDPE liner on the bottom of the cells would not be covered with soil.

A leak detection and collection system would be installed between the two liners. The trough in the center-bottom of each cell would have a six inch perforated HDPE pipe to carry any leakage to a rock sump located at one end of the cell (Sargent and Lundy, August 29, 1997). Any leakage through the inner liner would be removed entirely by a pump located in the rock sump. The pump would be activated by a level control. Pumped water would be discharged back into the pond. This same system would be provided at the three acre storage pond.

No truly impervious liner has been devised; flaws are assumed. The HDPE material which would be used meets a standard of one 10 square mm hole per acre at the maximum working depth of the pond. A two inch hole caused by damage while the liner is in place is also assumed. Leakage through inherent liner flaws, and a damage hole, would be approximately 90 gpm. Leakage would be monitored; any rate exceeding the design assumptions would result in automated notification and consequent cell shut down by plant operation staff. These project design features reduce potential leakage to below significant levels.

4.3.4.2.2 Effects on Groundwater and Soils In the Event of Spill

The liner and leak collection and removal system would be installed per a Quality Assurance/Quality Control Plan. The plan would be implemented under a qualified independent engineer and inspectors.

In the event of liner failure, percolating water from the evaporation pond would have to travel approximately 135 vertical feet through the bluffs before reaching the water table. Such percolating water, if any ever were to be present, would be held in the unconsolidated sands and gravels of the cliff which comprise the vadose zone, that is, the zone between a surface water source and the water table, without ever reaching the water table. Because of the protection afforded by a highly impervious liner, and containment in smaller cells within the 30 acre pond, the small quantity of water which could escape through a leak or leaks in the liner, and the distance separating the pond water and the water table, the probability that leaking process wastewater containing concentrated dissolved chemicals would enter the water table is very remote, and no adverse effects to groundwater quality are anticipated. In any event, no significant levels of toxic or hazardous chemicals are present in either the wastewater, or in solids remaining after evaporation (W&EST, Inc., 1997).

Because the process wastewater would be held separate from soil by the HDPE liners, no change in existing soil conditions would result from impoundment of wastewater. The pond would have a primary bank to contain the wastewater, and a secondary berm to contain wastewater in the event the primary bank failed. Therefore, pond design would prevent wastewater solids from being washed out and carried by stormwater to lower elevations where it could mix with surface or groundwater. The wastewater pond would be fenced to prevent trespass and access by many wildlife species, and would have warning signs posted.

Similarly, leak prevention measures, and the large surface area of the bluff which could absorb spreading water in the event of total pond failure would not present a significant additional liquefaction hazard. Temporary saturation of the soil surface in the event of a total spill of approximately 60 AF would not be likely to wet more than 12 vertical inches temporarily. Drying through evaporation would be rapid.

If a major spill were to occur, soils testing would be necessary to determine whether significant levels of contaminants, such as salts, had been deposited, and what appropriate remediation, if any, would be implemented. The BCFD hazardous response team will be the entity responsible for determination of significant hazards and initiations of remediation action, if any.

At the end of the useful life of the proposed Southpoint power plant, residual accumulated solids and the pond liner would be removed and properly disposed of. The ponds would be filled in with soil as part of the decommissioning process required by the proposed lease terms. (See Section 5.1.2.5 for committed mitigation measure). No significant adverse environmental consequences are expected to result from operation and maintenance of the three acre process wastewater storage pond or the evaporation pond.

4.3.4.2.3 Accumulation of Precipitated Solids

The pond allows solids to settle out of the water during the evaporation process. The rate of evaporation would be primarily dependent on temperature, humidity, wind velocity, and TDS concentration. A crude pan evaporation rate measurement for the Mohave Valley is approximately 7 feet per year. This estimate is based on irrigation water requirements, and does not consider the higher chemical concentrations that would be present in process wastewater. Process wastewater would be a saturated Na_2SO_4 - NaCL brine, which would evaporate more slowly than unsaturated water. A design evaporation rate of 3.5 AF per acre per year has been used to calculate an appropriate size for the evaporation pond. At temperatures of less than 17-20°C, crystallization of salts may occur on the pond surface which could further retard evaporation. This effect can be minimized by maintaining a pond depth of four feet or more. Ponds would be oriented to maximize wave action. This would increase evaporation and would aid in breaking up floating encrustations of crystallized solids such as sodium sulfate decahydrate which could be formed at surface temperatures of less than 18°C.

Accumulated solids would be removed routinely and disposed of in a licensed sanitary landfill. (See Section 4.6.2.3.1). No significant adverse environmental consequences are anticipated from the accumulation of precipitated solids in the pond as a byproduct of the evaporation of water during the maximum lease term of 65 years during which the proposed power plant would be in operation.

4.3.4.2.4 Water Vapor

In average years, the months from May through October account for 68 to 70 per cent of total annual evaporation (W&EST, supplemental memo 1997, p. 2). No environmental consequences from evaporation of water are anticipated because water which evaporates to the atmosphere as a gas is virtually pure; no chemicals from the process water would be carried into the atmosphere.

4.3.4.3 Wildlife Species: Resident and Migratory Populations

4.3.4.3.1 Preferred Alternative Site - Section 8

The evaporative pond, which is the preferred method for disposing of plant process wastewater, poses a hazard to both resident and migratory animal species, especially birds, which may land on the water surface. The high mineral concentrations of the water are presumed to be toxic in some degree to most animals if consumed or if they come in contact with it for prolonged periods.

The pond would be attractive to migratory waterfowl. The probability of such waterfowl being attracted is enhanced by the Preferred Alternative site's proximity to Havasu National Wildlife Refuge (Topock Marsh). The marsh has a high migratory waterfowl visitation because of its location in a desert environment, and on the Colorado River flyway. (Gregory Wolf, Manager, Havasu National Wildlife Refuge, personal communication).

Locating the evaporation pond on top of the bluffs lessens the attractiveness of the pond to wildfowl as it is above their normal travel corridor along the Colorado River where there are more plentiful food and water sources on the valley floor. Some birds may die as a result of being attracted to the evaporation pond, however, the total number would be small in the context of the commonality and abundance of these bird species. Potential impacts to migratory waterfowl would not be significant.

Other animal species, especially small mammals, may be attracted to a water body in the midst of an arid environment. The pond would be fenced, as appropriate, to minimize potentially adverse impacts. Effects on non-avian wildlife are not anticipated to be significant.

4.3.4.3.2 Alternative Two Site - Section 30

The potential adverse impacts to migratory wildfowl are generally the same for the Alternative Two site as they would be for the Preferred Alternative site. The potential impacts to migratory waterfowl are somewhat less than for the Preferred Alternative site because of the greater distance from Topock Marsh, and are not significant. Effects on non-avian species are not anticipated to be significant.

4.3.4.3.3 Alternative Three Site - Section 16

The Alternative Three site has potential impacts to animal species comparable to those presented by the Preferred Alternative site if a power plant is built and operated. The potential impacts to waterfowl would be not significant. Effects on non-avian species would not be significant.

4.3.4.3.4 No Action Alternative

Under a No Action Alternative, there would be no change in existing habitat on any of the alternative sites, and there would, consequently , not be any impacts, beneficial or adverse. No evaporative pond would be built, so that there would be no risk to any resident or migratory species from drinking or coming into prolonged contact with water having high chemical concentrations.

4.4 Biological Resources

4.4.1 Flora

4.4.1.1 Preferred Alternative Site - Section 8

If the proposed power plant is built and operated on the Preferred Alternative site, approximately 78 acres of sparse vegetation, recovering from a wildfire, would be destroyed. The fire severely degraded both the variety and density of plant species on the site. Because plant species present on the site occur throughout the Mohave Valley, and no rare or endangered species occur on the site, impacts to flora would not be significant.

4.4.1.2 Alternative Two Site - Section 30

The Alternative Two site is a combination of irrigated farmland on the valley floor, and natural desert vegetation on the bluffs. It was not damaged by fire. Construction and operation of a power plant would destroy approximately 78 acres of vegetation commonly occurring throughout the Mohave Valley. Impacts to flora would not be significant because no rare or endangered species occur on the site.

4.4.1.3 Alternative Three Site - Section 16

The Alternative Three site has the same conditions of fire-ravaged vegetation on the valley floor as the Preferred Alternative site. Impacts would be the same as for the Preferred Alternative site, and would not be significant.

4.4.1.4 No Action Alternative

If no power plant is built, the existing vegetation on all three alternative sites will remain in its present condition. There would be no adverse or beneficial impacts.

4.4.2 Fauna

4.4.2.1 Preferred Alternative Site - Section 8

If the proposed power plant were built on the Preferred Alternative site, some resident animal species would be displaced to adjacent undeveloped desert. Impacts would not be significant, as there are vast areas of comparable habitat in the immediate vicinity. The 1995 fire which burned off almost all the vegetation on the valley floor portion of the site has permanently altered the pre-fire habitat. In the desert environment of the Mohave Valley, it is unlikely that a mature mesquite bosque will ever reestablish on the site (George Ruffner, EcoPlan Associates, personal communication). Although the site lies near to Topock Marsh and is under a migratory wildfowl flyway, its present and long term future degraded condition render it relatively unattractive to these, and other, species. See Section 4.3.5.3 for potential impacts to fauna from evaporation ponds.

4.4.2.2 Alternative Two Site - Section 30

Construction and operation of the proposed Southpoint power plant on the Alternative Two site would have no significant effects on fauna. The valley floor is in agriculture, while the bluffs are the same habitat as that available over vast areas of adjacent undeveloped desert. No significant adverse impacts would result. See Section 4.3.5.3 for potential impacts to fauna from evaporation ponds.

4.4.2.3 Alternative Three Site - Section 16

The Alternative Three site, which also burned in 1995, has very comparable potential impacts to animal species as the Preferred Alternative site if a power plant is built and operated. It is under the migratory wildfowl flyway. Topock Marsh, which is adjacent to this site, offers more attractive water sources and habitat for most area species. More detailed discussion of potential impacts to migratory waterfowl appears in Section 4.3.5.3. No significant adverse effects would result.

4.4.2.4 No Action Alternative

Under a No Action Alternative, there would be no change in existing habitat on any of the alternative sites, and there would, consequently , not be any impacts, beneficial or adverse. No evaporative pond would be built, so that there would be no risk to resident or migratory species from drinking or coming into prolonged contact with water having high chemical concentrations. No impacts would occur.

4.4.3 Endangered Species

Development of any of the proposed sites for a power plant would not adversely affect individuals or populations of endangered species or any critical habitat. The Biological Assessment for the three alternative sites was made before fire destroyed much of the vegetation on the Preferred Alternative and Alternative Three sites in 1995. Species variety and density, of both plants and animals, is lower now on these two sites than when the Biological Assessment was made. Conditions on the Alternative Two site are the same as when the Biological Assessment was made. The water supply pump which would be mounted in the Colorado River would be screened to prevent intake of migrating endangered fish species and other aquatic species. The buried water supply pipeline would have no impact on endangered species, it would be located in an existing ROW corridor in which there are no rare or endangered species (EcoPlan Associates, 1998).

The Sonoran Desert Tortoise is a distinct population from the Mohave Desert Tortoise. The Mohave Desert Tortoise is a threatened species which occurs in Nevada, including the FMIR lands in Nevada. The Sonoran Desert Tortoise occurs in Arizona, including the FMIR lands in Arizona, but is not listed as threatened or endangered. The Arizona Game and Fish Department has published "Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects".

The Arizona Game and Fish Guidelines are not enforceable, and do not apply to sovereign Indian lands. Calpine agrees to implement the Arizona Game and Fish Guidelines during construction and operation of the proposed Southpoint power plant. The Preferred Alternative Site (Section 8) is not considered suitable Desert Tortoise habitat (EcoPlan Associates, April 16, 1998). Because of the low probability that Sonoran Desert Tortoise would occur on the site, and because Calpine voluntarily would implement the guidelines, no significant impacts would result.

4.4.3.1 Critical Habitat

4.4.3.1.1 Preferred and Alternative Two and Three Sites

There is no critical habitat on any of the three alternatives sites. No impacts would result from construction or operation of a power plant, or from a no action alternative.

4.4.3.1.2 No Action Alternative

There would be no impacts to critical habitat if the proposed project were not constructed.

4.4.3.2 Endangered Fish

4.4.3.2.1 Preferred Alternative and Alternative Two and Three Sites

There is no open water on the Preferred Alternative, Alternative Two, or Alternative Three sites where razorback sucker or bonytail chub could occur.

These species occur only in the Colorado River. The proposed project would not adversely affect individuals or populations of these species.

The tribally owned and operated proposed water supply pump in the Colorado River would be located where there is no suitable habitat for either the razorback sucker or bonytail chub (Avi Marina EA, 1995). These two species migrate through the reach of the Colorado River which flows through the reservation. The pump intake would be screened to prevent fish kill. Therefore, it does not appear that these fish species would be significantly adversely affected by pumping water from the Colorado River. However the effects of the proposed pump intake on endangered fish species are the responsibility of the FMIT.

4.4.3.2.2 No Action Alternative

As there is no open water on any of the alternative sites, a No Action Alternative would have no impact on fish species. No new pump would be placed in the Colorado River, and no delivery pipeline would be built. Therefore fish species would not be significantly adversely affected by pumping river water.

4.4.3.3 Endangered Birds

4.4.3.3.1 Preferred Alternative Site - Section 8

Southwestern Desert Willow Flycatchers are not anticipated to be adversely affected by the proposed project. No natural areas of standing water would be present within the proposed project area and no suitable habitat was observed at the site. No Flycatchers were observed during the field survey. Because of lack of habitat, no impacts to Southwestern Desert Willow Flycatchers is anticipated. Potential habitat for Peregrine Falcons does not exist within the Preferred Alternative site and no Falcons were observed on the site during the field survey. The proposed project would not adversely affect individuals or populations of this species.

It is unlikely the activity area is suitable habitat for Bald Eagles as the proposed sites are removed from the Colorado River. Potential habitat does not exist within any of the proposed power plant sites and no Bald Eagles were observed during the field survey. The proposed project is not anticipated to adversely affect individuals or populations of this species.

Due to the lack of suitable wetland habitat on Section 8, it is highly unlikely that Yuma Clapper Rails utilize the area for nesting or foraging. No Yuma Clapper Rails were observed during the field survey. The proposed Southpoint power plant is not anticipated to adversely affect individuals or populations of this species.

Shrikes may be present on the Preferred Alternative site, but are not considered sensitive to construction or plant operation activities, and therefore would not experience adverse impacts.

No endangered avian species were found at either the proposed location of the new pump in the Colorado River, or the proposed water delivery pipeline corridor (EcoPlan Associates, 1997). Therefore, no effects on Southwestern

Desert Willow Flycatchers or Yuma Clapper Rails would result from construction and operation of the proposed pump and pipeline.

The evaporation pond may attract migratory wild fowl. The high mineral concentration of the evaporating water would be deleterious to birds landing on the water. The primary avoidance and minimization of potential impacts is location of the pond on the bluffs, above the valley flyway. Fewer birds would be likely to pass over the pond in this location because of its elevation some 150 feet above the valley floor which contains more attractive habitat. A second impact minimizing measure is design of the pond. Pond banks would have an inside slope of approximately 2.5:1. The steep slope would inhibit shore birds from using the pond. The cells within the pond would be long and narrow, so that mesh or screen could be installed to prevent waterfowl from landing in the ponds. At this time it is not anticipated that the adverse effects on waterfowl are significant enough to warrant installation of mesh. (Kirk King, USFWS, Phoenix, AZ, personal communication). A third preventive measure would consist of owl or other bird-of-prey decoys mounted on poles at random locations around the perimeter and within the pond. Artificial birds of prey are a successful deterrent which has been employed elsewhere to minimize the problems of attracting waterfowl. The decoys must be rotated to new locations weekly to remain effective. (Dr. George Ruffner, EcoPlan Associates, personal communication).

Flagging would also be installed as an additional deterrent to waterfowl. Surface coverage with plastic balls or other floating objects was considered but found to be infeasible because of the size of the pond, and the reduction in evaporation rate which would result. Calpine, in consultation with the Havasu National Wildlife Refuge manager, would monitor actual effects of the evaporation pond on migratory waterfowl and would determine when and if netting, or other acceptable measures, would be added as additional design features. Species visiting the pond would be monitored by the FMIT Environmental Protection Officer for presence of rare or endangered birds. In the event that rare or endangered bird species were to be identified, installation of netting or other appropriate deterrents would be implemented by Calpine, in consultation with the Manager of the Havasu National Wildlife Refuge, the FMIT and the BIA. These features of project design and operation would reduce any potential adverse effects on waterfowl to insignificance.

4.4.3.3.2 Alternative Two Site - Section 30

The Biological Assessment found no rare or endangered bird species on the Alternative Two site which would be adversely affected by construction and operation of the proposed power plant. No new pump in the Colorado River, or water delivery pipeline, would serve this alternative site, therefore, Southwestern Desert Willow Flycatchers or Yuma Clapper Rails would not be affected significantly by water supply infrastructure.

4.4.3.3.3 Alternative Three Site - Section 16

Potential impacts to rare or endangered birds from construction and operation of the proposed Southpoint power plant on the Alternative Three site would be comparable to those on the Preferred Alternative site, including effects of the proposed new pump in the Colorado River and Water delivery pipeline. No adverse effects on endangered avian species are anticipated.

4.4.3.3.4 No Action Alternative

The No Action Alternative would have no effect on endangered bird species.

4.4.3.4 Wetlands

4.4.3.4.1 Preferred Alternative Site - Section 8

There are no wetlands on the Preferred Alternative site so that impacts to wetlands would not occur. Construction and use of the evaporation pond would not create a wetland because water quality would prevent establishment of biota, and highly impervious lining would prevent creation of hydric soils. No direct or indirect impacts to Topock Marsh are anticipated. No water would exit the site to Topock marsh, eliminating potential for deleterious water quality impacts to the marsh. Groundwater pumping would not effect water levels, or water quality, in Topock Marsh. (See Section 4.3.2.1) No wetlands exist within the vicinity of the water supply pumping platform in the Colorado River, or the proposed water supply pipeline corridor. No impacts to jurisdictional wetlands are anticipated.

4.4.3.4.2 Alternative Two Site - Section 30

Project impacts are essentially identical to those in the Preferred Alternative. No significant impacts are anticipated.

4.4.3.4.3 Alternative Three Site - Section 16

Project impacts are essentially identical to those in the Preferred Alternative. No significant impacts are anticipated.

4.4.3.4.4 No Action Alternative

There would be no impacts to wetlands from the No Action Alternative.

4.5 Cultural Resources

4.5.1 Preferred Alternative Site - Section 8

Three archaeological sites and four isolated artifact or feature occurrences are on the Preferred Alternative site. The three archaeological sites are potentially eligible for National Register listing. All of these sites would be avoided. Two of the three sites are located in areas not designated for construction of any facilities of the proposed power plant. The third of the potentially eligible sites occurs on top of the bluffs, at the north east edge of the proposed Calpine lease area. The evaporation pond is proposed for this general locale. There is ample land area in which to build the evaporation pond, and any future pond which may be required, in a location which avoids this cultural resources site.

Tribal elders from the Aha Macav Cultural Society examined the cultural resources sites on the Preferred Alternative proposed lease area and concluded that none were culturally sensitive or of special concern (Garry Cantley, BIA/PAO Archaeologist, personal communication).

No significant adverse effects to known cultural resources or sensitive sites would result from construction and operation of the proposed power plant and related facilities on the Preferred Alternative site.

4.5.2 Alternative Two Site - Section 30

Five archaeological sites and two isolated artifact or feature occurrences were recorded on the Alternative Two site. All are located on top of the bluffs.

Sites AZ L:2:50, 51, 53, and 54 (ASM) are recommended as eligible for listing on the National Register of Historic Places under Criterion D (information potential). Site AZ L:2:52 is recommended as potentially eligible pending more detailed study and analysis of this possible geoglyph. Sites AZ L:2:50, 52, and 53 (ASM) all contain features (e.g., possible shrines, trail markers, or geoglyphs) that may be associated with important ceremonial activities, and these sites could potentially be considered "Traditional Cultural Properties" in regards to National Register evaluation of these sites.

It would be difficult to locate the power plant equipment, evaporation pond, and other facilities on top of the bluffs without disturbing one or more cultural resources sites. Impacts to known cultural resources would be significant if the proposed power plant were to be built on the Alternative Two site.

4.5.3 Alternative Three Site - Section 16

Three cultural resources sites were identified on top of the bluffs on the Alternative Three site. Sites AZ L:2:55, 56, and 57 (ASM) are recommended as eligible for listing on the National Register of Historic Places under Criterion D (information potential). Sites AZ L:2:56 and 57 (ASM) contain features (e.g., petroglyphs, rock cairns, possible shrines, and trails) that may be associated with important ceremonial activities, and are located within an area identified by local Native Americans as culturally sensitive. These sites could potentially be considered "Traditional Cultural Properties" in regards to National Register evaluation.

The proposed power plant and related facilities, including the evaporation pond, could be located to avoid cultural resource sites. No adverse effects to known cultural resources would result.

4.5.4 No Action Alternative

There would be no effects to known or unknown cultural resources if the proposed power plant and associated facilities is not built.

4.6 The Social and Economic Environment

4.6.1 Population and Its Distribution

4.6.1.1 Mohave Valley

A temporary construction workforce averaging 135 people, and peaking at 230, and a permanent workforce of 20 full time employees, would not have discernible beneficial or adverse impacts on population in the tri-state region. Regional growth is projected to increase 300 per cent in the decade between 1991 and 2000 (MVR EIS, H-8, 1991). Using this figure, the Mohave Valley's population would increase from approximately 17,000 (US Bureau of Census, 1990) to approximately 51,000 in the same period.

The temporary workforce is expected to peak at 230 workers in the middle of the 19 month construction period. The peak would occur in the tenth, eleventh, and twelfth months. (Ron Sichau, Project Engineer, Calpine, personal communication).

Black and Veatch (1995) suggest there are insufficient qualified local residents available with the construction skills necessary for power plant construction. It is estimated that as much as 95 per cent of the workforce would be obtained from outside the immediate region, especially from centers like Las Vegas, Flagstaff, and Phoenix. An estimated five per cent would be recruited locally, from the reservation and from the regional cities of Needles, Laughlin, and Bullhead City.

At peak construction it is assumed that some 230 workers would be net additions to the regional population. Assuming that 75 of the incoming construction workers arrive with families, and assuming a family size of 3.2 (Bureau of the Census, 1990) the maximum temporary population generated by the project would be about 230 workers plus 90 family members, or 320 people. At its peak, the construction workforce and their families would represent approximately two per cent of the population in the Mohave Valley.

Once the plant is in operation, a permanent work force of 20 people would be employed. Staff would consist of a plant manager, an operation manager, three maintenance technicians, 14 operating personnel, and one maintenance worker. Black and Veatch (1995) indicate that 12 of the permanent work force would be local to the region and that the remaining eight employees would be from other regions. It is assumed that all non-local employees bring families. Using the same family size multiplier employed above, an additional 10 family members would be added to the population, for a total of 18 new people (eight employees, and 10 family members).

Temporary and permanent workers would cause an incremental increase within the overall population of 51,000 people. This increase would not be significant either in number, or in distribution. These effects would be identical for construction and operation of the proposed power plant on any of the three alternative sites.

4.6.1.2 The Fort Mojave Indian Tribe

The FMIT has approximately 1,050 enrolled members. Of enrolled members, 630 live on the reservation (Nora Helton, Chairperson, FMIT, personal communication). Most of the remaining tribal members live in the tri-state area; few live in areas remote from the FMIR. Creation of temporary and permanent employment opportunities by the proposed Southpoint power plant would not have a significant effect on tribal population because it is not anticipated that substantial numbers of tribal members living outside the tri-state region would return to the reservation to seek power plant related employment. Similarly, no significant impacts on tribal housing resources, or social services programs, would result.

4.6.1.3 No Action Alternative

In the No Action Alternative, the power plant would not be constructed and there would be no change to the permanent or temporary population of the area, and no employment opportunities created, either temporary or permanent.

4.6.2 Regional Economy and Employment

The proposed power plant would create 20 full time permanent jobs for administrative and operating personnel. Self-contained economies in rural areas of the southwest typically have an employment multiplier of at least 1.5 non-basic jobs to one basic job (BIA 1991). In this context, a basic job is one which brings earnings into the region. A non-basic job is one which depends on expenditure of the income which enters the area from basic jobs. The temporary construction workforce, and the permanent workforce, represent basic jobs. At its peak, the construction workforce would support an additional 360 non-basic jobs. The average would be lower during the course of construction. The permanent workforce would support an additional 30 non-basic jobs. Some of the new jobs would be taken by local people and some would be filled by newcomers to the area.

Information used to calculate the wages infused into the local economy by the temporary workforce which would be created by the proposed project was extrapolated from wages paid on the FMIR for major construction projects (Martin Bailey, FMIT Realty Services, personal communication). Information on salary ranges for permanent jobs was supplied by Calpine (Maurice Richard, Calpine Program Mgr., personal communication).

The income stream is calculated using the following assumptions:

- a standard working week
- average wage rates of $10 per hour for unskilled and semi-skilled laborers, who would constitute 75 per cent of the construction workforce
- average wage rates of $20 per hour for skilled laborers, who would make up the remaining 25 per cent of the workforce

- an annual salary average of $30,000 for the permanent workforce at the power plant and $17,000 per year for indirect jobs created by the project.

Table 4.6-1 shows that short term regional income generated directly by the construction component of the project would average approximately $3.1 million per year for almost two years. Income during the operational life of the plant would be substantially less, starting at approximately $600,000 per year for the permanent labor force.

Not all of this income would be spent locally. The tri-state region is largely rural and heavily dependent on only two economic activities: agriculture, and gaming. The area does not have a diverse economy and is not well positioned to take advantage of this spending. For example, manufacturing is under represented, as are many segments of the retail consumer market (BJ Raval, GIS Southwest, personal communication). It is estimated that about 50 per cent of new income would leave the area. Hence about $1.5 million would be spent locally for each of the first two years, declining to $300,000 per year generated by the permanent workforce at the power plant. An additional $255,000 would be spent locally by the permanent indirect jobs stimulated by the plant, making a total of slightly more than $500,000 annually.

In addition to wages paid to employees, there is substantial spending associated with the cost of constructing the power plant itself. Construction cost is estimated at $250 million. The project would generate several rounds of spending. For instance, materials must be purchased from various suppliers such as lumber companies, metal fabricators and so on. The firms which supply the raw materials for construction also require goods and services from other firms in order to supply what is demanded of them. Lumber companies purchase timber from mills and a metal fabricator requires various iron products from a steel company. However, not all of this spending would be local. Again, the rural nature of the region and its specialized economy position it badly to take advantage of construction spending. It does not have the range of products available to supply a project like a power plant. It is estimated that 90 per cent of construction outlays would leak from the region, leaving some $25 million to be spent locally.

The significant beneficial local and regional economic impacts of the power plant would be virtually identical on all three alternative sites.

4.6.3 Fort Mojave Indian Reservation

4.6.3.1 Economy and Employment

The FMIT has near full employment because of the jobs created by recent tribal enterprises, particularly the Avi Casino and Hotel. Construction jobs associated with the proposed power plant, and permanent jobs associated with its operation, may offer preferable, and higher paying, occupations to some tribal members, allowing them to move into new job types that would become available for qualified tribal members. Preference in hiring for both construction jobs and permanent positions with the proposed power plant is required for qualified tribal members, and other Native Americans, under the tribe's Tribal Employment Rights Ordinance (TERO). Movement out of present jobs by tribal members may create new openings for area residents, while also diversifying the employer base away from government and service jobs on the reservation. These effects would be significant and beneficial, and would occur regardless of which project alternative site is selected.

Table 4.6-1: Infusion of Direct Labor Income Into the Region from the Power Plant

Construction period from Notice to Proceed	Plant construction period		Plant operation period	
	Employment stream	Income generated per quarter	Employment	Income generated per quarter
First quarter	135	$861,900	-0-	-0-
Second quarter	135	$861,900	-0-	-0-
Third quarter	135	$861,900	-0-	-0-
Fourth quarter	240	$1,530,000	-0-	-0-
Fifth quarter	135	$861,900	-0-	-0-
Sixth quarter	135	$861,900	-0-	-0-
Seventh quarter (first month)	135	$287,300	-0-	-0-
Seventh quarter (2nd and 3rd months)	-0-	-0-	20	$150,000
Annual average income	-	$5,126,800	-	$600,000

4.6.3.2 No Action Alternative

In the No-action Alternative the project would not occur. There would be no new project-related jobs generated or spending of any kind. A No Action Alternative would result in significant adverse effects to the economy and employment of the FMIT and its members because the proposed Southpoint power plant would be the highest and best use of FMIT lands if it were to be built on any of the three alternative sites. Therefore a No Action Alternative would result in less economic benefit, or no economic benefit, than would result from construction and operation of the proposed Southpoint power plant.

4.6.3.3 Fiscal Impacts of the Proposed Lease

4.6.3.3.1 Lease Terms

The tribe would receive a base annual rent for land. The tribe would also receive income from property taxes and from the lease of up to 4,000 acre-feet of water per year. There are no direct costs to the tribe as a consequence of the proposed project.

The proposed lease between the FMIT and Calpine includes clauses which address potential environmental liabilities during the operating life of the plant, and conditions of decommissioning the plant at the end of its useful life. Calpine, or its successors, would be required to remove and dispose of any residual solids in the pond bottom and the pond liner, fill in the evaporation pond with soil, and restore the filled pond's surface to match natural grade and revegetate disturbed surface areas. Calpine, or its successors, would also be required to remove any chemicals stored on site, and to dispose of chemicals or waste as required by law. Irrevocable financial guarantees to assure compliance with these provisions are included in the proposed lease terms. Overall fiscal impacts of the proposed lease are significant and beneficial.

4.6.3.3.2 No Action Alternative

Under a No Action Alternative, the proposed lease between the FMIT and Calpine would not be executed and approved, and the proposed Southpoint power plant would not be built. There would be no income to the tribe from project-related lease of its land and water. The amount of income to the tribe specified in the proposed lease with Calpine is confidential information. The proposed lease is not a public document. However, it can be stated that the loss of income to the tribe would be substantial and significant in the context of its current income from other revenue sources. Therefore, significant adverse fiscal impacts to the FMIT would result from a No Action Alternative.

4.6.4 Community Infrastructure

4.6.4.1 Housing

The Mohave Valley has an increasing housing stock in new and existing master planned subdivision developments. Mesquite Creek, located on land leased from the FMIT seven miles north of the Preferred Alternative site, has 100 single family homes, and developed lots for over 100 more, in its first phase development. A second phase with over 300 lots just was approved (Goldie Stroup, Realty Services, Parker Agency BIA, memo dated November 23, 1997). Similar large developments are at start up or expansion stages in the southern Mohave Valley. Single family homes available for purchase are plentiful with moderate to expensive price ranges, typically from around $70,000 at the lowest to $300,000 at the highest.

Not all construction workers with families elect to move their families to a new jobsite, and many do not have families. The Mohave Valley is within a half days' drive of major cities in Southern California and central Arizona, and it is probable that some portion of the construction workforce will commute to and from permanent residences in those locales on a weekly, or less frequent, basis. This commuting pattern is typical on large scale construction projects, and would diminish the need for family housing during the construction phase of the proposed project by an estimated 20 per cent, or 48 family housing units, at the construction peak, although accommodations for the workers would still be needed (Ron Sichau, Project Engineer, Calpine, personal communication). An estimated 155 solo workers and 75 workers with families would require temporary housing during the construction peak.

Temporary housing for construction workers, with or without families, is available in the local housing market. Lowest cost offerings range from budget motel rooms along old Route 66 in Needles, to mobile home and RV parks. Approximately 160 budget motel rooms are available in Needles. There are 2,500 mobile home and RV spaces in the Mohave Valley. Occupancy rate averages about 60 per cent (Hallock/Gross, Inc., MVR Feasibility Study, 1996). The FMIT has a new 200 space RV park located six miles northwest of the Preferred Alternative site, and another 500 space park under construction in the Aha Macav development in Nevada, approximately 12 miles northwest of the Preferred Alternative site (Martin Bailey, FMIT Real Estate Services, personal communication).

Moderate cost housing options include apartments and house rentals. Because of the seasonal and retiree base for the area's housing market, apartments are not in demand and make up a very small segment of the housing stock. Rental houses, however, are plentiful because of their seasonal use pattern (Martin Bailey, FMIT Real Estate Services, personal communication).

Recent experience during construction of the FMIT's 302 room casino/resort, which employed several hundred construction workers for more than a year, attests to the availability of temporary housing in the area (Mark Temple, Temple Construction, personal communication). The Mohave Valley has an adequate supply of permanent and temporary housing in a variety of price ranges would be available to satisfy the shelter needs of permanent employees of the proposed power plant. No significant adverse effects on area housing are anticipated.

4.6.4.2 Schools

4.6.4.2.1 Preferred Alternative Site - Section 8

It is assumed that 75 temporary construction workers would bring families. Workers plus one other adult per household would total 150 new adults. Using a multiplier of 21 per cent of the new adult population, based on projection of school impacts associated with the FMIT's Aha Macav development (MVR EIS, 1991, H-8), approximately 32 school age children would accompany temporary construction workers. Permanent employees would add approximately four children, based on the projection that 44 per cent of single family home residents in the Mohave Valley have school age children, and that the number of school age children is less than one per household (MVR EIS, 1991, H-6).

The impact of 32 temporary and four permanent new students on educational facilities is expected to be minor. It is assumed that Needles and Mohave Valley schools would absorb all, or almost all, of these additional students because they serve residential areas closest to all three alternative sites for the proposed Southpoint power plant. Discussions with elementary and high school officials suggest that there would be no capacity problems associated with accommodating new school children from the construction or permanent workforce and related population (Ford, Needles School Dist.; Alstott; Mohave Valley School Dist., 1995). No significant impacts to area educational capacity are anticipated from construction and operation of the proposed Southpoint power plant on either the Preferred Alternative, Alternative Two or Alternative Three sites.

4.6.4.2.2 No Action Alternative

In the No Action Alternative, the proposed project would not be built. There would, therefore, be no impacts of any kind on educational facilities.

4.6.4.3 Libraries

The size of the temporary and permanent population increase which would result from construction and operation of the proposed Southpoint power plant is incrementally small as a component of projected annual regional growth. No significant effects on existing library services would result if the proposed power plant were built on any of the three alternative sites. Similarly, no significant effects to library services would occur under a No Action Alternative.

4.6.4.4 Parks

Local parks are not anticipated to experience significant adverse impacts from increased use by temporary or permanent power plant workers and their families. These workers would represent an incrementally small proportion of the total area population.

4.6.5 Attitudes, Expectations, Lifestyle and Culture

Construction and operation of the proposed power plant could be anticipated to have a beneficial impact to tribal attitudes, expectations, lifestyle and cultural values. The power plant would partially fulfill stated tribal goals for economic development and self-sufficiency. Use of any of the three alternative sites would be consistent with Tribal Council policy committing reservation land for economic development purposes. Income derived from the power plant would be committed to improving social services, including Mojave cultural and language education, and to capitalizing further development for profit.

Tribal members live in residential communities several miles from any of the three alternative sites, so that there would be no discernible impacts to village life.

Under a No Action Alternative a substantial step toward fulfillment of stated tribal goals for economic development and self sufficiency would not occur; therefore, impacts would be adverse and significant. (See Section 4.6.2.3.2).

4.6.6 Public Health and Safety

4.6.6.1 Law Enforcement

The permanent population growth resulting from the construction of the power plant is estimated at 18 people. During the peak construction period there may be some 320 temporary residents in the area. The Mohave County Sheriff's Department (Smith 1995) suggests that the impact on police services would be minimal and could readily be handled by existing facilities. The impacts described would be essentially the same on any of the three alternative sites. No significant adverse impacts are anticipated.

In the No Action Alternative, the proposed project would not be built. There would, therefore, be no impacts of any kind on law enforcement services.

4.6.6.2 Fire Protection and Hazardous Materials Response

4.6.6.2.1 Fire Protection

The permanent population growth, both direct and indirect, resulting from the construction of the power plant is estimated at 18 people. Assuming that all permanent employees live within that portion of the Mohave Valley served by the MVFD, the additional demand for fire protection services by the MVFD would be minimal and could readily be handled by existing facilities (Campbell 1995). No significant adverse impacts are anticipated.

The FMIT currently has a contract with the MVFD to provide fire protection (and emergency medical services). The existing contract does not include services to the proposed Southpoint power plant. In the absence of a contract modification to include services to the proposed power plant, fire protection and emergency medical response impacts would be significant. A contract modification to provide fire protection and emergency medical services would be executed between the FMIT and the MVFD. The cost would be borne by Calpine. This measure would mitigate to acceptable levels the significant adverse impacts of having no service provider.

On site emergency fire protection at the proposed Southpoint power plant would be provided two pumps--one diesel powered and one electric motor. The diesel pump could be operated even if there is an electrical power outage. The pumps would draw from the 240,000 gallon water storage tank located on site. Adequate supply and pressure for two hours pumping by one of the emergency pumps is available. As an additional protection measure, the FMIT building code requires installation of fire sprinklers in all buildings constructed on the reservation. These mitigation measures are project design features.

The MVFD is some three miles northwest of the Preferred Alternative and Alternative Three sites but only one quarter mile west of the Alternative Two site. Other than a marginal difference in response time, the degree of impact would not vary over the three alternative locations.

4.6.6.2.2 Hazardous Materials Response

Emergency response protocols have been devised for hazardous materials which would be stored onsite if the proposed Southpoint power plant were built and operated on any of the three alternative sites. A complete list of chemicals (and quantities) which would be stored appears in Table G-1 'Onsite Chemicals' which appears in Appendix G. The USEPA Region IX staff reviewed the list and concluded that no Resource Conservation and Recovery Act (RCRA) permit would be required (Jennifer Downey, USEPA, personal communication).

Some types of chemicals in the quantities which would be stored onsite, such as anhydrous ammonia and chlorine, pose a degree of hazard if they were to leak or spill. The chemical substance which would be stored onsite that poses the greatest degree of health risk is anhydrous ammonia. In the event of an anhydrous ammonia leak, some of the pressurized liquefied chemical would pond around the leaking storage container, and some of the chemical would vaporize. Tables 4.6-2, 4.6-3, and 4.6-4 summarize health risks, initial isolation distance, and the distance vapor would travel under various conditions. The distance vapor would travel is dependent on the quantity leaked, wind direction, and other variables (USEPA, 1998; John Krause, Solid Waste/Hazardous Materials Coordinator, BIA/PAO, personal communication).

Personnel at the proposed Southpoint power plant and the Mohave Mesa Fire Department (MMFD) would be the first available responders in a hazardous materials incident. Depending on the type of incident, either or both of these two responders could be adequate.

If a major incident at the proposed power plant involving anhydrous ammonia occurred, the BCFD has a fully equipped and trained hazardous materials response team. It is the only team in the Mohave Valley region, and will respond to any request from other emergency service providers in the region (Chief Richard Vickers, Mohave Mesa Fire Department, personal communication). Response time from Bullhead City to any of the three alternative sites would be approximately 35 to 45 minutes. A major nighttime anhydrous ammonia incident could require evacuation of the power plant, and of residences in a zone within 2.2 miles of the epicenter of the hazardous materials leak or spill (USEPA, 1998). Approximately 22 residences are within a 2.2 mile radius of the proposed power plant. Approximately 80 residents would be affected in the event of a nighttime large spill evacuation of these residences.

A daytime large spill would not affect any residences, as there are none within the three-tenths of one mile evacuation zone centered on the proposed power plant equipment block.

The same isolation and evacuation criteria would apply if a large or small incident occurred which involved transport of anhydrous ammonia to the proposed power plant.

In addition to the hazardous materials emergency response capability of the BCFD, the USEPA has a hazardous materials technical assistance team which is available to the BIA. Assistance includes emergency response and an on site emergency coordinator.

As a sovereign Indian tribe, the FMIT is also eligible to receive hazardous materials response assistance directly from the USEPA through the Emergency Planning and Community Right-to-know Act of 1986 (EPCRA, aka SARA Title III). Available assistance includes a qualified professional on the scene coordinator. Tribes are responsible for putting into place a chemical emergency preparedness program. Any facility located within the exterior boundaries of the reservation that has a regulated chemical inventory onsite must comply with EPCRA through the tribal program. To fulfill each of these programmatic components, tribes must have a preparedness plan, a training program, administration and funding for plan and program development, and guaranteed access to "readily available hazardous emergency response service," usually through contract with a local service provider (USEPA, 1997, at 4.2, p.1; http://www.epa.gov/swercepp/).

The FMIT has not formed a Tribal Emergency Response Commission (TERC), nor gone through the procedures to identify its status under EPCRA. In cooperation with the FMIT, Calpine would prepare an emergency preparedness plan for Tribal Council adoption by resolution and implementation in compliance with EPCRA. The plan would include program development and a contract with the BCFD. The FMIT would create a TERC to oversee emergency planning and responses on the reservation. An important component of the emergency planning would be identification of a procedure to assure timely evacuation of residences within the potentially affected area. With these measures in place, effects on hazardous response capabilities would be significant and beneficial.

In addition to these committed mitigation measures the ADEQ acts as USEPA's agent to provide emergency response within Arizona, including Indian lands.

4.6.6.2.3 Emergency Fire Pump Fuel Storage

Fuel would be required to operate emergency fire pumps in the event of an electric power outage if the proposed Southpoint power plant were built and operated on any of the three alternative sites. Low sulfur No. 2 diesel fuel oil for operation of the emergency fire pumps would be stored in a small (300 to 500 gallon) above ground storage tank located on site. The storage tank would have secondary containment which would drain to the oil/water separator to allow for discharge rainwater collected in the secondary containment area into the evaporation pond.

Table 4.6-2 Potential Hazards

Anhydrous Ammonia	Anhydrous Ammonia	Chlorine	Chlorine
Health Hazards	Fire or Explosion	Health Hazards	Fire or Explosion
Poisonous; may be fatal if inhaled or absorbed through skin.	Some of these materials may burn, none of them ignites readily.	Poisonous; may be fatal if inhaled.	May ignite other combustible materials (wood, paper, oil, etc.)
Contact may cause burns to skin and eyes.	Cylinder may explode in heat of fire.	Contact may cause burns to skin and eyes.	Mixture with fuels may explode.
Contact with liquid may cause frostbite.		Contact with liquid may cause frostbite.	Cylinder may explode in heat of fire.
Clothing frozen to skin should be thawed before being removed.		Runoff from fire control or dilution water may cause pollution.	Vapor explosion and poison hazard indoors, outdoors or in sewers.
Runoff from fire control or dilution water may cause pollution.			

Source: USEPA 1993 Emergency Response Guidebook

Table 4.6-3 Protective Action Decision Factors to Consider

The Hazardous Material	The Population Threatened	Weather Conditions
Degree of health hazard	Location	Effect on vapor and cloud movement
Amount involved	Number of people	Potential for change
Containment/control of release	Time to evacuate or protect in-place	Effect on evacuation or protection in-place
Rate of vapor movement	Ability to control evacuation or protect in-place	
	Building types and availability	
	Special institutions or populations, e.g., nursing homes, hospitals, prisons	

Source: USEPA 1993 Emergency Response Guidebook

Table 4.6-4 Initial Isolation Zone

		Small Spills*			Large Spills**		
		First ISOLATE persons in all Directions (Feet)	Then, PROTECT persons DOWNWIND (miles)		First ISOLATE persons in all Directions (Feet)	Then, PROTECT persons DOWNWIND (miles)	
ID#	Material		Day	Night		Day	Night
1005	ANHYDROUS AMMONIA	500	0.1	0.6	500	0.3	2.2
1017	CHLORINE	500	0.7	2.8	1500	2.4	4.6

*A small spill is a 55 gallon drum, or less
**A large spill is greater than one 55 gallon drum or multiple spills
Source: USEPA 1993 Emergency Response Guidebook

The secondary containment would be designed in accordance with regulations on oil pollution prevention (40 CFR 112) and a SPCC plan would be developed to assist plant operations staff in the event of an oil spill.

Emergency fire protection for the proposed power plant must be assured and reliable. Two energy sources would be available to power fire pumps: electricity, and diesel. A diesel-powered pump is imperative as a safeguard in the event of electric power failure. The risk which would be presented by having only an electric-powered emergency fire pump outweighs any risk presented by onsite storage of diesel fuel. There are no feasible alternate storage methods for the diesel fuel.

4.6.6.2.4 No Action Alternative

In the No Action Alternative, the proposed project would not be built. There would, therefore, be no impacts on fire protection services of any kind, or any need for hazardous materials response responsibility and capability.

4.6.6.3 Medical Facilities and Services

The permanent population growth, both direct and indirect, resulting from the power plant project is estimated at 18 people. The impact on medical facilities and emergency services would be minimal and could readily be handled by the existing infrastructure under normal circumstances. Effects of new permanent residents on medical services and facilities, therefore, would not be significant.

A serious multi-person accident at the power plant is within the response capabilities of the Needles-Desert Communities Hospital and Bullhead Community Hospital, which have emergency receiving rooms and have a total capacity of 121 beds. Each hospital has a disaster management plan in existence to cope with large scale accidents (Tyler 1995 and Lucas 1995). Hospitals at Parker and Kingman could be allocated patients in the unlikely event of an emergency affecting a large number of people at the plant. Las Vegas has the nearest full service trauma center.

Response to large scale medical emergencies would also be available to the BIA and the FMIT through the USEPA, and through FEMA.

The medical emergency impacts would be essentially the same for the Preferred Alternative, Alternative Two, and Alternative Three sites. Local, regional, and federal entities have current capability to respond to medical emergencies of any scale. Effects would not be significant.

In the No Action Alternative the proposed project would not be built. There would, therefore, be no impacts of any kind on medical or emergency services or facilities.

4.7 Resource Use Patterns

4.7.1 Hunting, Fishing and Gathering

Because hunting, fishing, and gathering are occasional and recreational in nature for tribal members, and because of the low resource value for these activities on the three alternative sites, no significant adverse impacts to these activities are anticipated from construction and operation of the proposed power plant on any of the alternative sites. Similarly, no significant effects to hunting, fishing, or gathering would result from a No Action Alternative.

4.7.2 Timber Harvesting

There is no commercial timber on any of the three alternative sites. Construction and operation of a power plant on the Preferred Alternative site, and the Alternative Three site, may have some beneficial impact to the health of mesquite trees which survived the wildfire on these sites. The trees would be managed as part of the power plant's buffer landscape. As there is no timber harvesting on the reservation, a No Action Alternative would not result in any impacts to this activity.

4.7.3 Agriculture

4.7.3.1 Preferred Alternative Site - Section 8

Approximately eight acres of prime soils with agricultural potential occur on the Preferred Alternative site. They are in the southwest corner of the proposed lease area. This area would be used as a buffer and would not be developed. No impacts to prime agricultural soils would occur.

The draft Reservation Plan and corollary water budget do not designate future agricultural development on the Preferred Alternative site, which is planned for industrial use. No impacts to tribal agricultural production would result from construction and operation of the proposed Southpoint power plant.

4.7.3.2 Alternative Two Site - Section 30

There would be minor adverse impacts to agriculture if the proposed power plant were built on the Alternative Two site. Approximately 80 acres of farmland would be removed from production and would have to be replaced by subjugating new agricultural land elsewhere on the reservation. There is an abundance of suitable land for agriculture which has not been developed. Therefore, impacts would be less than significant.

4.7.3.3 Alternative Three Site - Section 16

There would be no significant adverse impacts to agriculture if the proposed power plant were built on the Alternative Three site. This site is not designated for agricultural use in the draft Reservation Plan. Its designation is open space because of its low suitability for agricultural development.

4.7.3.4 No Action Alternative

Under a No Action Alternative, the proposed power plant would not be built, and no land with agricultural production potential would be lost. The land would remain available for agricultural, or other, uses.

4.7.4 Mining

4.7.4.1 Preferred Alternative Site - Section 8

No adverse impacts to mining would result from construction of a power plant on the Preferred Alternative site. All sand and gravel materials needed for fill would be taken from sources on site. Some beneficial impacts to tribally-owned and off-reservation sand and gravel mining operations could result from purchase of rock products used for concrete and other construction materials.

4.7.4.2 Alternative Two Site - Section 30

No adverse impacts to mining would result from construction of a power plant on the Alternative Two site. All sand and gravel materials needed for fill would be taken from sources on site. Some beneficial impacts to sand and gravel mining could occur from purchase of rock products used for concrete and other construction materials.

4.7.4.3 Alternative Three Site - Section 16

Some beneficial impact to sand and gravel mining would result from construction of a power plant on Alternative Three. Almost all fill and construction rock products would be purchased from local suppliers. Rock products are abundant.

4.7.4.4 No Action Alternative

There would be no effects, adverse or beneficial, on mining if the proposed power plant is not constructed.

4.7.5 Recreation

No impacts, adverse or beneficial, are anticipated to recreation resources available to tribal members if the proposed power plant is constructed on any of the alternative sites. None of the sites has significant recreational uses and none of the sites is open to non-tribal members for use. Incremental demand for non-reservation open space based recreation by temporary and permanent employees of the proposed power plant would not be significant because of the low numbers of temporary and permanent residents which would result from construction of the proposed power plant. The region has abundant open space for recreation, most of which is public lands. No significant effects on recreation are anticipated.

No effects to recreation would result from a no action alternative.

4.7.6 Transportation

4.7.6.1 Local Roads

4.7.6.1.1 Preferred Alternative Site - Section 8

A permanent workforce of 20 people, with an equal number of daily visitors, is unlikely to generate more than 100 employee trips per day (Jim Ball, PE, Transportation Industries International, 1995). The 100 trips would include both visitor and work-based trips. At the height of construction in the tenth to twelfth months, with a peak construction workforce of 230, it is estimated that the total increased traffic load on CR 227 would not exceed 500 employee trips. Impacts to traffic would be temporary and not significant in the context of traffic volumes ranging from 2,000 to more than 11,000 ADT on regional arterials. Turning movements to and from the plant access road would be significant during the construction period.

Regional traffic predictions point to CR 227 carrying a maximum of 3000 ADT by the year 2010 (Colorado River Regional Transportation Study, 1993). The addition of 100 employee and visitor trips after the construction period would be nearly imperceptible. Adding up to 500 trips for a three month peak construction period is a proportionally high increase in traffic load. However, it would not reduce the level of service on CR 227 (James Ball, PE, Transportation Industries International, 1995). There may be some local congestion while work shifts are changing but this would be confined to the stretch of CR 227 in the immediate vicinity of the plant, and to the parking areas within the site.

It is assumed that the majority of the construction and permanent work force would come from cities and towns to the west of the proposed Southpoint plant, as there are few residential areas elsewhere in the region. Therefore, left turn movements from CR 227 in to the proposed power plant would occur most frequently in the AM, while right turn movements from the plant onto CR 227 would be most frequent in the PM. The Mohave County Sheriff's Department (Smith 1995) expressed concern over the safety impact of increased traffic and turning movements because the two lane road lacks graded shoulders and makes a gradual 90 degree curve to the south which begins immediately east of the Section 8 east boundary.

Turning movements at intersections of Vanderslice and Mountain View Roads with CR 227 are of low volume and are unlikely to cause an impact because these north-south roads are unpaved and carry few vehicles. No significant adverse impacts to traffic movement, or safety, are anticipated from these turning movements if proposed changes to highway geometry are made. The proposed changes are discussed in Section 5.

The greatest traffic impacts would occur at the intersection of CR 227 and SR 95 during the construction phase of the proposed project. ADT on SR 95 in 1990 was 11,100 (Colorado River Regional Transportation Study, 1993). Up to an estimated 1,000 employee and delivery trips per day would be added for the projected 19 months during which the proposed plant would be under construction. Intersection movements during the peak construction period would increase substantially at this junction, raising congestion and safety issues. Temporary traffic impacts at the SR 95/CR 227 intersection during project construction would be significant. Traffic conflicts would be reduced by placing flaggers at appropriate locations, and by scheduling materials deliveries at off-peak travel times whenever feasible. For example, weekend traffic volumes are substantially higher than weekday traffic. Scheduling materials deliveries during weekdays would avoid increases to weekend traffic volumes. Similarly, scheduling deliveries at times which avoid peak-hour congestion would reduce the severity of temporary impacts resulting from construction vehicle traffic.

After construction, plant employees and visitors would add approximately 100 trips per day to the existing traffic volume of 2,200 ADT on CR 227, and 11,000 ADT on SR 95 at CR 227. These increases would not be significant. Volume would increase by less than one per cent on CR 227, and by less than nine-tenths of one per cent on SR 95. Turning movement LOS would remain D at the SR 95/CR 227 intersection for southbound traffic exiting SR 95 and making a left turn eastbound on CR 227. Right turn movements for northbound SR 95 traffic exiting to the east on CR 227 would remain A. LOS on SR 95 would remain C. LOS on CR 227 immediately east of the SR 95 intersection would remain B. Therefore no permanent significant effects on traffic are anticipated.

4.7.6.1.2 Alternative Two Site - Section 30

Road traffic impacts would be significant, and comparable to those created under the Preferred Alternative. Traffic volumes would increase both temporarily and permanently on SR 95. Construction traffic and vehicular movement associated with the operation of the proposed plant would use Willow Drive east of SR 95, which at present has extremely low traffic volumes. Although Willow Drive has low traffic on the section which leads to the Alternative Two site, it has a very high number of turning movements where it intersects with SR 95. Congestion at this intersection has raised safety concerns. The tribe's convenience store, the JB's restaurant, a bank, and other commercial uses attract more than 2,000 patrons a day. Willow Drive west of SR 95 has a school, with its attendant auto and bus traffic, and a fire station.

Local area residents have voiced concern over safety at this intersection during public meetings held by ADOT for planning improvements to SR 95. ADOT officials have stated, in published studies and at related public meetings (ADOT 1995) that addition of turning lanes is warranted, but that signalization is not. However, in response to safety concerns, the tribe has arranged with ADOT to pay for a signal at this location to be installed in 1998 (Nora Helton, Chair, FMIT, personal communication).

Traffic turning to and from Willow Drive east of SR 95 by construction workers and employees of the proposed power plant would significantly increase traffic congestion at this intersection and on Willow Drive east of SR 95. Temporary traffic impacts would be significant but mitigable. Addition of power plant employee traffic would be a significant permanent impact which would be mitigable by the committed installation by the FMIT of a traffic signal at the intersection of Willow Drive and SR 95.

4.7.6.1.3 Alternative Three Site - Section 16

Alternative Three would generate similar impacts to those in the Preferred Alternative since access would be from CR 227. Turning movements would create significant impacts.

4.7.6.1.4 No Action Alternative

There would be no traffic impacts associated with this alternative.

4.7.6.2 Rail Transport

There are no foreseeable impacts to rail transport, either beneficial or adverse, which would result from the construction of the proposed power plant at the Preferred Alternative, Alternative, Two, or Alternative Three sites.

There are no impacts to rail transport which would result from the power plant not being constructed under a No Action Alternative.

4.7.6.3 Airports

There would be no impacts on air transportation during and following the construction of the power plant at either the Preferred Alternative, Alternative Two, or Alternative Three site. None of the sites lies under the glide slope of any airport in the vicinity. Impacts would not be significant.

Similarly, there would be no perceptible effects, either adverse or beneficial, to airports under a No Action Alternative.

4.7.6.4 Transit

There would be no perceptible impacts to existing or future transit services if the proposed power plant were built on any of the three alternative sites, as they are not served by public transit. A No Action Alternative would have no effect on present or future transit services.

4.7.7 Regional Energy Transmission Lines

4.7.7.1 Natural Gas Pipelines - Preferred Alternative for Fuel Supply Source: El Paso and Transwestern

The preferred alternative for supply of natural gas fuel to the proposed Southpoint power plant is to tap two independent lines owned and operated by the EPNGC, and the TPC, respectively. Major natural gas lines owned by these companies traverse BLM land approximately one mile east, and six miles north, respectively, of the site of the Preferred Alternative site. No natural gas lines connect to any of the three alternative sites Therefore, natural gas to supply fuel for the proposed Southpoint power plant would require construction of a new feeder line, or lines. Available natural gas supplies are adequate to meet the needs of the proposed power plant.

Natural gas from these two sources would be wheeled through new pipelines built on BLM ROW. Lines could access any of the three alternative sites. An Environmental Assessment, with the BLM as lead agency, would be prepared by the service providers.

4.7.7.2 Topock Substation and Associated Transmission Lines

The proposed Topock substation is expected to be located adjacent to the existing Davis-Parker No. 1 & 2, 230 kV transmission lines in Section 31, approximately seven miles east of the Preferred Alternative site. It would be designed and constructed in accordance with the standards of WAPA, which would own and operate the substation.

WAPA would determine the quantities, locations, and configurations of the transmission lines required to interconnect the Topock substation with WAPA's existing 230kV transmission line between the proposed Southpoint generating facility on the Preferred Alternative site and the Topock substation. With the exception of the transmission lines connecting the proposed Southpoint power plant to the Topock substation, all transmission lines would be designed, constructed, owned, and operated by others.

An Environmental Assessment for the Topock substation and associated transmission line corridor was prepared with the BLM as lead agency, and with WAPA as a cooperating agency. The Environmental Assessment is available for review at the Colorado River Agency and Phoenix offices of the BIA and the Kingman, AZ office of the BLM. Its document number is EA-AZ-025-97-066. A FONSI was issued in December, 1997.

Under a No Action Alternative the Topock substation would be built by others. Two 69kV lines would be built in the transmission line corridor ROW. The tow 230kV lines proposed to serve the Southpoint power plant would not be built in the ROW.

4.7.8 Utilities

4.7.8.1 Domestic Water Service

4.7.8.1.1 Domestic Water Service Preferred Alternative

Potable water service is not available to any of the three alternative sites. Two sources of water would be utilized to meet the needs of all non-power producing water consumption, such as landscape irrigation, restrooms, and drinking water. Domestic service water, i.e., water used for purposes other than drinking water, would be supplied from the new wells which would be drilled on site. Wellwater would be pretreated as needed to meet Safe Drinking Water Act Standards, although it would not be used as a potable water source.

Domestic service water requirements are 4,000 gallons per day or less. This estimate is based on a total of 30 persons (20 permanent employees, and 10 plant visitors), with an average consumption of 50 gpd per person, plus a landscape requirement of 2,500 gpd. Domestic water consumption would be identical for each of the three alternative sites. This quantity of water is readily available from the subflow of the Colorado River, and is included in the quantity of water proposed to be leased by Calpine from the tribe. No adverse impacts to water utilities are anticipated from providing on site domestic water.

The second source of non-power producing water would be bottled water delivered by contractor to the proposed power plant. Bottled water would be used for drinking water to provide a more palatable and aesthetically pleasing source than wellwater. No impacts to water utilities would result from contracting for bottled water delivery.

4.7.8.1.2 No Action Alternative

Under a No Action Alternative, domestic service water and drinking water would not be required at any of the three alternative sites. No impacts to water utilities would result.

4.7.8.2 Domestic Wastewater Disposal

4.7.8.2.1 Preferred Alternative for Disposal of Domestic Wastewater

The preferred alternative for disposing of domestic wastewater on any of the three alternative sites is to route sanitary wastes to a septic holding tank on site. The holding tank would be pumped out periodically by a licensed sanitary waste hauler. The FMTUA plant has adequate capacity to receive and treat the estimated 4,000 gpd output from the proposed Southpoint power plant. No adverse environmental consequences would result from disposal of domestic wastewater at a certified wastewater treatment plant.

4.7.8.2.2 No Action Alternative

If the proposed power plant is not built, the there would not be production of domestic wastewater. No treatment capability would be required. No adverse or beneficial impacts would result.

4.7.8.3 Solid Waste Disposal

Solid waste would be hauled under contract by a commercial solid waste hauler for disposal in the Mohave County Landfill if the proposed Southpoint power plant were built on any of the three alternative sites. Solid waste from the operation of the proposed power plant would be minor in the context of regional solid waste production, and impacts would not be significant. The Mohave County Landfill has a remaining capacity of 50 years, and therefore would not be adversely impacted by construction or other ordinary waste. Under the tribe's agreement with Laidlaw Waste, Inc., recyclable materials would be separated before unusable waste would be hauled to the county landfill.

Approximately 10 tons of sludge cakes from the pretreatment sludge filter press would be produced each day and pressed into cakes. Up to 30 tons would be stored on site awaiting disposal. Sludge cakes could be disposed of at any Class III landfill which could accept this volume of waste. Sites exist in La Paz County, AZ and in Clark County, NV. Sludge cakes would be trucked to a disposal site every three days. One truck per disposal trip would be required.

Removal of accumulated precipitated solids from the 30 acre evaporation pond would generate solid waste. If precipitated solids were allowed to accumulate for 30 years, they would fill the ponds to a depth of one foot. Therefore, the total potential volume of accumulated solids would be 30 acres x 43,560 square feet per acre = 1.3 million cubic feet. Accumulated solids would weigh 75 pounds per cubic foot. One truck can carry 50,000 pounds. Therefore, it would require approximately 2,000 truckloads to remove all accumulated solids from the ponds at the end of 30 years. In operation, solids would be removed every year to maintain the pond's evaporation function for disposal of wastewater. To remove one year's accumulated solids, or one-thirtieth of the total potential accumulation, would require 67 truckloads per year, with a total combined capacity of 3,300,000 pounds, or 1,675 tons per year (Ron Sichau, Calpine, personal communication). This volume of solid waste would exceed the daily receiving capacity of the Mohave County Landfill. The solid waste removed from the evaporation pond would have to be hauled to the La Paz, Arizona, or other existing landfill in the region with adequate receiving capacity. Precipitated solids would be tested for chemical content at the time of removal to ascertain that they are in compliance with local landfill requirements. No significant adverse impacts would result to existing high capacity landfills.

If no power plant is built, no solid waste would be generated. There would be no impacts to waste disposal or recycling facilities under a No Action Alternative.

4.7.8.4 Electricity

Regardless of the alternative site selected, electricity for plant operation would be generated on site as part of the power production process. Therefore, no impacts, adverse or beneficial, to electric power providers would result.

Under a No Action Alternative, there would be no effects to electric power providers.

4.7.8.5 Natural Gas

Regardless of the project alternative site selected, natural gas for incidental use in operation of the plant, other than to fuel turbines, would come from the same source as the plant's fuel for energy production. Natural gas would not be required from area utility service providers; therefore, no impacts to local natural gas utilities would be anticipated. Under a No Action Alternative, there would be no effects to natural gas utilities.

4.7.8.6 Telecommunications

Regardless of which alternative project site is selected, telecommunications would be provided by the tribal company, Fort Mojave Telecommunications, Inc. (FMTI). FMTI has resources and territorial exclusivity to serve the needs of the proposed power plant. Underground cable would be routed in on tribal land. No adverse impacts are anticipated; indirect impacts would be beneficial through addition of a major user to the customer base.

4.7.9 Existing Land Uses Adjacent to Alternative Sites

4.7.9.1 Preferred Alternative Site - Section 8

The land surrounding the Preferred Alternative on the north and east is undisturbed desert. To the west, there is a rural housing subdivision on the southeast quarter of the section. It is one half mile from the proposed lease area boundary. The proposed power plant equipment block would be at least seven-tenths of a mile from the nearest house. The remainder of that section is irrigated agriculture. To the south of the Preferred Alternative site, across CR 227, a rural housing subdivision occupies the west half of the section. The nearest residence is approximately one-tenth of a mile from the southwest corner of the proposed lease area. The main power plant complex would be approximately three-tenths of one mile from the nearest residence. The east half of the section is undisturbed desert. No sensitive land uses would be affected; therefore, impacts would be less than significant.

4.7.9.2 Alternative Two Site - Section 30

Land to the north, south and west of the Alternative Two site is farmland. Land to the east is raw desert. Scattered rural residences occupy land one and one-fourth mile to the west of the proposed power plant's equipment compound. At this distance, no adverse effects are anticipated to sensitive uses such as housing, or to other land uses. Impacts would be less than significant.

4.7.9.3 Alternative Three Site - Section 16

Land uses adjacent to the Alternative Three site are raw desert to the north and east, Topock Marsh to the south, and a rural housing subdivision to the west. The nearest housing would be approximately seven-tenths of a mile from the proposed power plant's equipment compound. With this distance as a buffer, no significant adverse impacts to sensitive residential land uses are anticipated, nor to other land uses in the site's vicinity.

4.7.9.4 No Action Alternative

No impacts to land use would result if the power plant is not built.

4.7.10 Consistency with Land Use Plans, Policies and Controls

4.7.10.1 FMIT

4.7.10.1.1 Reservation Land Use Plan

The Preferred Alternative site is included in the draft Reservation Plan as an industrial site. No impacts to tribal land use plans would result from implementation of the proposed project on this site. Revision of the draft Reservation Plan to change the existing Agricultural and Open Space designations on the Alternative Two site would not be significant in the context of reservation land use because of the abundance of other land designated for these two use categories. Such a redesignation would be accompanied by redesignating the Preferred Alternative site to Open Space. The same revisions would also apply to the Alternative Three site. No significant impacts to tribal land use plans would result from construction of a power plant on any of the three alternative sites.

Under a No Action Alternative, the Preferred Alternative site would remain in its current industrial use designation until such time as a new land use proposal for the east half of Section 8 is presented to the Tribal Council. No impacts would result to tribal land use plans.

4.7.10.1.2 Planned Area Development and Subdivision Ordinance

All development on the reservation must comply with the submittal and approval requirements of the Planned Area Development and Subdivision Ordinance. The proposed power plant would conform to this requirement regardless of which of the three alternative sites is selected, and no impacts are anticipated. Under a No Action Alternative, there would be no project requiring planned submittal and approval; no impacts would result.

4.7.10.2 Other Agencies and Jurisdictions

4.7.10.2.1 Mohave County

Mohave County has no jurisdiction over land use decisions on the Reservation. However, the proposed power plant is consistent with the Urban designation for county land adjacent to all three alternative sites. The Mohave County General Plan allows a very broad range of uses--including "industrial" -- in the Urban category. Land under county jurisdiction adjacent to the three alternative sites has not been rezoned for a specific use, and remains under the generic "Urban" designation for future land use. No impacts to county land use plans would result.

4.7.10.2.2 City of Needles

The City of Needles is remote from any of the three alternative sites and land under its planning jurisdiction would be unaffected by land uses there. No impacts would result to land use plans of that city.

4.7.10.2.3 Bullhead City

The Bullhead City is sufficiently remote from many of the alternative sites as to be unaffected by land uses there. No impacts would result to Bullhead City's land use plans.

4.7.10.2.4 State of Arizona

The state of Arizona does not have lands in the immediate vicinity of the Alternative Two site. Therefore, there would not be any impacts to state lands if the proposed Southpoint power plant were built and operated on that site. The Arizona Game and Fish Department has land managed for wildlife habitat adjacent to the Preferred Alternative and the Alternative Three sites. County Route 227 separates the Preferred Alternative site from the Arizona Game and Fish Department land. No significant impacts to state land use or management plans would result from construction and operation of a power plant on the Preferred Alternative or Alternative Three sites, because environmental consequences to water quality, noise, and other resources with potential to effect wildlife would be less than significant. (See Section 4.7.10.2.5 below).

4.7.10.2.5 Federal Agencies

The US Fish and Wildlife Service manages Topock Marsh, which is very near the Preferred Alternative and Alternative Three sites. The Alternative Two site is too far from the marsh to have any effect on its management. Potential marsh-related issues addressed in this EIS are migratory birds, groundwater drawdown and water quality, air quality, and endangered species. Consultation with the marsh manager indicated no particular concerns regarding marsh management if the proposed power plant were built on either of those sites (Gregory Wolf, Manager, Havasu National Wildlife Refuge, personal communication), and this EIS documents no significant impacts to the marsh.

The BLM has lands adjacent to each of the three alternative sites. BLM staff have been consulted regarding construction of the proposed power plant, and have expressed no concerns. No impacts to BLM land use plans would result from construction and operation of the proposed Southpoint power plant on any of the alternative sites.

There would be no environmental consequences of any kind if the proposed power plant were not built under a No Action Alternative.

4.8 Other Values and Conditions

4.8.1 Wilderness Areas

Four Class II wilderness areas lie on the east slope of the Black Mountains in Mohave County. Each is on BLM land. The four areas are: Warm

Springs, Mount Nutt, Mount Tipton, and Wabayuma Peak. The nearest wilderness area, Warm Springs, is approximately eight miles east of the Preferred Alternative site

There would be a minor visual impact on the Warm Springs Wilderness if the Southpoint power plant were built on any of the three alternative sites. From some locations in the western portion of the wilderness area the two stacks would potentially be visible. Night lights on the stacks would also be visible from some locations within the wilderness area. These visual impacts are minor and insignificant because of the distance across the viewshed, and the small scale of the power plant in a large landscape. Existing built elements in the environment, including elements with night lighting, would dilute the impact of any single element at the viewing distance of eight miles or more. Due to the distances to wilderness areas, no significant visual impacts to wilderness areas are anticipated.

The air quality analysis prepared for the proposed Southpoint power plant demonstrates that AAQS would not be exceeded. Therefore, the proposed power plant would not result in exceedances of AAQS in any wilderness area, regardless of classification, and impacts would not be significant.

If the proposed power plant is not built, no effects to any wilderness resources would result under a No Action Alternative.

4.8.2 Wild and Scenic Rivers

There are no impacts of any kind on wild and scenic rivers since there are no such resources either on or close to the Preferred Alternative, Alternative Two, or Alternative Three sites.

There would be no impacts to wild and scenic river resources from the No Action Alternative for the same reason.

4.8.3 Operational Noise

4.8.3.1 Plant Operational Noise

An assessment of the proposed power plant's operational noise has been performed. The assessment involved identifying the dominant facility noise sources, estimating the equipment noise emissions, and determining the acoustic contribution of sources at the property line, and at the nearest noise sensitive receptors, which, in this case, were residences. Noise emission modeling has been performed for the Preferred Alternative site only.

A review of applicable noise regulations was performed for the project. There are no federal, state or local regulations which establish specific noise limits for power facilities. Typical community noise limits require stationary sources to meet a level of 45 to 55 decibels using the A-weighted scale (dBA) at neighboring residences. Based upon previous project acoustical analyses, typical community reaction to stationary noise sources and typical noise control regulatory limits, it is recommended that the facility exterior acoustic design goal should be 50 dBA at the property line of the nearest residential locations. As a reference, the US Department of Housing and Urban Development (HUD) has established site acceptability standards. These standards indicated exterior noise levels of 65 dBA daytime and 55 dBA nighttime are acceptable for residential housing. The facility acoustic design would be based upon meeting an acoustic design goal of 50 dBA at the property line of the nearest residences (Black and Veatch, 1997). For the Preferred Alternative site, the nearest residence is located approximately three-tenths of a mile from the power generation equipment block of the proposed power plant.

Noise emitted by a power facility is the result of the combined effect of each individual noise source located onsite. Predictive noise modeling of a facility involves determining the noise impact of each pertinent source and combining these individual impacts to determine the overall facility noise emissions. The modeling procedure accounts for equipment noise emission levels, location of the equipment relative to the receiver, and the absorption of noise by natural sources. The model results reflect the proposed power plant's noise emissions.

The facility noise emissions were modeled using a computer program model that simulates the propagation of sound from point sources of noise by considering wave divergence, atmospheric absorption, directivity of the noise emissions, and blockage of noise by any interceding barriers. The model calculates the sound pressure level from each source per octave band at each point on a specified receptor grid. The model then combines the impact of each individual source to determine the overall noise impact. The resultant sound level at each receptor grid is tabulated in each of the nine standard octave bands and in terms of overall A-weighted sound pressure level. The program then produces plots of noise contours (also called isobels) based on the calculated sound pressure level at each grid receiver. The model is based upon the physics of acoustics.

The noise model assumes conservative values for the all noise equipment. Expected equipment noise emissions are anticipated to be slightly less than the values predicted in the model. In addition, the model assumes the noise is radiated over a flat reflective plane. In reality, the local vegetation, ground surface and variations in the local terrain tend to absorb some of the noise energy as it travels from the plant. The modeling results are estimated to include a conservatism factor of two to three dBA. Therefore actual sound levels are expected to be at least two to three dBA less than predicted by the model.

The location, sound power level per octave band, and source directivity of each source were input into the computer model. The model was used to generate isobel contours for the area surrounding the facility site.

The primary noise sources at the facility would include noise radiated from the combustion turbines (including casing radiated and inlet noise), Heat Recovery Steam Generator (HRSG) (including wall radiated and stack emitted noise), steam turbine, generator transformers, cooling towers, refrigerant rotary screw compressors, and the evaporative condenser.

The noise modeling assumes all equipment is in operation excluding any redundant equipment. All modeling represents two unit operation at full load conditions.

Equipment noise emissions are based upon noise data provided by equipment vendors for the model of equipment proposed for this project. Where vendor data is not available, the equipment noise emissions were derived from information contained in the Edison Electric Institute's (EEI) report entitled Electric power plant Environmental Noise Guide. The EEI report provides methods of estimating equipment sound emissions based on the equipment design parameters. The estimating methods are derived from noise measurements taken from equipment in operation at electrical facilities.

Vendor data is available for the combustion turbine, steam turbine, HRSG and associated equipment. Empirical noise data was used to estimate the emissions from the cooling tower, transformers, circulating water pumps and the boiler feed pumps.

Iterative modeling has been performed to determine if the acoustic design goal of 50 dBA at the property line of the nearest residence would be met. The model demonstrates that the acoustic level at the western boundary of the proposed lease area would be less than 55dBA, and the acoustic level at the nearest residence property boundary is 50dBA. The acoustic design goal of the proposed Southpoint power plant would be met. The 50dBA noise level at the property boundary of the nearest residence is well within the 65 dBA daytime/55 dBA nighttime HUD standard for sensitive receptors (Black and Veatch, 1997). Therefore, the threshold for significant noise impacts would not be reached, and no significant noise impacts from operation of the proposed power plant would result.

No impacts from noise would result under a No Action Alternative.

4.8.3.2 Construction Noise

Construction activities for large industrial facilities are commonly grouped into four phases. These phases would consist of site clearing and preparation, foundation construction, building and equipment erection, site cleanup, and facility startup. Noise emissions would vary with each phase of construction depending on the construction activity, associated equipment, location of equipment and the level of activity.

Site clearing and preparation would required the use of heavy diesel-powered earth moving equipment. This equipment would include bulldozers, scrapers, dump trucks, and front end loaders. Noise emissions during this construction phase would be dominated by the diesel engine noise. Site clearing and preparation activities would occur at all locations where facility equipment would be installed.

Foundation construction would involve concrete handling equipment such as the concrete trucks, mixers, vibrators, and pumps. Some earth moving equipment would also be required to backfill the foundations. Pile driving may be required for the project. Any pile driving activities would occur for as short a duration as possible and would be limited to day time periods only. Foundation construction activities would be centered at the Power Generation Building, with some activity occurring at the location of other facility equipment.

The building and equipment installation would involve mobile cranes, equipment delivery, impact wrenches, and air compressors. The activities would be centered at the power generation equipment block, with less activity occurring at the other facility equipment locations.

Site cleanup and facility startup would generally result in minimal noise emissions. The one major noise emission associated with facility startup would be steam blowout of the HRSG steam lines. At the end of construction, high-pressure steam is passed though the HRSG to remove any debris within the steam lines prior to hookup with the steam turbine. Noise is produced when the high-pressure steam is vented to the atmosphere. Typical steam blow schedules would involve several steam releases lasting about two to three minutes each, occurring within a two-week period.

Construction activities would be scheduled during daytime periods (7:00 a.m. to 10:00 p.m.) to the fullest extent practicable. Some activities would require extended hours of operation due to scheduling constraints or to maintain structural integrity of concrete pours. Any nighttime construction would be limited to low noise producing activities to the fullest extent practicable.

The anticipated type of equipment, equipment usage, and equipment noise emissions for each phase of construction are listed in Table 4.8-1. This information is included to provide typical construction equipment noise emissions. Estimations of the construction equipment usage and noise levels are based on information provided in the USEPA Document PB-250 430, Noise Emission Standards for Construction Equipment (USEPA 1975).

4.8.3.3 Noise Assessment of Preferred Alternative Site - Section 8

Predictive noise modeling contours are contained in Figure 4.8-1. The sound contours indicate the expected sound levels within the surrounding area. As indicated by the contours, the sound level at the nearest residence is predicted to be 50 dBA. This residence is located approximately 1,500 feet (three-tenths of a mile) west of the combustion turbine equipment. The predicted sound level represents full load operation of both proposed combined cycle combustion turbine units.

The Southpoint facility would introduce a new noise source into the surrounding community. The facility, with minimal attenuation, would contribute a sound level of 50 dBA at the nearest residence. (See Section 5.5 - Noise Mitigation for a list of the attenuation features included in the facility design). A level of 50 dBA would be audible at the residence during the quiet time periods, such as during the nighttime and in between traffic passes, but this sound level is not anticipated to cause a disturbance at this location. The US Department of Housing and Urban Development (HUD) has established an acoustic site acceptability standard of Ldn 65 dBA for residential housing. An Ldn 65 dBA noise level is equal to a daytime level of 65 dBA and a nighttime level of 55 dBA. In reference to Figure 4.8-1, sound levels would be 55 dBA or less at the west boundary of the proposed lease area, and 50dBA or less for all residences nearest the proposed power plant. No significant noise impacts to any existing residences would result. Similarly, any future residences which may be built on private land to the west of the proposed lease area's boundary would not experience significant effects from noise, as levels would be less than 55dBA, and therefore below the HUD 65 dBA daytime/55 dBA nighttime threshold.

Noise levels at the Arizona Game and Fish reserve and the Havasu National Wildlife Refuge to the south of the proposed lease area would range from 65dBA affecting a small area adjacent to Topock-Davis Dam Highway, and would diminish to 50 dBA approximately 1,750 feet south of the highway. These noise levels would all be at, or below, the HUD 65 dBA daytime/55 dBA nighttime threshold. No significant noise impacts to wildlife would result.

Noise levels at the north boundary of the proposed lease area would be less than 50dBA. Noise levels at the eastern boundary of the proposed lease area 50dBA or less (Black and Veatch, 1997). No significant noise impacts to private or BLM land north and east, respectively, of the proposed power plant would result, as these levels are well below the HUD 65 dBA daytime/55 dBA nighttime threshold.

Construction noise emissions are highly variable and would vary as the phase of equipment changes and as different equipment is operating at the site. The foundation and erection stages of construction are anticipated to result in an average level of 55 dBA at the nearest residence. The clearing and start-up phases are anticipated to result in 53 dBA at the nearest residences. These sound levels represent an average construction related level therefore, the noise level may exceed 55 dBA for short periods of time but is expected to be below the 55 dBA level much of the time. The construction noise would occur principally during daytime periods. The construction noise levels would be audible at the nearest residences but would be of a low level and would be anticipated to cause any disturbance to local residents. Impacts would not be significant because they would not exceed 65 dBA daytime/55 dBA nighttime at the residences.

4.8.3.4 Noise Assessment of Alternative Two Site - Section 30

The Alternative Two site is located in a remote open area. The nearest residences are located approximately 5,000 feet west of the site location. At a distance of 5,000 feet the facility would not be audible at the nearest residences. The noise traveling over this distance would be reduced by geometric spreading, atmospheric absorption, ground absorption and anomalous attenuation to the point of being inaudible at the nearest residences. Under certain atmospheric conditions with low background noise the facility may be faintly audible, however, the associated sound level would not be of a level to cause disturbance to local residents.

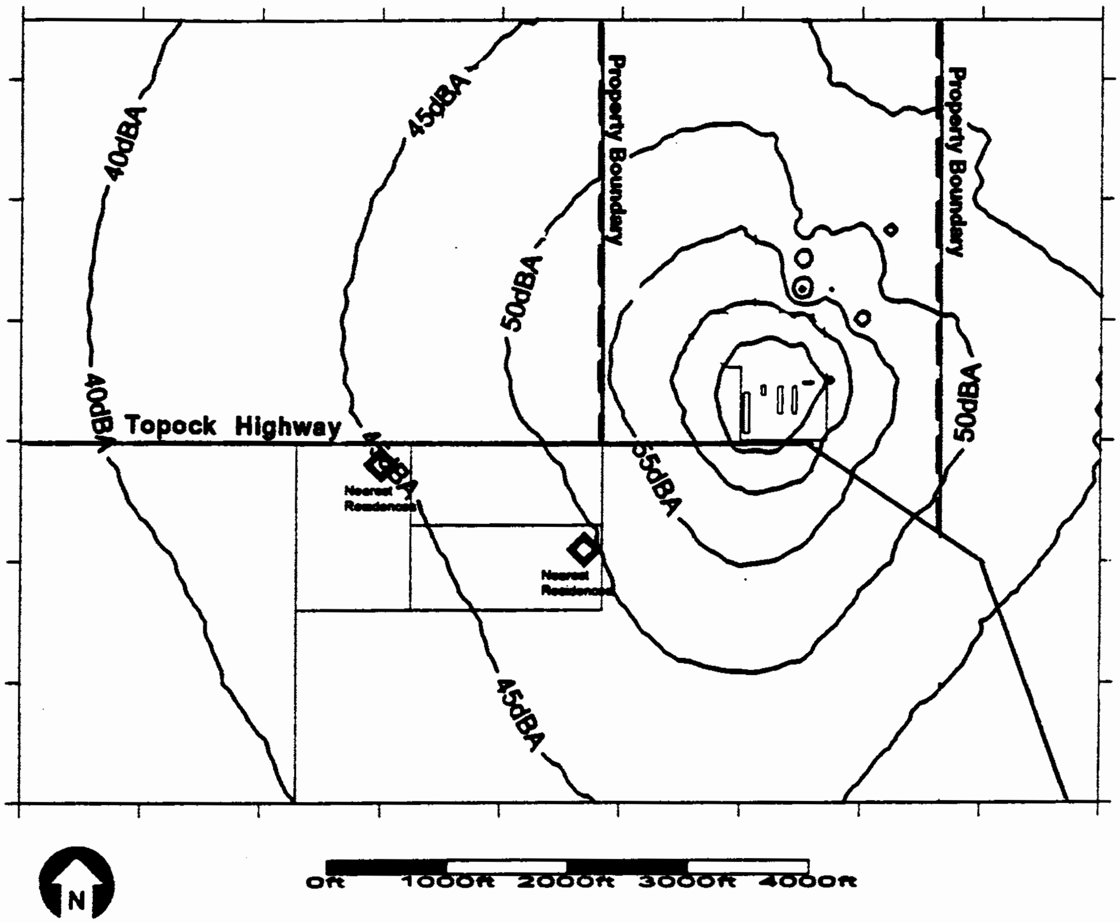
Construction noise emissions would not be audible at the nearest residences. Maximum levels may reach 40 to 45 dBA during worst case situations. The construction noise emissions would not be anticipated to cause any disturbance at the nearest residences.

Table 4.8-1 - Typical Construction Equipment Noise Emissions

Phase	Equipment	LP* (15m) (dBA)	Quantity	Usage	Leq** (15m) (dBA)
Clearing	Backhoe	85	1	.20	78
	Concrete Vibrator	76	5	.16	75
	Drill	85	1	.16	77
	Grader	85	1	.30	80
	Diesel Generator	78	1	.16	70
	Trencher	82	1	.21	75
	Mobile Crane	83	1	.33	78
	Dozer	87	2	.33	85
	Front End Loader	84	2	.33	82
	Compactor	80	2	.25	77
	Truck, Large	88	4	.16	88
Foundation	Mobile Crane	83	1	.16	88
	Front End Loader	84	2	.33	82
	Concrete Vibrator	76	4	.16	76
	Drill	85	1	.16	77
	Saw	78	2	.21	74
	Torque Wrench	85	2	.16	80
	Dozer	87	1	.33	82
	Stationary Crane	88	2	.33	86
	Backhoe	85	2	.20	81
	Truck, Large	88	4	.16	88
	Diesel Generator	78	1	.16	70
	Compactor	80	2	.25	77
	Air Compressor	81	1	.25	75
	Pile Driver	101	1	.04	87
	Trencher	82	1	.21	75
Erection	Mobile Crane	83	1	.33	78
	Backhoe	85	2	.20	81
	Truck, Large	88	4	.16	88
	Trencher	82	1	.21	75
	Stationary Crane	88	5	.33	90
	Drill	85	1	.16	77
	Torque Wrench	85	7	.16	87
	Air Compressor	81	1	.25	75
Startup	Grader	85	1	.30	80
	Trencher	82	1	.21	75
	Drill	85	1	.16	77
	Torque Wrench	85	5	.16	84
	Diesel Generator	78	1	.16	70
	Truck, Large	88	4	.16	87
	Mobile Crane	83	1	.33	78
	Air Compressor	81	1	.252	75

*Sound pressure level at 15 meters horizontal distance from the equipment.
**Energy average sound pressure level at 15 meters horizontal distance from the equipment.
Source: Black and Veatch

South Point Project



Predicted Facility Noise Emission - Preferred Site

CALPINE

hallock/gross inc.

planning ● land design ● environment ● tourism

Fig. 4.8-1 Predicted Facility Noise Emission - Preferred Site

4.8.3.5 Noise Assessment of Alternative Three Site - Section 16

The site is located approximately 2,500 feet southeast of the Preferred Alternative site location, along Topock Highway. The Alternative Three site is located 1,500 feet farther from the nearest residence than is the Preferred Alternative site. The equipment arrangement would be very similar for both site locations, and the facility noise emissions would be virtually identical for each proposed facility site. Based upon the relative distance from each site to the nearest residence, the noise emissions at the nearest residence which would be attributable to the proposed power plant on the Alternative Three site would be 6 dBA less than emissions from the Preferred Alternative site. Expected noise emissions at the nearest residence would be 44 dBA if the power plant were to be built on the Alternative Three site. The land lying north, east and south of the Alternative Three site is all in public ownership, and will remain as undeveloped desert. Because no noise sensitive receptors would occur on public lands, no noise related impacts are anticipated.

A sound level of 44 dBA would be faintly audible at the residences during lulls in background noise. During most periods, local traffic or wind blowing through the local vegetation would produce enough noise to mask the facility. During quiet nighttime periods the facility would be audible, however noise of this level would blend into the background ambient conditions and would not be anticipated to cause any disturbance to the neighboring residents.

Construction noise emissions are anticipated to result in an average noise level of 49 dBA at the nearest residences. The construction noise would be faintly audible at the nearest residences during the daytime operating periods. Construction noise would not be anticipated to cause any disturbance at the nearest residences.

4.8.3.6 No Action Alternative

Under the No Action Alternative, no additional noise would be added to the proposed project area. No environmental consequences would occur.

4.8.4 Visual Resources: Southern Mohave Valley, Alternative Sites, and Nighttime Illumination

4.8.4.1 Visual Character of the Mohave Valley

The visual character of the southern Mohave Valley would be altered from one dominated by residential, small scale commercial and agricultural uses commingled with raw desert to an industrial character in the vicinity of the proposed power plant. This would be true of any of the three alternative sites. Introduction of a large scale industrial element into the landscape would be perceived by many viewers as an adverse impact. However, the valley is rapidly urbanizing, and the rural character is disappearing in large sections. Moreover, the FMIT has adopted plans and a development strategy which would ultimately add up to 10 more casinos in its Aha Macav project. These casinos would have intense night lighting, comparable to the Avi Casino which is presently in Aha Macav. They would also be large in scale, with heights up to 10 stories. In this context, the intensity of the visual intrusion of the proposed power plant would lessen over time. Its location in the extreme southeastern corner of the valley also lessens its potential for impact on the valley as a whole.

4.8.4.2 Visual Alteration of the Alternative Sites

4.8.4.2.1 Preferred Alternative Site - Section 8

The proposed power plant's equipment block and miscellaneous facilities would be located on the valley floor at the toe of the bluffs. The bluffs would form a visual buffer for the power plant equipment block and other structures. They would provide a backdrop of a much larger scale. The most visible element of the plant would be the stacks, which would be about 225 feet high. This would place the top of the stacks approximately 75-100 feet above the top of the bluffs.

The proposed power plant's structures would be colored in tones similar to those found in the surrounding desert landscape, which has a color palette principally of tan, sand, and buff. An exception would be any color mandated by regulation, for instance, colors required for air traffic safety. No significant impact resulting from contrasting color would result.

The retention basins would not be visible unless the observer was standing on top of the bluffs looking down. Similarly, the evaporation pond located on top of the bluffs would not be visible except from a viewing point on top of the bluffs. The road connecting the power plant and the evaporation pond would be visible from some viewing points on the valley floor, as would pipelines to carry process wastewater up the bluff face.

The power plant would be located on the north side of, and immediately adjacent to, CR 227. It would be visible as a middle ground or foreground feature by travelers on a major road with an ADT of approximately 2,000 vehicles. The view of the site approaching from the south is poor and the main mass of buildings would not be visible until the driver was within one-half mile. The stacks would be visible from farther away. Their needle-like form rising above the bluffs would be a focal point because of contrast in form and scale with the surrounding landscape, and because of the steam plumes rising from the stacks. These visual alterations to the existing landscape would occur on the valley floor, which is VRM Class V, and against the bluffs, which are VRM Class III. Driving north on CR 227 would afford a very limited viewing time of the proposed power plant as the road approached the sharp curve to the west. Beyond the curve, the plant would not be visible. The moderate number of viewers (approximately 1,000 approaching from the south) also diminishes the severity of impact. Impacts for northbound travelers on CR 227 would not be significant because of the limited viewing time of about 30 seconds.

Driving east on CR 227, the proposed power plant would be intermittently visible in the fore and middle ground from near the junction with SR 95 until the point where the county road veers to the south. Views would occasionally be restricted by local vegetation. Approximately 1,000 travelers a day would view the proposed power plant in the middle and foreground for approximately five minutes. Visual impacts would not be significant because of the interruption of the view, and the buffering provided by the backdrop of the bluffs in a Class III landscape, which can absorb visual change without significant deterioration of visual quality.

The view from SR 95 is limited to southbound travelers on a seven mile stretch of the highway between Boundary Cone Road and Courtwright Road. Viewing time would be approximately seven minutes. The power plant would be in the "background" distance zone, a location with the lowest sensitivity to viewers. Although the number of viewers is high, impacts to SR 95 travelers would not be significant because of distance.

For northbound SR 95 travelers, the time which the power plant would be in view is very brief, perhaps 30 seconds because of intervening landform. Again, impacts would not be significant because of distance; the severity of impact is lessened further by the short viewing time.

For viewers located to the east of the proposed power plant, only the portion of the stacks which would rise above the bluffs would be visible; however, there are no highway travelers or inhabitants to view them from near or middle distances. They would be visible as background objects from higher elevation locations eight or more miles away. Impacts would not be significant because of the low number of viewers, and distance.

Some residents in the immediate vicinity of the proposed power plant would be able to see its structures. The number of affected residences, and the degree to which the proposed power plant would be visible, would depend on the location and orientation of individual residences. The proposed power plant would occupy a foreground distance zone for those residents who could view it, but the number of viewers is very low. Because of the low number of viewers, the visual sensitivity rating is also low. Impacts would not be significant.

Visibility from Needles Highway in Nevada is not a significant factor. Although the plant's plume might be visible during the day, and plant lighting might be visible at night, the distance is too great for the plant to have a significant effect on visual quality for travelers on this highway.

The Preferred Alternative site has a low sensitivity rating. This classification is the result of the combined evaluation of the following sensitivity factors: the common quality of the landscape in the vicinity of the site; the existence of other built features in the surrounding visual context; the low traffic volume on CR 227; the low number of residents in the immediate vicinity, and the distance between the power plant site and the high volume of travelers on SR 95. Overall visual impacts would not be significant.

4.8.4.2.2 Alternative Two Site - Section 30

The Alternative Two site has limited land area on which to build a power plant, so that the power equipment block and other facilities would have to be built on top of the bluffs. This location would make the proposed power plant a focal point visible from long distances from most of the Mohave Valley. Although the distance between large numbers of viewers and the proposed plant would generally place the plant in the background distance zone, it would be a major visual intrusion because of its high contrast and the silhouetting effect of its blufftop location. Although the common character of the site (Class III), would place the site in a low to moderate visual sensitivity category, placing the proposed power plant on top of the bluffs would result in a significant visual impact. Impacts would be significant both for travelers throughout most of the Mohave Valley, and for residents in the immediate vicinity of the Alternative Two site.

4.8.4.2.3 Alternative Three Site - Section 16

The Alternative Three site lies on the north side of CR 227. The highway separates the two major landforms on the site, with the bluffs lying to the northeast of the road, and the level valley floor lying to the southwest. The power plant would be located on the valley floor. The buffering effect of having the bluffs in the immediate background of the proposed power plant is diminished by the necessity of locating the power equipment block on the southwest side of the road. The power plant would appear to be a large scale vertical form in the landscape.

The Alternative Three site is 4.5 miles east of SR 95 and borders CR 227 on its north side. Viewed from SR 95 the proposed power plant would occupy the mid to background zone for a large number of southbound viewers; viewing time would be approximately five minutes. Dense vegetation would partially screen the power plant equipment block. Views of the upper half of the stacks would not be obstructed. The site would be almost entirely screened from northbound viewers by heavy phreatophyte vegetation in Topock Marsh, and by landform. The upper half of the 225 foot stacks would be readily visible, and viewing time would be approximately 30 seconds.

User volumes on CR 227 are relatively low but the power plant would occupy a mid- to foreground position for approaching travelers. The site's location on a 90-degree bend in the road somewhat limits viewing opportunity during approach from either direction, and during travel along the edge of the site. Viewing time is estimated to be approximately two minutes from either approach. Views from nearby Topock Lake Ranches would be low in number and of short duration in most cases. The proposed power plant would occupy a foreground distance zone for those residents who could view it, but the number of viewers is very low. Because of the low number of viewers, the visual sensitivity rating is also low. Impacts would not be significant.

Topock Marsh is used by boaters, birders, and other recreationists. Enjoyment of these activities depends, in some degree, on the visual quality of the landscape in which they take place. If seen from Topock Marsh, the proposed power plant would be a significant degradation of visual quality for marsh users because of its immediate proximity to the marsh in a foreground view location, and because of its scale in the landscape. Although the portion of the Alternative Three site where the power plant would be built is a low sensitivity Class V, and although visual impacts for highway travelers would not be significant because of viewing distance or viewing time, this is not the case for Topock Marsh viewers. They would experience long duration foreground views. Because of the potential degradation of the marsh's visual quality for recreationists, impacts of locating the proposed power plant on the Alternative Three site would be significant.

4.8.4.2.4 No Action Alternative

A No Action Alternative would not alter the visual character of the Mohave Valley, or of any of the three alternative sites. No effects on visual resources would occur.

4.8.5 Plant Illumination

4.8.5.1 Mohave Valley

The proposed Southpoint power plant would require nighttime illumination of the power equipment block, and of the stacks. Lighting on the equipment block would include area lighting for the 15 acre equipment compound, and lighting mounted on the structures themselves. These lights would be constant, that is, they would remain on from dusk to dawn. The stacks would have Federal Aviation Administration required safety lighting. These lights would flash on and off in compliance with safety lighting requirements for potential aviation hazards.

Nighttime lights at the proposed power plant would be visible from most of the Mohave Valley. There are other nighttime light sources of comparable scale and intensity in the Mohave Valley, including the Mohave Generating Station at Laughlin, the complex of high rise casinos in Laughlin, the Avi Casino in Aha Macav, and street light grids in large subdivisions. However, the proposed power plant's isolation from these other major light sources would intensify its impact in an otherwise nearly dark environment. The degree of contrast presented by an illuminated power plant in a mostly dark nighttime context would be very high. The proposed power plant would be a focal point with an interesting form of large scale outlined by lights. The number of viewers would be substantially fewer than during the daytime. Because of the low number of viewers, and the distance between the great majority of viewers and the proposed power plant, nighttime illumination impacts would not be significant for the Mohave Valley.

4.8.5.2 Preferred Alternative Site - Section 8

The degree of night time illumination of the plant is such that it is likely to be visible from many miles away. A significant part of the developed area of the site would be lit at 0.25 footcandle or more. Circumstances which lower the plant's visibility during the day such as interrupted sightlines or location below the bluffs (except for the top of the stacks), would not be present in darkness. The plant would possess an aura of luminosity which would be an obvious feature in the landscape and which could not be avoided. Stack height would mandate lighting for aviation safety. The lighted stacks would be visible from long distances from most points to the west, east, and north.

Because of the proposed plant's isolation from areas of dense population, the plant's intrusiveness would be minimal except for those few residents who live in the immediate vicinity. For some of the residents of Topock Lake Ranches, for example, the night time glow in the sky would intrusive. It would be substantially more obvious than other sources of night light such as auto headlights. It would also be much more apparent than forms of illumination which are not usually thought of as having adverse impacts, such as street lighting. However, because of the very low number of affected residences, impacts would not be significant. The intensity of the night time lighting intrusion on nearby residents would change over time as the Mohave Valley continues to urbanize. Future impacts, therefore, would be less than immediate impacts. The Preferred Alternative site is VRM Class V, which has a very low sensitivity to visual alteration, for the area which would be occupied by the illuminated power equipment block. Nighttime illumination visual impacts, therefore, would not be significant.

4.8.5.3 Alternative Two Site - Section 30

If the proposed Southpoint power plant were to be built on the Alternative Two site, the power plant complex would be located on the top of the bluffs. In this location, nighttime lighting would be visible from great distances. The proposed power plant's position superior to viewers, and silhouetted against a the naturally dark desert sky, would create a distinct focal point in the Mohave Valley with the characteristics of a landmark or geographic point of reference. The focal attractiveness would be enhanced by the blinking aviation safety lights on top of the 225 foot stacks. Nighttime illumination impacts would be significant if the plant were situated on the bluff top in a VRM Class III landscape.

4.8.5.4 Alternative Three Site - Section 16

The conditions which would be likely to prevail on the Preferred Alternative site would be very similar to those which would affect the Alternative Three site. Impacts are likely to be lower since the plant is slightly further away from Topock Lake Ranches than the Preferred Alternative site, and because few, if any, recreationists or others would view the proposed power plant from Topock Marsh at night. Illumination related impacts would not be significant.

4.8.5.5 No Action Alternative

If the proposed Southpoint power plant were not built, each of the three alternative sites would remain undeveloped for an unforeseeable time in the future, and project-related illumination-related nighttime visual impacts would not occur.

4.9 Cumulative and Indirect Effects

4.9.1 Cumulative Effects

Cumulative effects are part of the reasonably foreseeable chain of consequential events which would result from implementation of a proposed project. Cumulative effects include environmental consequences from past, present, and reasonably foreseeable future projects which are linked to the proposed project evaluated in an EIS. Such effects may be minor individually, but may become significant when evaluated collectively, or lumped together.

In the context of conditions in the vicinity of the proposed Southpoint power plant, no significant cumulative impacts have been identified. The incremental increase in vehicle traffic on CR and SR 95 is below threshold levels for significance when evaluated in the context of present and forecast conditions. Air quality effects would remain below threshold levels when evaluated in a regional context.

A new substation and transmission lines would be built at Topock. The environmental consequences of this proposed action have been evaluated in an EA prepared with the BLM as lead agency. New natural gas supply lines would be laid to serve the proposed Southpoint power plant, regardless of which of the three alternative sites it would be built and operated on. If and when the new natural gas pipelines are needed to serve the proposed power plant, a NEPA-compliance environmental document would be prepared by the natural gas supplier, with the BLM as lead agency.

An incremental increase in the regional electric energy supply would result, allowing private and public utility providers improved ability to meet existing peak load power demands. The proposed Southpoint power plant would generate electricity needed to support existing demand in the western states. The power produced would incrementally prevent or delay a deterioration of electric power service in that market area.

A number of projects within the tri-state region which would occur farther into the future have been identified in this EIS. These include new casinos, new residential developments, new recreational developments, and improvements to the regional transportation network. Other unidentifiable projects will surely occur as rapid projected regional growth occurs. These identifiable and unidentifiable future projects do not depend on construction and operation of the proposed Southpoint power plant, and would occur independently of implementation of the proposed power plant on any of the three alternative sites. No significant cumulative effects related to reasonably foreseeable future projects are anticipated.

Except for air emissions, long-term project effects are incremental and would constitute a de minimis contribution to environmental effects from cumulative projects. The PSD permit required by the USEPA prior to construction and operation of the proposed Southpoint power plant would specify air pollution control technology to prevent significant deterioration of ambient air quality. Therefore, cumulative impacts to air quality--including any effects from the recently approved El Dorado generating plant in the El Dorado Valley area of Nevada-- would not be significant.

4.9.2 Indirect Effects

Several indirect effects which would result if the proposed Southpoint power plant were constructed and operated have been identified. The following indirect effects would be identical for any of the three alternative sites.

The FMIT would commit up to 4,000 AF of its Colorado River water allocation per year to the proposed power plant to be used consumptively. This would remove this amount of water from availability for other economic or community development projects for the life of the proposed lease. Similarly, 320 acres of reservation land would be removed from development for any other use for the life of the proposed lease.

The FMIT would build and operate a new water pipeline and related equipment to convey water pumped directly from the Colorado River to the proposed Southpoint power plant. AMPS would extend service lines from the power plant to other locations throughout the reservation.

4.10 Growth-Inducing Effects Of The Proposed Project

No significant growth inducing effects which would result from construction and operation of the proposed Southpoint power plant have been identified.

The proposed Southpoint power plant would be a merchant plant, producing electricity for which there is a pre-existing demand in the western states served by the WAPA distribution grid. No new growth in the western states would be directly dependent on power which would be produced by the proposed Southpoint plant. There would not be a growth-inducing effect from generation and sale of its electric power output, which would be part of the "spot market" power available to meet peak load demands by service providers.

The proposed power plant's permanent workforce would be drawn principally from the existing labor force in the Mohave Valley. No significant indirect growth would result from employment of an estimated 20 permanent plant staff, or from temporary employment of a construction labor force.

Community development projects on the FMIR have been approved by the Tribal Council and will occur whether or not the proposed Southpoint power plant is built. The proposed power plant, therefore, has no growth inducing effect on the reservation. Similarly, growth in the tri-state area will occur whether or not the proposed Southpoint power plant is built; there are no growth-inducing effects on the tri-state area.

4.11 Unavoidable Adverse Effects

Four unavoidable adverse impacts have been identified which would occur if any of the three alternative sites is selected. The first is an adverse effect on fire protection service availability. There is no existing contract to provide fire protection service to the Preferred Alternative site. This inadequacy can be mitigated to an acceptable level by modifying the FMIT's existing fire protection contract with the MVFD to provide services to the Preferred Alternative site and the proposed Southpoint power plant.

The second is an adverse effect on hazardous materials response capability. In the event of a major hazardous materials incident, tribal and local service providers would not have adequate capacity to respond. This capacity inadequacy can be mitigated to acceptable levels.

The third is a temporary increase in traffic volume and safety hazard during the construction phase of the proposed project. After completion of construction, lesser permanent but significant effects on traffic volume would continue during the plant's operating life. These temporary and permanent effects could be mitigated to acceptable levels.

The fourth is air quality. With measures specified in the required PSD Permit, impacts can be mitigated to below significance.

If the Alternative Two site were selected as the proposed project site unavoidable and unmitigable impacts to topography, cultural resources, and visual resources would occur. The bluff faces would have to be cut. A cultural resources site could not be avoided. The proposed power plant would occupy the bluff tops on the Alternative Two site, where it would be a focal point visible day and night for long distances.

Unavoidable and unmitigable adverse impacts to visual resources would result if the Alternative Three site were selected. Construction and operation of a power plant on this site would adversely affect the quality of the visual environment for recreationists using Topock Marsh. Impacts could not be mitigated to insignificance.

No unavoidable adverse environmental consequences have been identified for other components of the human environment, including water and other mineral resources, biotic resources, socioeconomic conditions, land use, noise, resource use patterns, or other values. A summary of unavoidable adverse impacts appears as Table 4.11-1.

Table 4.11-1 Unavoidable Adverse Impacts

Impacts	Preferred Alternative	Alternative Two	Alternative Three	Mitigable
Fire Protection	X	X	X	yes
Hazardous Materials Response	X	X	X	yes
Traffic	X	X	X	yes
Air Quality	X	X	X	yes
Visual Resources	None	X	X	no
Cultural Resources	None	X	None	no
Topography	None	X	None	no

4.12 Relationship Between Local Short-Term Uses Of the Environment and the Maintenance and Enhancement Of Long-Term Productivity

A long-term commitment of 320 acres of tribal land would result from approval of the proposed lease and Southpoint power plant. The term of the commitment could be as long as 65 years. During that time, approximately 108 acres of the proposed lease area would be converted from natural desert vegetation to retention basins, an evaporation pond, a power generation compound, and other developed project facilities. The remaining acreage of the proposed lease area would be kept in its current natural condition, or enhanced by planting new native species, or improved by active management of existing native plant species, such as mesquite.

When the term of the lease expires, some of the developed features would be returned to their pre-development condition, and the land would again become available for another use, or could remain as a restored desert landscape. The proposed lease provides for restoration of the evaporation ponds. The residual accumulated solids and the liner would be removed and the pond would be filled with soils and the berms regraded to blend with the existing topography. They would also be revegetated with native species. These steps would substantially restore the pond area to a pre-development condition, maintaining their long-term productivity within the desert ecosystem.

The power production equipment would be dismantled and recycled as scrap. Land in the vicinity of the power generation complex would be assessed for the presence of any hazardous materials, and appropriate remediation would be performed if necessary, maintaining the long term productivity of the land.

4.13 Irreversible And Irretrievable Commitment Of Resources

An irreversible commitment of a resource occurs if the commitment cannot be changed once it occurs. The resource cannot be reused or recovered. Construction and operation of the proposed Southpoint power plant would result in several irreversible and irretrievable commitments of resources, including capital, labor, some construction materials, fuels, and water.

Capital and labor required for construction and operation of the proposed Southpoint power plant would be irreversible and irretrievable commitments of these resources.

Construction materials such as sand, gravel, cement, bituminous binder, wood, and other materials would be irretrievably and irreversibly consumed during the life of the project. Other construction materials, such as metal, could be recycled, and therefore would not be an irreversible and irretrievable commitment of these resources.

Fossil fuels used for generation of electricity and for ancillary plant operations, including transportation, would be irretrievably consumed during construction and operation of the proposed power plant

Water from the FMIT's allocation of Colorado River water would be consumptively used for construction and operation of the proposed power plant.

4.14 Environmental Justice

Executive Order 12898 requires consideration of "environmental justice." The potential impacts on area minority and low income populations must be considered when evaluating the environmental consequences of a proposed project.

There would be no environmental justice impacts from the lease of land for construction and operation of the proposed power plant. The FMIT has participated in review of the EIS at all stages of its preparation. The FMIT passed a Tribal Council resolution in support of construction and operation of a power plant on leased land located on the Preferred Alternative site. The FMIT is party to the proposed lease agreement with Calpine and has participated fully in negotiations of the proposed lease. The FMIT has prepared a draft land use plan for the entire Reservation, which also includes a water budget consistent with planned land uses, and a transportation network supportive of Tribal land development goals and policies. Moreover, the FMIT desires orderly development in the Arizona part of the Reservation where checkerboard land ownership complicates planning and development. The power plant proposed to be built on the leased Preferred Alternative site is included in the draft Reservation Plan. Lease of land for construction and operation for the proposed power plant implements Tribally-determined outcomes for economic and political self-determination.

No Tribal members live in the immediate project vicinity. No other substantial minority or economically disadvantaged populations live in the vicinity of any of the three alternative site locations. No environmental justice concerns have been identified in association with the lease of land for construction and operation of the proposed power plant, or consequent direct and indirect actions which would result from such a lease.

4.15 Indian Trust Assets

Under Secretarial Order 3175, The BIA is responsible for protecting Indian Trust Assets. Indian Trust Assets are values derived from land resources. The lease of land for the proposed power plant would not result in significant unmitigable environmental consequences to biotic or abiotic resources. There are several cultural resource sites within the proposed lease area. All would be avoided. No signifdicant adverse visual resource impacts have been identified with construction and operation of the proposed Southpoint power plant on the Prefered Alternative site; however, significant adverse unmitigable visual resource impacts to nearby Havasu National Wildlife Refuge would occur.

The lease of land for the proposed power plant would be consistent with Tribal goals and policies for orderly development of the checkerboard portion of the reservation. The proposed lease would also be consistent with tribal land use plans, and with its water budget for the reservation. The proposed lease includes provisions for decommissioning the proposed power plant at the end of the lease term, and funding mechanisms to assure implementation of the lease's decommissioning provisions. This EIS enumerates committed mitigation measures which would reduce adverse impacts to affected trust resources to less than significance. Numerous other mitigation measures are incorporated in the proposed power plant's design and operation features. No unmitigable concerns related to the protection of Indian Trust Assets have been identified with the proposed lease.

5.0 MITIGATION MEASURES

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5.1 Mitigations Which are Inherent to the Project

The Council on Environmental Quality's NEPA Regulations define five means of mitigating significant environmental effects. These are "avoiding;...minimizing;...rectifying;...reducing;...and "compensating" . 40 CFR 1508.20). These principles have been applied to guide design and siting criteria for the Southpoint power plant. Where potential effects on the human environment were identified in early stages of EIS preparation, appropriate changes in the project description were made to minimize or eliminate them. For example, archaeological sites will be avoided. Flood hazard will be reduced by raising critical equipment above the 100 year flood elevation. The evaporation pond will be lined to minimize leakage. The power plant equipment will be painted to harmonize with the colors of the surrounding desert environment. Many other applications of the principles of mitigation have been noted throughout the EIS. These changes implement CEQ's mandate that "all of a [proposed project's] specific effects on the environment, whether or not "significant," must be considered, and mitigation measures must be developed where it is feasible to do so" (CEQ 40 Most Asked Questions, 19a(A)).

Calpine will be responsible for implementing these mitigations. The FMIT will enforce these mitigations through the development review and approval process. For example, no Planned Area Development Plan will be approved by the FMIT Tribal Council that does not contain stipulations regarding such mitigations. A water use permit, building permit and building inspection, and other tribal procedures provide enforcement mechanisms at every stage of the project.

5.2 Committed Mitigation Measures

Committed mitigation measures are actions which will eliminate, or minimize to acceptable levels, actions which will have a significant adverse effect on the human environment. Only five such actions were identified in this EIS: fire protection; hazardous emergency response capabilities; traffic; air quality; and pond removal and restoration. Mitigation measures are for each of these affected components of the human environment are defined, have the entity responsible for their implementation identified, and are enforceable.

The lessee must comply with all applicable environmental laws, regulations, standards, and permit conditions, and applicable future laws and regulations within a timely manner.

5.2.1 Fire Protection

Fire protection (and emergency medical response) shall be provided by modification of the existing contract between the FMIT and the MVFD to include the Southpoint power plant's proposed location on Section 8, the Preferred Alternative site. The contract modification shall be executed before construction activity commences, and shall remain in place for the life of the proposed power plant. The costs of contract fire protection services with the MVFD, or other capable provider, shall be borne by Calpine or its successor.

5.2.2 Hazardous Response Capability

The FMIT shall form a TERC which meets USEPA guidelines for such committees. The FMIT shall also comply with EPCRA through a tribal program which contains the following four elements: a preparedness plan, a training program; administration and funding for plan and program development; and a readily available hazardous emergency response service. To meet the fourth element, the FMIT shall enter into a contract with the BCFD, or other entity, capable of meeting hazardous materials response emergencies. A contract for such services shall be in force before the Southpoint power plant commences operation, and shall remain in force for the duration of the lease term. The FMIT may require Calpine to bear all or any of the costs incurred to implement this measure.

5.2.3 Traffic

Left and right turn lanes shall be added to CR 227 prior to plant construction to improve safety at the power plant entrance. The turn lanes shall be designed and built to Mohave County standards. Calpine shall be financially responsible for improvements to CR 227. The FMIT shall enforce this mitigation measure in cooperation with Mohave County.

During construction, flaggers shall be assigned to the intersection of CR 227 and SR 95 to improve safety for vehicles turning at this intersection. Flaggers shall also be stationed on CR 227 to control traffic approaching from both directions to improve safety in the vicinity of the entry drive to the power plant. Materials deliveries will be scheduled at off peak traffic hours whenever feasible. No other traffic mitigation shall be required after the construction phase ends.

5.2.4 Air Quality

The Air Quality Analysis contained in Appendix B to this EIS includes a preliminary determination of BACT for stationary sources of air pollutant emissions from the proposed power plant. Based on application of this technology, this EIS demonstrates that operations-related air quality impacts could be mitigated to insignificance because the National Ambient Air Quality Standards would not be exceeded and, therefore, public health would be protected.

Calpine will mitigate operations-related air quality impacts to insignificance by providing control technology that does not result in exceedances of the NAAQS. The mechanism for determining the appropriate control technology to mitigate operations-related air quality impacts is the Prevention of Significant Deterioration Permit that will be processed by the

US Environmental Protection Agency. The PSD Permit process is a public process, including public notice and the opportunity for public review and comment.

5.2.5 Evaporation Ponds Monitoring, Closure and Removal Plan

No significant environmental effects were identified with construction, operation and maintenance of the evaporation ponds. However, as a precautionary measure, Calpine agrees to the following mitigation measures which are part of the project design. The monitoring program shall consist of the following components:

1. Calpine shall prepare a monitoring plan at least 180 days prior to plant start of operations and first discharge of effluent to the evaporation pond. The plan shall specify the following:
   - What constituents are to be monitored
   - Where will samples be taken
   - What method(s) is to be used for sampling and analysis, by constituent/location
   - How often will samples will be taken for each sampling location
   - What measured result by each monitored constituent would trigger a need for additional monitoring
   - What measured result by each monitored constituent would trigger a need for corrective action

2. BIA and FMIT shall review and comment on to either approve or require additional documentation for the monitoring plan within 45 days of receipt.

3. Calpine shall revise the monitoring plan until it is accepted by the BIA and FMIT.

4. Calpine shall conduct the monitoring in accordance with the approved plan.

5. Calpine shall report the results of monitoring within 45 days of the end of each monitoring period. The report shall include the following information:
   - A summary of the findings since the last report
   - Monitored concentration of sampled constituents by date, time, and location since the last reporting period.
   - Any monitoring results that trigger the need for additional monitoring or corrective action as specified in the approved monitoring plan
   - Recommended corrective actions, if necessary
   - Copies of the laboratory analysis reports keyed to each sample, location, and date
   - Any recommendations for changes in the monitoring plan based on the monitored results.

6. BIA and FMIT shall review the reports and provide written approval or comments within 45 days of receipt. Comments may include denials of proposed changes to the monitoring plan, requests for clarification of results, and requests for additional monitoring and/or corrective action plans or activities.

7. Calpine shall respond to BIA comments within 45 days of receipt. The monitoring report is not deemed complete until the BIA and FMIT approve it. Monitoring and reporting shall include wildlife species visiting the pond. Monitoring and reporting shall occur on a quarterly basis unless changes in the monitoring schedule are recommended in the monitoring plan or monitoring report, and the recommended changes are approved by the BIA and FMIT. The BIA and FMIT may consult with other federal agencies with regard to the adequacy of Calpine's proposed monitoring plan and the reported results. Please note on page 175 of the FEIS, as referenced above, this has been changed to quarterly monitoring.

The monitoring program will consist of testing quarterly for hazardous substances and pollutants in sediments as well as water, and monitoring for wildlife species visiting the pond. If, at any time during the operational life of the evaporation pond, analysis of monitoring samples from the pond indicate that threshold levels for toxic metals or other toxic substances are met or exceeded, under applicable tribal or federal law, appropriate corrective measures shall be implemented immediately by Calpine, or its heirs or successors, to restore water quality and/or pond sediment chemical makeup to below-threshold levels. If warranted, appropriate wildlife deterrent measures would be implemented by Calpine, in consultation with the Manager of the Havasu National Wildlife Refuge (see page 184, Section 4.4.3.3.1), the FMIT and the BIA.

In the event that below threshold levels of toxic metals in evaporation pond water or sediment cannot be achieved, the pond will cease to be used and its contents shall be disposed of in an appropriate waste disposal facility according to a closure plan to be prepared by Calpine, or its heirs and successors, and approved by the FMIT and other agency or agencies, if any, with jurisdictional authority.

If at any time during the life of the lease the pond must cease operation and is closed according to an approved closure plan, a plan for restoration and revegetation of the pond site to pre-development condition shall be prepared by Calpine, or its heirs and successors, and approved by the FMIT and other agency, or agencies, if any, with jurisdictional authority. Restoration shall include placement of gravel and rock to simulate desert pavement in unplanted areas of the restoration. Restoration and revegetation of the pond site under the provisions of the approved plan shall be the responsibility of Calpine or its heirs and successors.

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Adam Kline created the original graphics for this document.

Subconsultants

Calpine Corporation commissioned a series of independent technical reports prepared by subconsultants to Hallock/Gross, Inc. and the BIA which were the basis for analysis of environmental consequences in the following subject areas:

- Drainage, Hydrology and Sedimentation - Gookin Engineers
- Water Supply - Dames and Moore
- Biologic Resources - EcoPlan Associates, Inc.
- Air Quality - Black and Veatch, Inc.
- Review of Power Plant Design and Safety - Stone and Webster
- Power Plant Design - Sargent and Lundy
- Noise Impact Analysis - Black and Veatch
- Water Quality - W&EST, Inc.
- Traffic and Preliminary Flood Elevation Calculation - James T. Ball, P.E., Transportation Industries International, Inc.
- Cultural Resources - Archaeological Research Services, Inc.

In addition to these technical report preparers, the BIA used an independent contractor, Erich Lathers of BRG Consulting, Inc., to review this EIS for NEPA compliance. Mr. Lathers also contributed portions of the sections on air quality.

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8.0 REFERENCES CITED

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1. Complete sets of Appendices are available at Hallock/Gross, Inc.; the Phoenix Area Office of the BIA; the Colorado River Agency of the BIA; the Fort Mojave Indian Tribe; and the Western Area Power Administration. Please go to inside cover page of document for sources.

RESPONSES TO PUBLIC COMMENTS

COMMENTS and RESPONSES

Contents

Introduction

This section contains all letters received during the public comment period on the DEIS, which began on June 12, 1998 and ended on August 15, 1998. The comment letters are arranged in three groups, where they appear in the order they were received. The three groups are federal agencies, state agencies, and local agencies. No letters from organizations or individuals were received.

All of the comment letters are reproduced. Individual comments have been identified in the letters and marked in the right hand margin of the letter with an alphanumeric code. The responses, which follow the letters, correspond to these alphanumeric codes. A total of 76 comments were identified. Each comment has an individual response. Generally, information is provided in the responses to comments. In some instances, however, the reader is referred to the appropriate section of the DEIS which addresses the comment, or to another response. In some instances, information which was developed in response to a comment was subsequently added to the text of the FEIS. Where this has occurred, the revision or addition is noted.

The BIA wishes to take this opportunity to thank those agencies which provided written comments on the DEIS.

U.S Department of Transportation
Federal Aviation Administration

Western-Pacific Region
Airports Division

P.O. Box 92007
Worldway Postal Center
Los Angeles, CA 90009

July 6, 1998

Ms. Amy Heuslein
United States Department of the Interior
Bureau of Indian Affairs
Phoenix Area Office
Environmental Quality Services
P.O. Box 10
Phoenix, Arizona 85001

Dear Ms. Heuslein:

Draft Environmental Impact Statement
Southpoint Power Plant
Mohave County, Arizona

In response to your letter of June 16, 1998, the Federal Aviation Administration (FAA) has reviewed subject document and provides the following comments:

a. Intrusion of emission stacks into navigable airspace: The document does not indicate the height of the emission stacks. If these stacks are 200 feet AGL or higher, then the proponent of the project must notify the FAA for our review of a possible airspace obstruction. The enclosed FAA Form 7460-1, *Notice of Proposed Construction or Alteration* is provided for proper notification, if required. Lighting and marking of these stacks may be required. If so, the light emissions from these stacks may have a visual impact to the surrounding communities. A1

b. Fogging, icing and water deposition from the cooling towers: The document should address any possible visibility impacts from the cooling tower plume fog. This plume fog could have possible impacts to air navigation and visual impacts to the surrounding communities. A2

c. Thermal plume turbulence from the emission stacks: The document should address the effects of thermal plumes from the emission stacks. This air turbulence could extend upward as much as 1000 feet from the top of stacks. Possible impacts to aviation safety, particularly small aircraft, should be studied. A3

Thank you for the opportunity to review your project. If you have any questions please call our office and speak with Mr. Charles Lieber, Airport Planner, at (310) 725-3614 or charles.lieber@faa.dot.gov.

Sincerely,

Mickeal R. Agaibi
Supervisor, Planning Section

Enclosure

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Reston, Virginia 22092

In Reply Refer To:
Mail Stop 423

JUL 31 1998

AUG 7 2 03 PM '98
PHOENIX AREA DIRECTOR
BUREAU OF INDIAN AFFAIRS
RECEIVED

MEMORANDUM

To: Area Director, Bureau of Indian Affairs

From: James F. Devine James F. Devine
Senior Advisor for Science Applications

Subject: U.S. Geological Survey Review of Draft Environmental Impact Statement for the Southpoint Power Plant

Thank you for requesting a review of the draft environmental impact statement (EIS) for the Southpoint Power Plant, Fort Mojave Indian Reservation, Mohave County, Arizona.

AUG 1998
RECEIVED
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ENVIRONMENTAL SERVICES

Specific Comments:

Page 44 - 45, Section 3.1.3.1, Mohave Valley Soils

The Torrifluents Association is described but does not appear in the figures or tables. The other soils, such as Kofa, Rositas-Superstition-Torriorthuents, and Holtville, are in the figures and tables but are not described here. Information on present conditions of these soils, as well as which soils might be disturbed by the future project work, should be included here. A4

The statement, "There is a low hazard of erosion due to the flat slope," is not totally correct. These soils are a high hazard for wind erosion, especially if disturbed. A5

Page 51 - 53, Table 3.1-1, Table 3.1-2, Table 3.1-3

The silty loam (Indio) and the silty clay loam (Kofa, Holtville, Gadsden) soils are somewhat stable to the wind when undisturbed; however, when disturbed, they become highly vulnerable to the wind and could be a source of PM10 emissions. The same is true of the Carrizo soils, as mentioned, when the desert pavement is disturbed. A6

Page 55 - 56, Section 3.1.4.4, Colorado River Probable Maximum Flood (PMF)

The possibility of a PMF is unlikely, but even a much smaller flood could overtop the levees and flood the entire valley. The stated conditions for a PMF, a heavy snow pack in the Rocky A7

Mountains, full reservoirs, and warm spring rain on the snowpack, are almost exactly the conditions during 1983, when the entire system was overfull. The flood levels of 1983, in the river system, which equaled and exceeded the predicted PMF levels, were not that high compared with the historic flood record. Larger runoff has occurred in the past 100 years, and could likely occur again.

The statement, attributed to the Bureau of Reclamation (p. 56), that the flow depth of the PMF would be 200 ft. is inaccurate. If this happened, the river would flow above the level of the Pleistocene terrace, which hasn't happened in at least 10,000 years. However, the entire floodplain has been inundated numerous times in only the past several hundred years. So, even though the possibility of a flood 200 ft. deep is highly unlikely, a flood sufficient to overtop the levees and flood the power plant site is not. A8

Finally, the last sentence on page 56 is premature. The largest floods of the systematic record happened before Hoover Dam was built, most notably in 1884, 1909, 1917, and 1921. For climatic reasons, there have not been any really large floods on the Colorado River since completion of the dam. A9

Page 59 - 61, Section 3.1.5.1, Sedimentation

The estimates of sediment volume debouching from the tributary streams onto the Colorado River floodplain are adequate, but all estimates are probably not very reliable. A10

Page 61, Section 3.1.5.2, Seismicity

The U.S. Geological Survey 1997 seismic hazard map would be a more appropriate document to reference than the 1991 UBC seismic zone map. The 1997 ground-motion maps for probabilities of exceedence of both 2% and 10% in 50 years (http://gldage.cr.usgs.gov/eq) do not appear to alter the conclusion that the seismic hazard at the site is low. However, at a minimum, the EIS should identify potential seismogenic sources and what is known about them in order to establish the uncertainty in the probabilities for the Southpoint site. The recent literature and the Arizona Bureau of Geology and Mineral Technology would be a good resource for this description. A11

Page 61, Section 3.1.5.3 Liquefaction

Despite the fact that these sites generally contain fluvial materials that are susceptible to liquefaction, the liquefaction hazard is evaluated as low because of the low seismicity in Mohave Valley. Historical observations of maximum distance to liquefaction indicate, however, that for large earthquakes, liquefaction can occur more than 100 km away from the epicenter. Thus, consideration should be given to a larger area of potential seismic sources that just the Mohave Valley. A12

Page 62 - 63, Section 3.2.1, Regional Climate of the Mohave Desert

The statement, "...wind speeds...greater than 21 knots for less than one percent of the year," fails to show the significance of these winds. Although less frequent, they are usually associated with severe dust storms from the SSE-SSW (thunderstorms). These dust storms can produce 24-hour PM10 maximum concentrations (NAAQS) that could be moved into the Bullhead City nonattainment PM10 area as well as possibly into the Class I Grand Canyon area. A13

Page 140 - 141, Section 4.1.3, Soils

These soils remain a wind-erosion hazard even after construction due to disturbance. The Best Management Practices (BMP) should be established in this EIS. The BMP needs to continue after construction has finished to keep these soils from becoming a source of PM10 emissions during wind-erosion events. A14

Page 141 - 146, Section 4.1.4, Natural Drainage and Floodplain Determination

Tributary sedimentation problems might be controllable by the methods discussed in this section; however, inundation of the floodplain by the Colorado River is not so easily controlled or dismissed. The statement that (p. 144) " . . . no ordinary flood hazard is presented by the Colorado River," is not totally accurate. As discussed above, the flood of 1983 was probably not unusual, and floods much larger than that have repeatedly overtopped the floodplain in the past several hundred years. A15

Page 146 - 147, Section 4.1.5.1, Sedimentation

This section seems to adequately address the on-site sedimentation problems. However, it should be noted that, in the recent geologic past, the Colorado River removed tributary sediment faster than it was deposited, as shown by the fact that the river now flows nearly 200 ft. below its former banks. A16

Page 148, Section 4.1.5.4, Dust Storms

The project will have no impact on the intensity of the dust storms, but it could have an impact on the amount of available particulate material that can be moved by the dust storms. A17

Page 149, Section 4.2, Air Quality

The model (p. 6-2, section 6.2.1.1 in Appendix F) of Appendix B seems to only evaluate the emission from the power plant and does not include the PM10 emissions from the dust storms, roads, vehicles, and other sources. A18

Page 150 - 151. Section 4.2.1.2. Emission Inventory Compilation

The references to Appendix B are confusing; for example: Appendix B, page 2-2 does not exist, Appendix B page 4-1 is not related to the total acreage, and there is more than one Appendix B. Therefore, the model for these calculations cannot be found. A19

Page 152. Section 4.2.2.1.1. Fugitive Dust

The statement, " Therefore, fugitive dust is anticipated to be negligible beyond the property boundary...," is not accurate. There are 338 tons per year modeled of fugitive dust from construction activities, some of which is not PM10; however, there are 113 tons per year of PM10, which will most likely leave the site, even with dust control measures (p. 150). A20

A wind velocity greater than 30 mph is too high for the disturbed soils or the Rositas-Superstition-Torriorthuents soils mentioned. The threshold velocity for wind erosion for these soils is closer to 20 mph measured at 10 m. A21

Page 159. Table 4.2-6

Although the discussion on page 151 states that all sources of PM10 are included to produce a total PM10 impact, the figures on Table 4.2-6 only include the emissions modeled from the power plant. There does not appear to be cumulative data for the PM10 emission amounts in ug/m^3 for the power plant, construction, vehicles, and wind erosion for the site. A22

Page 225. Section 4.12. Relationship Between Local Short-Term

These soils do not return to a natural state quickly or easily, even with the planting of native vegetation. A reference on wind-erosion vulnerability of the soils in this area is: A23

Wolfe, Stephen A., and Helm, Paula J., 1998, Chapter C: Wind Erosion Susceptibility near Desert Wells, Arizona in Breed, Carol S., ed., Desert Winds: Monitoring wind-related surface processes at desert sites in Arizona, New Mexico, and California: U. S. Geological Survey Professional Paper 1598.

Copy to: Director, Office of Environmental Policy and Compliance
District Chief, Water Resources Division, Arizona

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
TUCSON PROJECT OFFICE, REGULATORY BRANCH
5205 EAST COMANCHE STREET
DAVIS-MONTHAN AFB, ARIZONA 85707-5000

REPLY TO
ATTENTION OF:

August 6, 1998

Office of the Chief
Regulatory Branch

Bureau of Indian Affairs
ATTN: Ms. Amy Heuslein
Environmental Quality Services
PO Box 10
Phoenix, Arizona 85001

File Number: 944-0903-MB

Dear Ms. Heuslein:

This letter provides comments to the proposed Southpoint Power Plant Draft Environmental Impact Statement (EIS) dated May, 1998.

The U. S. Army Corps of Engineers requests that the following clarifications/corrections be made to the EIS before it becomes final.

General Comments

We believe the alternatives analysis is not thorough enough since only three site alternatives are explored and no on-site configurational alternatives are discussed. Should the proposed project require a Section 404 individual permit, a more comprehensive alternatives analysis will be required as the Corps, in accordance with the Section 404(b)(1) guidelines, can only permit the least environmentally damaging practicable alternative in light of costs, logistics, and technology. A24

Page 5, 1.3.2.3

This paragraph should read "The U. S. Army Corps of Engineers (USACE) regulates the discharge of dredged and/or fill material into waters of the United States including wetlands under Section 404 of the Clean Water Act and work and/or structures in or affecting a navigable water of the U. S. (e.g. Colorado River) under Section 10 of the River and Harbor Act of 1899. Activities regulated under Section 404 include but are not limited to grading, filling, mechanized landclearing, ditching, or other similar activities which impact a water of the U. S. Any activity in, under, over or affecting the course, capacity, or condition of a navigable water of the U. S. is regulated by the USACE under Section 10." The Corps has not been contacted by A25

Calpine and has not received a permit application for this proposed activity. It is, therefore, not necessary to discuss the type of permit which might be applicable here (nationwide or individual) since we have very limited knowledge of the project and how it will affect waters of the U. S.

Page 7, Table 1.3-1

The Corps' permit is not a "water quality permit". The table should be corrected to read (under "Permit"), "Section 404/Section 10". A26

Page 77, 3.3.2.1

Installing a pump in the Colorado River is an activity regulated by the Corps under Section 10. Calpine is required to obtain a Section 10 permit prior to installation of any structure or commencement of any activity which would affect the Colorado River. A27

Page 77, 3.3.2.2

It appears there may be jurisdictional waters of the U. S. within the proposed project area. A jurisdictional delineation must be conducted and approved by the Corps prior to the processing of any permit. This section should define the jurisdictional waters of the U. S. and the extent of the impacts to them. A28

Page 91, 3.4.3.4

The Corps is the responsible agency for determining the presence of wetlands. The Corps has not been contacted regarding a wetland determination. If a wetland determination has been conducted by a consultant, specific methodology is required and it must be approved by the Corps. While a cursory investigation may seem to indicate there are no jurisdictional wetlands within the proposed project area, it is possible they exist if the correct methodology was not employed. The Corps should be consulted regarding wetlands within the project area prior to issuance of the final EIS. A29

Page 166, 4.3.2.1

The Corps must assess and permit placement of a water intake in the Colorado River to determine if there are any impacts to threatened and endangered species and navigation. There is not enough information in this section regarding the intake to determine the extent of impacts. A figure (cross-section) depicting the pump and intake should be included in the final EIS. In addition, the 24" buried pipeline might cross jurisdictional waters for which a Secton 404 permit would be required. A30

Page 182, 4.4.3.2.1

Has consultation under Section 7 of the Endangered Species Act (ESA) been conducted with the U. S. Fish and Wildlife Service for impacts to the bonytail chub and razorback sucker as a result of the intake? Unless a "no effect" determination has been made by BIA (which should be stated in the DEIS), then consultation is required. If consultation has been accomplished, it should be stated in the document. A31

Page 185, 4.4.3.4.1

Please reference our comments above regarding "Wetlands". A32

Page 209, 4.7.10.2.5

The Corps should be listed under this section as having regulatory authority under Section 404 and Section 10 as it currently appears that permits will be required. A33

Thank you for the opportunity to comment on this DEIS. We look forward to working with BIA, the Tribe, and Calpine regarding this project. If you have questions, please contact me at (520) 670-5021.

Sincerely,

Marjorie E Blaine

Marjorie E. Blaine
Senior Project Manager
Arizona Section, Regulatory Branch

United States Department of the Interior

BUREAU OF RECLAMATION
Boulder Canyon Operations Office
P.O. Box 61470
Boulder City, NV 89006-1470

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IN REPLY REFER TO:
BCCO-4442
ENV-6.0

AUG 1 0 1998

Mr. Wayne Nordwall
Area Director
Bureau of Indian Affairs
Phoenix Area Office
Environmental Quality Services
PO Box 10
Phoenix, Arizona 85001

Subject: Comments Concerning Southpoint Power Plant Draft Environmental Impact Statement (EIS) (Your Memorandum of May 19, 1998)

Dear Mr. Nordwall:

This is in response to the subject document, for the Southpoint Power Plant natural gas fired, 500 megawatt combined cycle power plant. The Bureau of Reclamation (Reclamation) has the obligation to manage and operate the Colorado River in an attempt to meet all of the entitlement users rights to Colorado River water in an environmentally sensitive manner.

Reclamation would like to confirm that the Fort Mojave Indian Community does have the right to beneficially use 103,535 acre-feet of Colorado River water on Tribal lands in the State of Arizona as stated in section 3.3 Water Resources, and the Fort Mojave Indian Community is not currently using all of its water entitlement. The water entitlement is for the diversion of up to 103,535 acre-feet per year, or the consumptive uses that would have occurred if the water was used for irrigation purposes. For planning purposes the consumptive use for irrigation is projected at 70 percent which would result in a consumptive use not to exceed 72,475 acre-feet per year as indicated in the draft EIS. A34

The use of water for the South Point Power Plant, regardless of how diverted, from wells which draw Colorado River water or directly from the river, is a portion of the State of Arizona's apportionment of Colorado River water, and shall be accounted against the Fort Mojave Indian Community's decreed water right entitlement. The proposed use as indicated in the draft EIS is a consumptive use amount chargeable against the 72,475 acre-feet consumptive use component of the Fort Mojave Indian Community's entitlement. This consumptive use of 4,000 acre-feet is equal to diversions of 5,714 using the 70 percent planning criterion.

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SERVICES

Reclamation has the following concerns:

1. As with other power plants and compressor stations located along the Colorado River one of Reclamation's concerns is how the waste water is disposed of after use. This type of use tends to concentrate chemicals and other by-products, and the resulting wastewater is normally of a higher temperature and higher TDS levels than water in the Colorado River. We are concerned about any impacts associated with the direct or indirect return of waste water to the Colorado River that is of a higher temperature and higher TDS level than Colorado River water, and recommended that the EIS address this issue. We have found that this often not only requires well-managed evaporation ponds but also observation wells and wells to recapture leakage from the sealed ponds. A35a A35b

2. In order to comply with the Supreme Court Decree in *Arizona vs. California* dated March 9, 1964, specifically Article V, Reclamation requests that the water used by the South Point Power Plant, via wells or river diversions, be scheduled in advance, measured, and reported to Reclamation. A36

3. Delivery of treated waste water off the Fort Mojave Indian Community Reservation would be considered a new or additional use of Colorado River water that would have to be accounted for against an entitlement holder's existing right to divert and use Colorado River water. A37

4. Section 1.6.5.2, Process Wastewater Disposal, indicates that precipitates would be removed from the evaporation ponds. However, there is no discussion of how these solids would be removed without potentially damaging the geomembranes. In addition, what are the likely concerns with disposal of the solids? Will a separate assessment have to be made to remove the solids? A38a A38b

5. Section 4.3.4.2.3, Accumulation of Precipitated Solids, has a reference to a "Section 4.6.2.3.1." This section could not be located. A39

If you have any questions regarding our comments please contact Mr. Bill Martin at 702-293-8652 or Mr. Deon Murphy at 702-293-8103.

Sincerely,

ACTING FOR William E. Rinne
Area Manager
Boulder Canyon Operations Office

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Amy Heuslein
Environmental Quality Services
Bureau of Indian Affairs
P.O. Box 10
Phoenix, Arizona 85001

AUG 31 1998

RECEIVED SEP 1998 PHOENIX AREA OFFICE ENVIRONMENTAL SERVICES

Dear Ms. Heuslein:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the proposed **SOUTHPOINT POWER PLANT, CONSTRUCTION AND DEVELOPMENT, FORT MOHAVE INDIAN RESERVATION, MOHAVE COUNTY, ARIZONA.** Our comments on the DEIS are provided pursuant to the National Environmental Policy Act (NEPA), Section 309 of the Clean Air Act, and the Council on Environmental Quality's (CEQ) NEPA Implementing Regulations. The DEIS was prepared to assess the environmental impacts associated with a proposed longterm lease of 320 acres of tribal trust land to construct and develop a 500-megawatt combined cycle natural gas power plant located on the Fort Mohave Indian Reservation in Mohave County. The Bureau of Indian Affairs (BIA) is the lead Federal agency for NEPA compliance and the Tribe is a cooperating agency on the DEIS. We appreciate the individual extension which you granted EPA to provide comments until August 31, 1998.

Overall, we consider the DEIS to be a generally well-written, comprehensive document in terms of identifying potential environmental impacts and mitigation measures. Only in one aspect do we have environmental concerns, whch relate to the accuracy and completeness of the air quality emissions data presented in the EIS. Based upon a new, modified air permit application submitted to US EPA by the project applicant (Calpine), increased emissions of several criteria air pollutants are projected to occur; thus, certain emissions presented in the DEIS are less than what is now actually projected to occur. The Final EIS (FEIS) should be modified to reflect these increased emission levels, and air mitigation measures may correspondingly need to be amended as well. Accordingly, we have rated the DEIS as Category EC-2, Environmental Concerns - Insufficient Information. Please refer to our comments below:

CLEAN AIR ACT

1. Page 152, 4.2.2.2, Operational Impacts, and Page 156, 4.2.2.3.1, Prevention of Significant Deterioration (PSD) Program: The air quality section of the DEIS is correct in its explanation of the PSD (Prevention of Significant Deterioration) permit process and requirements. However, we believe it is in need of substantial revision since the data and presentation in the DEIS is based on Calpine's PSD permit application of approximately one year ago. As noted on page 149, that application was withdrawn. On June 15, 1998, a new, modified application was submitted to EPA. Although the project description and plans are essentially unchanged, there are some A40

characteristics of the new plans that will have substantial changes in the overall project emissions. In particular, Table 4-2-2 in the DEIS needs to be updated to reflect increases in N0x, CO, S02, and PM emissions. Likewise, the text and other tables in this section will require changes based on this new information provided by the company. For your reference we have attached a copy of a July 15, 1998 EPA letter to Calpine in which we inform the company that their PSD application is administratively complete. EPA is now reviewing the PSD application submitted by the company in order to prepare a draft PSD permit for the proposed facility.

2. Page 156, 4.2.2.3.1.2. Ambient Monitoring and page 160, 4.2.2.3.1.5. Impacts to Class I Areas: The modeling protocol mentioned in the DEIS is still in effect, and EPA is satisfied with the current PSD application and modeling submittals. In addition to the basic requirements of the PSD program, Calpine has agreed to submit further modeling at the request of a federal land manager for several Class II wilderness areas in the vicinity of the proposed project. EPA will analyze these models as they are provided to us. These models and analyses should be included in the FEIS if available at its time of publication. We believe that these changes are essential for the FEIS to be considered an accurate, complete document. Lastly, we encourage your office to work with the National Park Service (NPS) to ensure that any NPS issues and concerns regarding air quality and protected airsheds under NPS jurisdiction are satisfactorily addressed in the BIA's NEPA process. A41

CLEAN WATER ACT

1. Page 5. 1.3.2.4 - US EPA 402 National Pollutant Discharge Elimination System (NPDES) Permit. Any discharge from a point source to a water of the United States as defined at 40 CFR 122.2 requires a Clean Water Act (CWA) Section 402 permit (NPDES permit). A42

2. Page 5. 1.3.2.3. Section 404 Permit: Regarding the potential need for a Clean Water Act Section 404 permit for the proposed project, water quality certification (or waiver) would be needed from US EPA as the project is on tribal lands. A43

3. Page 37. 2.7.2.4 - Supply Topock Marsh. This alternative would involve discharge to Topock Marsh, a water of the United States, thus requiring an NPDES permit and CWA Section 401 water quality certification, required from US EPA. A44

4. Page 38. 2.7.2.7 - Return Flow Through Natural Channels. This alternative would result in a discharge to natural channels which are tributaries to the Colorado River. Such natural channels are, in all likelihood, waters of the United States. In either case, the discharge would be subject to CWA Section 402 NPDES permitting requirements and would need to comply with Water Quality Standards in order to protect the beneficial uses of the Colorado River. A45

We appreciate the opportunity to comment on the DEIS. Please send two copies of the FEIS to me at the letterhead address (code: CMD-2) when it is filed with EPA's Washington, D.C. office. If you have any questions, please call David Tomsovic of my staff at 415-744-1575.

Sincerely,

David Farrel, Chief
Federal Activities Office

Attachments: 2

1) Summary of Rating Definitions and Follow-Up Action
2) EPA's July 15, 1998 letter to Calpine

SUMMARY OF EPA RATING DEFINITIONS

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Havasu National Wildlife Refuge
Post Office Box 3009
Needles, California 92363

August 3, 1998

Amy Heuslein
BIA Phoenix Area Office
Environmental Quality Services
P.O. Box 10
Phoenix, AZ 85001

Dear Ms. Heuslein:

Below is a brief comment on the Draft Environmental Impact Statement "South Point Power Plant". I am in contact with our Ecological Service Division in Phoenix and will submit most of my comments through their response. However, one reference in the EIS referred specifically to me, and I felt I should respond directly.

On page 137, paragraph two of section 4.3.4.3.1 last sentence: "Potential impacts to migratory waterfowl would not be significant." This is attributed to someone's personal communication with me. I did not give this statement to the preparer's of this document or anyone else. It is not a true statement and should be removed. There is significant information in the literature pointing to hazards to wildlife related to evaporative ponds and this should be throughly dealt with.

A46

A47

Sincerely,

Gregory A. Wolf

Gregory A. Wolf
Refuge Manager

United States Department of the Interior

FISH AND WILDLIFE SERVICE
P.O. Box 1306
Albuquerque, New Mexico 87103

In Reply Refer To:
R2/ES-SE
CL8-0039

SEP 0 9 1998

Memorandum

To: Area Director, Bureau of Indian Affairs, Phoenix, Arizona

From: Regional Director, Region 2

Subject: Draft Environmental Impact Statement for the Proposed Southpoint Power Plant, Fort Mohave Indian Reservation, Mohave County, Arizona (DES 98-25)

The Fish and Wildlife Service (Service) has reviewed the subject Draft Environmental Impact Statement (DEIS) and offers the following general and specific comments.

General Comments

The Service is concerned about the proposed power plant being located adjacent to the Havasu National Wildlife Refuge and the impact it may have on resources of the Refuge. The construction of a 30-acre evaporation pond and a 3-acre interim storage pond for wastewater poses a hazard to both resident and migratory waterfowl. The accumulation of chemicals and metals could be toxic to animals that come in contact with them. It may be necessary to keep all wildlife species from coming in contact with the ponds. Due to it's close proximity to the Refuge, the proposed power plant may degrade air quality to the extent that a real and immediate threat to wildlife resources will occur. A complete analysis of all air quality parameters should be undertaken. A48a A48b

Throughout the document, there appears to be a lack of understanding of what permits will be needed for the proposed project under Section 404 of the Federal Water Pollution Control Act (33 U.S.C 1344) and Section 10 of the River and Harbor Act of 1899. The U.S. Army Corps of Engineers should be consulted to make sure that all of the requirements of these acts are satisfied. A49

Specific Comments

Executive Summary, Page S-4: The first sentence of the document states that "no federal permits or NEPA compliance would be required" for the Colorado River pumping apparatus. We believe a Section 10 and Section 404 permit from the Corps of Engineers (Corps) would be required. A50

SEP 1998 RECEIVED PHOENIX AREA OFFICE ENVIRONMENTAL SERVICES

PHOENIX AREA DIRECTOR SEP 14 12 42 PM '98

BUREAU OF INDIAN AFFAIRS RECEIVED

Section 1.6.3 Natural Gas Pipeline Corridor, Page 22 : The second paragraph states that the gas pipeline corridors to the boundary of the reservation are not part of this project and a separate Environmental Assessment would be prepared by the pipeline company for the Bureau of Land Management. We believe construction of the pipeline is a necessary part of the project and should be included in this document. Without the fuel, the power plant would not be possible. A51

Section 3.4.3.4 Wetlands, Page 91: The document states that, "No jurisdictional wetlands are located within 6 miles of the water supply pumping platform in the Colorado River on which the proposed new 100 HP pump would be built." The Colorado River is a jurisdictional water of the U.S. and jurisdictional wetlands do occur along the Colorado River. The Corps should be asked to conduct a jurisdictional delineation for the project. A52

Section 4.2.2.3.1.5 Impacts to Class 1 Areas, Page 160: The first sentence states that national wildlife refuges are class 1 areas. However, the last sentence states that because the proposed power plant is located more than 100 kilometers away from any class 1 areas and the emissions from the proposed project would be low, an analysis was not deemed necessary. The Havasu National Wildlife Refuge is less than 1 kilometer from the project area. We believe a full analysis should be completed. A53

Section 4.4.3.2.1 Preferred Alternative and Alternative Two and Three Sites: The DEIS does not provide sufficient information on the effects of the proposed project or actions taken to remove them. Therefore, the Service does not agree with the statement, "the proposed project would not adversely affect individuals or populations of these species." A54

The Service appreciates the opportunity to review this document. It is the desire of the Fish and Wildlife Service to work with Fort Mohave Reservation resource managers to amelorate concerns and potential conflicts with wildlife resources on both Reservation and Refuge lands. If we can be of further assistance, please contact the Field Supervisor, Ecological Services Office, Phoenix, Arizona at (602)640-2720.

Nancy M. Kaufman

cc: Director, Arizona Game and Fish Department, Phoenix, AZ
Refuge Manager, Havasu National Wildlife Refuge, Needles, CA
Supervisor, Ecological Services Field Office, Phoenix, AZ

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General Fax:
602-542-4180

Director's Office Fax:
602-542-4188

July 27, 1998

Amy Heuslein, Environmental Protection Officer
USDI Bureau of Indian Affairs
Phoenix Area Office
Environmental Quality Services
P.O. Box 10
Phoenix, Arizona 85001

RE: Ft. Mojave Indian Reservation; Draft EIS for Proposed South Point Power Plant; BIA-PAO

Dear Ms. Heuslein,

Thank you for providing this office with a copy of the above-referenced Draft Environmental Impact Statement (DEIS). I have reviewed it and offer the following comments:

All project sites under consideration have been surveyed in order to locate and evaluate significant cultural resources that might be impacted by the proposed action. Archaeological sites considered potentially eligible for inclusion on the National Register of Historic Places were located in the areas identified as the Preferred Alternative and Alternative Two. On page 97, the DEIS indicates that no archaeological sites were recorded in the Alternative Three area; however, on page 186, it states that three sites were located "on top of the bluffs on the Alternative Three site." This apparent discrepancy should be resolved, or the language revised to clarify the author's meaning, as the EIS is finalized. The cultural resource discussion on page 186 also states that sites in the Alternative Two and Three areas may have traditional cultural value, and may be eligible for the National Register as Traditional Cultural Properties.

B1a

B1b

The DEIS does not mention consultation between the BIA and this office pursuant to Section 106 of the National Historic Preservation Act. We look forward to working with BIA to ensure that the proposed project's potential impacts on historic properties are carefully considered.

B2

Your continued cooperation with this office considering the impacts of Federal undertakings on historic preservation is appreciated. If you have any questions, please call me at (602) 542-7137 or 542-4009.

Sincerely,

Carol Heathington

Carol Heathington
Compliance Specialist
State Historic Preservation Office

JUL 1998
RECEIVED
PHOENIX AREA OFFICE
ENVIRONMENTAL
SERVICES

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
PHOENIX AREA OFFICE
P.O. BOX 10
PHOENIX, ARIZONA 85001

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Quality Services
Project No. 95-102
4303.1MO
(602) 379-6750

AUG 18 1998

Mr. James Garrison
State Historic Preservation Officer
Arizona State Parks
1300 West Washington
Phoenix, Arizona 85007

Attention: Carol Heathington, Compliance Specialist

Re: BIA-PAO/Draft EIS, South Point Power Plant, Fort Mohave Indian Reservation

Dear Mr. Garrison:

This is in response to your letter of July 27, 1998 whereby your office provided comments on the draft Environmental Impact Statement (DEIS) for the proposed South Point Power Plant on the Fort Mohave Indian Reservation.

You are correct that the DEIS does not mention consultation between your office and the Bureau of Indian Affairs (BIA), the lead agency for this undertaking. As the enclosed letter illustrates, however, the Section 106 process was completed for this undertaking on February 12, 1996 when it was known as the Nordic/South Point Power Plant Project.

The enclosed letter is in specific regard to the preferred alternative for the undertaking (Alternative 1). At the time that letter was written, construction activity was to be confined to the flood plain and all of the historic properties, which are located on the terrace above, would be avoided. In the interim, evaporation ponds have been proposed for the northern portion of the terrace, but these will be located so as to avoid the one historic property in the general area. Consequently, my original determination of no effect still holds for the undertaking.

We will attend to this and the other comments provided by your office in the editing process for the Final EIS.

If you have any questions, please contact Mr. Garry J. Cantley, Area Archeologist, at (602) 379-6750.

Sincerely,

Larry W. Welch

Acting Area Director

Enclosures

95-102

United States Department of the Interior

TAKE PRIDE IN AMERICA

BUREAU OF INDIAN AFFAIRS
PHOENIX AREA OFFICE
P.O. BOX 10
PHOENIX, ARIZONA 85001

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JAN 12 1996
1/12/96
STATE PARKS BOARD

100 450

IN REPLY REFER TO:

Environmental Quality Services
Project No. 95-102
File 4303.1MO
(602) 379-6750

JAN 9 1996

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PHOENIX AREA OFFICE
ENVIRONMENTAL SERVICES

PHOENIX AREA DIRECTOR
FEB 28 11 31 AM '96
BUREAU OF INDIAN AFFAIRS

Mr. James Garrison
State Historic Preservation Officer
Arizona State Parks
1300 West Washington
Phoenix, Arizona 85007

Attention: Compliance Specialist

Re: BIA-PAO/Historic Property Survey,
Nordic/Southpointe Power Plant

Dear Mr. Garrison:

Pursuant to 36 CFR 800.4(b), as Agency Official, we have made a reasonable and good faith effort to identify historic properties that may be affected by the proposed undertaking, **grant of easement for utility lines on the Fort Mojave Indian Reservation**, and have gathered sufficient information to evaluate the eligibility of these properties for the National Register. Documentation is provided as an enclosure entitled <u>A Cultural Resources Survey of 320 Acres for the Nordic/Southpointe Power Plant Project (Alternative 1), Approximately Five Miles East of Needles, California, On the Fort Mojave Indian Reservation, Mohave County, Arizona</u> (T. Wright, June, 1995).

It is our opinion that application of the National Register Criteria has the following result:

Property Designation	Criterion	Eligibility	Effect
AZ L:2:47(ASM)	d	yes	no
AZ L:2:48(ASM)	d	yes	no
AZ L:2:49(ASM)	d	yes	no

We now request consultation as required at 36 CFR 800.4(c)(1) and 36 CFR 800.5(a). As recommended in the report, the three historic properties will be avoided. All construction activity will be confined to the floodplain, whereas the historic properties occur some distance away (>700 feet) on the top of the Pleistocene terrace. As a result, it is our opinion that the undertaking will have no effect on historic properties.

If there are any questions, please contact the Area Archeologist at (602) 379-6750.

Sincerely,

Area Director

Enclosure

It is our opinion that this project should have no effect on any National Register listed or eligible property.

2/12/96
for State Historic Preservation Officer

PETER G. MORROS, Director

L.H. DODGION, *Administrator*

(702) 687-4670
TDD 687-4678

Administration
Mining Regulation and Reclamation
Water Pollution Control
Facsimile 687-5856

STATE OF NEVADA
BOB MILLER
Governor

Waste Management
Corrective Actions
Federal Facilities

Air Quality
Water Quality Planning
Facsimile 687-6396

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION

333 W. Nye Lane, Room 138
Carson City, Nevada 89706-0851

July 28, 1998

Ms. Amy Heuslein
Environmental Quality Services
Phoenix Area Office
Bureau of Indian Affairs
P.O. Box 10
Phoenix, Arizona 85001

Re: DEP # 1999-012 – Draft Southpoint Power Plant EIS

Dear Ms. Heuslein:

The Nevada Division of Environmental Protection has conducted an internal Clearinghouse review of the Draft Environmental Impact Statement for the Southpoint Power Plant proposed by the Fort Mojave Indian Tribe. Below is the division's comments regarding the aforementioned project.

The State of Nevada is concerned about the movement of air emissions and pollutants from Arizona to Nevada. The State of Nevada will exercise their right to review the air quality Title V application pursuant to the process allowing affected states to comment. B3

If you have any questions please feel free to contact me at 687-4670, ex 3118.

Sincerely,

David R. Cowperthwaite

David R. Cowperthwaite
NDEP Clearinghouse Coordinator

cc: Heather Elliot, Nevada State Clearinghouse

THE STATE OF ARIZONA

GAME & FISH DEPARTMENT

2221 West Greenway Road, Phoenix, Arizona 85023-4399 (602) 942-3000
www.gf.state.az.us
Kingman Office, 5325 N Stockton Hill Rd., Kingman, AZ 86401-1043

August 10, 1998

Ms. Amy Heuslein
Environmental Quality Services
BIA Phoenix Area Office
P.O. Box 10
Phoenix, Arizona 85001

Re: Draft EIS for Southpoint Power Plant

Dear Ms. Heuslein:

The Arizona Game and Fish Department (Department) has reviewed the above-referenced DEIS, whereby the Calpine Corporation under a lease from the Fort Mojave Indian Tribe, is proposing to construct and operate a 500 megawatt combined cycle natural gas fired power plant. We offer the following comments for your consideration.

GENERAL COMMENTS

For clarification, the Department owns and manages 320 acres of land in Section 17, Township 17 North, Range 21 West. Department property is directly adjacent to the preferred alternative site located in Section 8, and the Alternative three site in Section 16.

For the most part, wildlife issues and concerns appear to be adequately addressed. We do not anticipate any significant impacts to wildlife on Department owned lands adjacent to the Preferred Alternative or Alternative Three site.

We do have concerns regarding the placement of ancillary structures associated with the power plant and the potential cumulative impacts to the environment. Powerline and pipeline right-of-ways could be numerous. There is the potential that easements could be sought across Department owned property. It would be helpful if the EIS were to identify potential pipeline and transmission line corridors. Although some of this information is located in other NEPA documents, and separate NEPA analysis would be conducted for each right-of-way, it would be helpful to identify these corridors in this EIS document. B4

PAGE SPECIFIC COMMENTS

Section 3.7.10.2.4 State of Arizona Land Management; Pages 117-118

This paragraph could be misleading. Although Arizona State Trust Land must be used to support education, the land managed by the Department in Section 17 is managed specifically for the benefit of wildlife and does not fall under the category of other State Trust Lands. B5

Section 3.7.11.4.1 Preferred Alternative Site - Section 8; Page 124 First Paragraph

This paragraph states that "Section 17 is privately owned. It has a low density rural subdivision built on its west half; its east half is undeveloped." This statement should be changed to reflect the 320 acres in Section 17 that the Department owns and manages. The 3rd paragraph on the same page is correct. B6

In addition, maps on pages 120-123 are inaccurate. The Department owns and manages 320 acres of land in Section 17 not depicted on these maps. The map on page 92 is correct. B7

Section 4.7.10.2.4 State of Arizona; Page 208 Last Paragraph

This paragraph states that "The state of Arizona does not have lands in the immediate vicinity of the Preferred Alternative or Alternative Two sites." This statement is incorrect. The Department has 320 acres of land located in Section 17 directly adjacent to the Preferred Alternative. This same tract of Department land abuts the Alternative Three site in Section 16. B8

Section 4.3.4.3.1 Preferred Alternative Site-Section 8; Page 179

This paragraph discusses the evaporative pond used for disposing of plant process wastewater. It states that "Locating the evaporation pond on top of the bluffs lessons the attractiveness of the pond to wildfowl as it is above their normal travel corridor along the Colorado River..." B9

We disagree with this statement. Providing open water in this area will attract wildlife, particularly waterfowl species. We also disagree that potential impacts to migratory waterfowl would not be significant. The Department has documented the loss of more than a hundred waterfowl at a toxic pond more than two miles from the Colorado River.

We suggest that in addition to fencing the pond off to terrestrial wildlife, measures be taken to preclude access by waterfowl. Each of the alternatives should include measures to ensure the safety of avian, and terrestrial species in and around the evaporative pond facilities. B10

Thank you for the opportunity to review and provide comments on this draft EIS. If you have any questions regarding the Department's comments, please contact myself or Duane Aubuchon at (520) 692-7700.

Sincerely,

Thomas D Fresques

Tom Fresques
Habitat Specialist, Kingman Region

TDF:tf

cc: Duane Aubuchon, Habitat Program Manager, Kingman Region
John Kennedy, Supervisor, Project Evaluation Program, Phoenix
Joshua Hurst, Wildlife Manager, Bullhead City

AGFD Log No.6-26-98(06)

TRANSPORTATION/FLOOD CONTROL
DEPARTMENT - SURVEYOR

COUNTY OF SAN BERNARDINO
PUBLIC SERVICES GROUP

825 East Third Street • San Bernardino, CA 92415-0835 • (909) 387-2800
Fax (909) 387-2667

KEN A. MILLER
Director

June 30, 1998

United States Department of the Interior
Bureau of Indian Affairs
Attn.: Ms. Amy Heuslein
BIA Phoenix Area Office
Environmental Quality Services
P.O. Box 10
Phoenix, AZ 85001

File: 10(ENV)-1.01

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT - SOUTHPOINT POWER PLANT

Dear Ms. Heuslein:

Thank you for giving the San Bernardino County Transportation/Flood Control Department the opportunity to comment on the Draft Environmental Impact Statement (EIS) for the proposed Southpoint Power Plant.

After reviewing the Draft EIS, our Department does not have any comments at this time.

C1

Should you wish to contact us, please address written correspondences to the address shown on this letterhead, or you may call us at (909) 387-2620.

Sincerely,

Frank Molina

FRANK MOLINA, Senior Associate Planner
Environmental Management Division

cc: Jim Borcuk, P.E., Chief
KAM/CLL Reading Files

MOHAVE COUNTY
ECONOMIC
DEVELOPMENT
AUTHORITY, INC

August 3, 1998

Bureau of Indian Affairs
Phoenix Area Office
Environmental Quality Services
P.O. Box 10
Phoenix, Az 85001

Bureau of Indian Affairs
Colorado River Agency
Real Estate Services
Agency Road, Building #4
Parker, Az 85344

RE: Southpoint Power Plant, EIS Fort Mohave Indian Reservation, Mohave County, Arizona

Dear Ms. Heuslein and Mrs. Stroup;

First and foremost let me say M.C.E.D.A. supports Fort Mohave Tribe and their efforts to bring economic development to the area. We are not sure the Southpoint power plant is the best alternative available for needed area electrical supply.

We have carefully reviewed the draft EIS and submit the following comments.

1). EIS is not complete – the proposed gas pipelines are not included in the study. This EIS states the pipeline providers will do their own EIS later. These pipelines are a key component of the power plant; the plant can not operate without the pipelines. To exclude the pipelines from the analysis would be similar to studying the environmental impact of manufacturing plant and excluding the roads into the plant. The route of the pipelines needs to be analyzed for impact to the environment, and the route needs to have archeological review. C2a

Further, 1.6.8 gives a cost estimate which they say includes natural gas line, how do you know gas line costs when you haven't talked to gas line operators? C2b

2). In 2.4.1.1 Yucca Site = you state "this site does not have an adequate water supply for a power plant" this is a totally untrue statement = where and what documentation do you have or can you produce to back such a statement. The Yucca Site is and always has been a separate site and never studied or intended to be an alternate to Southpoint site. C3

3). EIS is not complete – the impact of the water pipeline from the Colorado River has not been studied enough. There is no archeological review of the pipeline route, no study of impact on water flows, no study of impact on the fish population, and other key issues. Where has the Corp of Engineers permitted the withdrawal point from the Colorado River. C4

4). Calpine proposes to pump water from the Colorado, use it once in the power plant, and then let it evaporate. This is a phenomenal waste of water in an arid region! It should be sufficiently treated so as to allow it to be returned to the Topock Marsh which "suffers from an inadequate water supply" see 2.7.2.4. C5

5). EIS refers to "personal communication" with individuals and/or agencies on key points. These key points should be in the form of a letter. Otherwise, how do you know if the comments in the EIS match what was stated by the individual? The letter should then be a part of this EIS for all to see. C6

3160 SHANGRI LA DRIVE • KINGMAN, AZ 86401
520 692-6970 • 520 692-6972 • FAX 520 692-6974

6). EIS is not complete – the impact on County Road 227 has not been determined. With the increase truck traffic on 227 from the power plant, will 227 be able to handle the traffic? Furthermore, 227 is not built for truck traffic. It essentially serves residential areas. C7

7). EIS is insufficient in its scope on hazardous material. The EIS state that due to the low number of residential homes presently near the site, hazardous material spills are not that big of a concern. What happens when an area builds up and there are more residential homes nearby? What then if there is a haz-mat spill? C8

The study is 4.6.6.2.2 speaks of "fewer than 80 residence would be effected in the event of a nighttime large spill" it would not make a difference if it were only 8 they are still human beings.

8). Power plant is essentially in a residential area and a wildlife area with Topock March nearby. This use of land is incompatible with the surrounding area, and with the fact that there is B.L.M. disposable land to the North and East of it, that could quite well become residential. C9

9). EIS is not complete – 1.6.2 there is not mention of transmission line study except for two 69KV lines by A.E.P.C.O. When you add 125 ' tower and widen the ROW to 300' you need to include it in this EIS. C10

(10). Further, where is the study to show that the two existing 230KV lines have compacity to handle the added load? C11a What will the impact on other areas within the county be if Calpine operates this project? C11b How will this plant benefit the people and the utility companies in Mohave County? C11c

(11). Last, what will impact on personal property taxes be for the County? What will the personal property tax effect on infrastructure not owned by the Fort Mohave Tribe be? C12

Thank you for the opportunity to comment.

Sincerely,

Donald W. Van Brunt
Executive Director

RESPONSES TO PUBLIC COMMENTS

Federal Agencies
Federal Aviation Administration (FAA) **(A1-A3)**

A1 Comment noted. Please see pages 218-219, Section 4.8.4.2.1, and page 221, Section 4.8.5, which address stack height, illumination, and visual impacts.

A2 Comment noted. Please page 218, Section 4.8.4.2.1, which discusses the visible -plume. Any plume would be very localized and aircraft could easily avoid any possible impacts. Visual impacts are discussed on page 218, Section 4.8.4.2.

A3 Your comment regarding possible turbulence is noted. Thermal plumes are not expected to significantly impact aviation safety. The Preferred Alternative site is not in an airport area of influence. The stacks would be lighted, and painted, in compliance with Federal Aviation Administration requirements. Any other requirements identified through Form 7460-1. Notification would be implemented.

US Geological Survey (USGS) **(A4-A23)**

A4 Your comment pointing out the potential for confusion in discussion of soils associations is appreciated. The Torrifluents Association consists of the three soils present in the Antho-Vint- and Gilman Association. Although these three soils are common in the Mohave Valley, none occurs on any of the three alternative sites. Reference to the Torrifluents Association has been deleted from the text.

Information regarding individual soils which would be subject to project disturbance is summarized in tabular form. The characteristics of soils which are relevant to the proposed development of the three alternative sites are adequately addressed in Tables 3.1-1; 3.1-2; and 3.1-3.

The present condition of soils is discussed on page 46 in Sections 3.1.3.3.1; 3.1.3.3.2; and 3.1.3.3.3. Discussion of impacts to soils from project development appears on pages 140 and 141 in Sections 4.1.3.1; 4.1.3.2; and 4.1.3.3, where impacts to existing soils conditions are discussed in the context of the proposed development of the three alternative sites.

A5 The partial accuracy of the statement, "There is low hazard of erosion due to the flat slope" (page 45, Section 3.1.3.1) is noted. The statement has been revised to read , "There is low hazard of water erosion due to the flat slope." Wind erosion hazard is presented in Tables 3.1-1; 3.1-2; and 3.1-3, which are found on pages 51-53. Sections 4. 1.3.1; 4.1.3.2; and 4.1.3.3 (found on pages 140-141) have been revised to include the statement, "The soils at the plant site would be covered by compacted fill, landscape plants, decorative rock, or paving after construction, which should eliminate any type of erosion hazard."

Dust control is a standard construction practice which would be practiced during site development activities. Discussion of dust control including a dust control management plan and best management practices, appears in Sections 4.2.2.1.1 on page 152 of the DEIS. Please see also response A14.

A6 As noted in your comment, we agree that silty loam and silty clay loam soils are subject to wind erosion if severely disturbed. Excavation of the proposed stormwater retention basins and evaporation pond would create a temporary severe soil disturbance. During excavation of the proposed stormwater retention basins and evaporation pond, soils would be stockpiled and managed to minimize fugitive dust. Stockpiled soils would be placed in new locations on the site and compacted to create building pads. Dust control measures would also be implemented during soil excavation, placement, and compaction activities to minimize fugitive dust. Dust control measures are discussed on page 152 in Section 4.2.2.1.1. Silty loam and silty clay loam soils would not be left unmanaged and, therefore, would not be subject to wind erosion. Please refer, also, to response A14.

Desert pavement would be disturbed only on those portions of the three alternative sites which are located on the bluffs above the floodplain. No desert pavement occurs on the lower elevation floodplain portions of the sites. The same erosion and dust control measures discussed above would be applied during and after construction. As part of the committed mitigation measures of the proposed power plant, the evaporation pond which would be constructed in areas of existing desert pavement would be restored to a simulated pre-construction condition with measures which would include placement of rock and gravel to compensate for lost desert pavement. The text has been expanded in the FEIS (see page 231, Section 5.2.5) to include placement of gravel and rocks to simulate desert pavement in unplanted areas of the restoration.

A7 The Probable Maximum Flood (PMF) in this DEIS is based on the US Bureau of Reclamation's (USBOR's) definition. The flood of

1983 was not a PMF. In 1983, the Colorado River flowed at 43,000 cfs for a few days, which exceeded the 100 year flood volume of 40,000 cfs. A PMF is estimated by the USBOR at 365,000 cfs. The definition of PMF used in the DEIS exceeds the PMF defined in your letter, so that your concern has been addressed. As defined by the USBOR, a PMF would exceed the volume of the flood of record by approximately eight and one half times. Any flood that would overtop the levees has a very low probability of occurrence, and therefore the potential for impacts would not be significant.

A8 The USBOR is the agency which Congress tasked with definition of a PMF, and estimation of a PMF's probability of occurrence. In the absence of other definition or estimate, this DEIS uses the USBOR's data and conclusions. Construction engineering and FEMA typically use a 100 year flood event to establish a flood elevation and acceptable risk. The DEIS uses 100 year flood estimates as the basis for determining significance. Description of a PMF, and of the 1983 flood of record, are presented to create a context for evaluating the significance of a 100 year, or design norm, event. See also response A7.

A9 The statement that "the combination of events which would trigger a PMF have not occurred in the past 62 years" we believe is accurate, and is not, therefore, "premature." The probability of a PMF occurring is addressed in the DEIS in the next to last sentence on p. 56, Section 3.1.4.4. See also response A7.

A10 Your comment has been noted. We agree with your observations.

A11 We concur with your statement that "seismic hazard [at the Preferred Alternative site] is low." The USGS publishes seismic survey maps, which we encourage the interested reader to review. We chose to use the seismic maps included in the Uniform Building Code (UBC). The UBC is a nationally recognized authority which sets construction standards to protect public health and safety. The 1997 edition of the UBC (the most recent edition) includes procedures for calculating seismic factors. These factors are included in the design equations required to identify structural components of the proposed power plant. These factors inherently include a seismic safety factor that is generally expected to accommodate a reasonably foreseeable seismic event which could occur in the relevant seismic zone. The proposed Southpoint Power Plant would be located in UBC seismic zone 2B (1997 UBC, Vol. 2). Structural design would use the factors specified for buildings to be constructed in UBC zone

2B. The seismic safety construction standards which would be applicable to construction of the proposed power plant can be found in 1997 UBC Volume II, Chapter 16, Part IV, Sections 1626-1635 (and Appendices to Chapter 16), and including soil profile design factors appearing in Section 1636.

A12 As a factor of seismic area of influence, your evaluation of liquefaction is noted. Despite the possible large seismic zone of influence which may affect the Mohave Valley which you note in your comment, the liquefaction hazard on any of the three alternative sites remains low because of the very low probability of saturated soils ever occurring on the sites, and the even lower probability that both saturated soils and a seismic event would occur simultaneously. Please reference, also, response to A11.

A13 The significance of winds greater than 21 knots in relation to dust storms is noted. It should also be noted that the potential for dust storms occurs with or without the project. One of the available dust control measures is cessation of construction activities. We have changed the text in the FEIS (page 152, Section 4.2.2.1.1) to state that construction activity would cease when wind velocity reaches 20 mph. Best Management Practices would be implemented to control dust during construction activities (see page 140, Section 4.1.3.1). Please refer, also, to response A18.

A14 Your comment regarding on-going need to control fugitive dust is noted. A fugitive dust control plan is incorporated as a project design measure (See page 152, Section 4.2.2.1.1). Fugitive dust will not be significant after plant construction because any disturbed areas will be compacted soil, paved in asphaltic concrete, revegetated, or topped with decorative gravel or ABC.

A15a Your comment regarding sediment control methods is noted.

A15b Your comment regarding possible flood hazard from the Colorado River is noted. For purposes of engineering design, "[O]rdinary flood hazard" is defined as a 100 year (40,000 cfs) flood event. Although larger volume floods may have occurred over the past several hundred years, as you noted, a 100 year flood event has a one per cent chance of occurring in any one year, and this probability factor is less than significant. See also response A7.

A16 Comment noted.

A17 Please reference responses to A13 and A14.

A18 Appendix B of the DEIS presents the modeling results for point source emissions from the proposed power plant. The DEIS identifies fugitive sources of PM10 on pages 150 and 151 (Sections 4.2.1.2 and 4.2.1.3) and impacts from project-related fugitive PM10 emissions on page 152, Section 4.2.2.1). During operations, project-related fugitive dust emissions would be limited to dust generated by project-related vehicle trips, and maintenance or repair of project related facilities such as roads or the evaporation basins. Other operations-related PM10 emissions would derive from vehicle tailpipe emissions. Operations-generated fugitive dust and tailpipe emissions would not combine with point source dust emissions to create a significant effect for the following reasons:

- All roads would be paved or otherwise improved to minimize dust emissions;
- Best Management Practices would be applied and maintained to minimize dust emissions from previously disturbed areas;
- Best Management Practices would be utilized during all subsequent maintenance or repair of project related facilities;
- Tailpipe emission would be controlled in accordance with applicable federal laws; and,
- The maximum percent of increment shown on revised Table 4.2-5 (See Response A40) for PM10 is 41.6 percent, meaning the fugitive dust sources would have to be 1.4 times greater than fixed source PM10 emissions from the power plant to cause a theoretical exceedance of NAAQS. With Best Management Practices, this is not expected to occur.

A19 Your comment is noted regarding discrepancies in the alphanumeric references to the Appendices to the DEIS. Reference to Appendix B on page 150, Section 4.2.1.2, is incorrect. The correct Appendix reference is B1. Appendix B, which is the Air Quality Analysis prepared for the proposed Southpoint Power Plant, addresses stationary sources. An additional study, "Fugitive Dust Analysis," has been appended to Appendix B as Appendix B1. The page reference, 2-2, which contains discussion of construction activities which could potentially produce fugitive dust, is found in Appendix B1. The text of the FEIS on page 150, Section 4.2.1.2, has been corrected to refer to Appendix B1.

A20 With the implementation of the Best Management Practices, impacts from fugitive dust, including PM10 would not be significant. Please refer also to responses A6, A14, and A18.

A21 Comment noted. See response A13.

A22 The text on page 151 of the DEIS does not include a statement that "all sources of PM10 are included to produce a total PM10 impact." The comment that Table 4.2-6 (page 159) only includes the emissions modeled from the power plant is correct. Please see response to comment A18, which explains why PM10 emissions, including all project-related sources, are not significant.

A23 Your observation regarding the difficulty of restoring desert soils to pre-development conditions is noted. Please see response A6.

US Army Corps of Engineers (USACE) **(A24-A33)**

A24 Your comment regarding the differing requirements for alternatives analysis under NEPA and the guidelines for analysis of alternatives under Section 404(b)(1) of the Clean Water Act has been noted. (The alternatives analysis contained in the DEIS was prepared under NEPA implementing regulations of the Bureau of Indian Affairs (BIA), whereas alternatives analysis under Section 404(b)(1) is prepared under guidelines of the USACE). It is the BIA's position that the alternatives analysis in the DEIS adequately meets NEPA requirements. No further alternatives analysis is required. Should a 404 permit be required, the alternatives analysis required by Section 404(b)(1) would be prepared.

A25 The paragraph supplied by the USACE describing more fully its authorities under Section 404 has been incorporated into the text on page 5, Section 1.3.2.2 of the FEIS. (Section 1.3.2.3 has been renumbered to Section 1.3.2.2). A Section 10 permit is not anticipated to be required for any development activity on the Preferred Alternative site, which has no rivers or harbors. The last line of page 5, Section 1.3.2.3 of the DEIS has been revised to read "Application for a Section 404 permit determination for the proposed power plant site will be made by Calpine." Table 1.3-1, page 7, has also been revised in the FEIS. A qualifying note has been added to explain that it is not determined at this time whether these permits would be required.

A26 The phrase used in the DEIS referring to a "water quality permit" has been revised to read "Section 404/Section 10" Permit.

A27 The proposed pump and water pipeline are not part of the Calpine lease and therefore are not part of the proposed action before the BIA. The Fort Mojave Indian Tribe (FMIT) would be the project constructor for the pump and pipeline and would be the entity responsible for any necessary permit application. Your comment regarding the need to conduct a jurisdictional determination has been noted. However, the referenced section of the DEIS (Section 3.3.2.1, page 77) describes the existing conditions of the Colorado River. No reference to possible future actions is required in this section.

To the extent possible at this time, your concerns about placement of a pump in the Colorado River are addressed in Section 4.3.2.1, page 166 of the DEIS. The placement of a pump, and the associated water pipeline to wheel water to the proposed power plant, may be the subject of supplemental NEPA documentation prepared by the appropriate federal agency. Any permits, such as a Section 10 permit, would also be fully addressed in any supplemental National Environmental Policy Act (NEPA) documentation.

A28 Calpine Corporation will submit a Section 404 application to the USACE for final determination of jurisdictional waters of the US and of impacts, if any, which would result from development of the proposed power plant site. The 404 permit application process is independent of this NEPA compliance documentation and therefore full discussion of jurisdictional determination of waters of the US and the extent of any impacts is not addressed in the DEIS. See also response A30.

A29 The Preferred Alternative site has been assessed in accordance with BIA regulations for NEPA compliance. We have concluded that there are no jurisdictional wetlands present on the proposed or alternative sites. An application will be submitted by Calpine to the USACE for final determination of the presence or absence of jurisdictional wetlands on the Preferred Alternative site.

The text has been amended on page 91, Section 3.4.3.4 of the FEIS, to correct an erroneous statement. Wetlands occur at Twin Lakes, approximately three miles northwest of the Preferred Alternative site (Section 8).

A30 The FMIT will be the entity responsible for any planning, permitting, and environmental compliance documentation of the proposed water pipeline to supply the proposed power plant with water withdrawn from the Colorado River. If a federal action warrants it, supplemental NEPA environmental compliance documentation assessing the consequences to the environment of the proposed water pipeline and associated facilities may be prepared by the appropriate federal agency when more detailed information regarding design, location, and other factors is available.

Any required permits, such as Section 404 or Section 10 permits, will be secured by the FMIT prior to placement of a new intake and construction of the proposed water pipeline. The following agencies are notified routinely by the tribe six months prior to construction of new intakes: BIA; USBOR; USACE; USFWS; US Coast Guard. These notices would include the exact location, the approximate date of commencement and duration of construction, a written description of the project, and a drawing or photograph of a similar facility.

Supplemental NEPA compliance at a later time is appropriate. The need for detailed analysis of a possible action, such as the pipeline, which may occur at a later stage than the issue which is "ripe for decision" (in this case, the proposed lease approval) may be excluded and deferred until a specific action is proposed and a site-specific environmental compliance document is prepared. See Subsection 1508.28(b) of the NEPA Regulations.

A31 Regarding your question concerning Section 7 of the Endangered Species Act, the BIA has made a no effect determination for the proposed action, which would not impact any threatened or endangered fish species. (See page 182, Section 4.4.3.2 of the DEIS). The text has been clarified regarding the no effect determination made by BIA. See pages 182 and 183, Section 4.4.3.2.1 of the FEIS. Supplemental environmental compliance documentation under NEPA may be prepared to assess the potential environmental consequences of withdrawing water from the Colorado River to supply the proposed power plant.

Supplemental NEPA compliance at a later time is appropriate. The need for detailed analysis of a possible action, such as the pipeline, which may occur at a later stage than the issue which is "ripe for decision" (in this case, approval of the proposed lease) may be excluded and deferred until a specific action is proposed and a site-specific environmental compliance document is prepared. See Subsection 1508.28(b) of the NEPA Regulations.

A32 Please see response to A29.

A33 Section 4.7.10.2.5 discusses land use plans of land managing federal agencies. The regulatory authority of the USACE is discussed in the DEIS on page 5, Section 1.3.2.2. Please see also response A25.

US Bureau of Reclamation (USBOR) **(A34-A39)**

A34 We concur with your statement regarding the right of the FMIT to beneficially use water from the Colorado River, and confirmation of the accuracy of the calculation of the quantity of water which the FMIT may consumptively use.

A35a Your concerns regarding possible water quality impacts to the Colorado River are noted. However, no wastewater would be discharged to the Colorado River either directly or indirectly (see page 23, Section 1.6.5.2 of the DEIS). Initially an alternative was considered which would return treated wastewater through natural drainages to be carried offsite. This alternative was eliminated from further consideration because of the concerns about surface and groundwater quality which you note in your comment, as well as potential adverse impacts to soils and wildlife (see page 38, Section 2.7.2.7 of the DEIS). Similarly, disposal of process wastewater through an injection well was considered but eliminated from further consideration based on concerns about possible effects on groundwater (see page 38, Section 2.7.2.6 of the DEIS).

A35b A committed mitigation measure (see page 230, Section 5.2.5 of the DEIS) is leak detection and monitoring of the evaporation pond, which would be double-lined with highly impervious geomembranes to minimize the possibility of leakage. Leakage through the double liners is anticipated to be too small in quantity to be recaptured by a well. (See page 174, Section 4.3.4, and, particularly, page 177, Section 4.3.4.2.2 of the DEIS). The evaporation pond would be located on top of the bluffs to isolate them from areas of the Preferred Alternative site beneath which there is underground flow of the Colorado River. The possibility of wastewater reaching the surface flow of the Colorado River, or of percolating into the underground flow of the Colorado River, is extremely remote, and therefore insignificant.

A36 Your request that the FMIT schedule, measure, and report water usage is acknowledged. The FMIT routinely schedules water deliveries and reports diversions to the USBOR. This practice would include water for the proposed power plant which would be pumped from the Colorado River and/or wells. This routine reporting is voluntary as the FMIT does not contract for water through the USBOR.

A37 No wastewater would be delivered off reservation. The alternatives which considered various possibilities for delivering process wastewater to off reservation locations were eliminated from further consideration (see page 37, Section 2.7.2.4, and page 38, Sections 2.7.2.7 and 2.7.2.8 of the DEIS). The FMIT takes the position that water has been accounted for in its initial use, and reuse does not involve the Law of the River.

A38a Your question regarding possible damage to evaporation pond liners during the removal of accumulated solids has been noted. The text has been expanded to include discussion of removal of pond liners as it becomes necessary to remove accumulated solids from each of the individual cells forming the evaporation pond. At the time accumulated solids were to be removed, the double liner for that cell would also be removed and disposed of. New liners would be placed in the pond cell before it would be returned to service to evaporate process wastewater. This expanded discussion can be found on page 176, Section 4.3.4.2.1 of the FEIS.

A38b Precipitated solids are expected to be non toxic and would not require special permitting for disposal. (See page 174, Section 4.3.4.1, and page 177, Section 4.3.4.2.2 of the DEIS). Disposal is addressed, in the DEIS, on page 205, Section 4.7.8.3. A sentence has been added to this section (page 206, Section 4.7.8.3 of the FEIS) stating that solids will be tested for chemical content at the time of removal to ascertain that they are in compliance with local landfill requirements. No further environmental documentation is anticipated.

A39 The inaccurate Section numbering has been noted. Reference to Section 4.6.2.3.1 in the DEIS has been replaced with the correct reference, Section 4.7.8.3 in the FEIS.

USEPA - Region IX (USEPA) **(A40-A45)**

A40 Calpine has provided the BIA with a copy of the June 12, 1998 *Prevention of Significant Deterioration [PSD] Air Permit Application for the Southpoint Generating Plant*. This application is included in its entirety as Appendix K to the FEIS.

The DEIS noted on page 151 that the specific control technology that would be required at the Preferred Alternative site is unknown. We understand that the PSD permit has not yet been granted, and that the Best Available Control Technologies (BACT) that will ultimately be required are still unknown. The conclusion of the DEIS that the project would not result in significant air quality impacts with Implementation of BACT is correct. As requested, we are providing an update of Table 4.2-3, 4.2-4, 4.2-5, and 4.2-6. The 1998 PSD permit application does not separately report information on the maximum potential to emit for the first year (Table 4.2-2 of the DEIS); therefore, an update of Table 4.2-2 is not provided.

Table 4.2-3 (Revised) Maximum Potential to Emit (tpy): Successive Years of Operation

Pollutant	No. 1 CCT/HRSG	No. 2 SCCT	Emergency Generator	Diesel Fire Pump	Cooling Tower	Project Maximum Potential to Emit	PSD Significant Emission Levels
NOx	173.68	173.68	0.91	0.10	--	348.37	40
CO	483.18	483.18	0.38	0.04	--	966.78	100
SO2	19.47	19.47	<0.001	0.002	--	38.94	40
VOC	219.49	219.49	0.07	<0.001	--	439.05	40
PM/PM10	143.85	143.85	--	0.008	12.7	300.41	25/15

Table 4.2-4 (Revised) Comparison of Maximum Predicted Impacts

Pollutant	Averaging Period	Maximum Predicted Impact
NOx	Annual	0.87
CO	1-Hour	900.14
	8-Hour	243.62c
PM/PM10	24-Hour	4.16
	Annual	0.66

a From first year operations; 1992 meteorological data; at 726,700 meters East, 3,865,300 meters North UTM coordinates
b From first year operations; 1989 meteorological data; at 725,704.8 meters East, 3,860,777 meters North UTM coordinates.
c From first year operations; 1990 meteorological data; at 725,776.5 meters East, 3,860,777 meters North UTM coordinates,
d From "fourth" year operations; 1992 meteorological data, at 726,700 meters East, 3,865,300 meters North UTM coordinates
e From "first" year operations; 1989 meteorological data; at 726,700 meters East, 3,865,300 meters North UTM coordinates.

Table 4.2-5 (Revised) Comparison of Project Impacts and Background Concentrations with the National Ambient Air Quality Standards (ug/m^3)

Pollutant	Averaging Period	Baseline Ambient Air Quality (No Action Alt.)	Project Impact	Baseline and Project Concentrations	NAAQS	Percent of Increment $\frac{\text{Project}}{\text{NAAQS - Baseline}}$ x100
NOx	Annual	15-34 a,b,c	0.87	16-35	100	1.0% -1.3%
CO	1-Hour	9,020e	900.14	9,920	40,000	2.9%
	8-Hour	4,400e	243.62	4,644	10,000	4.4%
PM/PM10	24-Hour	26-140 a-f	4.16	30-144	150	3.4 - 41.6%
	Annual	8-36 a-f	0.66	9-37	50	1.6% - 4.7%
SO2	3-Hour	100-217 a-f	NA	100-217	1,300	0%
	24-Hour	21-39 a-d	NA	21-39	365	0%
	Annual	3-8 a-d	NA	3-8	80	0%
Ozone	1-Hour	0.08ppm b	0.023ppm	0.10ppm	0.12ppm	57.5%

Stations with data 1991-1995 considered or analysis:
a Bullhead City
b Alonas Way
c Holiday Shores
d Riviera
e Barstow
f McConnico, Kingman, Twentynine Palms
Note: PM data does not include 1991 data which was anomalously high for all stations. Successive years do not show these high numbers.

Table 4.2-6 (Revised) Comparison of Maximum Predicted Impacts with the PSD Class II Significant Impact Levels and the PSD De Minimis Monitoring Levels

Pollutant	Averaging Period	Maximum Predicted Impact	PSD Class II Significant Impact Level	PSD De Minimus Monitoring Level
NOx	Annual	0.87	1	14
CO	1-Hour	900.14	2000	----
	8-Hour	243.62	500	575
PM/PM_{10}	24-Hour	4.16	5	10
	Annual	0.66	1	----

A41a The DEIS discusses impacts to Class I Areas on page 160, Section 4.2.2.3.1.5. The 1998 PSD permit application addresses impacts to Class I and Class II areas at Section 7.4 (Pages 7-6 through 7-13). Based on conversations with the National Park Service, the Grand Canyon National Park (GCNP) and Joshua Tree National Monument (JTNM) were addressed as Class I areas, while the Lake Mead National Recreational Area was addressed as a Class II area. The 1998 PSD permit application is included as Appendix K to this FEIS. The following are the conclusions of the 1998 PSD Permit Application:

- (Section 7.4.1.1, page 7-7) ... the maximum predicted concentrations of NOx and PM/PM10 are considerably less than the applicable Class I significant impact levels (SILs).

- (Section 7.4.1.2, page 7-9) ... the maximum predicted concentrations of NOx and PM/PM10 are considerably less that the applicable Class II increments.

- (Section 7.4.2.2, page 7-12). ... the [project-related haze impacts] for both Class I areas [GCNP and JTNM] are less than screening threshold for level I analyses of 5 percent. Therefore, further analysis of potential visibility impairment is not warranted.

- (Section 7.4.2.1, page 7-11)The 5 percent threshold for haze impacts was derived based on National Park Service guidance.

Three additional Class II wilderness areas (WAs) were addressed in the August 21, 1998 *Additional Impact Analysis for the PSD Air Permit Application of the Southpoint Generating Plant*, which was submitted to EPA on September 30, 1998. Depositional, air quality, and visibility impacts to the Warm Springs WA, Mount Nutt WA and Wabayuma WA were modeled and found to be insignificant. This document may be obtained from the USEPA Region IX or from the BIA Phoenix Area Office or the Colorado River Agency.

All of this information confirms the DEIS results that project-related air quality impacts would not be significant.

A41b Copies of the DEIS were mailed to the Department of Interior Office of Environmental Policy and Compliance in San Francisco, CA and to the Department of Interior, Field Solicitor in Phoenix, AZ. We have received no comments from the National Park Service. Copies the FEIS will be mailed to these same agencies.

A42 No point source discharge from the proposed power plant or its associated facilities to a water of the US is anticipated. Process wastewater would be contained onsite and routed to an evaporation pond (see page 174, Section 4.3.4 of the DEIS). Stormwater would be retained onsite in retention basins (see page 141, Section 4.1.4 of the DEIS). The text has been revised to state that a "National Pollutant Discharge Elimination System (NPDES) permit would be required if there is a discharge offsite." However, such discharge is not anticipated.

A43 A Section 404 application will be made to the USACE by Calpine Corporation for determination of any 404 permitting requirements. A Section 401 water quality permit on tribal lands is issued by the USEPA, but is required only if a Section 404 permit is required. Both agencies, and the respective permits, are fully discussed on page 5 in Sections 1.3.2.2 and 1.3.2.3 DEIS. These Sections have been expanded in the FEIS to note that if jurisdictional waters are present, a 404 permit and a 401 permit must be obtained.

A44 Comment noted. The alternative which considered using process wastewater to supply, i.e., discharge to, Topock Marsh was considered but eliminated from further consideration. See page 37, Section 2.7.2.4 of the DEIS.

A45 Comment noted. The alternative which considered disposing of process wastewater as return flow through natural drainage was considered but eliminated from further consideration. See page 38, Section 2.7.2.7 of the DEIS.

US Fish and Wildlife Service (USFWS) **(A46-A54)**

A46 Your concerns regarding implied or explicit attributions of statements made by you regarding the significance of impacts to wildlife are noted. The text has been revised on page 179, Section 4.3.4.3.1 of the FEIS, to place a summation of the general information which you provided to the report preparers in a position clearly separate from the conclusion regarding the significance of impacts to migratory waterfowl. The text has been further revised to clarify that evaluation of significance is that of the report preparers. "Craig" has been corrected to read "Gregory". (Section 4.3.4.3.1 appears on page 179, not page 137 of the DEIS.)

A47 Evaporative ponds, in general, may present a variety of hazards to wildlife, as indicated in the letter and the DEIS. The degree of hazard is dependent on the water quality and the substances which are present in precipitated solids on the pond floor. Because evaporation concentrates any substances which are present in incoming process wastewater, levels of substances, such as salt, which normally are non-toxic can reach unhealthful concentrations. Similarly, trace elements which are not harmful in low concentrations may reach toxic levels through the evaporation process. Arsenic and selenium are examples.

Based on analysis of the water quality of supply sources for the proposed power plant, and of the additives to the water during plant operations, it was concluded that the contents of the evaporation pond would not be toxic to wildlife after short duration contact. A special analysis for selenium and arsenic reached the same conclusion (see page 174, Section 4.3.4.1.1 of the DEIS).

Based on communication from Kirke King, Contaminant Specialist of the USFWS, (see letter dated October 8, 1998, which appears as Appendix 1 of the Comments and Responses) selenium rarely reaches toxic levels in adult birds, and bioconcentration peaks in about eight days. Once birds leave the source of selenium, levels regress at about the same rate. Thus, the hazard to migratory birds which might use the evaporation pond on a temporary basis is not significant.

Concentrated levels of selenium may be hazardous to resident and nesting wildlife species. No resident species are anticipated to inhabit the evaporation pond. Project design features which would prevent wildlife from coming into contact with the evaporation pond water, or which discourage prolonged contact, are discussed in detail on pages 183 and 184, Section 4.4..3.3.1, and on page 230, Section 5.2.5 of the DEIS.

The discussion of a monitoring program has been expanded in the FEIS (see page 231, Section 5.2.5) to explain that two monitoring activities will occur. Hazardous substances will be tested quarterly for pollutants in sediments as well as water. Species visiting the pond will be monitored as explained on page 184 in Section 4.4.3.3.1 of the DEIS.

Section 4.3.4.2.1 on page 176 of the FEIS has been expanded to explain that the evaporation pond would be constructed in five cells. This would facilitate removal of precipitated solids from one or more cells while leaving other cells of the pond area operational. It would also facilitate installation of netting to exclude waterfowl, if warranted.

The sentence appearing on page 179, Section 4.3.4.3.1 of the FEIS has been revised to change the inaccurate use of the word "chemical" to the more appropriate word "mineral," in referring to concentrations in the water. There are no federal standards for water quality in evaporation pond (Kirke King, USFWS Contaminant Specialist, letter dated 10/8/98).

There is a disparity in the definition of significance as implied in the Migratory Bird Treaty Act (MBTA), as amended, and the commonly applied tests for determining significance under NEPA. In response to your comments regarding this issue, and those of the Region 2 USFWS, we have requested clarification from the USFWS Ecological Services Office in Phoenix. Under the MBTA, any loss of migratory birds from any cause except regulated hunting appears to be "significant," while the general test of significance under NEPA is one of relativity which considers intensity within a specific context. Under the MBTA, losses associated with wildfowl coming into contact with the water of the evaporative pond would, apparently, be considered significant. Determination of significance under NEPA would consider the number of losses within the larger context of the commonality of species, the number of individuals in the local population of the species. Under the NEPA relative test, our conclusion that impacts to migratory waterfowl would not be significant is correct.

It should be noted that non-avian species do not appear to be under legislation comparable to the MBTA in which the strict test of significance would apply. Therefore, our response is primarily considers potential adverse impacts to migratory birds. The text has been revised to add the words, "as appropriate," to the discussion of fencing the evaporation pond to minimize potentially adverse impacts to non-avian species (see page 179, Section 4.3.4.3 of the FEIS).

Mr. King concluded that the proposed project design and committed mitigations regarding wildlife "adequately addressed minimizing exposure of birds to contaminants" (Kirke King USFWS

Contaminant Specialist, letter dated 10/8/98). Therefore, the finding of insignificance in the DEIS is correct.

A48a Please see response A47.

A48b A complete analysis of air quality impacts was made (see, particularly, page 160, Section 4.2.2.3.1.4 of the DEIS). At its highest concentration point the proposed power plant would not exceed the National Ambient Air Quality Standards (NAAQS), which are designed to protect public health, and, by inference, biotic resources. Please see revised Table 4.2-5 which is provided in response A40. The northern portion of Havasu National Wildlife refuge, which is the portion nearest the Preferred Alternative site, was included in the receptor grid. Please see Figure 6-1 from the 1998 PSD permit application (Appendix K). Therefore, there would be no "real and immediate threat to wildlife resources" from project related air emissions.

A49 Required permits, or those which may possibly be required, are fully discussed in Sections 1.3.2. See response to A28 regarding need for a Section 404 and Section 10 permit.

A50 Please see response A28. The text of the Executive Summary has been revised to clarify that the FMIT would be responsible for any compliance related tot he proposed water intake and pipeline. The sentence, "No federal permit or NEPA compliance would be required" has been deleted. Please see, also, responses A30 and A31.

A51 The proposed natural gas pipeline(s) would require separate NEPA documentation, as stated in Section 1.6.3. Any natural gas pipeline corridors would be located off Indian lands. NEPA compliance would be under the jurisdiction of another federal agency. They are not included in this DEIS because their construction is later in time, potential alignments are subject to change and are uncertain, and they are under the jurisdiction of another federal agency. The NEPA compliance documentation for the proposed pipeline or pipelines, whose exact location and time is undetermined, is appropriately "tiered." Detailed analysis of possible impacts cannot be made until a specific action for an exact location or locations is made. A power plant site must be defined and the proposed action, the lease, must be approved (or denied) before possible pipeline locations can be defined.

Supplemental NEPA compliance at a later time is appropriate. The need for detailed analysis of a possible action, such as the pipeline, which may occur at a later stage than the issue which is "ripe for decision" may be excluded and deferred until a specific action is proposed and a site-specific environmental compliance document is prepared. See Subsection 1508.28(b) of the NEPA Regulations.

A52 See responses to A29 and A33 regarding jurisdictional wetlands.

A53 The text has been revised on page 160, Section 4.2.2.3.1.5 of the FEIS to clarify that "some" wildlife refuges are Class I areas. Havasu National Wildlife Refuge is not a Class I area. No Class I areas are located within 100 kilometers of the proposed project (see Figure 3.2-2, USEPA Class I Air Sensitivity Areas, page 67 of the DEIS). Class I areas are those places which are Congressionally designated for protection of aesthetic air quality criteria, such as visibility. Class I Areas are generally National Parks, National Monuments, and Wilderness Areas greater than 5,000 acres, and wildlife refuge areas greater than 6,000 acres. Areas not specifically designated Class I are Class II by default (Doug McDaniel, Air Division, USEPA Region IX, personal communication). Please see response A48b.

A54 See Response A31 for discussion of possible effects on endangered species.

State Agencies

Arizona State Parks - State Historic Preservation Office (SHPO) **(B1a-B2)**

B1a Your comments on the occurrence of archaeological sites are noted. However, we believe that there is no discrepancy in the text regarding the presence or absence of archaeological sites on Alternative Three. In Section 3.5.2.3, there is reference to "no archaeological sites" reported in documents and historic maps. This statement is not to be construed that there are no archaeological sites on Alternative Three. A Class III field survey located and recorded several archaeological and artifact/feature sites. Three of these sites are discussed on page 186, Section 4.5.3 of the DEIS.

B1b With regard to possible Traditional Cultural Properties, if the power plant location Alternative Site Two or Three were to be selected instead of the Preferred Alternative site, this issue would be addressed at that time.

B2 Consultation occurred between the BIA and the Arizona SHPO, and the Arizona SHPO concurred with the finding in a letter dated January 9, 1996. Please see letter from the BIA dated August 18, 1998, which has been added to Appendix E of the DEIS. Appendix E also contains the letter dated January 9, 1996, evidencing Section 106 consultation between the BIA and the Arizona SHPO regarding the proposed power plant.

State of Nevada - Division of Environmental Protection **(B3)**

B3 Your comment regarding future review of the Title V air quality application is noted. We appreciate your review of the DEIS.

State of Arizona - Game and Fish Department (AGFD) **(B4-B10)**

B4 With regard to your concerns about potential cumulative impacts from "ancillary structures associated with construction of the [proposed] power plant", please see response A51. A powerline corridor, located approximately four miles north of the AGFD land in Section 17 (adjacent to the Preferred Alternative site) has been defined. BLM issued a Finding of No Significant Impact (FONSI) dated December 2, 1997. Department lands were not affected. No easements or rights of way for the proposed pipelines or other facilities would be located on Department owned property.

B5 The text of the FEIS (page 117, Section 3.7.10.2) has been amended to include the statement that state lands managed by AGFD are specifically for the benefit of wildlife and do not fall under the category of other State Trust Lands.

B6 The text of the FEIS (page 124, Section 3.7.11.4.1) has been revised to state that "all but 320 acres of" Section 17 is privately owned, and that Section 17 includes 320 acres of AGFD lands.

B7 The map on page 120 of the FEIS has been revised to correctly depict the acreage owned and managed by AGFD. The maps on pages 121-123 correctly depict AGFD acreage and have not been altered.

B8 The text of the FEIS (page 209, Section 4.7.10.2.4) has been revised to correctly locate AGFD land in relationship to the Preferred Alternative site as well as the Alternative Three site, with the qualification that County Route 227 separates the proposed power plant on the Preferred Alternative site from the AGFD state land.

B9 The possible attraction of wildfowl, and appropriate mitigation measures, are addressed in the DEIS. See also response A47.

B10 A monitoring program to confirm the analysis in the DEIS regarding protected avian species is a project design feature. Based on monitoring data, appropriate mitigation measures such as flagging and/or netting may be installed on the evaporation pond. Please see page 183, Section 4.4.3.3.1 of the DEIS and response A47.

Local Agencies

San Bernardino County (CA), Transportation/Flood Control Department **(C1)**

C1 We appreciate your review of the DEIS.

Mohave County (AZ) Economic Development Authority, Inc. **(C2a-C12)**

C2a The BIA, the FMIT and WAPA believe that the DEIS is complete. Please see response A51.

C2b The cost estimate referred to on page 25, Section 1.6.8 of the DEIS is for the total proposed facility and includes an industry standard estimate for pipeline construction, which is based on per mile cost and likely pipeline length. Capacity and availability of natural gas delivery have been confirmed by Calpine.

C3 At the time the Yucca site was considered, no viable water source was available, according to the proposed power plant's predecessor applicant, Nordic Power Company. Even if that situation has changed, the Yucca site does not meet the underlying purpose and need, as stated on page 1, Section 1.0, and further explained on page 28, Section 2.4.1.1 of the DEIS, and therefore was eliminated from further consideration.

C4 The BIA, the FMIT and WAPA believe that the DEIS is complete. Please see response A27.

C5 Water consumptively used for the proposed power plant would be cycled multiple times through the power production equipment. This would be an efficient use, and reuse, of water resources. Approximately 97.5 per cent of the water is reused before a small portion of the circulating water becomes uneconomical to treat for further reuse. Process wastewater to be evaporated in the evaporation pond would amount to only 94 acre feet a year of the approximately 4,000 acre feet consumptively used, or less than 2.5 per cent of the proposed project's total water consumption. (See page 166. Section 4.3.2, and page 176, Section 4.3.4.2.1 of the DEIS).

Managers of Topock Marsh (Havasu National Wildlife Refuge) determined that project wastewater was of unsuitable quality for marsh replenishment, so that this alternative for water reuse was eliminated from further consideration. See page 37, Section 2.7.2.4 of the DEIS.

C6 Personal communications, typically in the form of telephonic communications, are a common and accepted means of gathering information during preparation of environmental documents. All contact persons are listed in Section 6.0 as additional documentation of sources of information used in preparing the DEIS. Each contributor was sent a copy of the DEIS to afford opportunity to review the accuracy of information provided. Letters and reports are included in the Appendices.

C7 The BIA, the FMIT and WAPA believe that the DEIS is complete. Impacts are assessed in Section 4.7.6, which includes specific discussion of impacts from truck traffic during construction. Section 5.2.3, page 229 of the DEIS, contains discussion of committed mitigation measures for traffic impacts. Your comment regarding truck traffic on CR 227 provides no factual information to refute the conclusion of the DEIS. Calpine will cooperate with Mohave County staff and officials to define and address any unforeseen project-related impacts to county transportation facilities.

C8 The DEIS adequately addresses potential impacts from hazardous materials spills. The same procedures regarding hazardous materials handling and incident responses would be in place regardless of the intensity of residential development, now or in the future. Hazardous materials response is very specifically addressed on page 195, Section 4.6.6.2.2, and on page 229, Section 5.2.2 of the DEIS, which details committed mitigations measures for hazardous materials response capability.

Page 195, Section 4.6.6.2.2 of the FEIS has been reworded for greater clarity and to delete the words "fewer than" to eliminate any possible misinterpretation that there is any disregard for potential effect on public health and safety in the evaluation of environmental consequences to area residents in the event of a "nighttime large spill."

Ammonia and chlorine are commonly used in agricultural operations and for wastewater treatment in the Mohave Valley and are stored throughout the area. Approximately 12,000 gallons of ammonia, and approximately 5,000 gallons of chlorine, would be stored onsite. Therefore, no unusual materials would be stored on the site of the proposed power plant. The significance of impacts, and the mitigations, would be the same, regardless of the number of residents in the area.

As an additional emergency response capability, the USEPA Region IX has an agreement with the State of Arizona to facilitate hazardous materials response on Arizona's Indian reservations.

C9 There is limited residential development in the vicinity of the Preferred Alternative site at this time. We believe that it is inaccurate to characterize the area as "largely residential." The proposed industrial use is compatible with existing land uses as documented in the DEIS. (See Chapter 4.0, Environmental Consequences, pages 138-227 of the DEIS). Surrounding land under Mohave County jurisdiction is zoned to allow similar industrial uses. See page 117, Section 3.7.10.2.1 and page 118, Section 3.7.11.2 and, also, Figure 3.7-7 of the DEIS.

No significant adverse effects to wildlife areas were identified for the Preferred Alternative site in the DEIS. The Alternative Three site had an unmitigable adverse effect on the Havasu National Wildlife Refuge (page 225, Section 4.1.1 of the DEIS) which made it less desirable than the Preferred Alternative site.

Future development of BLM land is speculative and therefore not included in the DEIS.

C10 The BIA and the FMIT believe that the DEIS is complete. Please see response B4, which addresses transmission facilities and right of way.

C11a Electric transmission capacity issues are not under the purview of the BIA. Capacity issues are under the Western Area Power Administration's (WAPAs) purview and appropriate studies are in progress under the title, "Integration of Proposed Calpine Generation to Desert Southwest Region Transmission System." For information regarding this study, contact WAPA staff in Phoenix, AZ. Transmission capacity does not appear to be an issue.

C11b The DEIS addresses all impacts of the proposed project, including impacts to surrounding areas. Please see response B4.

C11c Under the stated purpose and need of the DEIS, the primary benefits are to the FMIT. However, significant benefits would go to Mohave County and its residents. Many of the temporary construction jobs, and 20 full time permanent jobs, would go to

Mohave County residents. Many construction supplies would be purchased from Mohave County suppliers. Indirect sales tax and other benefits would result from these purchases. Similarly, indirect benefits from wages and salaries would substantially benefit Mohave County suppliers of goods and services because few opportunities for on-reservation consumption currently exist. See pages 188-189, Section 4.6.2 of the DEIS.

The people of Mohave County would be the substantial beneficiaries of increased employment opportunities and construction spending. A new supply of electric power would be available for regional bulk purchasers.

C12 The DEIS documents that there are no unmitigated significant effects on neighboring property associated with the Preferred Alternative, and therefore, no significant adverse effects on property values of neighboring properties. Increased employment and income from the proposed power plant should result in increased tax collections by Mohave County. See Responses C11b and C11c.

Appendix 1

Letter from Kirke King, USFWS

United States Department of the Interior
Fish and Wildlife Service
Arizona Ecological Services Field Office
2321 W. Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
(602) 640-2720 Fax (602) 640-2730

In Reply Refer To:
AESO/EC

October 8, 1998

Dorothy Hallock
Hallock/Gross Inc.
517 West University Drive
Tempe, Arizona 85281

Dear Ms. Hallock:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) for the proposed Southpoint Power Plant Fort Mohave Indian Reservation, Mohave County, Arizona.

Please consider this comment as technical assistance only, as our Service's comments on the DEIS are being transmitted through official Department of Interior channels.

The Arizona Ecological Services Office enthusiastically endorses the applicant's efforts to include numerous environmental safeguards to protect fish and wildlife resources in the area. Your letter of September 24, 1998, presents four questions that I will attempt to answer. My area of expertise is environmental contaminants; I will confine my remaining comments primarily to this subject.

Questions one and three regarding "significance" are similar and I believe you have answered your own questions; "any impact on even a single bird appears to be prohibited". I am not a NEPA expert and will have to defer to others on the "intensity and context" test.

Question two referred to water quality standards for evaporation ponds. According to our Regional Water Quality Coordinator, there are no Federal or state standards regarding water quality for evaporation ponds.

Question four addresses mitigation: If there is a significant impact, are the mitigations adequate? I can only answer this question from the perspective of environmental contaminants. The plan addresses pond design, bird scare techniques, netting to exclude birds, and routine contaminant monitoring of water and sediment. Yes, I feel the plan adequately addressed minimizing exposure of birds to contaminants. If only a single pond is to be constructed, it should be as long and narrow as possible to deter bird use. A series of interconnected parallel ponds would facilitate netting to exclude birds.

One major concern only minimally addressed in the DEIS is the potential bioconcentration of selenium and other elements in wildlife that regularly use the evaporation ponds. Numerous studies reported the bioconcentration of higher-than-background levels of selenium in fish and wildlife of the lower Colorado River (Andrews et al. 1997, King et al. 1993, Lusk 1993, Martinez 1994,

Radtke et al. 1988, Rusk 1991, Villegas 1997, and Welch and Maughan 1993). These studies suggest that selenium in fish and wildlife tissues approaches the threshold where effects on reproduction might be expected. These studies also conclude that the source of the selenium is primarily Colorado River water and not agricultural return flows. If Colorado River water is confined in evaporation ponds, even higher levels of selenium can be expected.

Other studies suggest that selenium rarely reaches toxic levels in adult birds. The toxic effects of selenium are most evident during the reproductive period in eggs and embryos (dead/deformed young). Another trait of selenium is that it bioconcentrates to maximum levels in liver tissues in about 8 days. Once removed from the source of selenium, birds usually depurate selenium at the same rate. Therefore, selenium should not present a problem to birds using the evaporation ponds on a temporary basis, as in migration. The greatest hazard is to year-round resident birds and spring/summer nesting species. Little is known about the effects of selenium on populations of birds such as waterfowl, that overwinter in highly contaminated areas, but migrate to nest in relatively clean habitats. Continued monitoring of the proposed power plant site is highly desirable, not only for selenium, but for all potentially harmful elements.

Other elements in addition to selenium should be monitored as high levels were detected in fish and wildlife collected at Havasu National Wildlife Refuge which is located close to the proposed power plant site. Arsenic was detected in freshwater clams at 2.5-times background levels. Cadmium concentrations also were elevated in clams to the point that wildlife feeding on clams may be adversely affected. Cadmium, copper, and lead in most refuge fish samples exceeded background levels, but concentrations were below toxic thresholds. These elements will likely be highly concentrated in of Colorado River water that is retained in evaporation ponds. Pond sediments and possibly wildlife using the evaporation pond should be regularly monitored for bioaccumulation of metals.

The DEIS places much emphasis on monitoring water for contaminants. Concentrations of contaminants in the water column are often not representative of potential bioconcentration hazard to fish and wildlife. This is especially true for selenium. Chronic toxicity does not appear to be strictly a result of waterborne selenium. Dissolved selenium concentrations are a poor predictor of potential chronic toxicity to freshwater organisms. A sediment-based method is needed to accurately describe the potential for chronic toxicity of selenium on a site specific basis (Canton and Van Derveer 1997). Future monitoring efforts should focus on sediments.

If you have any questions or need clarification on any of the above, please call or write.

Sincerely,

Kirke A. King

Kirke A. King
Contaminant Specialist

cc: Regional, Fish and Wildlife Service, Albuquerque, NM (GARD-AZ/NM)

FTMOHAVE.LTR:KAK:bl

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