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COVER SHEET

RESPONSIBLE FEDERAL AGENCY: U.S. Department of Energy, Office of Fossil Energy

COOPERATING AGENCY: U.S. Department of the Interior, Bureau of Land Management

TITLE: Draft Environmental Impact Statement (DEIS) for the Imperial-Mexicali 230-kV Transmission Lines

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ABSTRACT: A U.S. Department of Energy (DOE) Presidential permit is required to construct an electric transmission line across the U.S. international border. On February 27, 2001, Baja California Power, Inc. (hereafter referred to as Intergen), InterGen Aztec Energy, V.B.V., filed an application with DOE, Office of Fossil Energy, for a Presidential permit that would allow construction and connection of a double-circuit, 230-kV transmission line extending from the Imperial Valley Substation in California for a distance of about 6 mi (10 km) to a point west of Calexico at the U.S.-Mexico border. The line would connect at the border with a similar line being built in Mexico. In a separate but similar proceeding, Sempra Energy Resources applied to DOE for a Presidential permit on March 7, 2001, also to construct a double-circuit, 230-kV transmission line that would parallel the proposed Intergen line and connect with a similar line being built in Mexico. The lines for both projects would traverse land managed by the Bureau of Land Management (BLM), a cooperating agency in preparing this EIS. For both of these projects, the applicants propose to use the international lines to connect to separate power plants, each about 3 mi (5 km) south of the border and located approximately 10 mi (16 km) southwest of Mexicali, Baja California, Mexico.

DOE and BLM have determined that the issuance of Presidential permits and right-of-way grants for these projects constitutes a major Federal action within the meaning of the *National Environmental Policy Act of 1969* as amended. The *Federal Register* "Notice of Intent to Prepare an EIS and to Conduct a Public Scoping Meeting and Notice of Floodplain and Wetlands Involvement" was published on October 30, 2003 (68 FR 61797). Public scoping meetings were held by DOE and BLM on November 20, 2003, in the City Hall of El Centro and in the City of Calexico City Hall, Calexico, California.

DOE and BLM have prepared this Draft EIS to address the environmental impacts of the proposed action and the range of reasonable alternatives, including the "No Action" alternative. The Final EIS will be used by DOE and BLM to ensure that they have the environmental information needed for informed decision making. The decisions will be issued in the form of a Record of Decision by DOE and a Record of Decision by BLM subsequent to the Final EIS.

NOTATION

The following is a list of acronyms and abbreviations, chemical names, and units of measure used in this document. Some acronyms used only in tables may be defined only in those tables.

GENERAL ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
AERMAP	AERMOD Terrain Preprocessor
AERMET	AERMOD Meterological Preprocessor
AERMOD	AMS/EPA Regulatory MODel
AFS	Air Facility Subsystem
AIRS	Aerometric Information Retrieval System
ANL	Argonne National Laboratory
AQI	air quality index
ARB	California Air Research Board
ASFMRA	American Society of Farm Managers and Rural Appraisers
ATSDR	Agency for Toxic Substances and Disease Registry
BLM	Bureau of Land Management
BOD	biochemical oxygen demand
BOR	U.S. Bureau of Reclamation
BPA	Bonneville Power Administration
CAA	Clean Air Act
Cal/EPA	California Environmental Protection Agency
Cal-ISO	California Independent System Operator
CBTIS	El Centro de Bachillerato Tecnológico Industrial y de Servicios
CDCA	California Desert Conservation Area
CDFG	California Department of Fish and Game
CDHS	California Department of Health Services
CEC	California Energy Commision
CEDD	California Employment Development Department
CEQ	Council on Environmental Quality
CESPM	Comisión Estatal de Servicios Públicos de Mexicali
CFE	Comisión Federal de Electricidad
CFR	*Code of Federal Regulations*
CICA	Centro de Informacíon sobre Contaminacíon de Aire
COBACH	Colegio de Bachilleres
COCEF	La Comisión de Cooperación Ecológica Fronteriza
COD	chemical oxygen demand
CRBRWQCB	Colorado River Basin Regional Water Quality Control Board
CRE	Comisión Reguladora de Energiá

CWA	Clean Water Act
DHHS	U.S. Department of Health and Human Services, Public Health Service
DO	dissolved oxygen
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
EA	environmental assessment
EAX	Energiá Azteca X, S. de R.L. de C.V.
EBC	Energiá de Baja California
EIA	Energy Information Administration
EIR	environmental impact report
EIS	environmental impact statement
ELF	extremely low frequency
EMF	electric and magnetic fields
E.O.	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FCR	field contact representative
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FR	*Federal Register*
GLC	ground level concentration
HAP	hazardous air pollutant
HARP	Hot Spots Analysis and Reporting Program
HMMH	Harris Miller Miller & Hanson, Inc.
HRA	health risk assessment
IARC	International Agency for Research on Cancer
IID	Imperial Irrigation District
ISCST3	Industrial Source Complex Short Term Dispersion Model 3
ITM	Instituto Tecnológico de Mexicali
IV	Imperial Valley
LRPC	La Rosita Power Complex
MACT	maximum achievable control technology
MCL	maximum contaminant level
MSL	mean sea level

NAAQS	National Ambient Air Quality Standards
NAEI	National Atmospheric Emissions Inventory
NAFTA	North American Free Trade Agreement
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NESHAPs	National Emission Standards Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NRHP	*National Register of Historic Places*
OEHHA	Office of Environmental Health Hazard Assessment
OZIPR	OZone Isopleth Plotting Package Research
PAH	polycyclic aromatic hydrocarbons
P.L.	Public Law
PM	particulate matter
PM_{10}	particulate matter with a mean aerodynamic diameter of 10 μm or less
$PM_{2.5}$	particulate matter with a mean aerodynamic diameter of 2.5 μm or less
QSA	Quantification Settlement Agreement
RCRA	Resource Conservation and Recovery Act
REL	reference exposure level
ROD	Record of Decision
ROG	reactive organic gas
ROI	region of influence
ROW	right-of-way
SCEDC	Southern California Earthquake Data Center
SCR	selective catalytic reduction
SDG&E	San Diego Gas & Electric
SEMARNAT	Secretaria de Medio Ambiente y Recursos Naturales
SHPO	State Historic Preservation Office(r)
SIP	State Implementation Plan
SL	significance level
SMCL	secondary maximum contaminant level
SWRCB	State Water Resources Control Board
TDM	Termoeléctrica de Mexicali
TDS	total dissolved solids
TMDL	total maximum daily load
TSI	trophic state index
TSS	total suspended solids
UABC	Universidad Autonomos de Baja California

USC	*United States Code*
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMT	vehicle-mile(s) traveled
VOC	volatile organic compound(s)
VRM	visual resource management
WSA	Wilderness Study Area

CHEMICALS

CO	carbon monoxide
CO_2	carbon dioxide
DO	dissolved oxygen
H_2S	hydrogen sulfide
HNO_3	nitric acid
NH_3	ammonia
NH_4NO_3	ammonium nitrate
NO	nitrogen oxide
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
O_3	ozone
Pb	lead
SO_2	sulfur dioxide
TCE	tetrachloroethylene

UNITS OF MEASURE

ac-ft	acre-foot (feet)
bhp	brake horsepower
°C	degree(s) Celsius
cm	centimeter(s)
cm^3	cubic centimeter
d	day(s)
dB(A)	A-weighted decibel(s)
DNL	day/night weighted average noise level

°F	degree(s) Fahrenheit
ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
g	gram(s)
gal	gallon(s)
h	hour(s)
ha	hectare(s)
Hz	hertz
in.	inch(es)
K	degree(s) Kelvin
kg	kilogram(s)
km	kilometer(s)
km^2	square kilometer(s)
kV	kilovolt(s)
L	liter(s)
lb	pound(s)
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
mg	milligram(s)
mG	milligauss
mi	mile(s)
mi^2	square mile(s)
MMBtu	million British thermal units
mph	mile(s) per hour
MW	megawatt(s)
ppb	part(s) per billion
ppm	part(s) per million
ppmv	part(s) per million by volume
ppt	part(s) per thousand
s	second(s)
t	metric ton(s)
yr	year(s)
V	volt
W	watt
µg	microgram(s)
µm	micrometer(s)
µT	microtesla

ENGLISH/METRIC AND METRIC/ENGLISH EQUIVALENTS

The following table lists the appropriate equivalents for English and metric units.

Multiply	By	To Obtain
English/Metric Equivalents		
acres	0.4047	hectares (ha)
cubic feet (ft^3)	0.02832	cubic meters (m^3)
cubic yards (yd^3)	0.7646	cubic meters (m^3)
degrees Fahrenheit (°F) –32	0.5555	degrees Celsius (°C)
feet (ft)	0.3048	meters (m)
gallons (gal)	3.785	liters (L)
gallons (gal)	0.003785	cubic meters (m^3)
inches (in.)	2.540	centimeters (cm)
miles (mi)	1.609	kilometers (km)
pounds (lb)	0.4536	kilograms (kg)
short tons (tons)	907.2	kilograms (kg)
short tons (tons)	0.9072	metric tons (t)
square feet (ft^2)	0.09290	square meters (m^2)
square yards (yd^2)	0.8361	square meters (m^2)
square miles (mi^2)	2.590	square kilometers (km^2)
yards (yd)	0.9144	meters (m)
Metric/English Equivalents		
centimeters (cm)	0.3937	inches (in.)
cubic meters (m^3)	35.31	cubic feet (ft^3)
cubic meters (m^3)	1.308	cubic yards (yd^3)
cubic meters (m^3)	264.2	gallons (gal)
degrees Celsius (°C) +17.78	1.8	degrees Fahrenheit (°F)
hectares (ha)	2.471	acres
kilograms (kg)	2.205	pounds (lb)
kilograms (kg)	0.001102	short tons (tons)
kilometers (km)	0.6214	miles (mi)
liters (L)	0.2642	gallons (gal)
meters (m)	3.281	feet (ft)
meters (m)	1.094	yards (yd)
metric tons (t)	1.102	short tons (tons)
square kilometers (km^2)	0.3861	square miles (mi^2)
square meters (m^2)	10.76	square feet (ft^2)
square meters (m^2)	1.196	square yards (yd^2)

1 INTRODUCTION

Executive Order (E.O.) 10485 (September 9, 1953), as amended by E.O. 12038 (February 7, 1978), requires that a Presidential permit be issued by the U.S. Department of Energy (DOE) before electric transmission facilities may be constructed, operated, maintained, or connected at the U.S. international border. On February 27, 2001, Baja California Power, Inc. (hereafter referred to as Intergen), filed an application with the Office of Fossil Energy of DOE for a Presidential permit. Intergen proposed to construct a double-circuit, 230,000-volt (230-kV) transmission line across the U.S.-Mexico border. In a separate but similar proceeding, Sempra Energy Resources (hereafter referred to as Sempra) applied to DOE for a Presidential permit on March 7, 2001, also proposing to construct a double-circuit, 230-kV transmission line across the U.S.-Mexico border.

In each of these projects, the applicants would use the proposed international transmission lines to connect separate natural gas-fired power plants in Mexico to the existing San Diego Gas & Electric (SDG&E) Imperial Valley (IV) Substation located about 6 mi (10 km) north of the border in Imperial County, California. Within the United States, both transmission lines are proposed to be constructed on lands managed by the U.S. Department of the Interior (DOI), Bureau of Land Management (BLM), parallel and adjacent to the existing SDG&E 230-kV transmission line (IV-La Rosita line) that connects the IV Substation with Mexico's La Rosita Substation. Both Intergen and Sempra applied to BLM for right-of-way (ROW) grants in order to be able to construct their respective projects across Federal land. Construction of the two natural gas-fired power plants in Mexico started in 2001 and has been completed.

Both DOE and BLM are required by law to review the potential environmental impacts of these projects under the National Environmental Policy Act (NEPA), *United States Code*, Title 42, Sections 4321–4347 (42 USC §§ 4321–4347).

1.1 BACKGROUND

1.1.1 Previous NEPA Review and Litigation

DOE and BLM originally determined that the appropriate level of NEPA review for the Intergen and Sempra Presidential permit applications was an environmental assessment (EA). DOE and BLM prepared a single EA that assessed the potential impacts that would accrue in the United States from the two transmission lines and from operation of the two related power plants in Mexico. DOE and BLM completed and issued the EA in December 2001 (DOE 2001). DOE relied on the EA to issue a Finding of No Significant Impact (FONSI) and Presidential permits for both projects on December 5, 2001. The Presidential permits authorized each company to construct, operate, maintain, and connect electric transmission facilities crossing the international border between the United States and Mexico. BLM issued two FONSIs on December 19, 2001, and two Decision Records to grant the ROWs on December 20, 2001, which allowed Intergen and Sempra to construct and maintain transmission facilities on Federal land. Following the authorizations by DOE and BLM, Intergen and Sempra constructed the transmission lines[1] and began commercial operation to export electricity from Mexico in July 2003.

On March 19, 2002, the Border Power Plant Working Group (hereafter referred to as Border Power) sued DOE and BLM in the United States District Court for the Southern District of California (Case No. 02-CV-513-IEG (POR)), alleging violations of NEPA and the Administrative Procedure Act. Border Power sought to have the EA, DOE FONSIs, Presidential permits, and ROW grants determined to be illegal and requested an injunction forbidding the use of the transmission lines. The District Court issued two orders in May and July of 2003 (Appendix A) after briefings and oral arguments by the various parties. On May 2, 2003, the court held that the EA and the FONSIs did not comply with NEPA. On July 8, 2003, the court sent the matter back to DOE and BLM for additional environmental review. The court declined to enjoin operation of the transmission lines immediately, instead, deferring the setting aside of the Presidential permits and the FONSIs until July 1, 2004, or until such time as superseding NEPA documents and permits are issued, whichever is earlier. Thus, the transmission lines have operated while DOE and BLM conducted additional NEPA review. In light of the concerns raised by the court and to increase opportunities for public and stakeholder participation in the environmental review process, DOE and BLM have decided to prepare this environmental impact statement (EIS).

In its July 8, 2003, order, the court expressly prohibited DOE and BLM from considering completion of construction and interim operation of the transmission lines or the court's analyses of environmental impacts of the proposed actions in conducting additional NEPA analyses. DOE and BLM have interpreted this language to require that they are to conduct their NEPA review from a fresh slate, as if the transmission lines had not been built. Accordingly, DOE and BLM will base their EIS analysis on the same purpose and need as was evaluated in the EA: whether to grant or deny Presidential permits and ROWs to Intergen and Sempra. The discussion of the transmission lines (proposed) and the environmental analysis will be presented as if the lines did not yet exist.

This EIS was prepared in accordance with Section 102(2)c of NEPA, Council of Environmental Quality (CEQ) Regulations (*Code of Federal Regulations*, Title 40, Parts 1500–1508 [40 CFR Parts 1500–1508]) and DOE NEPA Implementing Procedures (10 CFR Part 1021). DOE is the lead Federal agency as defined by 40 CFR 1501.5. BLM is a cooperating agency.

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[1] The Sempra Presidential permit and ROW grant were subsequently reissued and transferred to Termoeléctrica-U.S., LLC, after appropriate applications to DOE and BLM, respectively.

1.1.2 Overview of the Transmission Line Projects

The projects time line describes the milestones and sequence of events for construction and operation of the transmission lines and power plants. Also included are dates of DOE and BLM actions that pertain to the Presidential permit and grant of ROW approvals, and subsequent actions leading to the publication of this Draft EIS.

230-kV Transmission Lines
Imperial-Mexicali Projects Time Line

2001	
February	Intergen applies to DOE for Presidential permit. Intergen and Sempra apply separately to BLM for ROWs.
March	Intergen initiates construction of LRPC.
March	Sempra applies to DOE for Presidential permit.
December	DOE issues EA, FONSI, and Presidential permits to Intergen and Sempra allowing interconnection of transmission lines at the U.S.-Mexico border.
December	BLM issues FONSIs and Decision Records to grant ROWs.
2002	
January	Sempra initiates construction of TDM.
September	Intergen places transmission line in service.
November	Sempra places transmission line in service.
2003	
May	The court issues an order that the EA and the FONSIs do not comply with NEPA.
July	Sempra begins commercial operation of TDM.
July	Intergen begins commercial operation of LRPC.
July	The court orders additional environmental analyses.
October	DOE publishes Notice of Intent to Prepare an EIS.
November	Public scoping meetings held in El Centro and Calexico, California.
2004	
March	Intergen completes installation of SCR on LR-1 export gas turbine.

1.1.2.1 Intergen Transmission Line Project

Intergen proposed to construct and operate a double-circuit, 230-kV transmission line that would extend from the La Rosita Power Complex (LRPC), located about 10 mi (16 km) west of Mexicali, Mexico (see Figure 1.1-1), northward for approximately 3 mi (4.8 km) to the U.S-Mexico border at a point west of Calexico, California. From the border, the line would extend about 6 mi (10 km) north across Federal land managed by BLM and terminate at the IV Substation. The LRPC consists of two natural gas-fired combined-cycle generating units. The first unit (LR-1) is owned by Energiá Azteca X, S. de R.L. de C.V. (EAX) and consists of three 160-MW gas turbines and one 270-MW steam turbine, for a total generating capacity of 750 MW. The second combined-cycle unit (LR-2) is owned by Energiá de Baja California (EBC) and consists of one 160-MW gas turbine and one 150-MW steam turbine, for a total generating capacity of 310 MW. The capacity of the entire LRPC is a nominal 1,060 MW. See Figure 1.1-2.

The electrical output of LR-2 is designated exclusively to the U.S. market and can be exported to the United States only over the proposed new international transmission line. The electrical output of one gas turbine at LR-1 and one-third (90 MW) of the 160-MW electrical output of the LR-1 steam turbine are also designated for export to the U.S. market. However, the 160-MW electrical output of the LR-1 export gas turbine could be transmitted to the United States over either the proposed new international transmission line or over the existing IV-La Rosita line owned by SDG&E. The 90-MW electrical output of the LR-1 steam turbine designated for export to the United States may be transmitted to the United States only over the existing IV-La Rosita line. In addition, at times, there may be as much as 40 to 50 MW of additional output from the EAX plant that would be available for export over the existing IV-LaRosita line. Delivery of the electrical output of the export turbines would be scheduled by the California Independent System Operator (Cal-ISO). The remaining two EAX gas turbines and two-thirds of the electrical output of the EAX steam turbine are designated directly for the Mexico market and are connected to the Mexican electrical grid operated by Comisión-Federal de Electricidad (CFE), the national electric utility of Mexico.

California Independent System Operator

The Cal-ISO is the independent system operator of California's wholesale power grid, maintaining reliability and directing the flow of electric power along the long-distance, high-voltage power lines that connect California with neighboring states, as well as Mexico and British Columbia. The Cal-ISO evaluates energy schedules in the so-called "day-ahead" and "hour-ahead" markets and allocates the available transmission capacity to support the implementation of these schedules.

To reduce nitrogen oxides (NO_X) emissions, all gas turbines at the LRPC would be equipped with dry low-NO_X burners, and ultimately with selective catalytic reduction (SCR) systems. The EBC export gas turbine (310 MW) would be built with SCR. The other three gas turbines would have SCR systems installed by March 2005. The combination of dry low-NO_X burners and SCR would limit NO_X emissions to 4 parts per million (ppm). Carbon monoxide (CO) emissions are guaranteed by the gas turbine vendor to not exceed 30 ppm.

Cooling water for operation of the LRPC would be obtained from the inlet to the Zaragoza Oxidation Lagoons and treated before use.

1.1.2.2 Sempra Transmission Line Project

Sempra proposed to construct a double-circuit, 230-kV transmission line that would extend from a natural gas-fired power plant located 13 mi (21 km) west of Mexicali, Mexico, developed by Termoeléctrica de Mexicali (TDM), northward approximately 3 mi (4.8 km) to the U.S.-Mexico border west of Calexico, California. The line would parallel the existing IV-La Rosita line in the United States northward from the border, across Federal land managed by BLM, a distance of about 6 mi (10 km) to the IV Substation.

The power plant would consist of one natural-gas fired combined-cycle generating unit, with a nominal capacity of 650 MW. The unit would consist of two 170-MW gas turbines and one 310-MW steam turbine. The power plant would produce electricity exclusively for export to the United States that could be transmitted only over the proposed new transmission line. Delivery of the electrical output of the export turbines would be scheduled by Cal-ISO.

The power plant would be equipped with dry low-NO_X burners and SCR systems to reduce NO_X emissions to a maximum of 2.5 ppm, and an oxidizing catalyst system to reduce CO emissions to a maximum of 4 ppm.

Cooling water for operation of the power plant would be obtained from the outlet of the Zaragoza Oxidation Lagoons and treated before use.

1.2 PURPOSE AND NEED

Intergen and Sempra each need approvals from BLM and DOE, respectively, to allow construction of the approximately 6 mi (10 km) of new 230-kV transmission lines in the United States and connection of the lines at the U.S.-Mexico border, with similar facilities in Mexico. DOE and BLM will use the Final EIS to ensure that they have the environmental information needed for purposes of informed decision making. The decisions will be issued subsequently in the form of a Record of Decision (ROD) by DOE and a ROD by BLM.

1.2.1 DOE

DOE will use this EIS to determine whether it is in the public interest to grant Presidential permits to Sempra and Intergen for the construction, operation, maintenance, and connection of the proposed 230-kV transmission lines that would cross the U.S.-Mexico border. DOE's action responds to each applicant's request for a Presidential permit. DOE must comply with NEPA, and in this instance, is the lead Federal agency for NEPA compliance.

In determining whether a proposed action is in the public interest, DOE considers the impact of the proposed action on the environment and on the reliability of the U.S. electric power supply system. DOE also must obtain the concurrence of the Departments of State and Defense before it may grant a Presidential permit. If DOE determines that granting a Presidential permit is in the public interest, the information contained in the EIS will provide a basis upon which DOE decides which alternative(s) and mitigation measures, if any, are appropriate for the applicants to implement. In a process that is separate from NEPA, DOE will determine whether a proposed action will adversely impact the reliability of the U.S. electric system. Issuance of a Presidential permit only indicates that DOE has no objection to the project; it does not mandate that the project be completed.

Both the Sempra and Intergen proposed transmission lines would be used to export small amounts of electricity from the United States for the purpose of initial startup and restarting their respective power plants in the event of a plant shutdown. This is known as "black start." In order to export power from the United States, both companies must obtain separate export authorizations from DOE under Section 202(e) of the Federal Power Act. Before authorizing exports to Mexico over the proposed transmission lines, DOE must ensure that the export would not impair the sufficiency of the electrical power supply within the United States and would not impede, or tend to impede, the coordinated use of the regional transmission system.

1.2.2 BLM

BLM will use this EIS to determine whether to approve electric transmission line ROW requests for the projects proposed by Sempra and Intergen. To obtain the ROW approval, Sempra submitted an "Application for Transportation and Utility Systems and Facilities on Federal Lands" to BLM on February 13, 2001. The proposed ROW would be within Utility Corridor N (Figure 1.1-1) of the BLM's California Desert Conservation Area Plan (the Desert Plan). Intergen filed its application for ROW approval with BLM on February 6, 2001, also for use of a ROW in Utility Corridor N of the Desert Plan. The Sempra and Intergen transmission line ROWs would each be 120 ft (36 m) wide and are both proposed to be located along the east side of the existing IV-La Rosita line. In reviewing the applications for ROW grants, BLM must consider land status, consistency with land use plans, affected resources, resource values, environmental conditions, and concerns of various interested parties. Complete guidance for implementing the NEPA process within BLM can be found in *H-1790-1 — National Environmental Policy Act Handbook* (DOI 1988) and DOI guidance (1977).

These projects must be consistent with BLM's regional and local plans. The proposed projects fall within the California Desert Conservation Area (CDCA). BLM administers a comprehensive land use management plan for this area, which is referred to in this EIS as the CDCA Plan. The goal of the CDCA Plan is to provide for the educational, scientific, and recreational uses of public lands and resources within the CDCA in a manner that enhances and does not diminish the environmental, cultural, and aesthetic values of the desert and its productivity. According to the CDCA Plan, this goal is to be achieved through the direction given for management actions and resolution of conflicts. Direction is stated first on a geographic basis in guidelines set forth in each of four multiple-use classes. Within those guidelines, further refinement of direction is expressed in the goals for each CDCA Plan element (e.g., cultural resources, wildlife, vegetation, wilderness, recreation, motorized-vehicle access, geology, and energy production and utility corridors).

The proposed projects are located within an area designated as Multiple Use Class L (limited) in the CDCA Plan. Class L protects sensitive, natural, scenic, ecological, and cultural resource values. Public lands designated as Class L are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished.

The CDCA Plan states that "applications for utility rights-of-way will be encouraged by BLM management to use designated corridors." The proposed projects are consistent with the CDCA Plan because they are located entirely within a designated utility corridor (N). Utility needs that do not conform to the corridor system would require a plan amendment.

The project area for the proposed transmission lines is located in the Yuha Basin Area of Critical Environmental Concern (ACEC), designated by the CDCA Plan. The Yuha Basin ACEC Management Plan (BLM 1981) was prepared to give additional protection to unique cultural resource and wildlife values found in the region while also providing for multiple use management. The ACEC Management Plan allows for the "traversing of the ACEC by proposed transmission lines and associated facilities if environmental analysis demonstrates that it is environmentally sound to do so."

The Flat-tailed Horned Lizard Rangewide Management Strategy (hereafter referred to as the Strategy) was prepared to provide guidance for the conservation and management of sufficient habitat to maintain extant populations of flat-tailed horned lizards, a BLM sensitive species, in each of five Management Areas within the CDCA in perpetuity. The project area is within the Yuha Desert Management Area. The Strategy encourages surface-disturbing projects to be located outside of Management Areas. However, it does not preclude such projects from the Management Area. If a project must be located within a Management Area, effort should be made to locate the project in a previously disturbed area or in an area where habitat quality is poor, and be timed to minimize mortality. The applicants have agreed to accept all applicable mitigation measures identified in the Strategy (Section 2.2.1.4.1).

1.2.3 Applicants' Purpose and Need

The Sempra and Intergen Presidential permit applications each described a need for the 230-kV transmission line to transport electrical power generated by the Mexico power plants to the United States. In its application, Sempra indicated that all power generated by its proposed Mexico power plant would be exported to the United States to "reduce the region's dependence upon conventional oil-burning generation plants, and improve the region's ability to meet future electrical capacity and energy requirements."

In its application, Intergen stated it would utilize its 230-kV transmission line to export 310 MW from its EBC unit and 250 MW from its EAX unit to the United States. Intergen stated that this would reduce the need for power producers in southern California to build new oil- or gas-fired generation facilities, provide additional reserve capacity to California, and improve system reliability.

1.3 PUBLIC PARTICIPATION

The "Notice of Intent to Prepare an Environmental Impact Statement (EIS) and to Conduct Public Scoping Meetings and Notice of Floodplain and Wetlands Involvement" was published in the *Federal Register* (68 FR 61796) on October 30, 2003. Announcements were also placed in local newspapers. A project web site maintained for DOE (http://web.ead.anl.gov/bajatermoeis) provides background information on the proposed projects, including previous NEPA review and DOE's NEPA process. Public scoping meetings were held by DOE and BLM at two California locations on November 20, 2003 — the City Hall of El Centro and the City of Calexico City Hall. A total of 20 individuals presented oral comments at the two public scoping meetings. Written comments were also solicited. Seventeen individuals submitted written comments during the scoping period, which closed on December 1, 2003.

An additional opportunity for public participation will be provided during the public comment period on this draft EIS. At that time, interested or potentially affected agencies, tribes, organizations, and members of the public can comment on the draft document (this document) and participate in public hearings.

Commentors focused mainly, but not exclusively, on the impacts of construction and operation of the two transmission lines and operation of the two power plants to environmental resources in Imperial County, California. An account of comments received during public scoping is included in Appendix B. To ensure that all issues with respect to the permit applications are considered, this Draft EIS addresses issues that were raised during the litigation before the United States Ninth District Court. The major issues raised in the declarations and their disposition in this Draft EIS are included in Appendix C.

The issues raised that are within the scope of the EIS are summarized first below; then the issues raised that are outside the scope of the EIS are discussed.

1.3.1 Issues within the Scope of the EIS

Several commentors suggested that operation of the natural gas-fired power plants in Mexico would have adverse impacts on water volume and water quality of the New River and the Salton Sea and water availability to the Imperial Valley in California. Specific issues included impacts to the New River caused by an increase in temperature, the increase in total dissolved solids (TDS), and the reduction of dissolved oxygen (DO).

Many commentors were concerned that the two power plants would lead to further degradation of air quality in the region. Imperial County is classified as nonattainment for particulate matter (particles with a mean aerodynamic diameter of 10 μm or less [PM_{10}]) and ozone (O_3). Specifically, issues were raised about possible increases in NO_x, CO, O_3, and particulate matter (both $PM_{2.5}$ and PM_{10}) that would be caused by power plant operations. Commentors questioned the assumptions presented in the court declarations for the ammonia (NH_3) concentrations released at the plants used in calculations of secondary PM_{10} generation. One commentor suggested that the air samples taken at the border do not reflect maximum exposure concentrations and requested that stack heights and proximity to the border of the power plants be taken into consideration when estimating air emission concentrations.

There were several requests that a comprehensive health risk assessment related to air pollution be conducted as part of the EIS process. Appendix H contains a health risk assessment.

Many commentors were concerned about human health impacts from the power plants. Individuals expressed concern over possible effects of emissions on incidences of asthma in Imperial Valley.

Many commentors expressed the need for the EIS to discuss mitigation measures to offset impacts from power plant operations, mainly related to air emissions. Suggestions included establishing a mitigation fund, identifying offsets (ways to reduce air emission amounts from other sources to compensate for emissions from the power plants in Mexico) in the United States, and completing projects to mitigate impacts from power plant operations.

Commentors raised issues related to alternative technologies that could be used at the power plants to reduce water use in plant cooling and air emissions from the facilities. Issues included the use of dry cooling or a combination of wet-dry cooling to reduce water required for plant operation, installation of CO controls and SCR systems on all power plant units, and use of best available technology to reduce air emissions.

Ecological concerns raised by commentors related to transmission line construction and operation included potential impacts to endangered species and suggestions that birds protected by the Migratory Bird Treaty Act be addressed in the impact analysis. Issues raised related to aquatic habitats included salinity increases in the New River and Salton Sea, potential effects on fish and bird populations in the Salton Sea, and water quality degradation that would affect recreational fishing in the Salton Sea.

Commentors suggested that the EIS examine the visual impact of the two new transmission lines and that the EIS analysis address the potential effects of the projects on tourism and recreational fishing in the Salton Sea. Environmental justice was raised as an issue by a commentor who said that the new power plants could affect low-income populations. One commentor requested that the EIS address impacts of the project on cultural resources.

1.3.2 Issues outside the Scope of the EIS

Executive Order 12114 (January 9, 1979) requires Federal agencies to prepare an analysis of significant impacts from a Federal action in certain defined circumstances and exempts agencies from preparing analyses in others. The Federal action here, the granting of one or both permits and ROWs, does not fall within the requirements for an EIS set forth in the Executive Order. First, the Federal action does not affect the global commons. Second, the Federal action will not significantly affect “the environment of a foreign nation not participating with the United States and not otherwise involved in the action.” Mexico, not the United States, has issued permits for construction and operation of the power plants in Mexico. Moreover, the Federal action here is not to build the power plants, but only to permit the transmission lines to be built in the United States. The power plants are, at best, cumulative actions. Third, the Federal action does not produce a product, emission, or effluent that is “prohibited or strictly regulated by Federal law in the United States because its toxic effects on the environment create a serious public health risk,” or which involves regulated or prohibited radioactive materials.

Several commentors suggested that the Intergen and Sempra applications for Presidential permits, construction of the two power plants in Mexico, and approval of the North Baja Pipeline, LLC, by the Federal Energy Regulatory Commission (FERC) are related actions and should be assessed as a single undertaking because the power plants would burn natural gas supplied by the pipeline. While the transmission lines and pipeline are related and complementary in that they would facilitate the operation of the electric generating facilities in Mexico, they are independent actions that serve distinct functions and that can proceed separately. Intergen and Sempra stated that if the FERC had chosen not to grant a Presidential permit for the gas pipeline, the power plants would operate by using alternate fuel sources.

North Baja Pipeline, LLC, submitted information to FERC indicating that the gas pipeline would be a viable project even without the Intergen and Sempra power plants.

A commentor suggested that a 50-year comprehensive cumulative impact assessment be conducted as part of the EIS. This EIS does contain a cumulative analysis (Chapter 5). CEQ guidance (1997b) on conducting cumulative impact assessments states that projects be reasonably foreseeable. DOE and BLM believe that reasonably foreseeable projects tend to have a planning period of 10 years or less. Projects that may be developed during a 50-year period and beyond a 10-year planning horizon are too speculative to be considered reasonably foreseeable.

A commentor requested that a national policy be developed to define the minimum distance that transmission lines can be constructed relative to gas pipelines. It is not the purpose of this EIS to consider such a national policy; therefore, this issue is outside the scope of the EIS.

Commentors requested that information pertaining to emergency outage plans and homeland security issues be examined as part of the EIS. The development of emergency outage response plans is the purview of local public safety officials and is outside the scope of the EIS. The proposed transmission lines and power plants present no greater target for terrorists than any other high-voltage transmission lines or power plants in the United States. Also, outside of the NEPA process, DOE will perform an electric reliability study to ensure that the existing U.S. power supply system would remain fully operational upon the sudden loss of power, regardless of the cause of the outage.

1.4 ORGANIZATION OF THIS ENVIRONMENTAL IMPACT STATEMENT

This Imperial-Mexicali 230-kV Transmission Lines Projects EIS consists of 14 chapters and 9 appendixes. Brief summaries of the main components of the EIS follow:

- Chapter 1 introduces the EIS, discussing pertinent background information; the purpose of and need for the DOE, BLM, and applicant actions; public participation; and EIS organization.
- Chapter 2 defines the alternatives considered in the EIS.
- Chapter 3 discusses the environmental setting in the project area.
- Chapter 4 discusses the potential environmental impacts of the alternatives.
- Chapter 5 discusses the potential cumulative impacts.
- Chapter 6 identifies the unavoidable adverse impacts.
- Chapter 7 discusses the major irreversible and irretrievable commitments of natural and man-made resources.

- Chapter 8 discusses the relationship between short-term use of the environment and long-term productivity.

- Chapter 9 identifies the major laws, regulations, and other applicable requirements.

- Chapter 10 provides a list of agencies and individuals contacted during preparation of this EIS.

- Chapter 11 is an alphabetical listing of the references cited in the main text of the EIS.

- Chapter 12 lists the name, education, and experience of persons who helped prepare the EIS. Also included are the subject areas for which each preparer was responsible.

- Chapter 13 presents brief definitions of the technical terminology used in the EIS.

- Chapter 14 is a subject matter index that provides the page numbers where important terms and concepts are discussed.

- Appendix A contains copies of the court orders.

- Appendix B summarizes the comments received during public scoping.

- Appendix C is an index for major issues that arose in scoping, in court declarations, and in court orders, and that have been addressed in the EIS.

- Appendix D presents ambient air quality data used in preparing this EIS.

- Appendix E contains copies of consultation letters regarding the preparation of this EIS that were sent to and received from Federal and State agencies.

- Appendix F discusses water modeling used to support calculations for assessing water resource impacts.

- Appendix G provides data in support of the air quality analysis.

- Appendix H contains the health risk assessment for the proposed projects.

- Appendix I contains the contractor disclosure statements.

2 ALTERNATIVES

This chapter describes the alternatives analyzed in this EIS. They are as follows:

1. No Action Alternative: Deny both permit and corresponding ROW applications. This presents the environmental impacts in the United States as if the lines had never been constructed and provides a baseline against which the impacts in the United States of the action alternatives can be measured in the absence of Presidential permits and corresponding ROWs.

2. Proposed Action: Grant one or both permits and corresponding ROWs. This sets forth the impacts in the United States of constructing and operating the line(s) from the Mexico power plants as those plants are presently designed, and it is DOE's and BLM's preferred alternative.

3. Alternative Technologies: Grant one or both permits and corresponding ROWs to authorize transmission lines that connect to power plants that would employ more efficient emissions controls and alternative cooling technologies.

4. Mitigation Measures: Grant one or both permits and corresponding ROWs to authorize transmission lines whose developers would employ off-site mitigation measures to minimize environmental impacts in the United States.

DOE and BLM also consider alternative routes for the transmission lines within the United States under the action alternatives described above.

2.1 NO ACTION

Under the no action alternative, neither of the proposed transmission lines would be constructed and the environmental impacts associated with their construction and operation would not occur. In the case of Sempra, lack of the requested transmission line would preclude the Termoeléctrica de Mexicali (TDM) power plant from operating because there would be no delivery path for the electricity generated. Similarly, in the case of Intergen, the EBC export unit could not be operated because the proposed transmission line would have provided the only delivery path for the electricity generated from that unit.

However, the EAX unit at the La Rosita Power Complex (LRPC) could still operate. The existing SDG&E transmission line has sufficient capacity to transmit the electrical output of the EAX export gas turbine and one-third (90 MW) of the EAX steam turbine output to the United States. The other two EAX gas turbines and the remaining two-thirds (180 MW) of the electrical output of the EAX steam turbine are designated for the Mexico market and would operate under any and all circumstances.

Because DOE and BLM are proceeding with this EIS under the assumption that the proposed Intergen and Sempra transmission lines do not exist, this EIS does not address the removal of their lines and support structures from BLM lands. Should the Presidential permits and ROWs not be granted, the issue of whether to remove the existing lines from BLM lands would be a new Federal action subject to an appropriate separate NEPA review.

2.2 PROPOSED ACTION: GRANT ONE OR BOTH PRESIDENTIAL PERMITS AND CORRESPONDING ROWS

Under the proposed action alternative, one or both Sempra and Intergen transmission lines would be constructed and operated and all generating units at the TDM and LRPC power plants would be able to operate. DOE's and BLM's preferred alternative would be to issue both Presidential permits and ROWs to Sempra and Intergen as their projects are presently designed.

The impacts attributable to the preferred alternative would be those associated with operation of the entire TDM power plant, the EBC unit, the EAX export turbine, and the construction and operation of the proposed transmission lines. If the proposed Intergen transmission line were approved and constructed, the electrical output of the EAX export turbine at the LRPC would be exported to the United States over that line. Therefore, even though the EAX export turbine would be able to operate under the no action alternative, the impacts associated with this turbine are also included in the proposed action.

2.2.1 Descriptions of Proposed Transmission Lines

The proposed transmission lines would be located in the Yuha Basin in the Colorado Desert in the southwestern portion of Imperial County, California, about 10 to 12 mi (16 to 18 km) southwest of the town of El Centro (Figures 1.1-1, 2.2-1, and 2.2-2). Each proposed project would construct a double-circuit, 230-kV transmission line extending from the existing IV Substation south approximately 6 mi (10 km) to the U.S.-Mexico border in Utility Corridor N, where each line would connect with a corresponding transmission line in Mexico (Figures 2.2-3 through 2.2-6). The transmission line support structures would consist of steel lattice towers from the border to just south of the IV Substation, where steel A-frame structures would be used for each transmission line to allow the crossing of the Southwest Power Link (Figure 2.2-3). The Southwest Power Link is a 500-kV transmission line that enters the IV Substation from the east at the substation's southeast corner. After crossing the Southwest Power Link, the proposed transmission lines would be supported by steel monopoles along the east side of the IV Substation and would enter it from the north.

From the U.S.-Mexico border to the last tower south of the Southwest Power Link at the IV Substation, both the Intergen and Sempra ROWs would parallel the existing line. The ROW for the Intergen transmission line would be adjacent to the existing 120-ft (37-m) ROW for the existing SDG&E transmission line and would also be 120 ft (37 m) wide, so that the centerline would be 120 ft (37 m) east of the centerline of the existing transmission line ROW. The

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For both the Intergen and Sempra transmission lines, steel lattice towers would be erected on the centerlines of the ROWs.[1] The towers would be spaced approximately 900 to 1,150 ft (274 to 350 m) apart and would be roughly in line with the existing line's towers in an east-west direction. In this EIS, the towers, the A-frames, and steel poles for both lines are referred to by consecutive numbers from south to north; Tower No. 1 would be the first tower north of the U.S.-Mexico border, and Tower No. 24 would be just south of the IV Substation. Similarly, the steel monopoles are referred to by consecutive numbers from south to north of the substation, with the A-frame crossing structures included in the pole numbering system as No. 2 and No. 3. All proposed features of the projects are shown in Figures 2.2-3 through 2.2-6.

2.2.1.1 Transmission Line Construction

Sempra and Intergen would use the same contractor to build both transmission lines simultaneously. Construction would begin with site preparation, consisting of grading of access roads, where necessary, and drilling or excavation for support structures and footings. Support structures would be fabricated in segments by the same vendor in Mexico. Each lattice tower and A-frame structure would be carried to the construction site by helicopter, which would minimize the amount of lay-down area required in the United States. Monopoles would be brought to the site by truck in sections, assembled in lay-down areas, and lifted into place with a crane. Principal preparation at each support structure location would consist of preparing concrete foundation footings. Each tower would require four footings, one on each corner; a single footing would be needed for each monopole.

Three types of steel lattice transmission towers and two types of steel monopoles would be used, depending on function. The three types of steel lattice towers are suspension, deflection, and dead-end; the two types of steel monopoles are suspension and deflection. Suspension towers (or monopoles) are used where cables are strung in a straight line from one tower to an adjacent one (Figures 2.2-7 and 2.2-8). Deflection towers (or monopoles) are used where transmission lines turn gradual angles (Figures 2.2-9 and 2.2-10), and dead-end lattice towers are used where transmission lines turn large angles or where a transmission line is brought into an electric substation (Figure 2.2-11). Suspension, deflection, and deadend towers are about 140 ft (43 m) high, and both deflection and suspension monopoles are about 102 ft (31 m) high.

Conductors (wires) on the dead-end and deflection towers or poles would be supported by double insulators. Conductors on suspension towers or poles would be supported by single insulators. The minimum ground clearance of the conductor would be 36 ft (11 m). The average

[1] In some cases, the descriptions of tower dimensions and conductor spacing are slightly greater than the as-built dimensions. Thus, some of the estimates of land disturbance during construction are conservative.

horizontal distance between circuits for phase conductor spacing on steel lattice suspension and deflection towers would be approximately 35 ft (10.7 m). For dead-end steel lattice towers, the distance would be about 50 ft (15.2 m). The horizontal distance between phases on the steel monopoles would be about 26 ft (8.0 m) for the suspension monopole and 37.6 ft (11.5 m) for the deflection monopole. Vertical spacing between phases on a steel lattice tower would be between 21.3 ft (6.5 m) and 26.4 ft (8.0 m), depending upon the tower type. Vertical spacing between phases on steel monopoles would be 18.0 ft (5.5 m) for both monopole types.

Each support structure would contain two electrical circuits. Each electrical circuit consists of three phases with two unbundled conductors making up each phase. Two static ground wires would be located at the top of each support structure. These static ground wires would provide communications, system protection, and monitoring. The two ground static wires would include the installation of communications fiber for system protection and monitoring, with additional black fiber for future communications use. Therefore, each proposed transmission line would consist of 14 wires; that is, 12 conductors and the two static ground wires.

The conductors would be composed of strands of aluminum wire wrapped around a stranded steel cable. The aluminum conducts electricity and the steel supports the conductor. This type of construction is known as aluminum conductor steel-supported. Each conductor wire has a core of 7 steel wires surrounded by 54 aluminum wires.

The towers would be anchored to concrete foundations at each of the four corners at the base of the tower. The tower base dimensions would range from approximately 30 ft by 30 ft (9.1 m by 9.1 m) for suspension towers to 40 ft by 40 ft (12.2 m by 12.2 m) for the deflection and dead-end towers. At the top, the suspension towers would be approximately 6.6 ft (2.0 m) square, the deflection towers would be approximately 7.5 ft (2.3 m) square, and the dead-end towers would be approximately 13 ft (4 m) square.

Steel suspension monopoles would be approximately 2.5 ft (0.8 m) in diameter at the base, tapering to approximately 1 ft (0.3 m) in diameter at the top. Steel deflection monopoles would be approximately 4.8 ft (1.5 m) in diameter at the base, tapering to approximately 2.1 ft (0.6 m) at the top. Steel monopoles would be anchored to a concrete foundation.

Each of the four legs of the A-frame structures used to cross the Southwest Power Link (Figure 2.2-12) would be bolted to a cylindrical concrete footing. A total of 32 footings would be needed for the four A-frames, with two A-frame structures on each side of the Southwest Power Link.

Once support structures are in place, conductors would be strung for the entire length of the transmission lines, from the northernmost support structure at the substation. Truck-mounted cable-pulling equipment would be used to string the conductors on the support structures. Cables would be pulled through one segment of a transmission line, with each segment containing several towers or poles. To pull cables, truck-mounted cable-pulling equipment would be placed alongside the tower or monopole, directly beneath the crossarm insulators (the “pull site”) at the first and last towers or poles in the segment of the transmission line. The conductors would be pulled through the segment of line and attached to the insulators. Then the equipment would be moved to the next segment, with the "front-end" pull site just used becoming the "back-end" pull site for the next segment.

At the crossing structure south of the Southwest Power Link, the static wires would be brought down the structure, placed in a trench to pass to the other side of the Southwest Power Link, and brought back up the crossing structure on the other side. The trench would be backfilled.

Construction would be completed by restoring disturbed ground surfaces to original contours. Spoil dirt excavated for the footings would be spread on the ground, on access roads, or taken off site for disposal in a permitted disposal site.

2.2.1.2 Areas of Construction Impact

Areas of permanent impact would be those areas where the surface of the ground would be permanently disturbed. Specifically, permanent impacts would occur where new access roads and footings or anchors for tower, monopole, or crossing structures are constructed. Temporary impacts would occur in areas where construction activity takes place but where restoration of the surface is possible. These areas would include the work areas used to erect the towers, monopoles, or crossing structures; pull sites; lay-down areas for the monopoles; and the trenches for the optical cables under the Southwest Power Link at the substation. In some places, areas of temporary disturbance would overlap.

Many areas of temporary disturbance, such as work areas around towers or poles and pull sites, would overlap at least partially; consequently, the total estimate for the temporary impact areas is overestimated and therefore conservative.

The areas of impact, permanent and temporary, from construction of the proposed project are presented in Table 2.2-1.

2.2.1.3 Operations and Maintenance

Operations and maintenance requirements would include, but not necessarily be limited to, the following: (1) yearly maintenance grading of access roads; (2) insulator washing; (3) monthly on-ground inspection of towers, poles, and access roads by vehicle; (4) air or ground inspection as needed; (5) repair of tower or pole components as needed; (6) repair or replacement of lines as needed; (7) replacement of insulators as needed; (8) painting pole or tower identification markings or corroded areas on towers or poles; and (9) response to emergency situations (e.g., outages) as needed to restore power.

TABLE 2.2-1 Area of Construction Impacts

	Size of Impact (acres)[a]	
Impact Location	Temporary	Permanent
Lattice tower footing	NA[b]	0.23
Lattice tower access roads	NA	1.72
Lattice suspension tower work areas	2.46	NA
Lattice deflection tower work areas	0.88	NA
Lattice tower pull sites	0.83	NA
Area of substation impact[c]	9.5	NA
Monopole pull sites and work areas	0.48	NA
Monopole lay-down areas	1.21	NA
Optical line trenches	0.06	NA
Crossing structures footing	NA	<0.05
Monopole footings	NA	<0.04
Monopole access roads	NA	1.56
Total	15.42	<3.60

[a] Based on a total of 25 towers (the actual number built is 24); thus the actual disturbance would be less than that shown here. To convert acres to hectares multiply by 0.4047.

[b] NA = not applicable.

[c] The work area near the IV Substation would be subject to intensive disturbance. It is likely, however, that not all of this area would be disturbed.

For most of these operations, equipment could use the access roads and no significant additional disturbance would occur. Transmission line conductors may occasionally need to be upgraded or replaced over the life of the line. Old cables would be taken down and new cables would be strung on the insulators in an operation similar to the cable-pulling operation used to initially install the conductors. While the project access roads can be used for access, pull sites would also be required. The size and location of these pull sites may vary, depending on the cable and equipment used, the methods used by the contractor, and the technology available at the time. For these reasons, the size and location of future temporary disturbance areas because of pull sites cannot be accurately estimated. In any event, such conductor replacement is infrequent.

2.2.1.4 Applicants' Proposed Environmental Protection Measures

Several features of the projects' design and construction methods are intended to reduce the amount of surface disturbance and therefore the potential impacts on environmental resources. These include locating the support structures (steel lattice towers, crossing structures, and steel monopoles) so that new access roads can be kept as short as possible, using existing access roads to the maximum extent possible, and using a helicopter to place lattice tower assemblies onto footings to reduce the amount of ground disturbance that would otherwise be caused by the use of lay-down areas and operation of cranes. In addition, the applicants would hire the same construction contractor to build both lines, further minimizing impacts by combining and coordinating construction activity, eliminating potential repeated impacts to the same area, and minimizing traffic flows.

The applicants would commit to stringent monitoring and mitigation requirements to protect biological, cultural, and paleontological resources. These measures are discussed in the following subsections.

2.2.1.4.1 Biological Resources. To protect BLM sensitive species, including the flat-tailed horned lizard and the western burrowing owl, the applicants would agree to accept the following conditions for the proposed projects:

1. Construction would be scheduled to occur as much as possible during the flat-tailed horned lizard's dormant period — November 15 to February 15; BLM would approve the construction schedule before the start of construction.

2. A preconstruction worker education program would be developed and implemented. In addition, wallet-cards would be provided to all construction and maintenance personnel and would include information regarding the biology and status of the lizard; the protection measures that are being implemented; the function of the flagging around sensitive resources; reporting procedures if a lizard is found within the construction area; and methods of reducing impacts during commuting to and from construction areas.

3. A field contact representative (FCR) would be designated prior to the start of construction and approved by BLM. The FCR would be responsible for ensuring compliance with protective measures for the flat-tailed horned lizard and other sensitive biological resources and would act as the primary resource agency contact. The FCR would have the authority to halt construction activities if the project is not in compliance with mitigation required by BLM.

4. The FCR would coordinate with the construction manager to assure that all surface-disturbing activities are located as much as possible in areas that have been previously disturbed or where habitat quality is lower, and where disturbance to biological resources can be minimized.

5. All work areas would be clearly flagged or otherwise marked, and all work would be restricted to these areas. All construction workers would restrict

their activities and vehicles to areas that have been flagged or to clearly recognizable areas, such as access roads, that have been identified as "safe" areas by the FCR.

6. A Biological Monitor, hired by the applicants but authorized by BLM, would be present in each area of active construction throughout the workday, from initial clearing through habitat restoration, except where the project is completely fenced and cleared of flat-tailed horned lizards by a biologist (measure 12 below). The biologist must have sufficient education and field training with the flat-tailed horned lizard. This biologist would ensure that the project complies with these mitigation measures and would have the authority to halt activities if they are not in compliance. The biologist would inspect the construction areas periodically for the presence of flat-tailed horned lizards and would inspect any open trenches or pits prior to backfilling. The biologist would also work with the construction supervisor to take steps to avoid disturbing the lizards and their habitat. If a lizard is discovered within an affected area, the lizard would be captured and relocated. The Biological Monitor would also excavate all potential flat-tailed horned lizard burrows within the construction areas and relocate any flat-tailed horned lizards encountered.

7. Only biologists authorized by BLM may handle flat-tailed horned lizards. Any workers who discover flat-tailed horned lizards would avoid disturbing the animals and would immediately notify their construction supervisor and the Biological Monitor.

8. If a flat-tailed horned lizard is detected within an affected area, it should be relocated according to the measures detailed in Measure No. 9 of the Mitigation Measures section (Appendix 3) of the *Flat-tailed Horned Lizard Rangewide Management Strategy* (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003). Any relocation must be conducted by a biologist authorized by BLM to handle the lizards.

9. The area of vegetation and soil disturbance would be minimized to the greatest extent possible. When possible, the equipment and vehicles should use existing surfaces or previously disturbed areas. When excavation or grading is necessary, the topsoil should be stockpiled and restored following completion of the work.

10. Existing roads would be used to the greatest extent possible for travel and staging areas.

11. If BLM desires, newly created access roads would be restricted by constructing barriers, erecting fences with locked gates, and/or by posting signs. Maintenance access control facilities would be the responsibility of the applicants for the life of the project (construction and operation).

12. Sites where prolonged construction activity, lasting 6 hours or more, would occur, and in which lizard mortality could occur, may be enclosed with 0.5-in. (1.3-cm) wire mesh fencing to exclude the lizards from the site. This barrier fencing must be at least 12 in. (30.4 cm) above and below the ground surface, and all entry gates should be constructed to prevent lizard entry. Once a fenced site has been cleared of flat-tailed horned lizards and fenced in this manner, an on-site monitor would no longer be required. Fencing would not be required if a Biological Monitor is present.

13. For all areas disturbed by construction, a habitat restoration plan would be developed by a qualified biologist, approved by BLM, and implemented by the applicants. The restoration plan would address all of the items included in Measure No. 14 in Appendix 3 and in the Overview for Techniques for Rehabilitation of Lands in Appendix 8 of the Rangewide Management Strategy (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003). The restoration plan would include a schedule for monitoring and assuring the success of restoration, including the removal of invasive species, acceptable to BLM. The restoration plan would also include a minimum of 3 years of tamarisk and other exotics control following construction.

14. The FCR would keep a record of the extent of all areas permanently and temporarily disturbed by construction. This record would be the basis for determining a monetary compensation to be paid by the applicants to BLM upon the completion of construction as required by Appendix 4 (Compensation Formula) of the Rangewide Management Strategy. BLM may require, prior to the beginning of construction, a reasonable deposit, on the basis of the extent of anticipated disturbance, with the final compensation to be determined according to the FCR's final record and the Compensation Formula in the Rangewide Management Strategy.

For any construction occurring during the flat-tailed horned lizard's active period, before November 15 or after February 15, all of the measures listed above that are applicable would be implemented. In addition, the following measures would be required:

1. The FCR would coordinate with the construction manager for the applicants to assure that vehicular traffic is kept to a minimum, consistent with the practical requirements of construction.

2. Work crews would not drive to the work site in the management area in individual vehicles. The applicant would arrange for workers to park outside the management area and be driven together to the work site in single collection vehicles. This limitation would apply to the members of a work crew (two or more persons) who would be working together throughout the shift, except for emergencies.

3. The FCR and Biological Monitors would keep a record of all sightings of flat-tailed horned lizards and fresh flat-tailed horned lizard scat. Sightings would be reported in writing to BLM on a schedule established by BLM.

There is a potential that the proposed projects could impact active burrows of the western burrowing owl; the breeding season for burrowing owls is between February 1 and August 31. Burrows can be occupied and active during both the breeding and nonbreeding seasons. To avoid impacts to the burrowing owl, the following measures would be required:

1. Disturbance by construction of any occupied burrowing owl burrows should be avoided. A nondisturbance buffer of 160 ft (49 m) during the nonbreeding season and 250 ft (76 m) during the breeding season should be maintained around each occupied burrow when possible. It is preferable that construction take place between September 1 and January 31, to avoid impacts to breeding burrowing owls.

2. If construction is to begin during the nonbreeding season, a preconstruction clearance survey should be conducted within the 30 days prior to construction to identify whether any burrowing owl territories are present within the project footprint. The proposed construction areas would need to be identified in the field by the project engineers prior to the commencement of the preconstruction clearance survey. The survey should follow the protocols provided in the Burrowing Owl Survey Protocol and Mitigation Guidelines (California Burrowing Owl Consortium 2001).

3. Passive relocation of burrowing owls from occupied burrows that would be otherwise impacted by construction would be required. Passive relocation should only be implemented in the nonbreeding season. This includes covering or excavating all burrows and installing one-way doors into occupied burrows. This would allow any animals inside to leave the burrow but would prevent any animals from reentering the burrow. A period of at least 1 week is required after the relocation effort to allow the birds to leave the impacted area before construction of the area can begin. The burrows should then be excavated and filled in to prevent their reuse. An artificial burrow should be created beyond 160 ft (49 m) from the impact area but contiguous with or adjacent to the occupied habitat.

4. The destruction of the active burrows on site would require construction of new burrows at a mitigation ratio of 1:1, at least 164 ft (50 m) from the impacted area. New burrows would be constructed as part of the above-described relocation efforts.

5. If construction is to begin during the breeding season, the above-described measures should be implemented prior to February 1 to discourage the nesting of the burrowing owls within the area of impact. As construction continues, any area where owls are sighted should be subject to frequent

surveys for burrows before the breeding season begins, so that the owls can be relocated before nesting occurs.

6. It is possible that these protocols would need to be repeated throughout the length of construction to ensure that additional burrowing owls have not moved within the areas of impact subsequent to the initial preconstruction clearance survey and relocation efforts. As the construction schedule and details are finalized, a qualified biologist should prepare a monitoring plan to detail the methodology proposed to minimize and mitigate impacts to this species.

The construction of the steel lattice tower portions of both the Intergen and Sempra transmission lines could impact nonwetland jurisdictional waters of the United States. To mitigate impacts to nonwetland jurisdictional waters, the following measures would be required:

1. Any areas of nonwetland jurisdictional waters temporarily impacted would be returned to preconstruction contours and condition.

2. Permanent impacts of 0.08 acre (0.03 ha) would be mitigated at a ratio consistent with Federal regulatory agencies, which is typically 1:1. A restoration plan would be prepared detailing the proposed mitigation for impacts to jurisdictional waters. It is recommended that enhancement of the survey corridor through removal of the nonnative invasive tamarisk be conducted. This should be conducted along the eastern edge of the IV Substation, which would account for an area of at least 0.10 acre (0.04 ha) in size. Additional tamarisk could be removed from the southern edge of the wetland area, if necessary. The restoration plan should require a minimum of 3 years of control for tamarisk and other exotics following construction to ensure that these species are not allowed to establish within the impacted areas.

3. In addition, impacts to these waters would require a Section 404 Permit from the U.S. Army Corps of Engineers and a 401 Certificate from the Regional Water Quality Control Board in accordance with the Clean Water Act (CWA). This project would be covered by Nationwide Permit No. 12, which regulates all activities required for the construction of utility lines and associated facilities within waters of the United States. This Nationwide Permit covers all projects that do not exceed 0.50 acre (0.20 ha) of impact resulting from construction of the utility lines and associated access roads. This project meets that threshold by impacting a maximum of 0.21 acre (0.08 ha) of jurisdictional waters.

2.2.1.4.2 Cultural Resources. To protect cultural resources, the applicants would agree to accept the following conditions to the grants of ROW with BLM:

1. Identification and evaluation of historic properties and resolution of adverse effects would be determined through consultation with BLM, California State Historic Preservation Officer (SHPO), and consulting parties pursuant to Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations at 36 CFR Part 800.

2. The applicants would assist BLM in consulting (pursuant to the NHPA) with Indian tribes to determine whether there are properties of religious and cultural significance to the tribes within the Area of Potential Effect. The applicants would document their consultation efforts and would provide this in writing to BLM. This documentation may be submitted as part of the cultural resource survey report or as an addendum to that report.

3. The applicants would implement the treatment plan for resolving adverse effects on historic properties, if any, that would be affected by the undertaking.

4. BLM would ensure that all historic preservation work is carried out by or under the direct supervision of a person or persons (the Principal Investigator) meeting, at a minimum, the standards set forth in the Secretary of the Interior's Professional Qualifications (48 FR 44738–44739).

5. Archaeological monitoring would be conducted for any subsurface construction or ground-disturbing activity in areas determined by the Principal Investigator and BLM to be archaeologically sensitive in accordance with a monitoring and discovery plan approved by BLM and SHPO.

6. The Principal Investigator and Biological Monitors would attend a preconstruction meeting. The construction contract would state the need for the meeting, and project construction plans would be marked with requirements for monitoring. The meeting would allow the archaeological monitors to establish their roles and responsibilities, and protocol and point of contact information with the construction contractors.

7. Cultural properties discovered during construction would be reported and treated in accordance with a monitoring and discovery plan approved by BLM and SHPO.

8. If human remains or funerary objects are discovered during construction, construction would cease immediately in the area of discovery, and BLM would be notified by telephone followed by written confirmation. In accordance with the monitoring and discovery plan and Native American

Graves Protection and Repatriation Act, BLM would notify and consult with Indian tribes to determine treatment and disposition measures.

9. BLM would ensure that all materials and records resulting from the treatment program are curated in accordance with 36 CFR Part 79.

2.2.1.4.3 Paleontological Resources. To protect paleontological resources, the applicants would agree to accept the following conditions to the grants of ROW agreements with BLM:

1. A paleontologist, approved by BLM, would be retained prior to the beginning of construction and would be responsible for carrying out the mitigation program.

2. The consulting paleontologist would review project plans and site information and determine those areas of the site where excavations may have the potential to encounter significant fossils (areas of paleontological sensitivity).

3. Areas of paleontological sensitivity would be monitored when excavations or any other activities that could expose subsurface formations are occurring. Paleontological Monitors, approved by the consulting paleontologist, would monitor such activities. Areas of paleontological sensitivity would be marked on project plans used by the construction contractor.

4. The consulting paleontologist would attend at least one preconstruction meeting with the construction contractor to explain the monitoring requirements and procedures to be followed if fossils are discovered.

5. The construction contractor would keep the consulting paleontologist informed of the construction schedule and would perform periodic inspections of construction.

6. In the event that fossils are discovered, the Paleontological Monitor would immediately inform the consulting paleontologist. The monitor would have the authority to temporarily halt, redirect, or divert construction activities to allow the recovery of fossil material.

7. Any fossil materials collected would be cleaned, sorted, and cataloged and then donated to an institution approved by BLM with a research interest in the materials.

8. Within 6 weeks of the completion of construction, the consulting paleontologist would prepare a report on the results of the monitoring effort

and would submit the report to BLM, and, if fossils have been recovered, to the institution to which the fossils have been donated.

2.2.1.5 Alternative Transmission Line Routes

The identification of potential transmission line routes includes routes on Federal and private lands that would connect the IV Substation with lines from Mexico at the U.S.-Mexico border. BLM lands extend more than 20 mi (32 km) to the west of the existing 230-kV IV-La Rosita transmission line (hereafter, existing line) route, and private lands are within 1 or 2 mi (2 or 3 km) of the route to the east. Utility Corridor N, designated in the BLM Desert Plan (BLM 1999), is identified as an appropriate location for utility lines. This corridor also allows a more direct route between the IV Substation in the United States and the La Rosita Substation in Mexico. Two alternative transmission routes to the applicants' proposed routes are evaluated in this EIS (Figure 2.2-13). A third alternative route located mostly on private land east of the existing line was considered but not evaluated for the reasons given below.

The end point and start point of each alternative route is at a fixed geographical location, namely the IV Substation to the north and the U.S.-Mexico border immediately east of where the existing line crosses the U.S.-Mexico border. The applicants' proposed routes represent a relatively direct path between these points.

2.2.1.5.1 West of the Existing 230-kV Transmission Line. An alternative route west of the existing 230-kV IV-La Rosita transmission line (Figure 2.2-13) is evaluated. The location of the western route was selected to minimize the amount of land with sensitive cultural resources that would have to be crossed by the transmission lines. This route would require 7.4 mi (11.9 km) of ROW entirely on BLM land. The southern portion of this route would extend to the west, outside of the BLM-designated Utility Corridor N. Any alternative route outside the corridor could require a BLM Plan Amendment. Under this alternative, the Intergen and Sempra transmission lines would make a 90-degree turn to the west, then turn northeast to connect to the IV Substation. If the Intergen and Sempra lines were routed west of the existing line, these two new lines would have to cross over or under the existing line. The crossing of the existing transmission line would add considerable expense to construction and maintenance costs, as well as likely result in an increase in the number of towers required to be constructed on the U.S. side, and thus in the area temporarily and permanently impacted by construction.

2.2.1.5.2 East of the Existing 230-kV Transmission Line. An alternative route east of the existing line on the eastern boundary of BLM-managed land is also analyzed (Figure 2.2-13). The rationale for selecting the location of this route was to avoid concentrations of archaeological resources along the former shoreline of Lake Cahuilla and also to attempt to reduce biological effects by constructing the lines on the border of the Yuha Basin ACEC rather than through it. The eastern alternative route would require 5.8 mi (9.3 km) of ROW. This location, like the applicants' proposed routes, would remain entirely on BLM land within Utility Corridor N.

The Intergen and Sempra lines would make a 90-degree turn to the east along the border to the eastern boundary of BLM lands, then turn northwest along the eastern property boundary of BLM lands to the IV Substation.

2.2.1.5.3 Outside Federal Lands. An additional alternative route was considered in which the transmission lines would be located primarily on private lands located east of Utility Corridor N. To reach the IV Substation, this alternative route would traverse a little more than a mile in Federal lands.

Routing the transmission lines through private land to the east would require a considerably longer route than the more direct eastern, western, and applicants' proposed routes. Such a route would be more costly to construct and would result in a greater amount of ground disturbance than the other proposed routes. A larger number of towers would be required to be constructed, expanding any area temporarily or permanently impacted by construction; also, more materials, fuels, and expendables would be consumed.

Most important, private lands to the east are being used for agriculture. Any such alternative route would displace some agricultural land under towers and/or around poles and create conflicts with aerial crop dusting and other agriculture practices. Further, the acquisition of ROWs on private land would prove difficult to justify with regard to a variety of issues, including economic, environmental, and resource consumption, and it would be regarded as an unnecessary impingement on valued land when less expensive, shorter, and less intrusive routes are available on Federal lands through an existing, predesignated utility corridor.

This alternative route was not considered to be reasonable; no substantive advantage could be discerned to weigh against its considerable disadvantages; therefore, it was not analyzed further.

2.2.2 Project-Related Power Plants

Figure 2.2-14 is a schematic showing the generalized engineering features of the TDM and LRPC power plants as described in Chapter 1. The following sections further describe specific characteristics of each power plant.

La Rosita Power Complex

EAX:
- 3 Siemens-Westinghouse Model W501F combustion turbines
- Alsthom steam turbine
- Doosan heat recovery steam generator

EBC:
- 1 Siemens-Westinghouse Model W501F combustion turbine
- Alsthom steam turbine
- Foster Wheeler heat recovery steam generator

All generating units at both power plants would operate in a combined-cycle mode and would be fueled by natural gas supplied by a cross-border pipeline previously permitted by FERC. Electricity would be produced by both the gas turbines and the steam turbine generators. Exhaust gases from the gas turbine are cleaned up during their travel through the heat recovery steam generator. Heat from the gas turbine exhaust, which would otherwise be released to the atmosphere with exhaust gases, would be recovered by the heat recovery steam generator to produce steam, which in turn would be used by the steam turbine to generate additional electricity.

Termoeléctrica de Mexicali Power Plant

- 2 General Electric Model 7FA combustion turbines
- Alsthom steam turbine
- Cerrey heat recovery steam generator

All turbines at both power plants would be equipped with dry low-NO_X burners that control emissions of NO_X during combustion. All turbines at both power plants would also eventually utilize an SCR system to further control NO_X emissions. SCR (Figure 2.2-15) is a postcombustion cleaning technology that chemically reduces NO_X (nitrogen [NO] and nitrogen oxide [NO_2]) into molecular nitrogen and water vapor. A nitrogen-based reagent, such as NH_3, is injected either as a gas or liquid into the ductwork, downstream of the combustion turbine. The waste gas from the combustion turbine mixes with the reagent and enters a reactor module containing a catalyst. The hot flue gas and reagent diffuse through the catalyst, and the reagent reacts selectively with the NO_X. Unreacted NH_3 in the flue gas downstream of the SCR reactor is referred to as NH_3 slip. As the catalyst activity decreases, NO_X removal decreases and NH_3 slip increases. When NH_3 slip reaches the maximum design or permitted level, new catalyst must be installed. The NO_X removal efficiency of SCR ranges between 85 and 90%.

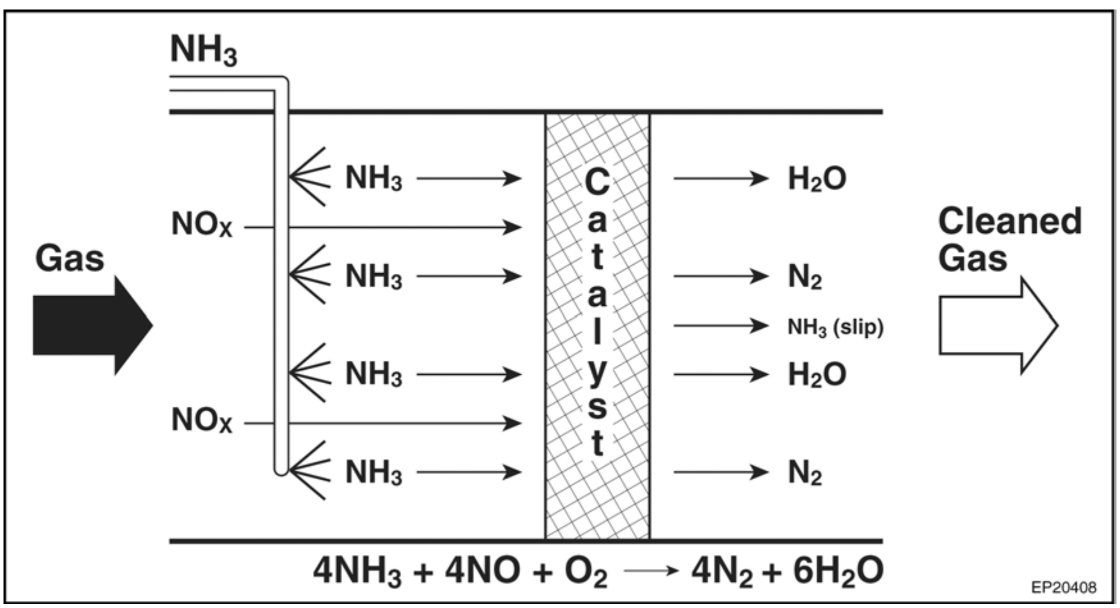

FIGURE 2.2-15 Schematic of Typical SCR System

Both the LRPC and TDM power plants would use wet cooling systems. The wet cooling system would consist of a surface condenser and a cooling tower. Figure 2.2-16 is a schematic of a wet cooling system. Because water used to produce steam in the steam turbine is demineralized and free of scale-forming material, it is in an open circulating system and reused in the steam turbine. Exhaust steam from the steam turbine is condensed by water circulating in the surface condenser. Demineralized makeup water is introduced to the steam cycle to replenish water lost as heat recovery steam generator blowdown and miscellaneous water and steam losses. The water in the surface condenser is then cooled by air flowing through the cooling tower(s) and the water is recirculated. Water is lost by evaporation in the cooling tower and must be replenished with "makeup water." Cooling towers are characterized by the means by which air is moved. Mechanical-draft cooling towers rely on power-driven fans to draw or force the air through the tower. Natural-draft cooling towers proposed for the Sempra and Intergen plants use the buoyancy of the exhaust air rising in a tall chimney to provide the draft. A fan-assisted natural-draft cooling tower employs mechanical draft to augment the buoyancy effect. To reduce the demand for cooling water, power plants could be equipped with either a dry cooling system or a wet-dry cooling system; these are described in Section 2.3.1.

Water (both cooling and steam cycle) for both power plants would come from the Zaragoza Oxidation Lagoons located west of Mexicali (Figure 2.2-17). The primary source of water entering the lagoons is municipal sewage. Minor sources include storm water runoff and industrial discharge water (both process and sewage). The Zaragoza facility receives and treats approximately 33,200 acre-ft/yr of sewage water (an acre-foot [ac-ft] of water is the volume of

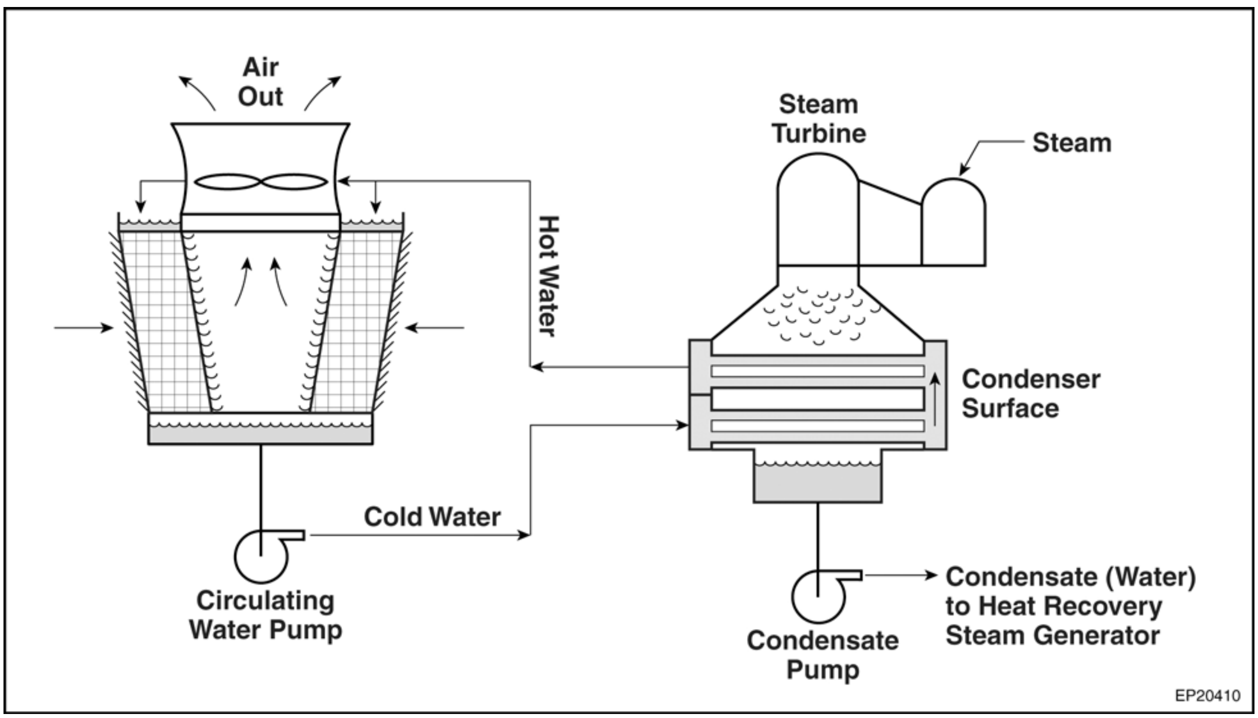

FIGURE 2.2-16 Wet Cooling Technology (Source: adapted from CEC 2001)

water that covers 1 acre [43,560 ft] to a depth of 1 ft [0.30 m]). The sewage water is processed at the Zaragoza facility in up to 13 lagoons or settling ponds. It is a primary treatment process, in which solids are settled out before the water is discharged into the New River through drainage channels managed by the Comisión Nacional del Agua.

Water Treatment for LRPC. The LRPC would contract with the local Mexican municipal water authority, Comisión Estatal de Servicios Públicos de Mexicali (CESPM), to provide untreated, municipal wastewater. Raw sewage water would be obtained at the inlet of the Zaragoza lagoons and piped to a sewage treatment plant adjacent to the lagoons that would treat the water for use at the LRPC. Consequently, the water input to the sewage treatment plant would have undergone little, if any, settling action from the lagoons. The adjacent sewage treatment plant would treat the raw sewage via screening, degritting, degreasing, biological treatment via an extended aeration-activated sludge process (known as Orbal aeration, a process developed by U.S. Filter), nitrification-denitrification, final clarification, and chlorine disinfection. The sludge would be dewatered and disposed of as nonhazardous waste. The treated water would be pumped and piped approximately 5.2 mi (8.3 km) to the LRPC. Because it is critical to meet the water demands of the LRPC, the sewage treatment plant is expected to operate at flow rates somewhat higher than the demands of the power plants. Excess treated water (up to 1 ft^3/s) would be discharged to a channel adjacent to the sewage treatment plant. This stream eventually combines with the Zaragoza lagoon effluent.

Next to the LRPC, a tertiary water treatment system would be constructed to further treat the water to reduce phosphates, dissolved organic matter, and heavy metals. The water would also be lime-softened and then stored in tanks for use at the power plant. Sludge from lime softening would be dewatered and disposed of in an off-site landfill as nonhazardous waste.

Treated and untreated wastewater streams collected from power plant operations would be collected in a sump and would then be discharged to the drainage channel. In the LRPC cooling towers, water is used up to five cooling cycles before it is discharged.

Water Treatment for TDM. The TDM power plant would obtain water from the Zaragoza lagoons after the water was treated in the primary settling ponds. The TDM sewage treatment plant would use a biological treatment process to first oxidize organic matter and NH_3 in an aerobic step (in the presence of air following aeration), and then remove nitrates formed by NH_3 oxidation by bacterial action under anaerobic conditions (in the absence of air) in a second step, incorporating an activated sludge process with nitrification-dentrification. This treatment process eliminates biological contaminants and reduces other contaminants in the water. After biological treatment, water would be clarified by the addition of lime to raise the pH to cause the precipitation of dissolved minerals such as calcium and magnesium. The clarified water would then be adjusted to neutral pH with the addition of sulfuric acid and disinfected through the addition of chlorine. The precipitated sludge settles out, thickens, and finally dehydrates on a belt press to produce a solid, nonhazardous waste, which would be hauled to a landfill in Mexico. The water so treated would be suitable for use as cooling water, the major use of water at the power plant. It would replace water lost to evaporation from the cooling towers.

A portion of this water would be further treated to high purity for use in the closed steam cycle portion of the plant. This treatment would be accomplished through coagulation of suspended solids using ferric chloride, filtering though sand and cartridge filters, and passage through a reverse osmosis system, which employs a semipermeable membrane to remove the smallest particles and much of the remaining dissolved matter. The water would be finally treated in a demineralizer to remove the remaining dissolved matter. This water would provide makeup water in the steam cycle as well as potable water for the plant.

Three main waste streams would be piped into the waste sump during normal power plant operation. Waste streams would mix before being discharged untreated into a drainage channel that would eventually lead to the New River. The first stream would be the wastewater from the cooling tower. The cooling tower bank would consist of 12 units, and the water would be used for up to six cycles before it was discharged. The second stream would be wastewater from the demineralization process. The third stream would be water discharged from the steam cycle.

At times when the TDM power plant is not producing energy under normal conditions, the sewage treatment plant would operate in the bypass mode; that is, water from the Zaragoza Oxidation Lagoons would be treated in the biological treatment portion of the sewage treatment plant and then be discharged into the drainage channels. This would be necessary because the biological treatment part of the sewage treatment plant must operate at all times to maintain the microorganisms in the biological reactor. If the microorganisms would die, the sewage treatment plant would require 4 to 6 weeks to restart operations.

2.3 ALTERNATIVE TECHNOLOGIES

Under this alternative, DOE and BLM would grant one or both Presidential permits and corresponding ROWs to applicants who would build transmission lines that connect to power plants that would employ more efficient emissions controls and alternative cooling technologies.

The alternative cooling technologies considered under this alternative are dry cooling and wet-dry cooling. Under the proposed action alternative, both power plants would use SCR technology to reduce NO_X emissions. Only one power plant would use oxidizing catalysts to reduce CO emissions. Thus, this alternative includes operation of two power plants utilizing SCR and oxidizing catalyst technologies on all turbines.

2.3.1 Cooling Technologies

This section provides a general description of the dry and wet-dry cooling technologies that will be analyzed in this EIS as alternative technologies.

A portion of this water would be further treated to high purity for use in the closed steam cycle portion of the plant. This treatment would be accomplished through coagulation of suspended solids using ferric chloride, filtering though sand and cartridge filters, and passage through a reverse osmosis system, which employs a semipermeable membrane to remove the smallest particles and much of the remaining dissolved matter. The water would be finally treated in a demineralizer to remove the remaining dissolved matter. This water would provide makeup water in the steam cycle as well as potable water for the plant.

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2.3.1 Cooling Technologies

This section provides a general description of the dry and wet-dry cooling technologies that will be analyzed in this EIS as alternative technologies.

2.3.1.1 Dry Cooling

There are two types of dry cooling systems: direct dry cooling and the lesser-used indirect dry cooling. In both systems, fans blow air over a radiator system to remove heat from the system via convective heat transfer (rather than using water for cooling or evaporative heat transfer). In the direct dry cooling system, also known as an air-cooled condenser system, steam from the steam turbine exhausts directly to a manifold radiator system that releases heat to the atmosphere, condensing the steam inside the radiator. Figure 2.3-1 is a schematic of a direct dry cooling system.

Indirect dry cooling uses a secondary working fluid (in a closed cycle with no fluid loss) to help remove the heat from the steam. The secondary working fluid extracts heat from the surface condenser and flows to a radiator system that is dry cooled (fans blow air through the radiator to remove heat from the working fluid). An indirect dry cooling system is more complex and less efficient than a direct dry cooling system; for this reason it is also less common. An indirect dry cooling system also produces no environmental advantages over a direct dry cooling system. For these reasons, this EIS only considers a direct dry-cooling system.

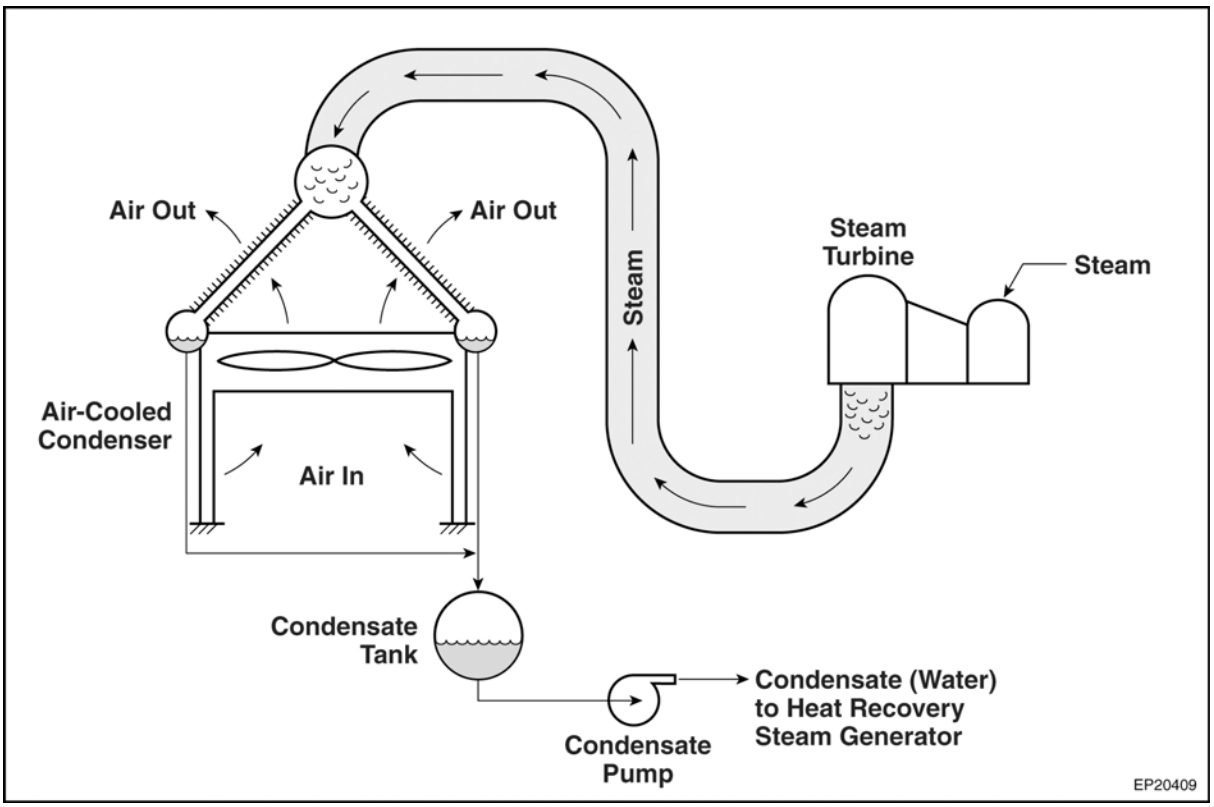

FIGURE 2.3-1 Dry Cooling Technology (Source: adapted from CEC 2001)

Advantages of dry cooling, relative to wet cooling, may include the following:

- Significant decrease in water required for dry cooling compared with wet cooling. Typically, dry cooling systems use 90 to 95% less water than power plants with wet cooling systems.
- Minimal use of water treatment chemicals, since air is used in the air-cooled condenser and not water like in the wet cooling tower.
- Minimal generation of liquid and solid wastes, since water impurities requiring disposal are not generated in the air-cooled condenser as they are in a wet evaporative cooling tower.
- No visible water vapor plume, which is present with wet cooling technology during certain meteorological conditions.
- Lower water consumption, that is, 90 to 95% less water would be purchased and treated.

The following disadvantages may be associated with dry cooling:

- Air-cooled condensers can have a negative visual effect because they are often taller than wet cooling towers.
- Decreased efficiency in hot weather compared with wet evaporative cooling.
- Disturbance of a larger land area for the air-cooled condensers than is required for wet cooling towers.
- Greater noise impacts than wet cooling systems because of the greater number of fans and the considerably greater total airflow rate. However, new quieter fans and other mitigation measures are available to reduce these impacts.
- A 10 to 15% reduction in power plant steam-cycle efficiency and output, depending on site conditions and seasonal variations in ambient conditions. Also, extra power is needed to operate the cooling fans.
- Increased capital and operating and maintenance costs for building a dry cooling system compared with a wet cooling system.

2.3.1.2 Wet-Dry Cooling

Wet-dry cooling systems combine wet and dry cooling technologies (Figure 2.3-2). A wide range of system designs is possible, covering the entire spectrum of wet versus dry cooling

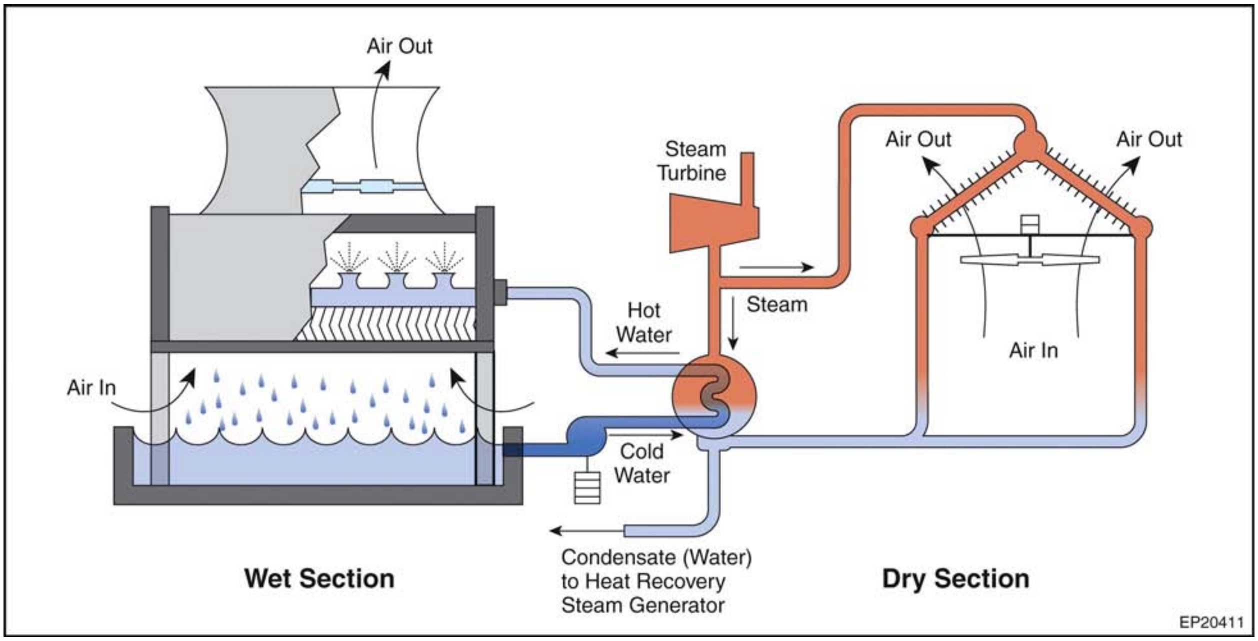

FIGURE 2.3-2 Wet-Dry Cooling Technology (Source: adapted from Institute of Clean Air Companies 1997)

components depending on plant needs. A typical wet-dry cooling system would utilize both an air-cooled condenser and a wet evaporative cooling tower within the same cooling system. A typical wet-dry cooling system would achieve a ratio of wet-to-dry cooling on the order of 50%. Ratios can vary, however, on the basis of ambient air temperatures and humidity. A wet-dry system is sometimes called a "water conservation design," or a "parallel condensing cooling system." Wet cooling would be used during hot weather, while dry cooling would be used most other times.

Application of a wet-dry cooling system allows tailoring the use of either the wet or dry system on the basis of climatic conditions. However, use of such a system entails increased capital and maintenance costs compared with either wet or dry cooling systems, since two systems are needed.

2.3.2 Air Emissions Control Technologies

This alternative includes operation of two power plants equipped with SCR and the use of oxidizing catalysts on all gas turbines.

The following is a description of a generic CO control system. CO is emitted when natural gas is not combusted completely. CO emissions in power plants are often controlled with an oxidizing catalyst. A honeycomb-like structure containing the catalyst is placed in the flue gas ductwork. The catalyst is made of precious metals, such as platinum and palladium, which act to promote a chemical reaction to transform CO to carbon dioxide (CO_2). This system can also reduce other hydrocarbons caused by incomplete combustion. These hydrocarbons combine with oxygen to form water and CO_2. For effective reduction of CO and hydrocarbons, the flue gas must be lean (i.e., have excess oxygen) to promote the reactions.

2.4 MITIGATION MEASURES

Under this alternative, DOE and BLM grant one or both Presidential permits and corresponding ROWs to authorize transmission lines whose developers would employ off-site mitigative measures to minimize environmental impacts in the United States. The mitigation measures addressed under this alternative pertain only to offsets of air emissions from power plant operation. DOE contacted the Imperial County Air Pollution Control Office and the Border Power Plant Working Group to obtain suggestions for off-site mitigation measures that could be evaluated under this alternative (Russell 2004; Pioriez 2004a,b,c; Pentecost and Picel 2004; Powers 2004). Additional mitigation measures to replace water reductions were not analyzed because all available water in California is committed to other uses (Colorado River Board of California 2000). Also, the Imperial Irrigation District (IID), the state agency that is presently addressing water use issues in the Salton Sea Watershed, currently has a monitoring and mitigation program to respond to such issues.

For air quality, the mitigation measures can be evaluated on a per-unit or individual project basis. The evaluation of impacts includes examples of reductions in PM_{10} and NO_x emissions that could occur as a result of updating engines in agricultural and transportation equipment and use of more efficient, newer automobiles. These examples could be assembled into a program that would mitigate impacts from emissions from the developers' power plants. The EIS evaluates possible elements of such a program, but does not specify combinations of elements.

The following mitigation measures identified by the Imperial County Air Pollution Control Office are also considered under this alternative. None of the measures, individually or collectively, would be able to offset the total quantities of PM_{10} or gaseous emissions produced by the power plants. However, implementation of one or more of these measures would serve to improve air quality in Imperial County. Later sections describe potential offsets in the Mexicali region.

- Paving of Roads: The Imperial County Public Works Director provided the Imperial County Air Pollution Control Office with a list of about 50 road segments totaling 22 mi (37 km) that could be paved to reduce fugitive dust emissions.

- Retrofitting of Emission Controls on IID Power Plants: The Imperial County Air Pollution Control Office suggested that SCR installation on IID steam plant Unit 3 and the peaker plants would reduce NO_x emissions in the project area.

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- Enhance the Use of Compressed Natural Gas in Motorized Vehicles: Four projects were identified as follows: (1) provide funding to maintain the El Centro Compressed Natural Gas refueling facility located at Commercial and Fairfield Streets; (2) provide funding for a compressed natural gas fast-fill facility to be constructed at the Calexico Unified School District; (3) acquire land in Brawley, California, for construction of a compressed natural gas facility; and (4) replace or update engines for the current fleet of ten 40-ft-long (12-m-long) Imperial Valley transit buses and 5 smaller buses.

- Controlling Imperial Airport Dust: Fugitive dust from natural windstorms and from aircraft (particularly from helicopter landings) occurs frequently at the airport.

- Retrofitting of Diesel Engines for Off-Road Heavy-Duty Vehicles: Diesel engines of off-road vehicle equipment used in agriculture, earthmoving, or construction would be updated to reduce particulate and gaseous emissions.

Several other mitigation measures could be implemented in the Mexicali region that could serve to improve regional air quality. These include a program to replace older automobiles and buses in the Mexicali area with a newer, less polluting, fleet; reduction of fugitive dust through road paving; and reduction of emissions from brick kilns by converting the fuel used in firing the kilns to natural gas.

2.5 COMPARISON OF ALTERNATIVES

A comparison of the impacts resulting from each of the four alternatives is provided in Table 2.5-1. The impacts are summarized by resource area (e.g., water resources) and its corresponding section number in this report.

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3 AFFECTED ENVIRONMENT

This chapter describes the baseline condition of the projects area for the purpose of identifying resources, ecosystems, and human communities that potentially could be affected by implementation of the alternatives described in Chapter 2. Information presented here includes geology, soils, and seismicity; water resources; climate and air quality; biological resources; cultural resources; land use; transportation; visual resources; socioeconomics; and minority and low-income populations. Information on the baseline environment for noise and human health is included in the corresponding sections in Chapter 4. The baseline condition serves as a reference point for the evaluation of impacts of the alternatives presented in Chapter 4.

3.1 GEOLOGY, PHYSIOGRAPHY, SOILS, AND SEISMICITY

3.1.1 Geology

The proposed transmission line routes and the two alternative routes would be located in the Imperial Valley, part of the Salton Trough, a structural and topographic depression that lies within the Basin and Range physiographic province. The Salton Trough is an extension of the East Pacific Rise as it emerges from the 1,000-mi (1,609-km) long trough occupied by the Gulf of California and continues northward to Palm Springs. The East Pacific Rise is a crustal spreading center characterized by a series of northwest-trending transform faults, the northernmost being the San Andreas. The tectonic activity of the East Pacific Rise has downwarped, downfaulted, extended, and laterally translated the sediments within the Salton Trough. Its underlying geologic complexity is masked by the relatively featureless surface of the basin, filled by thousands of feet of marine and nonmarine sediments (Morton 1977; Hunt 1974).

The sub-sea-level basin of the Salton Trough has received a continuous influx of sand, silt, and clay derived from the Colorado River, which created ephemeral lakes in the basin until about 300 years ago. Underlying this alluvial cover is a succession of Tertiary and Quaternary sedimentary rocks at least 20,000 ft (6,096 m) thick. These rocks are composed mainly of marine and nonmarine sandstones and clays and lake deposits. The depth to basement rock ranges from 11,000 to 15,400 ft (3,353 to 4,694 m), though metamorphism of sedimentary deposits is known to occur at depths as shallow as 4,000 ft (1,219 m) because of the high heat flows associated with crustal spreading. High heat flows also give rise to geothermal steam; several “known geothermal resources areas” have been delineated by the U.S. Geological Survey (USGS) in the Imperial Valley (Morton 1977).

The major geologic resources in Imperial County are sand and gravel. Of the 45 active mines reported by the California Department of Conservation Division of Mines and Geology (now the California Geological Survey) for 1997 through 1998, 36 (80%) were sand and gravel. Other mines in the county include gold (four), clay (two), limestone (one), fill (one), and gypsum (one) (Larose et al. 1999). While there is evidence of past small-scale mining (for sand and gravel) near the existing 230-kV IV-La Rosita transmission line (hereafter in this chapter referred to as the existing line), there is currently no active mining in this area.

3.1.2 Physiography

The Imperial Valley is a flat, alluvium-filled basin following the same northwest trend as the Salton Trough. Located in the south-central part of Imperial County, the valley has an area of about 989,450 acres (400,418 ha) in the United States and is bounded to the north by the Salton Sea and extends south into Mexico. To the east are the Algodones Dunes and Sand Hills; to the west (from north to south) are the Fish Creek Mountains, Superstition Hills, Superstition Mountain, and the Coyote Mountains (Figure 3.1-1). The Yuha Desert lies to the southwest. The Imperial Valley is separated from the Gulf of California by the ridge of the Colorado River delta, which has an elevation of about 30 ft (9 m) above mean sea level (MSL) at its lowest point (Morton 1977; Zimmerman 1981).

As recently as 300 years ago, a lake, called Lake Cahuilla, filled the Imperial Valley basin to the elevation of the Colorado River delta. The shoreline of this ancient lake has an elevation of about 35 ft (11 m) above MSL and is visible today. Between the east side of the ancient lake bed and the Algodones Sand Hills is a desert plain, called the Imperial East Mesa, a terrace of the Colorado River delta. The proposed transmission line routes are located near the Imperial West Mesa, a desert plain to the west of the ancient lake bed (Figure 3.1-1).

3.1.3 Soils

The soils within the Imperial Valley study area are formed predominantly on silty to sandy sediments within and adjacent to ancient Lake Cahuilla, with interspersions of gravels and clays transported by the Colorado River (Zimmerman 1981). For the most part, the lake deposits are deep, poorly consolidated, and subject to both water and wind erosion. Gradual deflation of these deposits has resulted in the formation of desert pavement and protopavement over large areas. Stable lake deposits appear to be especially susceptible to this process. Most of the surface formations within the project area consist of, or are overlain by, thin wind deposits derived from lake sands and silts. The softer underlying silt and clay formations are dissected by intricate drainage systems trending northward toward the Salton Sea. Ancient beach deposits can often be observed in the banks of these channels.

The proposed transmission line routes and the two alternative routes would cross two soil associations as mapped by the U.S. Department of Agriculture (USDA) Soil Conservation Service (Zimmerman 1981), now called the Natural Resources Conservation Service. These soils represent the two general kinds of landscapes in the southwestern portion of the Imperial Valley: the lake basin formerly occupied by ancient Lake Cahuilla and the mesas to the east and west of the lake basin (the western alternative route would cross soils of the Imperial West Mesa). The soils within the utility corridor already provide adequate structural support for the existing line immediately adjacent to the location of the proposed transmission line routes.

The USDA soil survey did not cover the area south of State Route 98 and west of the proposed transmission line routes; however, the soil types in these areas can be assumed to be similar. Brief summaries of the soil associations are provided below.

3.1.3.1 Meloland-Vint-Indio Association

This soil association consists of nearly level, well-drained fine sand to silt loam formed predominantly in the lake basin, floodplains, and on the low alluvial fans of the Imperial West Mesa. Natural drainage of these soils has been altered by extensive irrigation in the area and seepage of water from irrigation canals. During periods of heavy irrigation, a perched water table may be found at depths less than 60 in. (152 cm). These soils are deep (to at least 60 in., or 152 cm), low to moderately permeable, with a high to very high water capacity. The soil erosion hazard is generally slight, but soils in this unit are susceptible to blowing and to erosion during infrequent periods of intense rainfall. At higher elevations, floodwaters have created a drainage network of rills and arroyos. These soils are mainly used for farmlands but are also well suited for home sites, urban areas, and desert recreation.

3.1.3.2 Rositas Association

This soil association consists of nearly level to moderately steep (with slopes up to 30%), excessively well-drained sand to silt loam formed in the transitional area between the ancient beachline of the Lake Cahuilla basin to the middle and upper levels of alluvial fans from the Imperial West Mesa. These soils are deep (to at least 60 in. [152 cm]), highly permeable, and have a low water capacity. The soil erosion hazard is generally slight, but soils in this unit are susceptible to blowing and erosion during infrequent periods of intense rainfall. These soils are mainly used for desert recreation and wildlife habitat, but they have the potential for irrigated farming. They are also well suited for home sites and urban areas. Locally, these soils are a source of sand.

3.1.3.3 Prime Farmland

The Natural Resources Conservation Service has designated certain soil types in the Imperial Valley as “prime farmland” (if irrigated) subject to protection under the Farmland Protection Policy Act (FPPA; Public Law [P.L.] 97-98, 7 USC 4201). Among these are several soil types found in the Lake Cahuilla basin as part of the Meloland-Vint-Indio soil association: Meloland very fine sandy loam, wet; Meloland and Holtville loams, wet; Indio loam; Indio loam, wet; Indio-Vint complex; Vint loamy very fine sand, wet; Vint fine sandy loam; and Vint and Indio very fine sandy loams, wet. The Rositas silt loam (0 to 2% slopes) soil type found in the Rositas soil association in floodplains, basins, and terraces of the Imperial West Mesa also qualifies as prime farmland (California Department of Conservation 1995). Construction activities on privately owned property or within an existing ROW, such as the one through which the existing line runs, are not subject to the FPPA; however, the FPPA may apply to any route on public land outside of the existing utility corridor.

3.1.4 Seismicity

The zone of northwest-trending strike-slip faults in the Salton Trough defines the transform boundary between the Pacific and North American plates (Figure 3.1-2). As part of this system, the Imperial Valley is a seismically active region. In the past 100 years, 5 earthquakes with a magnitude equal to or greater than 6.5 have occurred: December 30–31, 1914 (2 earthquakes with magnitudes of 6.5 and 7.1), just below the U.S.-Mexico border; May 18, 1940 (magnitude 6.7), along the Imperial Fault; October 15, 1979 (magnitude 6.6), also along the Imperial Fault; and most recently, November 24, 1987 (magnitude 6.6), along the Superstition Hills Fault. Interim seismic activity is characterized by smaller magnitude earthquake swarms (Real et al. 1979; SCEDC 2004).

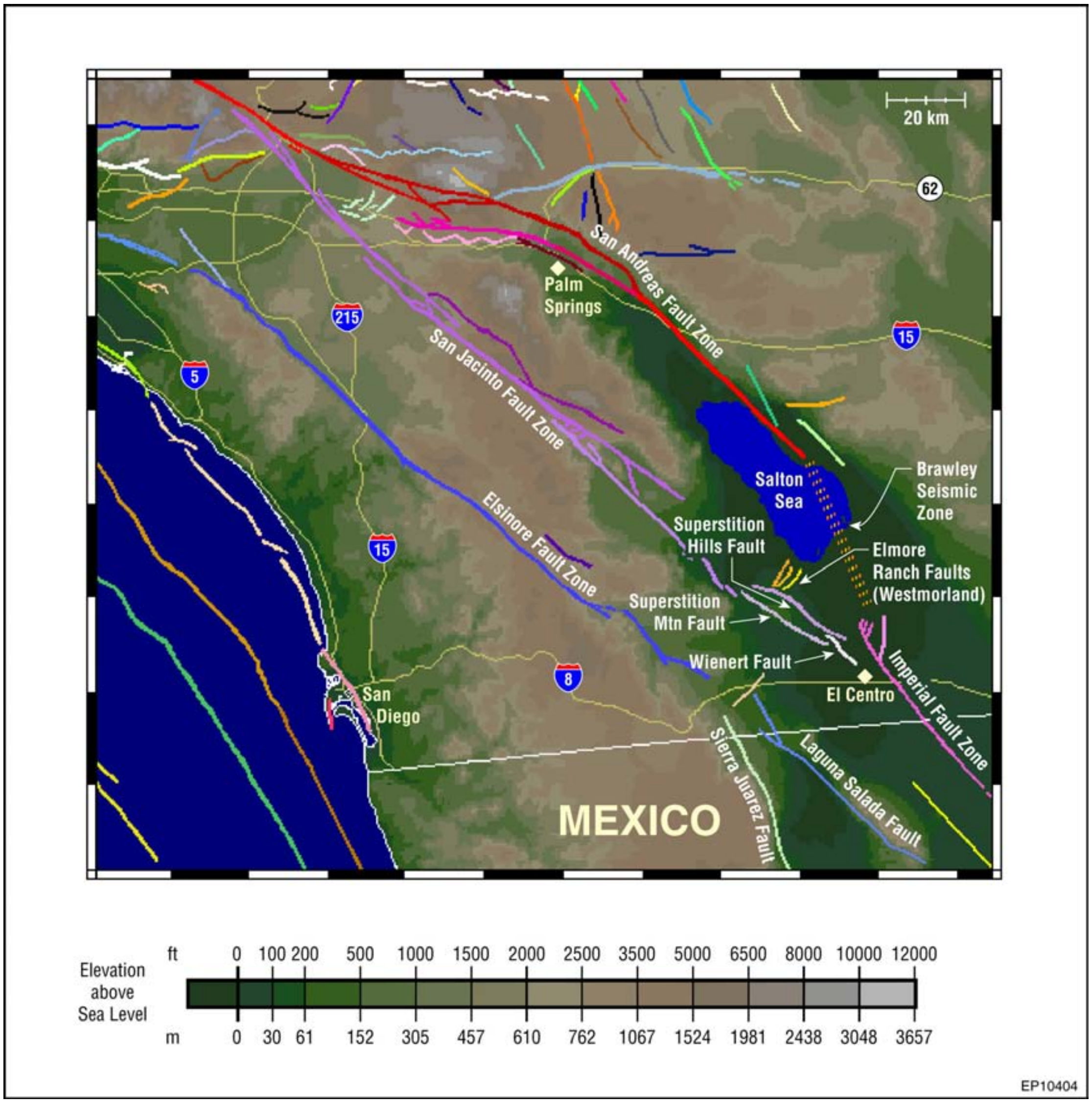

FIGURE 3.1-2 Major Fault Zones in the Salton Trough, Southern California (Source: SCEDC 2004)

The proposed transmission line routes and the two alternative routes would lie between the Laguna Salada Fault (about 9 mi [14 km] west), the Superstition Hills Fault (about 9 mi [14 km] northeast), and the Imperial Fault (about 14 mi [23 km] east) (Figure 3.1-2). In recent history, the Imperial Fault has had the most activity. Earthquakes along this fault have produced surface rupture (i.e., breakage of the ground) along the surface trace of the fault and offsets as great as 15 ft (4.5 m) (SCEDC 2004).

3.2 WATER RESOURCES

Water resources associated with the transmission line projects include surface water, wetlands, floodplains, and groundwater.

3.2.1 Surface Water Resources

The proposed routes and the two alternative routes for the projects lie within Imperial Valley, California, and the Colorado Desert. Very high summer temperatures, low precipitation, and high evaporation rates produce an extremely arid environment. Imperial Valley, California, has an average annual rainfall of about 3 in. (8 cm) (Setmire 2000). Under these conditions, surface water is scarce. The only surface water resource that would be directly affected by the projects is the New River. Indirect impacts would affect the Salton Sea and a pilot wetland project (at Brawley) along the New River. No natural wetlands occur along the New River (Barrett 2004).

The following sections present background information on the New River, the Zaragoza Oxidation Lagoons, Salton Sea, and the Brawley wetland. This information is used in Section 4.2 to evaluate the environmental impacts of the projects to surface water resources in the United States. The Zaragoza Oxidation Lagoons, a man-made feature, are part of the plants' operating systems (as described in Chapter 2). They are discussed in this section because they are also a source of water for the New River.

3.2.1.1 New River

3.2.1.1.1 Physical Conditions. The New River originates about 15 mi (24 km) south of Mexicali, Mexico, and flows 60 mi (97 km) northward through Imperial County, California, to the Salton Sea (EPA 2003b). The channel of the New River was formed between October 1905 and February 1907, when high waters following summer flooding in the Colorado River breached a temporary diversion that had been designed to bypass a silted-up section of the

TABLE 3.9-4 County Housing Characteristics

Type of Unit	1990	2000	2003[a]
Owner occupied	18,907	22,975	24,900
Rental	13,935	16,409	17,800
Total unoccupied units	3,717	4,507	4,900
Total units	36,559	43,891	47,500

[a] DOE/BLM projections.

Sources: U.S. Bureau of the Census (1994, 2001a).

3.10 MINORITY AND LOW-INCOME POPULATIONS

Executive Order 12898 (February 16, 1994) formally requires Federal agencies to incorporate environmental justice as part of their missions. Specifically, it directs them to address, as appropriate, any disproportionately high and adverse human health or environmental effects of their actions, programs, or policies on minority and low-income populations.

The analysis of potential environmental justice issues associated with the proposed transmission lines followed guidelines described in the CEQ's *Environmental Justice Guidance under the National Environmental Policy Act* (CEQ 1997a). The analysis method has three parts: (1) a description of the geographic distribution of low-income and minority populations in the affected area is undertaken; (2) an assessment of whether the impacts of construction and operation of the transmission lines would produce impacts that are high and adverse; and (3) if impacts are high and adverse, a determination is made as to whether these impacts disproportionately impact low-income or minority populations. Information on item (1) is provided in this section. Information on items (2) and (3) is in Section 4.12.

A description of the geographic distribution of minority and low-income population groups was based on demographic data from the 2000 Census (U.S. Bureau of the Census 2001a). The following definitions were used to identify low-income and minority populations:

- **Minority.** Persons are included in the minority category if they identify themselves as belonging to any of the following racial groups: (1) Hispanic, (2) Black (not of Hispanic origin) or African American, (3) American Indian or Alaska Native, (4) Asian, Native Hawaiian, or Other Pacific Islander.

  Beginning with the 2000 Census, where appropriate, the census form allows individuals to designate multiple population group categories to reflect their ethnic or racial origin. In addition, persons who classify themselves as being of multiple racial origin may choose up to six racial groups as the basis of their racial origins. The term minority includes all persons, including those classifying themselves in multiple racial categories, except those who classify themselves as not of Hispanic origin and as White or "Other Race" (U.S. Bureau of the Census 2001a).

The CEQ guidance proposed that minority populations should be identified where either (1) the minority population of the affected area exceeds 50% or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

This EIS applies both criteria in using the Census Bureau data for census block groups, wherein consideration is given to the minority population that is both over 50% and 20 percentage points higher than in the county (the reference geographic unit).

- **Low-Income.** Individuals who fall below the poverty line threshold. The poverty line threshold takes into account family size and age of individuals in the family. In 1999, for example, the poverty line for a family of five with three children below the age of 18 was $19,882. For any given family below the poverty line, all family members are considered as being below the poverty line for the purposes of analysis (U.S. Bureau of Census 2001a).

  The CEQ guidance proposed that a low-income population exists where the percentage of low-income persons in any geographic unit is more than 20 percentage points higher than in the reference geographic unit. A low-income population also exists in any geographic unit where the number of low-income persons exceeds 50% of the total population.

Data in Table 3.10-1 show the minority and low-income composition of the total population for Imperial County on the basis of 2000 census data and CEQ guidelines. Individuals identifying themselves as Hispanic or Latino are included in the table as a separate entry. However, because Hispanics can be of any race, this number also includes individuals identifying themselves as being part of one or more of the population groups listed in the table. Almost 80% of the total county population can be classified as minority, with almost 23% in the low-income category.

The geographic distributions of minority and low-income populations in Imperial County are shown in Figures 3.10-1 and 3.10-2. A large majority of census block groups in the county were more than 50% minority in 2000, although none had a percent minority more than 20 percentage points higher than the county average. Only a small number of census block groups in the county had a percent low-income more than 20 percentage points higher than the county average in 2000; one block group was more than 50% low-income in 2000.

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Imperial Canal (Setmire 2000; CRBRWQCB 1998a).[1] Water from the diverted Colorado River flowed for about 18 months, creating the New River and the Salton Sea. The breach created a channel that was 40 to 60 ft (12 to 18 m) deep, with a width of about 1,800 ft (549 m) (IID 2003c).

The New River flows north through Mexicali, crosses the U.S.-Mexico border at Calexico, California, and then flows northward through Imperial County to the Salton Sea (DHHS 1996; EPA 2003b). As it flows northward from Calexico, it passes through Seeley, Imperial, Brawley, and Westmorland, California (Figure 3.2-1).

In Mexico, the New River is reportedly used for bathing, drinking, household chores, and irrigation of crops (DHHS 1996). In the United States, water in the New River is used for agriculture via irrigation, and recreation. It is not used as a source of drinking water. Recreational activities include waterfowl hunting, fishing, and frog catching (DHHS 1996). Beneficial uses of the New River include freshwater replenishment; industrial surface water supply; preservation of rare, threatened species; water contact and noncontact recreation; warm freshwater habitat; and wildlife habitat (EPA 2003c).

Within the United States, the channel of the New River has a maximum width of about 3,500 ft (1,067 m) (CRBRWQCB 1998a). Recent USGS measurements at Calexico, California, indicate that the New River has a width of about 40 ft (12 m); at Westmorland, California, its width is about 95 ft (30 m) (USGS 2003a,b). The depth of the water depends on its flow. At the Calexico gage, between 1983 and 2003, the depth of water (i.e., stage) ranged from about 8 to 15 ft (2.4 to 15 m) (USGS 2003c).

The annual mean flows for the New River at USGS gages (10254970) at Calexico and Westmorland (10255550), California, are listed in Table 3.2-1 and shown in Figure 3.2-2. Between the U.S.-Mexico border and the gage near Westmorland, the New River gains in flow because of agricultural runoff and wastewater discharge. The mean flow at the Calexico gage is approximately 180,000 ac-ft/yr (7.04 m^3/s) for the period of record 1980 through 2001; the mean flow at Westmorland, California, for the same period is about 463,000 ac-ft/yr (18.10 m^3/s). As Table 3.2-1 and Figure 3.2-2 indicate, flow at these gages varies from year to

Standard Deviation

A statistical measure of spread or variability. The definition for standard deviation is the square root of the variance. In more simple terms, standard deviation is a statistic that tells you how tightly all of the various examples you are looking at are clustered around the mean (average) in a set of data. When the examples are tightly bunched together, the standard deviation is small. When the examples are spread apart, the standard deviation becomes relatively large. In the case of the New River, numerous measurements have been taken of flow rate over a one-year period. The standard deviation of these measurements was then calculated as a measure of the normal variation of flow.

[1] The Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) is one of nine regional water quality boards (collectively known as the California Regional Water Quality Control Board) that regulate most of the water-related projects in California. These agencies are managed under the State Water Resources Control Board (SWRCB), located in Sacramento, California, which is part of the California EPA (Cal/EPA).

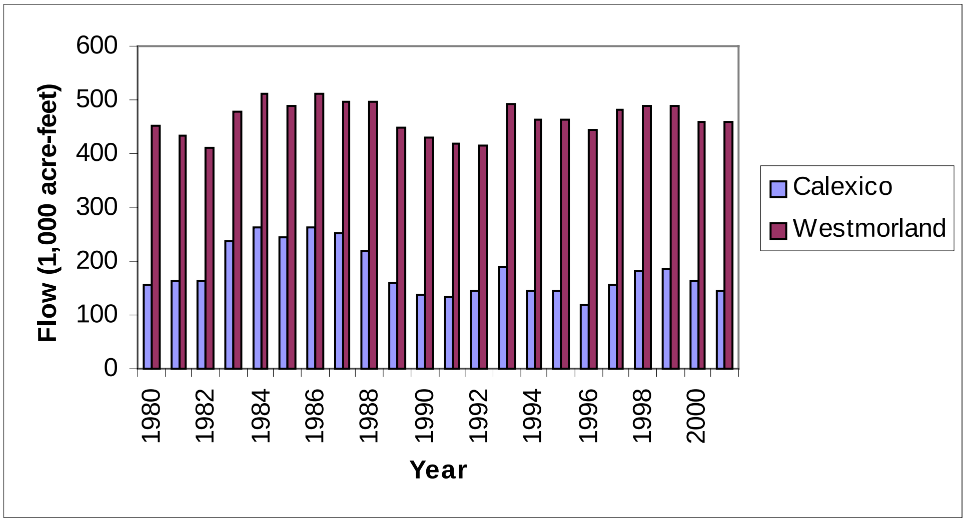

FIGURE 3.2-2 Annual Mean Flow in the New River at Calexico and Westmorland, California, 1980–2000 (Source: USGS 2003a,b)

year. The variability of the flow at Calexico, California, is about 46,000 ac-ft/yr (1.80 m^3/s); the variability at Westmorland, California, is about 31,000 ac-ft/yr (1.21 m^3/s). Minimum flows recorded for the Calexico and Westmorland gages for the period of record 1980 through 2001 were about 118,000 and 412,000 ac-ft/yr (4.62 and 16.11 m^3/s), respectively; maximum flows were about 264,000 and 513,000 ac-ft/yr (10.33 and 20.06 m^3/s), respectively (Table 3.2-1).

Figures 3.2-3 and 3.2-4 show depth/flow curves using the USGS data. These curves estimate the correlation between water depth and flow. A linear regression model was applied to the data to reduce its variability. The regression line shown in Figure 3.2-3 for the Calexico gage, along with its equation and R^2 coefficient (coefficient of determination; an R^2 value of 0.0 indicates that knowledge of variable *X* [in this case, flow] does not help in predicting value *Y* [in this case, the depth of the water]; an R^2 value of 1.0 indicates that all *Y* values are perfectly predicted from knowledge of *X*; i.e., *Y* lies on a straight line with no scatter). For a mean flow of 180,000 ac-ft/yr (7.04 m^3/s), the depth of the water in the New River at the Calexico gage calculated with the linear regression model is approximately 9.5 ft (2.9 m). For a standard deviation of 45,600 ac-ft/yr (1.78 m^3/s), the elevation of the water for a flow equal to the mean flow value minus one standard deviation 135,380 ac-ft/yr (5.30 m^3/s) would be about 9.0 ft (2.7 m), a difference of 0.5 ft (0.15 m) from calculated mean-flow conditions.

At the Westmorland gage, shown in Figure 3.2-4, the depth of the water ranges from about 4.6 to 7.4 ft (1.4 to 2.3 m) for a flow that ranged from about 260,600 to 680,500 ac-ft/yr (10.19 to 26.61 m^3/s) over the period of record 1993 through 2003 (USGS 2003d). Because the depth/flow data have short-scale variability, similar to that observed in the data for the Calexico depth/flow data, a linear regression model was again applied. Figure 3.2-4 shows the regression line for the model, its equation, and R^2 value. For a mean flow of 463,340 ac-ft/yr (18.12 m^2/s), the depth of the water calculated, using the linear regression model of the data, is about 6.0 ft

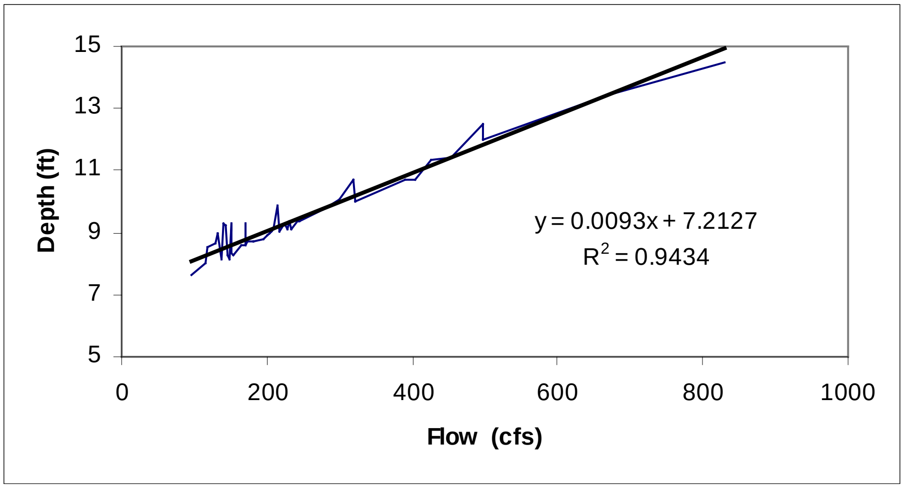

FIGURE 3.2-3 Depth/Flow Relationship for the Calexico Gage

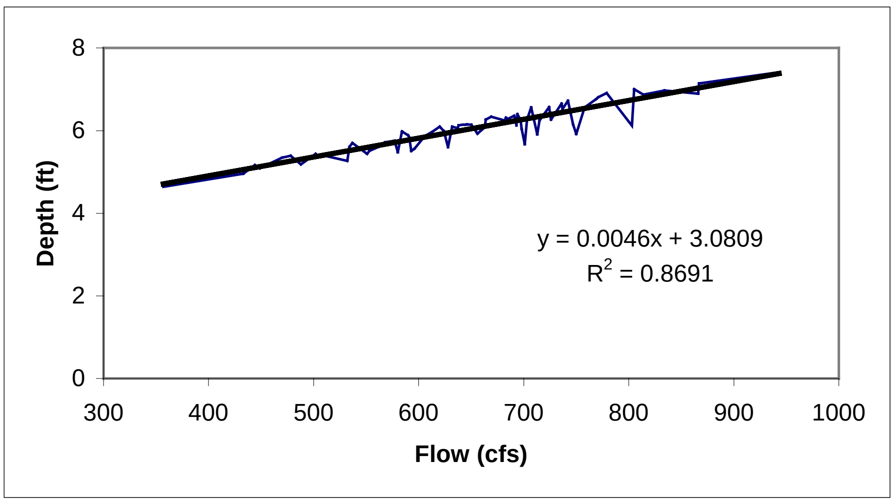

FIGURE 3.2-4 Depth/Flow Relationship for the Westmorland Gage on the New River (to convert ft^3/s to m^3/s, multiply by 0.02832)

(1.8 m). For a standard deviation of 31,130 ac-ft/yr (1.22 m^3/s), the depth of the water for a flow equal to the mean value minus one standard deviation calculated with the linear regression model is about 5.8 ft (1.8 m), a difference of 0.2 ft (0.1 m) from mean-flow conditions.

3.2.1.1.2 Water Quality. Water quality in the New River is, in general, poor. Pollution sources include agricultural drainage (both tailwater [i.e., surface water that drains from the low end of an irrigated field when the amount of water added to the field exceeds the infiltration capacity of the soil] and tilewater [i.e., subsurface water that drains via tiles from an irrigated field]); industrial and residential wastewater from Mexicali, Mexico, and the Imperial Valley in

California; and runoff from confined animal feeding operations and industrial and household "dumps" along the river.

Tiles

Man-made subsurface drains remove excess water from soil, usually through a network of perforated tubes installed 2 to 4 ft (0.6 to 1.2 m) below the soil surface. These tubes are commonly called "tiles" because they were originally made from short lengths of clay pipes.

Maquiladoras are sources of New River pollution in Mexicali (Pauw 2003). A maquiladora is a Mexican corporation that operates under a maquila (Mexican In-Bond) program approved by the Mexican Secretariat of Commerce and Industrial Development (Baz 2003). Many of these industries discharge untreated wastewater into rivers daily (American Rivers 2003). Additional pollution from south of the U.S.-Mexico border comes from the operation of two wastewater treatment lagoon systems in two water treatment districts (Mexicali I and II) in the Mexicali metropolitan area (Figure 3.2-5). These systems are organically and hydraulically overloaded because of large local municipal sewage flows. Because of the lack of treatment capacity and an inadequate and aging collection system, Mexicali discharges 5 million to 20 million gal/d (18.9 million to 79.7 million L/d) of untreated municipal wastewater into the New River (CRBRWQCB 2004b).

In the United States, the New River receives urban runoff, agricultural runoff, treated industrial wastes, and treated, disinfected, and nondisinfected domestic wastes from the Imperial Valley (University of California 2003). It also receives about 8,000 ac-ft (9.9 million m^3) of treated wastewater per year from eight National Pollutant Discharge Elimination System (NPDES) Imperial Valley wastewater treatment facilities. Of these facilities, three discharge disinfected effluent (approximately 4,100 ac-ft [5.1 million m^3]), and five discharge about 3,800 ac-ft (4.7 million m^3) of nondisinfected effluent (Cal/EPA 2003).

Environmental sampling of the New River has been performed at the U.S.-Mexico border since 1969; additional sampling has been performed between the U.S.-Mexico border and the Salton Sea. Many agencies, including the USGS, the California Regional Water Quality Control Board, the California State Water Resource Control Board, and the California Department of Fish and Game, have sampled water from the New River.

Contaminants of concern detected in water samples from the New River at the U.S.-Mexico border that exceeded comparison values set by the Agency for Toxic Substances and Disease Registry include pathogens (e.g., fecal coliform bacteria, fecal streptococci, *E. coli* bacteria, and enterococci bacteria), metals (e.g., lead, arsenic, cadmium, thallium, antimony, boron, and manganese), pesticides (e.g., aldrin, chlordane, dichlorodiphenyldichloroethane [DDD], 4,4'-DDD, dichlorodiphenyldichloroethylene [DDE], dichlorodiphenyltrichloroethane [DDT], and heptachlor epoxide), and volatile organic compounds (VOC) (e.g., tetrachloro-ethylene [TCE], methylene chloride, and *n*-nitrodiphenylamine) (DHHS 1996).

For the present study, water quality parameters of interest include salinity, selenium, total phosphorus, biochemical oxygen demand (BOD), chemical oxygen demand (COD), and total

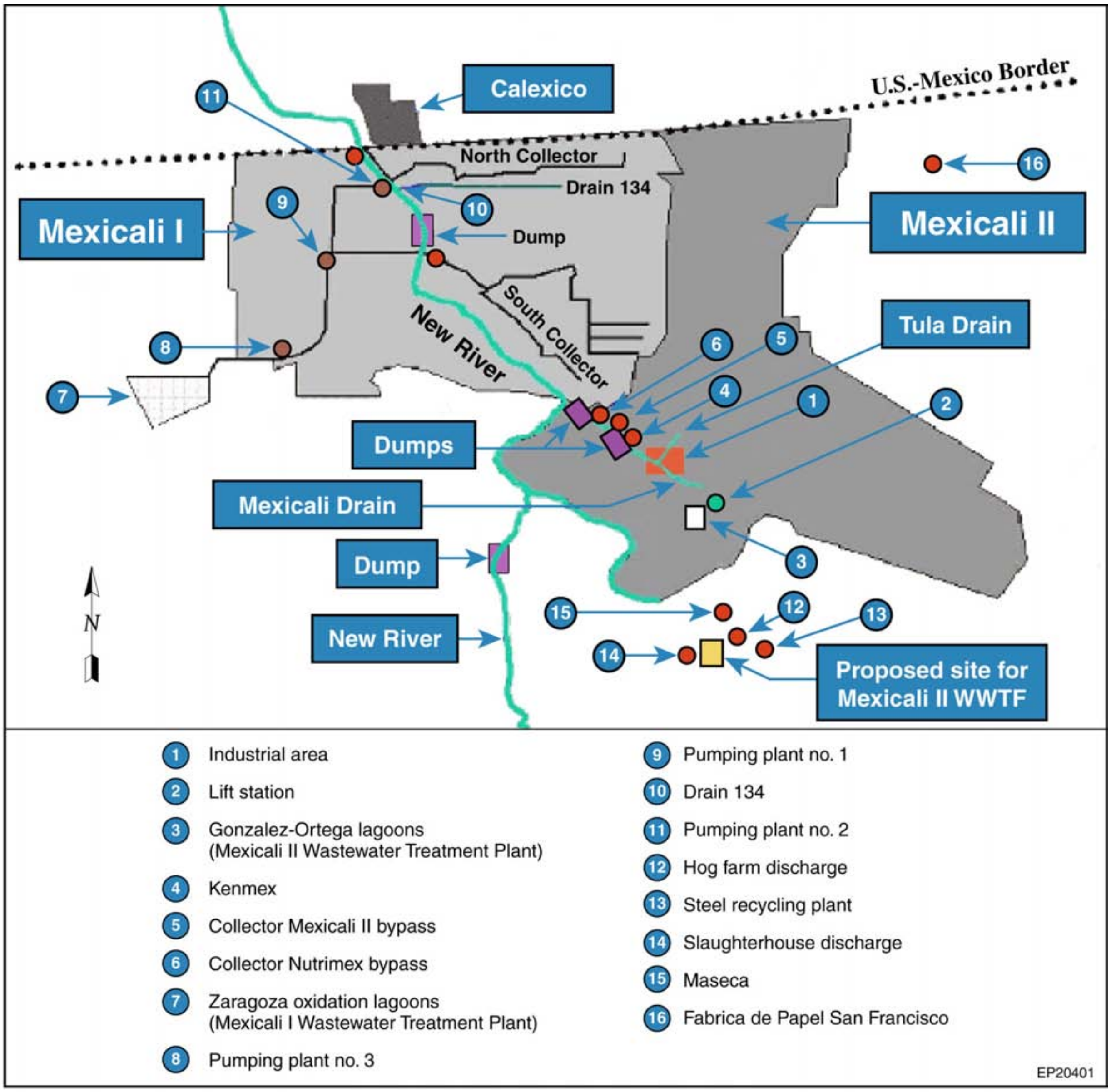

FIGURE 3.2-5 The New River in Mexicali, Mexico (Source: CRBRWQCB 2004c)

suspended solids (TSS). These parameters are of interest because operation of the power plants could increase the salinity and the selenium concentration in the New River and decrease the concentrations of the other constituents because of water treatment (Section 4.2).

Salinity. Salinity is a measure of the number of grams of material (salts) dissolved in a number of grams of water. Salinity is often referred to as total dissolved solids (TDS) and is usually expressed in units of milligrams of dissolved salts per unit volume of water (mg/L).[2]

2 One milligram (mg) is equal to 0.001 g; one microgram (µg) is equal to 0.000001 g.

Because 1 L of water weighs 1,000 g, 1 mg/L is the same as one part per million (ppm). Important salts associated with the New River include chloride, sodium, magnesium, calcium, carbonate, bicarbonate, nitrate, and sulfate (University of California 2003). The primary source of salts in waters is from chemical weathering of earth materials, such as rocks and soils. Other sources of salts include salt flushing (passing clean irrigation water through soil to reduce its salt content), chemical fertilizers, animal wastes, sewage sludges and effluents, and oil- and gas-field brines (University of California 2003).

From January 1997 through April 2003, the Colorado River Basin Regional Water Control Board collected samples of river water at the Calexico gage at the U.S.-Mexico border (CRBRWQCB 2003b). Monthly measurements of the TDS concentration for the New River water at the Calexico gage at the U.S.-Mexico border are shown in Figure 3.2-6. The mean TDS concentration for the period of record is about 2,620 mg/L. This value is less than the 4,000 mg/L upper bound for Colorado River basin water quality objectives (SWRCB 2003). The variability of the TDS concentration is about 315 mg/L. Most of this salinity is derived between Mexicali and the U.S.-Mexico border. As a point of reference, the mean salinity of the Colorado River, the primary source of water in the New River, is about 650 to 700 mg/L (University of California 2003).

Selenium. Selenium is an essential nutrient for humans and animals. When consumed in amounts greater than the amounts needed for good nutrition, selenium can be toxic. Selenium is naturally occurring in the environment and is usually found in a compound form. Plants can readily take up selenium compounds from water and concentrate them. This effect is particularly important for fish and birds that eat fish.

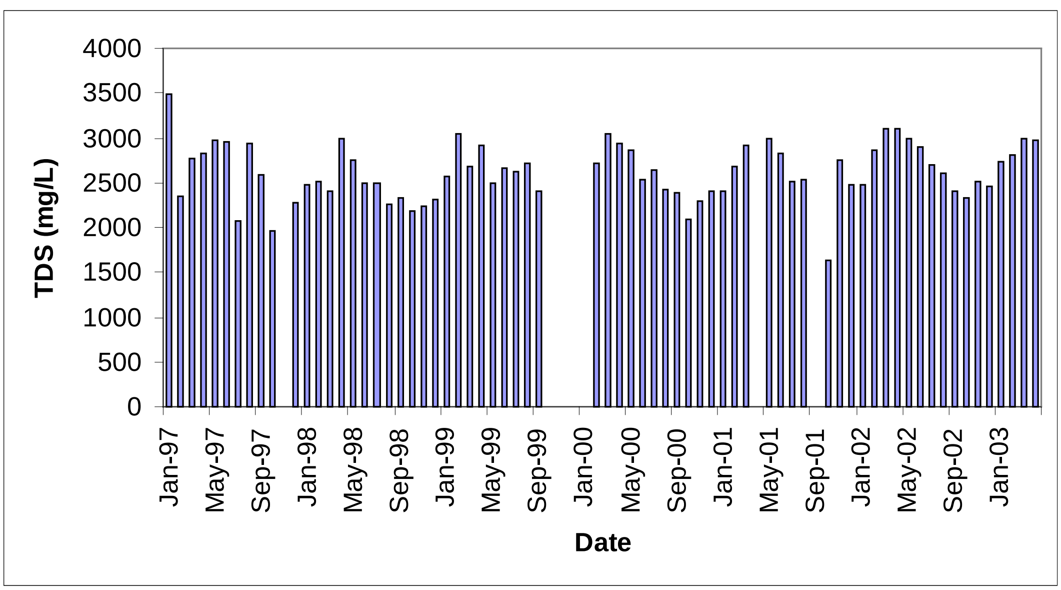

FIGURE 3.2-6 Total Dissolved Solids (mg/L) Concentration at the Calexico Gage on the New River (Source: CRBRWQCB 2003a)

Selenium measurements have been made for a number of years at the U.S.-Mexico border. Table 3.2-2 lists the values recorded for the past 6 years (1997 through 2003) by the Colorado River Basin Regional Water Quality Control Board. As indicated in Table 3.2-2, selenium was not detected (the reporting limit was 0.005 ppm; 1 ppm = 1 mg/L). In 2002, regular monthly detections occurred. These detections may have occurred either because smaller detection limits were used during sample analysis, or the method of reporting the results changed (E.S. Babcock and Sons, Inc., Laboratory replaced Department of Health Services - Southern California Laboratory for analytical work for most of the water sampling analysis during 2002). The average concentration for selenium was about 0.021 mg/L. The standard deviation of sample concentrations was also about 0.021 mg/L, indicating variability in the dataset.

The U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) for selenium is 0.05 mg/L or 50 μg/L (EPA 1996). Thus, the average value of the selenium concentration for the New River at the U.S.-Mexico border is less than the MCL for this contaminant.

Maximum Contaminant Level

The U.S. Environmental Protection Agency (EPA) has determined maximum contaminant levels (MCLs) that are allowable in water systems. MCLs have been determined for a wide range of pollutants ranging from metals to volatile organic compounds. Complete lists of pollutants and their MCLs are published by the EPA.

TABLE 3.2-2 Selenium Concentrations (μg/L) in New River Water at the U.S.-Mexico Border

	1997	1998	1999	2000	2001	2002[b]	2003
January	ND[a]	ND	ND	ND	ND	ND	ND
February	ND	ND	ND	ND	ND	11	ND
March	ND	30	ND	ND	ND	22	ND
April	ND	ND	ND	ND	ND	9.2	ND
May	ND	ND	ND	ND	ND	20	NA[c]
June	21	ND	ND	ND	ND	14	NA
July	ND	ND	ND	ND	ND	7.3	NA
August	ND	ND	ND	ND	ND	13	NA
September	37	ND	ND	ND	NA	72	NA
October	ND	ND	ND	ND	ND	ND	NA
November	ND	ND	ND	ND	ND	ND	NA
December	ND	ND	ND	ND	ND	ND	NA

[a] ND = nondetect; reporting limit = 5 μg/L.

[b] Detection limits in 2002 were 5 μg/L (0.005 mg/L).

[c] NA = not available.

Source: CRBRWQCB (2003a).

TSS, BOD, COD, and Phosphorus. In addition to salinity and selenium, other important water quality parameters for the New River are TSS, BOD, COD, and total phosphorus. Excess sediment in the water column (i.e., TSS) and in bottom deposits threatens many aquatic and terrestrial organisms that use New River habitat. BOD and COD deplete the quantity of oxygen available in the water. TSS, BOD, and COD concentrations, reported in mg/L, for 1997 through April 2003 are shown in Figures 3.2-7 through 3.2-9, respectively. Yearly averages and total yearly loads for these parameters are given in Table 3.2-3 and shown in Figure 3.2-10. These calculations use average quantities for the flow in the river and the average annual pollutant concentrations. For the period of record, TSS and BOD appear to have remained about constant. COD appears to be increasing with time. This type of increase is probably the result of additional industrial discharge to the river.

Total Suspended Solids

Total suspended solids (TSS) is the concentration of TSS in a water system. Suspended solids increase the turbidity of the water, degrade its quality, and impact the following beneficial uses: warm freshwater habitat, wildlife habitat, preservation of rare, endangered and threatened species, freshwater replenishment, and both contact and non-contact recreation. A Total Maximum Daily Load (TMDL) for New River suspended solids has an ultimate maximum TSS goal of 200 mg/L.

Biochemical Oxygen Demand

The biochemical oxygen demand (BOD) is a measure of the amount of oxygen consumed by microorganisms decomposing organic matter in stream water. A higher BOD value indicates a smaller amount of dissolved oxygen in rivers and streams that is available to higher forms of aquatic life.

Chemical Oxygen Demand

The chemical oxygen demand (COD) measures the total amount of oxidizable (biodegradable and nonbiodegradable) compounds in natural and wastewaters in terms of the equivalent amount of oxygen required to oxidize them. In a natural setting, oxygen depletion results from metabolic processes and contributes to the process of eutrification.

The concentration of total phosphorus in water in the New River is a concern because it is an important biological nutrient for the river, and it is a limiting nutrient for the Salton Sea (Section 3.2.1.3). Excess phosphorus leads to eutrophication of the waterbody. Figure 3.2-11 shows the concentration of total phosphorus at the Calexico, California, gage from 1997 through 2003. Figure 3.2-12 shows the annual total quantity of phosphorus transported by the New River for 1997 through 2001. The total quantity of phosphorus transported past the Calexico gage has been fairly constant and averages about 450 tons/yr (402 t/yr). The average total phosphorus concentration for 1997 through 2003 is about 2.0 mg/L (ppb). Phosphorus has no Safe Drinking Water Act guidelines, MCL, or secondary MCL (SMCL) (EPA 1996). However, to prevent eutrophication, the EPA recommends that phosphates should not exceed 0.025 mg/L in lakes, 0.05 mg/L where streams enter lakes, and 0.1 mg/L in streams that do not flow into lakes (University of California, Davis 2003). To prevent excessive plant growth that becomes a nuisance or adversely affects beneficial uses of the water, a 0.1-mg/L total phosphorus guideline has often been applied (e.g., CRBRWQCB 2003d). The average total phosphorus concentration at the Calexico gage exceeds all of these recommended values.

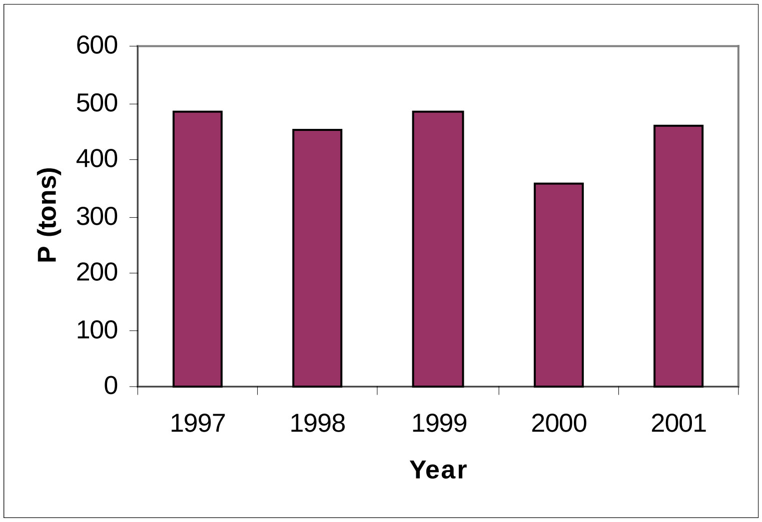

FIGURE 3.2-12 Annual Total Quantity of Phosphorus at the Calexico Gage on the New River at the U.S.-Mexico Border (Source: CRBRWQCB 2003a)

Dissolved Oxygen. The quantity of dissolved oxygen (DO) in the river increases with distance from the U.S.-Mexico border due to reaeration and self-purification. In summer, depressed oxygen levels extend 26 mi (42 km) downstream of the U.S.-Mexico border (i.e., north toward the Salton Sea), making water quality too poor to support a diverse fish population (Setmire 1984).

Temperature. The average temperature of water discharged from the TDM power plant for the period June through November 2004 was 79.2°F (26.2°C) (Henao 2004). The range of temperatures was 66.0 to 94.5°F (18.9 to 34.7°C). Water temperatures in effluent from the Zaragoza Oxidation Lagoons averaged 70.7°F (21.5°C) for the period August 2000 through June 2004 (Kasper 2003). The range of effluent temperature was 49.1 to 89.6°F (9.5 to 32°C). The water temperature in the New River at the Calexico gage has not been recorded regularly since 1981 (USGS 2003c). Between September 26 and September 30, 1977, the water temperature at the Calexico gage was 76.1°F (24.5°C) (Setmire 1984).

Phosphorus

Phosphorus is one of the key elements needed for plant and animal growth. Phosphates, PO_4^{-2}, are formed from elemental phosphorus and oxygen. Phosphates occur in three forms: orthophosphates, produced from natural processes and found in sewage; polyphosphates, found in detergents; and organically bound phosphate, produced from organic pesticides. The sum of all phosphorus-containing compounds is referred to as total phosphorus. Excess phosphorus can lead to eutrophication.

Eutrophication

Eutrophication is a process whereby water bodies, such as lakes, estuaries, or slow-moving streams and rivers, receive excess nutrients (phosphorus and nitrogen) that stimulate excessive plant growth (algae, periphyton-attached algae, and nuisance plants). This enhanced plant growth, often called an algal bloom, reduces dissolved oxygen in the water when dead plant material decomposes and can cause other organisms, such as fish, to die. If the quantity of total phosphorus or nitrogen exceeds the other, the nutrient with the lesser concentration controls the degree of eutrophication and is called limiting.

3.2.1.1.3 Water Quality Guidance for the New River. In evaluating impacts of operations of the proposed projects, pre- and post-operation water quality concentrations are compared with each other and with existing guidance (Section 4.2). The following section discusses applicable regulations, standards, and guidelines for salinity, selenium, TSS, BOD, COD, and phosphorus for the New River. These are in the forms of total maximum daily loads (TMDLs), EPA MCLs, EPA SMCLs, Salton Sea water quality objectives, and Colorado River Basin water quality objectives.

> **Dissolved Oxygen**
>
> Dissolved oxygen (DO) is the concentration of dissolved oxygen in a water system; it serves as an indicator of the existing water quality. DO is important to fish and other organisms living in the water and sediments. Low levels of DO indicate an impaired system. A draft Total Maximum Daily Load (TMDL) for the New River establishes a minimum DO of 5.0 mg/L.

> **Water Quality: Load vs. Concentration**
>
> The concentration of a material is the mass of the material per unit volume of water. Load is the quantity of material passing a given point in a specified period of time (usually one year). If the concentration of a material remains constant over a one-year time period, its annual load is given as the product of its concentration, flow, and a time of one year.

Section 303(d)(a)(1) of the CWA requires state agencies (in this case, the Colorado River Basin Regional Water Quality Control Board) to identify the region’s waters that do not comply with water quality standards applicable to such waters; rank the impaired waterbodies taking into account, among other criteria, the severity of the pollution and the uses made of such waters; and establish TMDLs for those pollutants causing the impairments (SWRCB 2003). As used here, load is the weight per unit of time of a substance passing a point. A TMDL is the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards and ensure that impaired waters attain their beneficial use. For assessments, a TMDL is the sum of the individual waste load allocations for point sources of pollution, the load allocations for nonpoint pollution sources, and the contribution from background sources of pollution.

In 1998, the Colorado River Basin Regional Water Quality Control Board, adopted Resolution 98006, which placed the New River on its list of impaired waters. Impairment of the New River was associated with sedimentation/siltation (including TSS and turbidity), pesticides, bacteria, nutrients, and VOC (SWRCB 2003).

The Colorado River Basin Regional Water Quality Control Board submitted a sedimentation/siltation TMDL to the EPA in May 2002 (CRBRWQCB 2002c); the EPA approved it in March 2003. Similarly, a New River pathogens TMDL for fecal coliform bacteria, *E. coli*, and enterococci bacteria was submitted to the EPA in March 2002 and approved in August 2002 (CRBRWQCB 2004b). TMDLs for the New River for DO, BOD, and COD have been drafted by the Colorado River Basin Regional Water Quality Control Board and are currently under review (CRBRWQCB 2004c). Concentrations of DO, BOD, and COD violate numeric standards in the Water Quality Control Plan for the Colorado River Basin (Basin Plan) and narrative standards in Minute No. 264 of the Mexican-American Water Treaty (CRBRWQCB 2004c). This TMDL would set a minimum DO concentration of 5.0 mg/L for the river and limit the BOD and COD releases to the river. Additional TMDL numeric targets for bacteria, nutrients, pesticides, and VOC are under development (EPA 2003a).

Selenium was not included in the EPA list of anticipated TMDLs for the New River; however, it is being considered as part of a Federal TMDL for the Colorado River Watershed. The EPA has established that the drinking water MCL is 0.005 mg/L (CRBRWQCB 2002c; EPA 1996). Salton Sea objectives that apply to selenium for the New River, as a tributary to the Salton Sea, include: a four-day average value of selenium that shall not exceed 0.005 mg/L, and a one-hour average value of selenium that shall not exceed 0.02 mg/L (CRBRWQCB 2002d).

As with selenium, no TMDLs have been established for salinity or total phosphorus for the New River. However, a 4,000-mg/L upper-bound salinity value for Colorado River Basin water quality objectives has been established (SWRCB 2003).

3.2.1.2 Zaragoza Oxidation Lagoons

The Zaragoza Oxidation Lagoons, described in Chapter 2 (see also Figure 2.2-17), are located in the northwest section of Mexicali, Mexico, and are used to treat wastewater from the Mexicali I district, which has a population of about 500,000 people. The treatment plant has a total design capacity of 22.4 million gal/d (84.8 million L/d). Because of a smaller than anticipated BOD load, the plant has an existing capacity of about 27.4 million gal/d (103.7 million L/d). The current flows entering the headworks of the treatment plant are at about full capacity (27.4 million gal/d [103.7 million L/d]) (EPA 2003b).

The average flow of water discharged from the Zaragoza Oxidation Lagoons to the discharge canals and subsequently to the New River is about 33,200 ac-ft/yr (1.30 m^3/s), which exceeds the full-capacity of the lagoons (30,694 ac-ft/yr or 1.20 m^3/s) (Henao 2004). This value is about 20% of the average flow in the New River at the Calexico gage. Water released from the Zaragoza lagoons is untreated or partially treated sewage water. Concentrations for TDS, TSS, BOD, COD, selenium, and total phosphorus for influent and effluent at the lagoons are provided in Table 3.2-4. The concentration ranges for these parameters (i.e., high versus low) tend to be large.

3.2.1.3 Salton Sea

3.2.1.3.1 Physical Conditions. The Salton Sea is situated in the Salton Trough near the Gulf of California in Riverside and Imperial Counties, California. The Salton Sea is located about 35 mi (56 km) north of the border between Mexico and the United States and about 90 mi (145 km) east of San Diego. In the geological past, the Sea was part of the Gulf of California; it is now separated from the Gulf by a delta created by the Colorado River. The Colorado River has flowed north across this delta forming large, temporary lakes about every 400 or 500 years (Laflin 1995). From 1824 until 1904, the Colorado River flowed into the Salton Basin many times (Salton Sea Authority 2003a), including 1840, 1849, 1852, 1859, 1867, and 1891 (Krantz 2002). The temporary lakes formed by the floodwaters dried up when the Colorado

River again flowed south to the Gulf. The last large lake that formed was ancient Lake Cahuilla; it covered about 2,100 mi^2 (5,440 km^2). Evidence of an ancient shoreline suggests that Lake Cahuilla occupied the basin until about 300 years ago (BOR 2003a).

TABLE 3.2-4 Influent and Effluent Concentrations for the Zaragoza Oxidation Lagoons (2000–2003)

Parameter	Average	Low	High
Influent (mg/L)			
TDS	1,147	816	1,404
TSS	192	42	772
BOD	217	67	386
COD	528	335	836
Selenium[a]	0.001[b]	ND[c]	0.0021
Total phosphorus[a]	4.5	ND	9.5
Effluent (mg/L)			
TDS	1,170	944	1,872
TSS	59	14	132
BOD	44	4	99
COD	162	110	210
Selenium[a]	0.0011[b]	ND	0.0026
Total phosphorus[a]	4.3	0.10	8.2

[a] Source: Kasper (2003).

[b] Value represents an average of results with detectable levels of selenium.

[c] ND = not detected.

The Salton Sea was formed between 1905 and 1907 when floodwaters in the Colorado River breached a temporary diversion of a silted-up section of the Imperial Canal and flowed into the Salton Trough rather than to the Gulf. Flooded areas in 1905 through 1908 are shown in Figure 3.2-13. The Salton Basin, below an elevation of –226 ft (–67 m) MSL, was designated as an agricultural sump in 1928 under Executive Order of Withdrawal (Public Water Reserve No. 114, California No. 26) (CRBRWQCB 2003b) to receive agricultural drainage water. When formed, the Sea had an elevation of –195 ft (–59 m) MSL, with a surface area of about 520 mi^2 (1,347 km^2) (Ponce et al. 2003). The surface of the Sea began to drop until the 1930s, when agricultural drainage inflows from the nearby developing Imperial and Coachella Valleys sustained the Sea's level (BOR 1999). From the 1930s to the 1960s, the level of the Sea increased slowly (Figure 3.2-14). Since 1980, the level of the Sea has been fairly constant, with a balance between inflow and evaporation.

Currently, the Salton Sea is about 35 mi (56 km) long and from 9 to 15 mi (14 and 24 km) wide. It covers about 360 mi^2 (932 km^2) and has about 105 mi (169 km) of shoreline (IID 2003c). The saline lake lies within a closed basin (Salton Sink, also known as the Salton Basin) and has no outlets. Its surface is about –227 ft (–69 m) MSL. At its deepest, the Sea has a depth of about 50 ft (15 m) (about –278 ft [–85 m] MSL); its average depth is about 30 ft (9 m) (–258 ft [–79 m] MSL) (Ponce et al. 2003). With a volume of about 7.53 million ac-ft (9.3×10^9 m^3), it is the largest inland body of water in California. The northern portion of the Sea is referred to as the North Basin; the southern portion is referred to as the South Basin.

The principal resource values of the Salton Sea are based on its recreational and wildlife uses and support of agricultural activities in the Coachella and Imperial Valleys. Recreational uses include fishing, boating, swimming, camping, sightseeing, and birding. Wildlife uses include aquatic habitat for organisms (e.g., microorganisms, plants, invertebrates, and fish) and terrestrial habitat, primarily for waterfowl. The Sea is host to state park and recreation areas and State and Federal wildlife refugees. For example, the Sonny Bono Salton Sea National Wildlife

FIGURE 3.2-14 Elevation of the Salton Sea from 1905 to 2001 (Source: adapted from BOR 2001)

Refuge (formerly Salton Sea National Wildlife Refuge), located on the southern end of the Salton Sea, includes 35,484 acres (14,360 ha) of salt marsh and open water, as well as 2,000 acres (809 ha) of agricultural fields and freshwater marsh (USFWS 2003a).

The Salton Sea provides agricultural support in the Coachella and Imperial Valleys primarily by serving as a drainage basin for agricultural runoff. In addition, the Sea assists with flood control in upstream communities by serving as a repository for stormwater runoff. The bed and surrounding area of the Salton Sea are relatively flat. Small changes in the volume of the Sea make large differences in the Sea's area (Figure 3.2-15) and volume (Figure 3.2-16). A decrease of 1 ft (0.30 m) in depth, for an initial elevation of –227 ft (–69 m) MSL, would produce a surface area change of approximately 2,140 acres (about 866 ha) (Weghorst 2001) and a decrease of about 233,000 ac-ft (2.9×10^8 m^3) of water.

Inflow to the Salton Sea comes from the Alamo River, New River, Whitewater River, IID agricultural drains, Salt Creek, San Felipe Creek, groundwater, precipitation, and overland flow. For the period of record 1950 through 1999, the mean inflow to the Salton Sea was approximately 1.34 million ac-ft/yr (52.4 m^3/s) (Weghorst 2001). As shown in Figure 3.2-17, annual inflow to the Salton Sea is variable. The standard deviation of the inflow is about 78,750 ac-ft/yr (3.1 m^3/s) for the period 1950 through 1999 (Weghorst 2001). Assuming an initial elevation of –227 ft (–69 m) MSL, the variation in Salton Sea inflow would produce a change of depth of about 6 in. (15 cm) (about 1.7% of the Sea's average depth), with a surface area change of about 1,100 acres (445 ha) (about 0.5% of the existing surface area) (Weghorst 2001). About 6% of the inflow to the Salton Sea is natural flow; the rest of the inflow is return flow from irrigation and municipal wastewater (Setmire 2000). Most of the agricultural

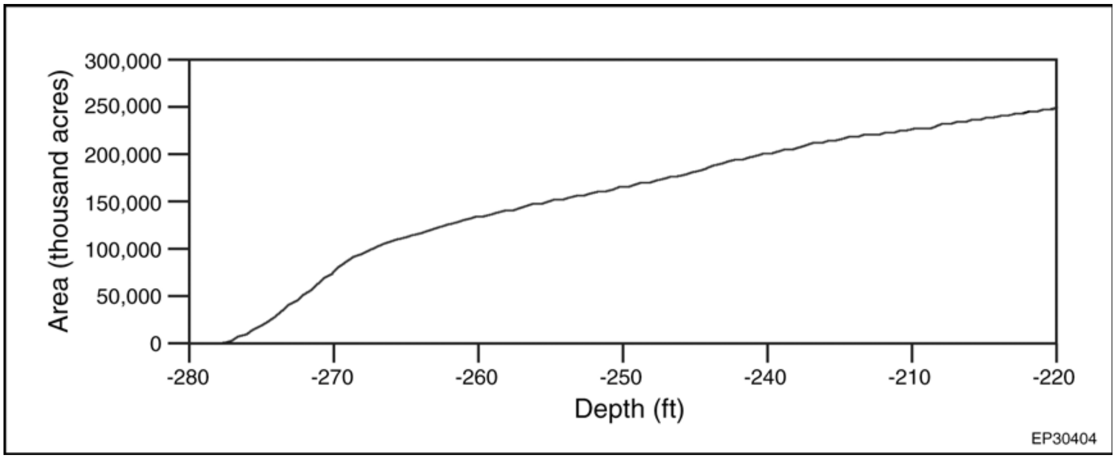

FIGURE 3.2-15 Depth/Area Relationship for the Salton Sea (Source: Weghorst 2001)

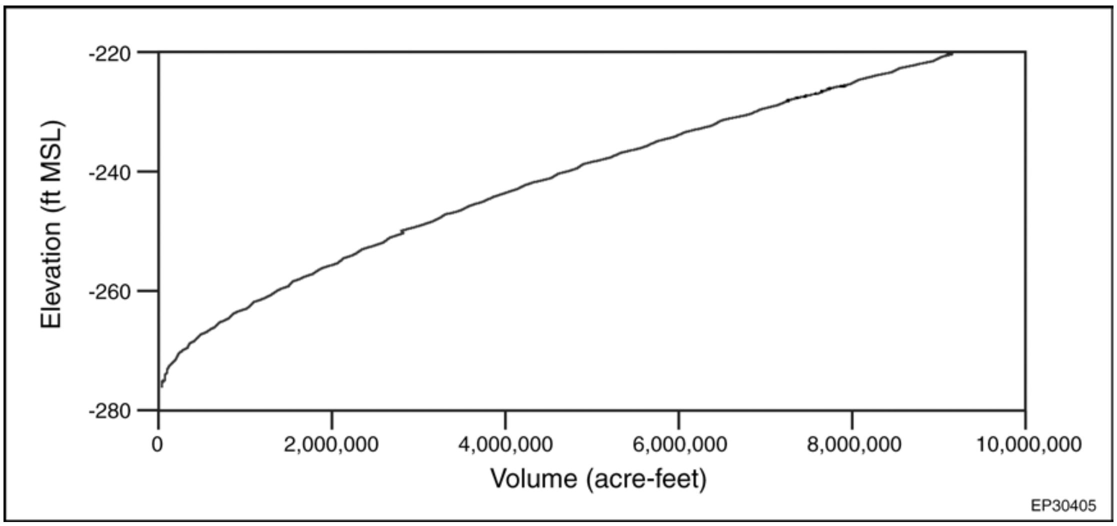

FIGURE 3.2-16 Volume/Depth Relationship for the Salton Sea (Source: Weghorst 2001)

water used in the watershed is derived from the Colorado River. About two-thirds of the water used for agriculture is consumed or lost to evaporation; about one-third of the water applied to fields eventually reaches the Salton Sea (Cohen et al. 1999). The residence time of agricultural water in the soil is about 6 years (BOR 2001). Colorado River water is delivered to the Coachella and Imperial Valleys via the All American and Coachella Canals. Inflow from the New River south of the U.S.-Mexico border accounts for about 14% of the total inflow to the Salton Sea, while the flow at Westmorland accounts for about 36% of the Sea's total inflow.

Because the Salton Sea is situated in a closed basin, water flows into it but does not leave, except by evaporation. The evaporation rate is about 6 ft/yr (2 m/yr) (Ponce et al. 2003). With time, evaporation reduced the elevation of the water in the Sea to its current value of approximately –227 ft (–69 m) MSL. The Salton Sea is in a near state of equilibrium, with inflow water roughly equaling the water lost to evaporation (BOR 1999).

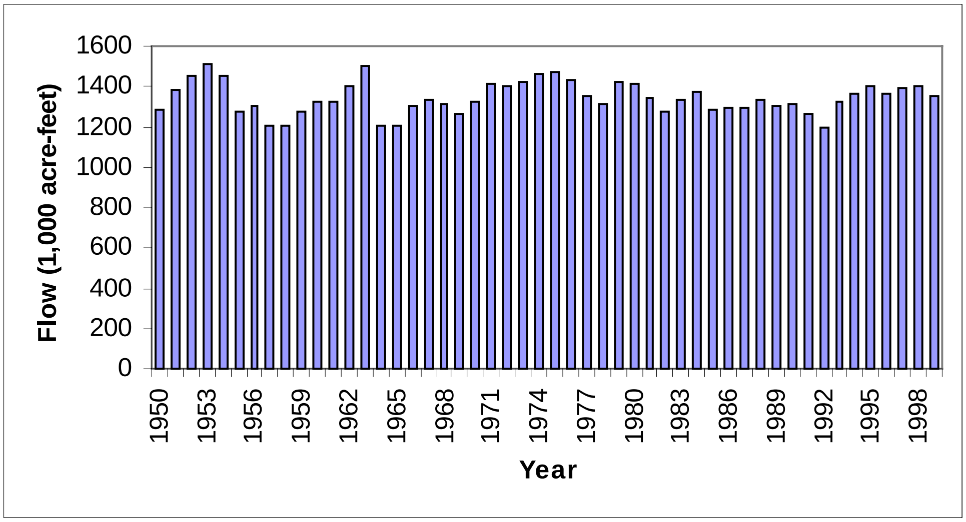

FIGURE 3.2-17 Inflow Volume to the Salton Sea (Source: Weghorst 2001)

3.2.1.3.2 Water Quality. As mentioned previously, the Colorado River Basin Regional Water Quality Control Board adopted Resolution 98006 during its January 1998 public meeting, which updated the list of impaired waterbodies for the region. The updated list included the New River, the Alamo River, and the Salton Sea. Impairment of the Salton Sea was associated with salt, selenium, and nutrients (SWRCB 2003; CRBRWQCB 2003c).

Water that flows into the Salton Sea contains dissolved salts. Figure 3.2-18 shows the total salt load into the Sea as a function of time for the period 1950 through 1999 (Weghorst 2001). The mean total load of dissolved salts entering the Salton Sea was about 4.6 million tons/yr (4.2 million t/yr). As indicated in Figure 3.2-18, the total load of salts per year varied considerably with time. The standard deviation of the annual salt load is about 640,000 tons (580,598 t). Figure 3.2-19 shows the TDS load entering the Salton Sea for the same period of record (TDS was calculated by dividing the total salt load by the annual volume of inflow water). The mean TDS for the inflow water was about 2,525 mg/L; the standard deviation of the inflow TDS was about 340 mg/L. Because the Sea is in a closed basin, incoming water evaporates, leaving behind the dissolved salts, thereby increasing the salinity of the Sea. Not all salts in the incoming water to the Salton Sea increase its salinity; some of the salts (particularly calcium salts as carbonate and sulfate, i.e., calcite and gypsum, respectively) precipitate (BOR 2001). Weghorst (2001) estimated that about one-third of the annual salt discharged to the Sea would precipitate. Other estimates range from 0.77 million to 1.32 million tons (0.7 million to 1.2 million t) of salt precipitated annually (BOR 2001).

In 1907, shortly after the Salton Sea was formed, its salinity was about 3,500 mg/L. Currently, it is about 44,000 mg/L (BOR 2003a) (Figure 3.2-20), approximately 25% saltier than ocean water. In 1998, the Colorado River Basin Regional Water Quality Control Board, in accordance with Section 303(d) of the CWA, listed the Salton Sea as impaired in its Water Quality Assessment because the salinity of the Sea exceeded the Regional Board's water quality

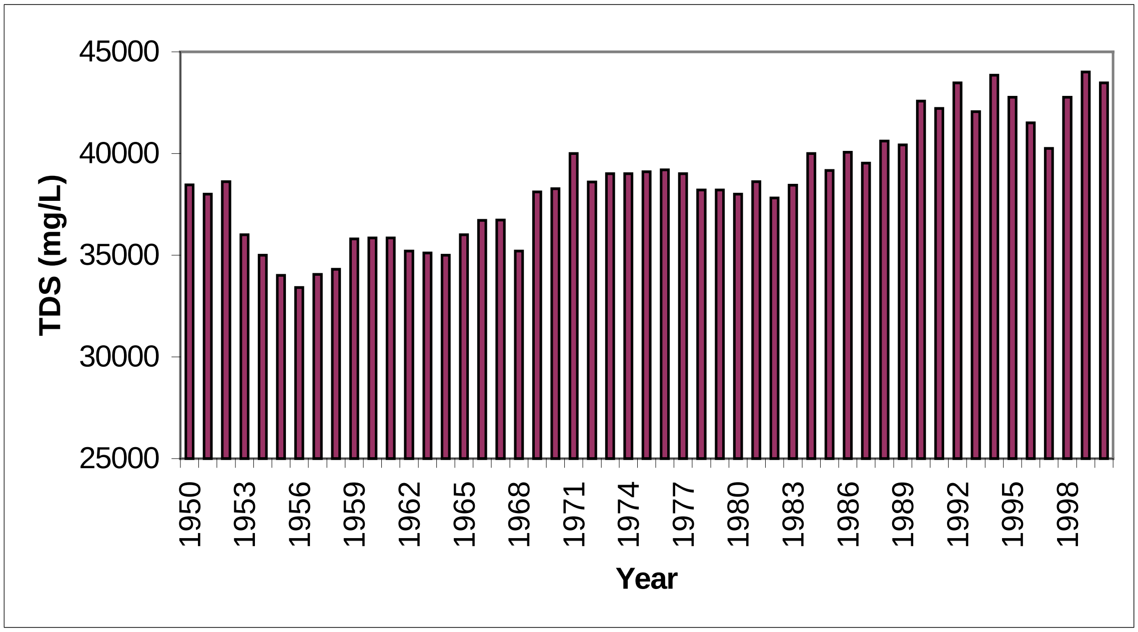

FIGURE 3.2-20 Salton Sea Total Dissolved Solids (Source: Weghorst 2001)

objective of reducing the salinity level to 35,000 mg/L, "unless it can be demonstrated that a different level of salinity is optimal for the sustenance of the Sea's wild and aquatic life" (CRBRWQCB 1991). The actual salinity of the Sea is uncertain because of measurement precision (on the order of 1% for conductance measurements), the location of the measurement (there is an approximate difference of 3% between the center of the north and south sub-basins of the Sea), a difference of about 1% between measurements taken at the Sea surface and measurements taken near its bottom, density variations in the Sea's water (a range of 1.028 to 1.032 g/cm^3), and temperature (BOR 2001). The uncertainty of the Sea's salinity is estimated to be about 5% of its actual value, or about 2,200 mg/L (BOR 2001).

The rate of increase of salinity in the Salton Sea has had a wide range of values reported in the literature. Between 1980 and 1995, the rate was approximately 430 mg/L/yr. At this rate, the Salton Sea would reach a value of 60,000 mg/L within about 37 years from its current salinity level. Because of toxicity, salinity values in excess of 60,000 mg/L would kill fish populations in the Sea (BOR 2003a). The rate of salinity increase for the Sea is highly uncertain. Estimates range from 0.4 to 1% per year (about 175 to 440 mg/L/yr) (BOR 1998a). For these rates of increasing salinity, the Salton Sea would reach a salinity of 60,000 mg/L after about 90 and 36 years, respectively.

Selenium. Although the potential loss of fish and other organisms that depend on the Salton Sea is closely related to salinity issues and high concentrations of nutrients, there are also significant water quality concerns related to selenium (CRBRWQCB 1991). Selenium is derived from irrigation water passing through clayey soils. The selenium concentration in Salton Sea water is very low, about 0.001 mg/L. This concentration is much less than the MCL for selenium in drinking water 0.05 mg/L (EPA 1996); however, concentrations in the Sea's sediment and biota are at levels of concern (Salton Sea Authority 1997). Most of the selenium in sediment occurs at the north end of the Sea (Redlands Institute 2002). The dissolved selenium in the Sea can be taken up and concentrated in tissues of small organisms in the Sea. Selenium can be further concentrated (biomagnified) by larger organisms from eating the smaller ones (CRBRWQCB 1991). At greatest risk are the larger fish-eating (piscivorous) birds, such as the double-crested cormorant, great blue heron, and the cattle egret, which have fairly long food chains. Other birds, such as the black-necked stilt, American coot, eared grebe, northern shoveler, and the ruddy duck also have elevated selenium concentrations in tissues, livers, and/or eggs. Concentrations in these birds, however, are lower because of shorter food chains (BOR 1998b).

Phosphorus. In addition to salinity and selenium, the Salton Sea is highly eutrophic (i.e., its waters are rich in dissolved nutrients, photosynthetically productive, and often deficient in oxygen during warm weather). Eutrophication of the Salton Sea is caused by the inflow of agricultural drainage and municipal effluent containing high levels of nutrients, especially nitrogen and phosphorus (EPA 2003c). High nutrient levels in the Sea promote algal blooms. Algal respiration and the decomposition of dead algae consume large quantities of oxygen, decrease concentrations of DO in the Sea, and kill fish by suffocation due to a lack of oxygen (Pacific Institute 2001). Fish kills then release algal nutrients back to the Sea, thus promoting additional algae growth.

Recent studies indicate that the ratio of nitrogen to phosphorus in the Sea exceeds 25. Because there is much more nitrogen than phosphorus in the Sea, phosphorus is the limiting nutrient for eutrophication. In 1999, the average mass of phosphorus in the Salton Sea was about 1,389 lb (630,000 kg) (Setmire 2000), with phosphorus loading coming primarily from external sources (New River, Alamo River, White Water River, and agricultural drains). Most of the nutrient load is supplied by the rivers. In 1999, the following phosphorus loads occurred: Alamo River – 1.3 million lb (0.574 million kg); New River – 1.5 million lb (0.669 million kg); and White Water River – 120,000 lb (0.053 million kg) (Setmire 2000). The nitrogen to phosphorus ratios for surface water (epilimnion) reached 192:1; hypolimnion ratios (bottom of the Sea) were even higher (430:1).

For samples collected during 1999 from three sites in the Salton Sea, total phosphorus concentrations in water ranged from less than 0.005 to 0.222 mg/L, with a median value of 0.071 mg/L in surface waters, and a median value of 0.059 mg/L near the bottom. These values exceed the phosphorus concentration of 0.025 mg/L recommended to prevent eutrophication in lakes (University of California, Davis 2003). These values have remained about the same over the past 25 years, indicating that there are processes occurring in the Sea that control (i.e., buffer) the phosphorus concentration against variations in influx concentrations.

Because phosphorus is a limiting nutrient for eutrophication, the degree of eutrophication of the Sea could be most easily reduced by decreasing the amount of phosphorus that enters it from its tributaries. A similar-sized reduction in the quantity of nitrogen entering the system would not affect the system as much because nitrogen is so plentiful. Although reducing the phosphorus load to the Salton Sea would improve its condition, a 50 to 80% reduction in load would be required to achieve a marked decrease in eutrophication (Setmire 2000).

3.2.1.3.3 Salton Sea Water Quality Guidelines. TMDLs have been proposed for the Salton Sea in order to improve its water quality. In July 2003, the EPA gave final approval to California's 2002 Section 303(d) List of Water Quality Limited Segments, which identified the Salton Sea as an impaired watershed because of selenium, salt, and nutrients. At the present time, a TMDL is being developed for nutrients (CRBRWQCB 2004d). A TMDL program will begin for selenium in 2005, with a target completion date of 2010 (CRBRWQCB 1998b). The State of California has determined that an engineered solution for salinity will be more effective than the development of a TMDL (CRBRWQCB 2003b).

3.2.1.3.4 Salton Sea Restoration. The Salton Sea Authority was established in 1993 to direct and coordinate actions to improve water quality, stabilize water elevation, and enhance recreational and economic development of the Salton Sea and other beneficial uses (EPA 2003c). The Salton Sea Authority is composed of Riverside and Imperial Counties, the IID, and the Coachella Valley Water District. The Torres Martinez Desert Cahuilla Indians and a host of Federal and State agencies are exofficio members of the Authority (Codekas 1998).

The Salton Sea Reclamation Act of 1998 directed the Secretary of the Interior to study options for managing the salinity and elevation of the Salton Sea (EPA 2003c). The act required that certain options be analyzed and required the consideration of reduced inflows down to a level of 800,000 ac-ft (31.3 m^3/s) or less per year. In January 2000, the Salton Sea Authority and the U.S. Bureau of Reclamation (BOR) issued a draft environmental impact report (EIR)/EIS that analyzed five alternatives for restoring the Salton Sea (Salton Sea Authority and BOR 2000). The proposed restoration project was developed to comply with Federal legislation that directs the Secretary of the Interior to conduct a research project for the development of a method to reduce and control salinity, provide endangered species habitat, enhance fisheries, and protect recreational values in the area of the Salton Sea. In August 2000, the BOR and the Salton Sea Authority announced plans to revise and supplement the EIR/EIS on the basis of public comments and engineering evaluations. The supplemental review process is exploring additional restoration alternatives, including the use of large-scale solar ponds.

In April 2003, the Salton Sea Authority Board of Directors endorsed moving ahead with the "North Lake" plan to improve the Salton Sea (EPA 2003c). This plan involves creating and managing an ocean-like lake in the North Basin of the Sea by constructing a dam midway across the current Sea. Extensive shallow water habitat would be created by using stepped ponds in the South Basin of the Sea. The plan also includes desalinization of Imperial Valley rivers that flow into the Salton Sea. Desalinated water from the rivers would be sold, and the proceeds would be used to help fund improvements to the Salton Sea (Salton Sea Authority 2003b).

3.2.2 Wetlands

The BOR's Citizen Task Force has developed two pilot-project wetland areas, Imperial and Brawley, along the New River in California (Figure 3.2-1). These wetlands were designed to improve water quality and provide new wildlife habitat by reducing nutrients, pathogens, and industrial waste in the river; reduce nutrients and agricultural chemicals in the drains; and help meet the Colorado River Basin Regional Water Quality Control Board's objective to improve environmental conditions (IID 2003c). Initial construction of the wetlands began in the late spring of 2000 (Miller 2001).

The Imperial wetland site is about 1.5 mi (2.4 km) long and occupies about 68 acres (28 ha). This site receives its water from Rice Drain and is fed entirely by agricultural runoff. This wetland is designed to process about 6.9 million gal (approximately 21 ac-ft [26,000 m^3]) of water annually (Sustainable Conservation 2002). Because this wetland does not receive water from the New River, it will not be discussed further in this report.

At the 7-acre (3-ha) Brawley site, water is pumped directly from the New River to large settling ponds to settle out the heavier silts. The water then flows into a series of smaller ponds planted with native bulrushes and sedges. This wetland is designed to process approximately 2.4 million gal (approximately 7 ac-ft [8,600 m^3]) of water per year (Sustainable Conservation 2002). Passing the river water through the complex of rushes and sedges in the wetlands reduces suspended solids by as much as 97% and increases the DO content by up to 83%. Wetland-processed water leaving both sites eventually discharges to the New River (BOR 2003b).

Some concerns have been raised that the wetlands could be harmful to wildlife by increasing potential exposure to toxic constituents, such as selenium, in sediments (Sustainable Conservation 2002). Deep sediment basins have been added to the wetlands to prevent diving ducks from reaching potentially contaminated food sources on the bottom, and bypass pipelines were added to allow operators to bypass some wetland cells from operation, if needed.

If successful, the pilot wetland project will be expanded to cover most of the river bottom areas of the New and Alamo Rivers, with about 40 new sites being considered.

3.2.3 Floodplains

No perennial streams or rivers are within the area of the proposed and alternative transmission line routes. However, three defined drainages traverse the proposed routes from, generally, southwest to northeast. The northernmost and largest in area is Pinto Wash, draining toward the northeast. Pinto Wash crosses the proposed routes about 3,000 ft (914 m) south of the IV Substation, where it is more than 3,000 ft (914 m) wide (Figure 3.2-21). Another drainage is just south of State Route 98. This area includes the confluence of two streambeds, where a culvert and dam have been placed. The area directly downstream of the culvert has been heavily disturbed due to off-road vehicle traffic. The southernmost area is an extension of an unnamed intermittent drainage that rises to the southwest in Mexico and drains northeasterly. These drainages are normally dry but are probably subject to flash-flooding in occasional torrential storms that can occur in the area. Pinto Wash is the site of the only 100-year floodplain mapped in the proposed transmission line routes by the Federal Emergency Management Agency (FEMA) on Flood Insurance Rate Maps.

The proposed action might also affect the floodplain of the New River, because water that would normally flow into the New River would be diverted for plant operations. The 100-year floodplain of the New River has a narrow channel that meanders through a large, steep banked channel in the valley floor. The steep banked channel lies within a broader channel that was created in 1905 when the New River and Salton Sea were formed. Within the large channel are a series of agricultural fields, undeveloped open spaces, drains, access roads, and the Brawley Sewage Treatment Plant (DOT 2001).

3.2.4 Groundwater

The proposed routes for the transmission lines overlie the Imperial Valley Groundwater Basin in the southern part of the Colorado Desert Hydrologic Regime. The basin is bounded on the east by the Sand Hills and on the west by impermeable rocks of the Fish Creek and Coyote Mountains (Figure 3.1-1). Its discharge point is the Salton Sea. Major surface hydrologic features crossing over the groundwater basin are the New and Alamo Rivers, the three branches of the All-American Canal, and the Coachella Canal (California Department of Water Resources 2003).

Two major aquifers occur in the groundwater basin. These aquifers consist predominantly of alluvial deposits of late Tertiary and Quaternary age. The upper aquifer is about 200 ft (61 m) thick, with a maximum thickness of 450 ft (138 m). It is separated from the lower aquifer by a semipermeable aquitard that averages 60 ft (18 m) thick, with a maximum thickness of 280 ft (85 m). The lower aquifer averages 380 ft (116 m) thick, with a maximum thickness of 1,500 ft (457 m). Low-permeability lake deposits create locally confined aquifer conditions. The total storage capacity of the basin is estimated to be 14,000,000 ac-ft (California Department of Water Resources 2003).

The major source of groundwater recharge in the Imperial Valley Groundwater Basin is from irrigation return. Other recharge sources include rainfall infiltration; surface runoff, especially in the East Mesa and West Mesa where surface deposits are fairly permeable; underflow into the basin, mainly from Mexicali Valley to the south; and seepage from the New River and the All-American and Coachella Canals. Together, recharge sources contribute about 423,000 ac-ft/yr (16.5 m^3/s) from irrigation seepage, 250,000 ac-ft/yr (9.8 m^3/s) from canal seepage, and 173,000 ac-ft/yr (16.8 m^3/s) from subsurface inflow, with the New River contributing about 7,000 ac-ft/yr (6.3 m^3/s). Total discharge is about 439,500 ac-ft/yr (17.2 m^3/s) (including an average loss to streams of about 169,500 ac-ft [6.6 m^3/s]) (California Department of Water Resources 2003).

Because of its high TDS concentrations (ranging from 498 to 7,280 mg/L), a major portion of the groundwater from the Imperial Valley Groundwater Basin is considered undesirable for domestic and irrigation purposes, unless treated. Groundwater in some areas of the basin also has elevated levels of fluoride and boron (California Department of Water Resources 2003).

3.3 CLIMATE AND AIR QUALITY

This subsection describes the climate and air quality of the Imperial County region.

3.3.1 Climate

3.3.1.1 California

The State of California has a very diverse climate range, extending over four out of the six major global climate zones. A Mediterranean climate zone exists in the coastal regions, with wet winters and dry summers, and varies greatly up and down the coast. A semiarid, or steppe, climate zone encompasses much of the San Joaquin Valley and the fringes of the Mojave Desert. There is less rainfall in this zone, and temperatures are generally warmer than in the Mediterranean zone. A microthermal, or Alpine, climate zone is found in the higher elevations of the Sierra Nevada, the Modoc Plateau, and the Klamath Mountains. This mountain climate has short, cool summers and snowy winters; average temperatures in the coldest month are below freezing. A desert climate exists in the southeastern third of the state, east of the Sierra Nevada and Peninsular ranges and in the southwestern part of the San Joaquin Valley. Cut off by mountains from westerly moisture-laden Pacific storms, this leeward rain shadow region receives very little precipitation. Summer temperatures in this region are the highest in the state and can average more than 100°F (38°C). The diversity of California's climate is illustrated by a precipitation range from about 80 in. (203 cm) in the more temperate Mediterranean north coast to less than 3 in. (8 cm) in the desert region in Imperial County. The more generally prevailing winds statewide in California are incoming westerlies[3] from the Pacific Ocean. These winds are reflective of the eastern Pacific high pressure zone centered off the California coast that typically is the major influence on California's climate.

3.3.1.2 Regional

The desert region that includes Imperial County is classified under the modified Köppen Climate Classification System as arid, low-altitude desert (hot). Imperial County is in one of the hottest and driest parts of California, characterized by hot, dry summers and relatively mild winters. During the summer, the Pacific high pressure zone is well-developed to the west of California and a thermal trough overlies California's southeast desert region. The intensity and

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3 Wind direction is conventionally described as the direction *from* which a wind blows. Thus "westerlies" are winds that come from the west. Throughout the discussions in this EIS, a wind direction describes the direction from which a wind is blowing.

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orientation of the trough varies from day to day. Although the rugged mountainous country surrounding the Imperial Valley inhibits circulation, the influence of the trough does permit some interbasin exchange of air with more westerly coastal locations through the mountain passes.

Relative humidity in the summer is very low, averaging 30 to 50% in the early morning and 10 to 20% in the afternoon. During the hottest part of the day, a relative humidity below 10% is common, although the effect of extensive agricultural operations in the Imperial Valley tends to raise the humidity locally. The prevailing weather conditions promote intense heating during the day in summer, with marked cooling at night.

As Table 3.3-1 and Figure 3.3-1 show, the normal maximum temperature in January in the Imperial County region is about 70°F (21°C), and the normal minimum temperature is around 41°F (5°C). In July, the normal maximum temperature is more than 107°F (42°C), while the normal minimum temperature is about 75°F (24°C). Average annual precipitation is less than 3 in. (7 cm).

Figure 3.3-2 is a wind rose plot that illustrates the annual distribution of hourly wind direction and speed measurements made over a 10-year period from 1993 through 2002 at the Imperial U.S. Weather Service weather station (identification number 747185) located at Imperial County Airport, south of Imperial, and at an elevation of –56 ft (–17 m). This site is located approximately 10 mi (16 km) northeast of the IV Substation and is fairly central to Imperial County. As Figure 3.3-2 shows, the annual winds are somewhat dichotomous in nature, mainly either westerly or east/southeasterly. However, they are predominately westerly, which is reflective of the statewide prevailing incoming westerlies referred to in Section 3.3.1.

Figures 3.3-3, 3.3-4, and 3.3-5 are wind rose plots showing the seasonal distribution of hourly wind direction and speed measurements over the same 10-year period for the fall months of September, October, and November; the winter months of December, January, and February; and the spring months of March, April, and May. As the figures show, the wind rose distributions for these seasons are consistent and very similar to the annual distribution.

TABLE 3.3-1 Average Temperatures and Precipitation in Imperial County[a]

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Average high temperature (°F)	70.2	74.5	79.3	86.1	94.0	103.4	107.0	105.7	101.1	90.9	78.1	69.7	88.3
Average low temperature (°F)	41.3	44.9	48.7	53.5	60.6	68.4	75.8	76.6	70.6	59.2	47.3	40.5	57.3
Precipitation (in.)	0.51	0.36	0.31	0.05	0.03	0.01	0.06	0.32	0.36	0.35	0.17	0.43	2.96

[a] Average readings from 1971 to 2000 at the El Centro 2 SSW Weather Station of the U.S. Weather Service, in Imperial County at latitude 32°46′N, longitude 115°34′W, at an elevation of -30 ft (-9 m). The site is approximately 5 mi (8 km) south of the Imperial U.S. Weather Service Station.

Figure 3.3-6 shows the distribution of hourly wind direction and speed measurements for the summer months of June, July, and August. The figure also shows a dramatic reversal to a predominately east-southeasterly wind pattern, with a strong westerly component remaining.

Figures 3.3-7, 3.3-8, 3.3-9, 3.3-10, and 3.3-11 are wind rose plots illustrating the distribution of wind direction and speed in Mexicali in Baja California, Mexico, abutting the U.S. border immediately south of Calexico, in an area some 16 mi (25 km) south of the Imperial U.S. Weather Service site, and approximately 8 to 10 mi (13 to 16 km) east of the Termoeléctrica de Mexicali (TDM) and La Rosita Power Complex (LRPC) power plants. These wind rose figures are based on records of meteorological observations taken in Mexicali through 1997 and 1999 at four monitoring sites at El Centro de Bachillerato Tecnológico Industrial y de Servicios (CBTIS), Colegio de Bachilleres, (COBACH), Instituto Tecnológico de Mexicali (ITM), and Universidad Autonomos de Baja California (UABC) in Mexicali. Their locations are shown in Figure 3.3-13.

Measurements commenced as early as January 1, 1997, at ITM and as late as June 1, 1999, at COBACH, and ceased at all four sites on December 31, 1997. There were other measurement gaps. The four-site data set encompasses the entire period; however, contemporaneous data at all four sites were not always collected (about 10% of possible measurements were not recorded). Of the data collected, DOE and BLM determined that 5% of the data were flawed and were not suitable for use in this EIS analysis.

Measurements for all four sites in Mexicali over the 3-year 1997 through 1999 period were pooled into a combined “twelve site-year” set of data allowing regionally representative wind roses to be constructed. Figure 3.3-7 shows a site-averaged average annual wind rose of speed and direction. Again, as was the case for the Imperial U.S. Weather Service site, a clear dichotomy in annual prevailing wind directions can be seen; northwestly winds from the United States to Mexico and southeast winds from Mexico to the United States. It is apparent that the northwestly winds from the United States to Mexico are dominant.

Figures 3.3-8, 3.3-9, and 3.3-10 are site-averaged wind rose plots for the fall months of September, October, and November; the winter months of December, January, and February; and the spring months of March, April, and May. The wind rose distributions for these seasons are very similar, and it is apparent that northwesterly winds from the United States to Mexico are overwhelmingly dominant. Figure 3.3-11 shows a wind rose for the summer months of June, July, and August. This wind rose illustrates a dramatic reversal in the summer to predominately southeasterly winds from Mexico to the United States, with a small northwest component remaining.

Surface winds in the Mexicali area appear to veer (move clockwise) relative to those in the Imperial area to the north. However, the Mexicali wind patterns broadly echo the wind patterns of the Imperial area. In summary, for most of the year, surface winds from the west or northwest strongly dominate (i.e., winds generally blow from the United States to Mexico) in the border region of Imperial County; for three months in the summer, however, southeasterly winds dominate (i.e., winds generally blow from Mexico into the United States).

3.3.2 Air Quality

The Clean Air Act (CAA) established the principal framework for national, state, and local efforts to protect air quality in the United States (42 USC §§ 7401–7642). Under the CAA, the EPA has set standards known as National Ambient Air Quality Standards (NAAQS) for six pollutants considered to be key indicators of air quality, namely, CO, NO_2, O_3, SO_2, lead (Pb), and two categories of particulate matter (PM_{10} and $PM_{2.5}$). National primary ambient air quality standards define levels of air quality, with an adequate margin of safety that sets limits to protect the public health, including the health of sensitive populations such as asthmatics, children, and the elderly. National secondary ambient air quality standards define levels of air quality judged necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The EPA is also responsible for ensuring that these air quality standards are met or attained in cooperation with state, tribal, and local governments through national strategies to control pollutant emissions from automobiles, factories, and other sources. As delegated by the EPA, the State of California is responsible for protecting California's air quality. The California Environmental Protection Agency (Cal/EPA) was created in 1991 by a Governor's Executive Order. Six Boards under this "umbrella" are responsible for the protection of human health and the environment and the coordinated deployment of state resources. The California Air Resources Board (ARB) is responsible for interpreting and implementing those statutes pertaining to the control of air pollution. The ARB regulations are contained in Titles 13 (Motor Vehicles) and 17 (Public Health) of the *California Code of Regulations*. The ARB gathers air quality data for the State of California, ensures the quality of these data, designs and implements air models, sets ambient air quality standards for the state, compiles the state's emissions inventory, and performs air quality and emissions inventory special studies. The ARB is responsible for monitoring the regulatory activity of California's 35 local air districts, which are responsible for promulgating rules and regulations for stationary sources. California is divided geographically into 15 air basins for the purpose of managing the air resources of the state on a regional basis, and each air basin generally has similar meteorological and geographic conditions throughout. The Salton Sea Air Basin encompasses all of Imperial County plus the major western portion of Riverside County to the north. The 6 mi (10 km) of double-circuit, 230-kV transmission lines extending south from the IV Substation to the U.S.-Mexico border north of Mexicali, Mexico, that are associated with the proposed action of this project undertaken in the United States, are in the Imperial County Air Pollution Control District and lie within the Salton Sea Air Basin.

Table 3.3-2 gives the State and Federal ambient air quality standards. California has set additional ambient standards for visibility-reducing particulates, sulfates, hydrogen sulfide, and vinyl chloride, and they are also listed in this table.

Areas that meet the NAAQS are said to be in "attainment." The air quality in attainment areas is managed under the Prevention of Significant Deterioration Program of the CAA. The

New O_3 and $PM_{2.5}$ Standards

On July 18, 1997, the EPA introduced new ambient air quality standards for ground-level ozone and for particulate matter (62 FR 38855 and 62 FR 38562). The EPA planned to phase out and replace the 1-hour 0.12-ppm O_3 standard with a new 8-hour 0.08-ppm standard more protective of public health. The EPA also adopted two new standards for $PM_{2.5}$. These were set at 15 $\mu g/m^3$ annual arithmetic mean $PM_{2.5}$ concentrations and 65 $\mu g/m^3$ 24-hour average. The standard for PM_{10} was essentially unchanged.

In response to legal challenges, however, the U.S. Court of Appeals for the District of Columbia vacated the new particulate standard and directed the EPA to develop a new standard, meanwhile reverting back to maintaining the previous PM_{10} standards. The revised O_3 standard was not nullified, but the court ruled that the standard "cannot be enforced."

In July 2000, the EPA formally rescinded the 8-hour 0.08-ppm O_3 standard and reinstated the 1-hour 0.12-ppm O_3 standard in the approximately 3,000 counties where it had been replaced. In February 2001, the U.S. Supreme Court affirmed the EPA's authority to establish health-related air quality standards and affirmed that the Clean Air Act prohibits consideration of implementation costs when setting those standards. The Supreme Court, however, overturned the EPA's procedures for implementing the standards and remanded the case back to the Appeals Court level for resolution of those and certain other issues. On March 26, 2002, the Appeals Court found the new air standards that had been subject to challenge to be neither arbitrary nor capricious and denied petitions for review except to the extent that their earlier decisions and those of the Supreme Court require action by the EPA.

On June 2, 2003, the EPA stated in a Proposed Rule (68 FR 32801) on the implementation of the 8-hour O_3 NAAQS that it intended to issue final attainment and nonattainment area designations for $PM_{2.5}$ by December 2004 and for 8-hour O_3 by April 2004.

On April 15, 2004, a Final Rule designating and classifying areas not meeting the NAAQS for 8-hour O_3 was recently signed by the Administrator of the EPA. At the time of this writing, this Final Rule is not yet published in the *Federal Register* but is scheduled to be published by April 30, 2004. The EPA designated and classified areas under the 8-hour O_3 standard, and in a separate action finalized the first phase of the rule implementing the 8-hour O_3 standard. Designations and classifications are to take effect on June 15, 2004. The EPA will revoke the 1-hour O_3 standard 1 year after the effective date of designating attainment and nonattainment areas for the 8-hour standard. Deadlines for attainment in designated nonattainment areas extend from 2007 to 2021, depending on the severity of nonattainment. Imperial County is designated as marginal nonattainment for the 8-hour O_3 standard, and attainment is to be achieved in 3 years time.

By December 31, 2004, the EPA will finalize designations for the $PM_{2.5}$ standards based on earlier recommendations in February 2004 from States and Tribes. Currently (as of the time of writing, April 2004), the 1-hour 0.12-ppm O_3 standard, the 150-$\mu g/m^3$ 24-hour PM_{10} standard, and the 50-$\mu g/m^3$ annual PM_{10} standard are the O_3 or PM NAAQS that are enforced.

TABLE 3.3-2 Ambient Air Quality Standards

		California Standards[a]	Federal Standards (NAAQS)[c]	
Pollutant	Averaging Time	Concentration[b]	Primary[b,d]	Secondary[b,e]
Ozone (O_3)	1-hour	0.09 ppm (180 µg/m^3)	0.12 ppm (235 µg/m^3)	Same as primary standard
	8-hour	–[f]	0.08 ppm (157 µg/m^3)[g]	
Respirable particulate matter (PM_{10})	24-hour	50 µg/m^3	150 µg/m^3	Same as primary standard
	Annual arithmetic mean	20 µg/m^3	50 µg/m^3	
Fine particulate matter ($PM_{2.5}$)	24-hour	No separate state standard	65 µg/m^3 [g]	Same as primary standard
	Annual arithmetic mean	12 µg/m^3	15 µg/m^3 [g]	
Carbon monoxide (CO)	8-hour	9.0 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)	None
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
	8-hour (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
Nitrogen dioxide (NO_2)	Annual arithmetic mean	–	0.053 ppm (100 µg/m^3)	Same as primary standard
	1-hour	0.25 ppm (470 µg/m^3)	–	–
Sulfur dioxide (SO_2)	Annual arithmetic mean	–	0.030 ppm (80 µg/m^3)	None
	24-hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	
	3-hour	–	–	0.5 ppm (1,300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	–	–
Lead[h] (Pb)	30-day average	1.5 µg/m^3	–	–
	Calendar quarter	–	1.5 µg/m^3	Same as primary standard
Visibility-reducing particles	8-hour	Extinction coefficient of 0.23/km; visibility of 10 mi or more (0.07–30 mi or more for Lake Tahoe) due to particles when relative humidity is less than 70%	–	–
Sulfates	24-hour	25 µg/m^3	–	–
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m^3)	–	–
Vinyl chloride[h]	24-hour	0.01 ppm (26 µg/m^3)	–	–

TABLE 3.3-2 (Cont.)

[a] California standards for O_3, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, suspended particulate matter (PM_{10}, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the *California Code of Regulations*.

[b] Concentration expressed first in units in which it was promulgated. For gaseous air pollutants, "ppm" refers to parts per million by volume, or micromoles per mole of gas. Since one mole of all gases at the same temperature and pressure occupies the same volume, a ppm value is unaffected by changes in temperature and pressure. Equivalent mass concentration units for air pollutant gases (shown in parentheses) are based on a reference temperature of (77°F) 25°C and a reference pressure of 760 torr.

[c] National standards (other than O_3, PM, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. (The $PM_{2.5}$ Federal standard is not yet enforced as outlined in the text.) The 8-hour O_3 standard became effective on April 15, 2004. NAAQS are listed in 40 CFR Part 50.

[d] National primary standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[e] National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] A dash indicates either no California or no Federal ambient air quality standard exists.

[g] The $PM_{2.5}$ Federal standard is not yet enforced. The 8-hour O_3 standard was issued by EPA on April 15, 2004.

[h] The ARB has identified lead and vinyl chloride as "toxic air contaminants," with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

goal of this program is to maintain a level of air quality that continues to meet the standards. Areas that do not meet one or more of the standards are designated as "nonattainment" areas for criteria pollutant(s). For regulatory purposes, remote or sparsely populated areas that have not been monitored for air quality are listed as "unclassified" and are considered to be in attainment. The CAA requires each state to produce and regularly update a State Implementation Plan (SIP) that includes a description of control strategies or measures to deal with pollution, for areas that fail to achieve NAAQS. A SIP is a plan developed at the state level that explains how the state will comply with air quality standards; a SIP is enforceable by the EPA.

The project area lies within the Salton Sea Air Basin. At present, the Salton Sea Air Basin is designated by the state as an O_3 nonattainment area and is Federally designated by the EPA as a Section 185A O_3 nonattainment area. (In this case, "Section 185A" was previously termed "transitional.") The Section 185A transitional status means that the EPA believes the nonattainment status is due partly to transboundary migration of pollutants from Mexico, the extent of which is not accurately defined.

Out of the entire Salton Sea Air Basin, only the City of Calexico near the border crossing is classified by the State of California as a state nonattainment area for CO. This localized nonattainment area does not extend west of the Westside Main Canal and is likely the result of the high level of vehicle traffic crossing the border near this location.

The Salton Sea Air Basin is classified by the state as a nonattainment area for $PM_{2.5}$ and is Federally classified by the EPA as a moderate nonattainment area for PM_{10}. Particulate matter levels in Imperial County come from local and agricultural sources; the EPA considers a significant fraction to be transported from nearby Mexico. These sources include a combination of windblown dust from natural and disturbed land areas, with the primary source being vehicles, including off-road vehicles that use paved and unpaved roads. Construction and agriculture also contribute to particulate levels. Recently, the United States Court of Appeals for the Ninth Circuit stated that the EPA's conclusion that PM_{10} attainment would be achieved, except for the negative effects of transborder emissions from Mexico, is unsupported, and has mandated that the EPA reclassify Imperial Valley from a moderate to a serious nonattainment area (Opinion No. 01-71902, October 9, 2003).

Ambient air quality data nearest the proposed transmission line routes and the two alternative routes are collected at air quality monitoring stations in El Centro and Calexico operated by the Imperial County Air Pollution Control District. The El Centro monitoring station is at 150 9th Street, about 10 mi (16 km) northeast of the IV Substation; the station in Calexico nearest the project area is at 900 Grant Street, about 12 mi (19 km) east of the proposed transmission lines border crossing.

Ambient air quality data are also collected in Imperial County at monitoring sites that are farther from the projects area. These are Brawley Main Street, Westmorland West 1st Street, and Niland English Road, approximately 19, 20, and 40 mi (31, 32, and 64 km) northeast from the projects area, respectively. Within the Salton Sea Air Basin as a whole, two additional monitoring sites are located in Riverside County at Indo Jackson Street and the Palm Springs Fire Station, approximately 60 and 80 mi (97 and 129 km) northwest from the projects area, respectively. These data are not reported here because the sites are less representative of the projects area due to their distance from the proposed transmission lines.

The Secretaría del Medio Ambiente y Recursos Naturales (SEMARNAT [the Mexican Environmental Agency]) also collects ambient air quality data at 10 monitoring sites in Mexicali immediately south of Calexico across the U.S.-Mexico border. These sites are also designated as ARB sites. They are loosely clustered within an approximate radius of several miles and generally lie approximately 11 mi (18 km) east of the southern end of the proposed transmission lines and approximately 8 mi (13 km) east of the Sempra and Intergen power plants that would supply power to the transmission lines in the projects area. Figures 3.3-12 and 3.3-13 show the locations of monitoring sites that are located in the United States and Mexico border regions, respectively, including those described here.

Tables D-1 through D-8 in Appendix D show a cross section of annual data of criteria air pollutant measurements in time frames ranging from 1988 to 2001 at monitoring sites in

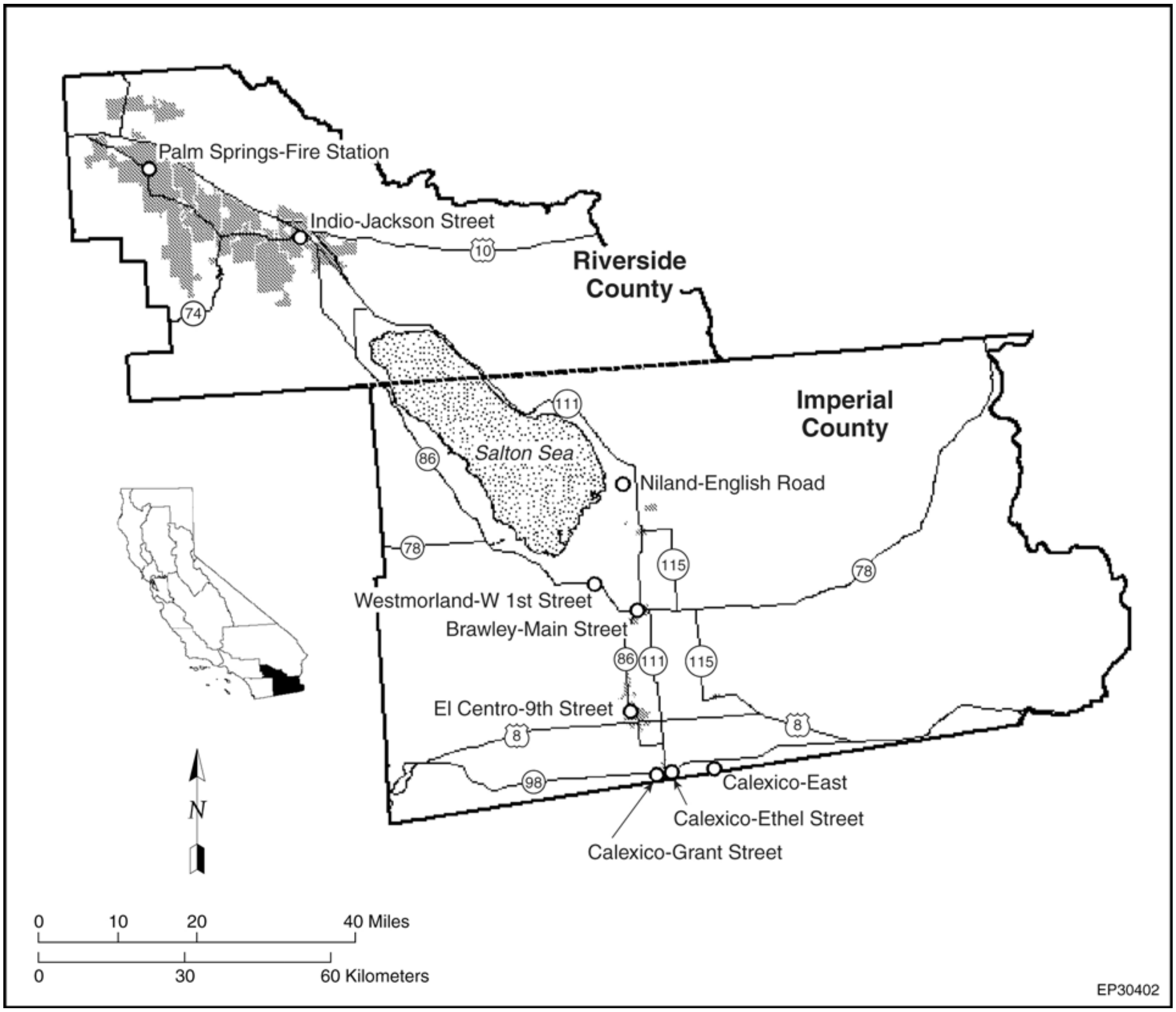

FIGURE 3.3-12 Salton Sea Air Basin Monitoring Stations ARB Map (Source: ARB 2003a)

El Centro and Calexico in Imperial County and the four monitoring sites in Mexicali described previously. Measurements in the United States were made on behalf of the ARB and in Mexico on behalf of SEMARNAT. These tables were abstracted from a larger summary database of border air quality maintained by the EPA, Technology Transfer Network, U.S.-Mexico border Information Center on Air Pollution (CICA: Centro de Información sobre Contaminación de Aire) (U.S.-México Information Center on Air Pollution) (EPA 2003d).[4]

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[4] This database was prepared by CICA from data retrieved from the EPA Aerometric Information Retrieval System (AIRS) on January 1, 2002. The EPA has since changed the AIRS to a database that is solely related to tracking the compliance of stationary sources of air pollution with EPA regulations. The Air Facility Subsystem (AIRS/AFS) information is available at http://www.epa.gov/Compliance/planning/data/air/aboutafs.html.

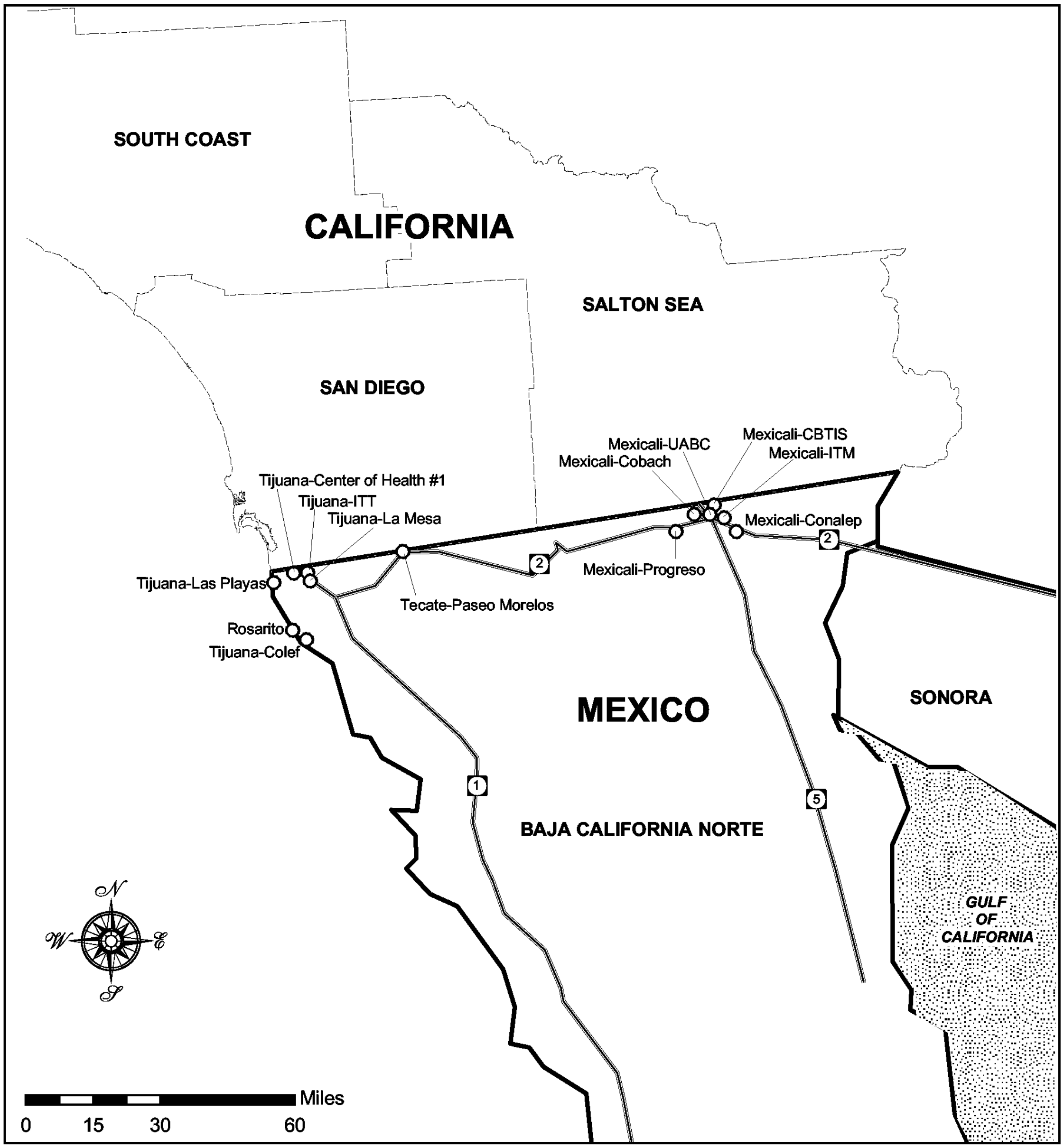

FIGURE 3.3-13 Mexico Monitoring Stations ARB Map (Source: ARB 2003a)

These tables show the annual means of 1-hour measurements of CO, NO_2, O_3, and SO_2 recorded in each year at each site. Also shown are annual means of 24-hour measurements of PM_{10}. Measurements of criteria pollutants were not made in every year at all of the sites listed or are not yet available in summary form in the CICA database. Annual arithmetic means, annual geometric means, highest annual values, and the number of observations for each air pollutant made in any year are listed.

Appendix D can be consulted for detailed information. Figures 3.3-14 through 3.3-23 plot arithmetic mean data for criteria pollutants CO, NO_2, O_3, SO_2, and PM_{10}.

Figures 3.3-14 through 3.3-18 show that the annual mean of criteria pollutants in the border region has remained fairly constant from 1992 through 2001. The only pronounced exception is a recent peaking of PM_{10} levels in 2000 through 2001 at the Calexico East border crossing, possibly due to increased traffic activity. Figures 3.3-19 through 3.3-23 display the same data as Figures 3.3-14 through 3.3-18, but by monitoring station. As these figures indicate, the annual means of O_3, SO_2, and PM_{10} remain much the same across the border region. However, there also appears to be a regional gradient of annual means of CO (Figure 3.3-19) and NO_2 (Figure 3.3-20); the highest levels are in Mexicali. This gradient may be associated with the large amount of vehicular activity in Mexicali, compared with the more rural Imperial County to the north. The annual means of CO and NO_2 are also highly correlated regionally, as can be observed from a side-by-side comparison of Figures 3.3-19 and 3.3-20.

The nearest Class I area to the proposed action is the Agua Tibia Wilderness located in the Cleveland National Forest, about 85 mi (137 km) to the northwest. The next nearest Class I area is the Joshua Tree National Park, nestled in the foothills of southeastern California's Mojave Desert, about 100 mi (177 km) to the north.

Class I Areas

Class I areas are areas of special national or regional natural, scenic, recreational, or historic value for which EPA Prevention of Significant Deterioration regulations provide special protection. For each proposed major new source or major modification that may affect a Class I area, the applicant is responsible for identifying all Class I areas within 62 mi (100 km) of the proposed source and any other Class I areas potentially affected. The proposed action does not comprise a major modification, nor is it located within 62 mi (100 km) of a Class I area.

Ambient air concentration measurements of VOC or hydrocarbons are not recorded in Imperial County at the seven air quality monitoring sites operated either by ARB or the Imperial County Air Pollution Control District. In addition, no VOC measurement data were available for the Mexicali area as such. Thus, no VOC air concentration data are presented here. In Section 4.3, where the impacts of VOC in local O_3 formation data are discussed, emission inventory information for organic gases for Imperial County and hydrocarbons for Mexicali are used.

Ambient air concentration measurements of NH_3 are not recorded in Imperial County at the seven air quality monitoring sites operated either by ARB or the Imperial County Air Pollution Control District. In addition, no NH_3 measurement data were found for the Mexicali area. Thus, no NH_3 air concentration data are presented here. In Section 4.3, where NH_3 impacts are discussed, NH_3 emission inventory information for the San Joaquin Valley is described. No local NH_3 emission inventory data were found.

3.4 BIOLOGICAL RESOURCES

This section describes the biological resources within the United States that could be affected by the proposed action and alternatives. These resources include habitats and organisms that occur in the vicinity of the proposed transmission line routes and the IV Substation, aquatic

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Ambient air concentration measurements of NH_3 are not recorded in Imperial County at the seven air quality monitoring sites operated either by ARB or the Imperial County Air Pollution Control District. In addition, no NH_3 measurement data were found for the Mexicali area. Thus, no NH_3 air concentration data are presented here. In Section 4.3, where NH_3 impacts are discussed, NH_3 emission inventory information for the San Joaquin Valley is described. No local NH_3 emission inventory data were found.

3.4 BIOLOGICAL RESOURCES

This section describes the biological resources within the United States that could be affected by the proposed action and alternatives. These resources include habitats and organisms that occur in the vicinity of the proposed transmission line routes and the IV Substation, aquatic and riparian habitats and organisms that occur within and immediately adjacent to the New River, and habitats and organisms at the Salton Sea.

3.4.1 Transmission Line Routes and Imperial Valley Substation

3.4.1.1 Vegetation Communities

The description of biological communities present within the vicinity of the proposed transmission lines and IV Substation is primarily based on biological surveys (Loeffler 2001) conducted in the vicinity of the routes for the proposed transmission lines in September and October of 2000. The surveys were conducted in a study area that was 2,150 ft (655 m) wide, centered on the existing IV-La Rosita transmission line, and that ran from the Mexico border to an area north and east of the IV Substation (Figure 3.4-1). A wetland delineation (Hodge 2001) was also performed for the same area.

Two distinctive vegetation communities, Sonoran creosote bush scrub and desert dry wash woodland, are present on the Federal land that would be traversed by the proposed transmission line routes and the two alternative routes, and in the vicinity of the IV Substation (Figure 3.4-1). Of the approximately 1,464 acres (592 ha) encompassed in the survey corridor, about 1,218 acres (493 ha) (83%) are Sonoran creosote bush scrub and about 204 acres (87 ha) (14%) are desert dry wash woodland. The remaining 42 acres (17 ha) (3%) are either covered by the State Route 98 roadway (5 acres) (2 ha) or by the IV Substation (37 acres) (15 ha). A small portion of the proposed transmission line routes is covered by a network of unpaved access roads for the existing line.

Sonoran creosote bush scrub is an open, relatively sparse plant community dominated by creosote bush (*Larrea tridentata*). Burro-weed (*Ambrosia dumosa*) and two species of saltbush (*Atriplex* spp.) are also common. Tree species such as ironwood (*Olneya tesota*), velvet mesquite (*Prosopis velutina*), and catclaw acacia (*Acacia greggii*) are interspersed throughout the community, especially in the southern half of the proposed routes in the United States.

The desert dry wash woodland plant community occurs in three areas of the proposed transmission line routes (Figure 3.4.1). The largest of these areas is Pinto Wash, located a short distance south of the IV Substation. The dominant species in this area is smoke tree (*Psorothamnus spinosus*). Other species include velvet mesquite, catclaw acacia, encilia (*Encilia frutescens*), sand verbena (*Abronia villosa* var. *villosa*), and big galleta (*Pleuraphis rigida*). A smaller area of the desert dry wash woodland occurs just south of State Route 98, where two ephemeral streambeds converge and where a dam and culvert have been constructed. Small species such as sand verbena, chinchweed (*Pectis papposa*), paper flower (*Psilotrophe cooperi*) and white dalea (*Psorothamnus emoryi*), are present in this area. The third area supporting a desert wash community occurs in the southernmost portion of the proposed routes. This small area has become established in an ephemeral streambed and contains a stand of tamarisk (an introduced invasive shrub also known as saltcedar; *Tamarix* spp.) amid a few native shrubs and a single ironwood tree.

3.4.1.2 Terrestrial Wildlife

The Sonoran creosote bush scrub and desert dry wash woodland provide cover, foraging, and breeding habitat for a variety of native desert wildlife species. Both the desert iguana (*Dipsosaurus dorsalis*) and flat-tailed horned lizard (*Phrynosoma mcallii*), a BLM sensitive species, have been observed within the proposed transmission line routes. Other common reptile species known in the region and expected to occur within the proposed routes include the long-tailed brush lizard (*Urosaurus graciosus*), side-blotched lizard (*Uta stansburiana*), long-nose leopard lizard (*Gambelia wislizenii*), western whiptail (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), coachwhip (*Masticophis flagellum*), sidewinder (*Crotalus cerastes*), western patch-nosed snake (*Salvodora hexalepis*), western shovelnosed snake (*Chionactis occipitalis*), and spotted leaf-nosed snake (*Phyllorhynchus decurtatus*) (Loeffler 2001).

Eleven species of birds were observed during surveys within the proposed transmission line routes (Loeffler 2001). Commonly observed species included yellow-rumped warbler (*Dendroica coronata*) and white-crowned sparrow (*Zonorichia leucophrys*). Two wintering species, blue-gray gnatcatcher (*Polioptila caerulea*) and rock wren (*Salpinctes obsoletus obsoletus*), potentially breed within the area. Raptors observed during the surveys included red-tailed hawk (*Buteo jamaicensis*) and prairie falcon (*Falco mexicanus*). In addition, a western burrowing owl (*Speotyto cunicularia hypugaea*), a BLM sensitive species, was observed within one of the small desert washes south of State Route 98 (Section 3.4.4.17).

A variety of mammal species utilize the Sonoran creosote bush scrub and desert dry wash plant communities for cover and as foraging areas. Desert black-tailed jackrabbit (*Lepus californicus deserticola*), cottontail rabbit (*Sylvilagus audubonii*), round-tailed ground squirrel (*Spermophilus tereticaudus tereticaudus*), coyote (*Canis latrans*), and desert kit fox (*Vulpes macrotis*) are present within the proposed transmission line routes and the two alternative routes, either on the basis of observations involving individuals, scat, or burrows. Other species that commonly occur in the region and that are expected to occur within the vicinity of the proposed and alternative transmission line routes include badger (*Taxidea taxus*), bobcat (*Lynx rufus*), and raccoon (*Procyon lotor*). Mule deer (*Odocoileus hemionus*) and mountain lion (*Felis concolor*) are occasionally observed within the region and could also occur along the proposed and alternative transmission line routes (Loeffler 2001).

3.4.1.3 Aquatic Biota

The proposed transmission line routes and the two alternative routes would pass through desert areas where no permanent aquatic habitats are present. The desert washes within the vicinity of the proposed routes contain standing water only following rare rainfall events, and are dry during most the year. As a consequence, there are no aquatic biota within the vicinity of the proposed and alternative transmission line routes.

3.4.2 New River Corridor

Relatively few surveys of ecological resources have been conducted within the New River corridor. The information presented here for vegetation and terrestrial wildlife is primarily based on surveys conducted during 2002 (BOR 2002). These surveys focused on 26 sites distributed along the U.S. portion of the New River from near the U.S.-Mexico border to the Salton Sea. While these were not highly detailed quantitative surveys, they do provide useful information about the habitats and biota that occur along the New River corridor.

3.4.2.1 Vegetation Communities

The riparian (shoreline) vegetation along the length of the New River from the U.S.-Mexico border to the Salton Sea primarily consists of four different vegetation community types: tamarisk series, iodine bush series, mixed saltbush series, and common reed series (BOR 2002). In addition, agricultural fields are immediately adjacent to the New River in some areas. The identified riparian communities are generally evident as bands of vegetated thickets that are denser and taller than the adjacent desert scrub habitats found outside of the more flood-prone areas immediately along the river shoreline. During a 2002 survey of 26 sites along the New River, it was found that tamarisk, iodine bush (*Allenrolfia occidentalis*), saltbush, common reed (*Phragmites australis*), and mesquite were the dominant plant species in the New River riparian zone (BOR 2002). A long narrow delta has formed where the New River enters the Salton Sea. This delta, which is within the Sonny Bono Salton Sea National Wildlife Refuge, supports a narrow strip of riparian vegetation that consists primarily of mature tamarisk and common reed (BOR 2002).

Two constructed wetland areas have been developed adjacent to the New River as part of a pilot project examining the feasibility of using constructed wetlands to improve water quality in the New River. The southernmost of these wetlands, known as the Imperial wetland (Figure 3.2-1), withdraws water from the Rice Drain. After water passes through the wetland area, it is discharged into the New River. The northern wetland area, known as the Brawley wetland, withdraws water directly from the New River near Brawley, California (Figure 3.2-1) by pump. As with the Imperial wetland, water is discharged into the New River after passing through the wetland area. Plant species in these two wetland areas include bulrushes (*Scirpus* spp.), broadleaf cattail (*Typha latifolia*), umbrella flatsedge (*Cyperus eragrostris*), and littlebeak spikerush (*Eleocharis rostellata*), in addition to other wetland species (BOR 2002).

3.4.2.2 Terrestrial Wildlife

The dense riparian vegetation associated with the New River provides habitat for a variety of bird and mammal species and often supports high densities of game species such as desert cottontail (*Sylvilagus audubonii*), Gambel's quail (*Lophortyx gambeli*), and mourning dove (*Zenaida macroura*) (Brown 1994). BOR (2002) reported that 36 species of wildlife, including 29 bird species, were observed during surveys conducted along the New River in 2002. Bird species associated with the riparian zone included cliff swallow (*Petrochelidon* *pyrrhonota*), great-tailed grackle (*Quiscalus mexicanus*), red-winged blackbird (*Agelaius phoeniceus*), and black phoebe (*Sayornis nigricans*). In addition, a variety of shorebirds and waterfowl utilize the New River corridor and the constructed Imperial and Brawley wetlands, including great blue heron (*Ardea herodias*), green-backed heron (*Butorides striatus*), American coot (*Fulica americana*), and mallard (*Anas platyrhynchus*). Amphibians and reptiles observed during surveys included bullfrog (*Rana catesbeiana*), long-tailed brush lizard (*Urosaurus graciosus*), and several unidentified species of turtles. Mammals observed in the vicinity of the riparian zone included California ground squirrel (*Spermophilus beecheyi*), muskrat (*Ondatra zibethicus*), and striped skunk (*Mephitis mephitis*) (BOR 2002).

3.4.2.3 Aquatic Biota

As described in Section 3.2.1.1, the channel of the New River was largely formed between 1905 and 1907 as a result of a breach in the Imperial Canal. Prior to this, the New River was normally a dry channel. Consequently, aquatic organisms have been able to become established in the New River only since the early 1900s. The establishment of biological communities in the New River has been greatly affected by the introduction of treated and untreated wastewater, industrial discharge, and agricultural runoff. However, there is relatively little information about the current status of aquatic organisms in the New River.

Setmire (1984) reported that phytoplankton (primarily drifting algae) in the New River between Calexico and the Salton Sea were mainly pollution-tolerant species. In addition, the concentrations and number of types of phytoplankton were highest near the U.S.-Mexico border and decreased as the river flowed toward the Salton Sea. Setmire attributed this decrease primarily to increasing turbidity as the New River flowed toward the Salton Sea and received additional sediment from agricultural runoff.

Setmire (1984) also examined benthic invertebrates (animals that lack a backbone and inhabit the bottom of streams and other aquatic habitats) in the New River. Invertebrates collected from the river included aquatic worms and larval forms of midges. Few species and a very low number of individual organisms were found in samples collected from the river at the U.S.-Mexico border at Calexico and 8.5 mi (13.7 km) downstream. A greater number of individuals and greater species diversity were found in samples obtained at sample stations located 36 and 61 mi (58 and 98 km) from the U.S.-Mexico border. On the basis of species diversity and the numbers and types of organisms collected, Setmire (1984) concluded that the water quality at Calexico and at the station located 8.5 mi (13.7 km) downstream was of such poor quality that very little animal life could exist. However, while the presence of particular invertebrate species indicated that pollution stress was still occurring at locations farther downstream, water quality improved and became more suitable for supporting invertebrate communities as the water flowed downstream toward the Salton Sea.

No quantitative information exists about the distribution and abundance of fish species in the New River. However, the Colorado River Basin Regional Water Quality Control Board has collected fish from the New River since 1978 for analysis of chemical concentrations in tissues as part of the Toxic Substance Monitoring Program. The DOI conducted other studies of contaminants in fish from the New River in 1987 through 1988 (Setmire et al. 1990) and 1988 through 1990 (Schroeder et al. 1993; Setmire et al. 1993). Fish species identified during these studies are listed in Table 3.4-1. Some of these species, such as redbelly tilapia and longjaw mudsucker, are most likely to occur near the downstream end of the New River near the Salton Sea where water quality is better. Other species (e.g., mosquitofish, common carp, and yellow bullhead) that are relatively tolerant of poor water quality and are known to occur in many of the agricultural drainages that enter the New River, may occur along a substantial portion of the New River itself.

TABLE 3.4-1 Fish Species in the New River

Common Name	Scientific Name
Channel catfish	*Ictalurus punctatus*
Common carp	*Cyprinus carpio*
Flathead catfish	*Pylodictis olivaris*
Longjaw mudsucker	*Gillichthys mirabilis*
Mosquitofish	*Gambusia affinis*
Redbelly tilapia	*Tilapia zilli*
Sailfin molly	*Poecilia latipinna*
Tilapia	*Tilapia sp.*
Yellow bullhead	*Ameiurus natalis*

Sources: Setmire et al. (1990, 1993); Schroeder et al. (1993).

3.4.3 Salton Sea

3.4.3.1 Vegetation Communities

Vegetation is generally sparse along the shoreline of the Salton Sea and consists primarily of plants adapted to habitats with limited water. The principal terrestrial vegetation communities in areas without perennial supplies of water (e.g., springs, rivers, or irrigation ditches) are various subcategories of Sonoran desert scrub, including Sonoran creosote bush scrub (as described previously for the proposed transmission line routes), Sonoran desert mixed scrub, and Sonoran mixed and woody succulent scrub. Irrigated agricultural land constitutes a large component of the vegetated areas surrounding the southern end of the Salton Sea where the New River flows into the Sea, although riparian vegetation is present in the vicinity of the New River and Alamo River deltas (Salton Sea Authority and BOR 2000).

A considerable amount of managed saltwater, brackish, and freshwater marsh habitat is present along the southern shoreline of the Salton Sea. Typical vegetation in brackish and salt-marsh habitats includes salt grass (*Distichlis spicata*), alkali bulrush (*Scirpus maritimus*), cattail, common reed, and giant bulrush (*Scirpus californicus*). Freshwater marshes are typically present as scattered stands that are dominated by common reed, cattail, golden dock (*Rumex maritimus*), and rabbitfoot grass (*Polypogon monspeliensis*) (Brown 1994; Salton Sea Authority and BOR 2000). The Sonny Bono Salton Sea National Wildlife Refuge, situated along the Salton Sea in the vicinity of the New River and Alamo River deltas, manages approximately 35,000 acres (14,164 ha) of brackish and salt-marsh habitats and 2,000 acres (809 ha) of freshwater marsh and pasture, in order to provide habitat for migratory birds and waterfowl (USFWS 2003a). In many locations, the edges of the Salton Sea's open water areas are surrounded by large expanses of unvegetated mudflats that serve as feeding areas for some bird species.

3.4.3.2 Terrestrial Wildlife

The Sonoran desert scrub habitats surrounding the Salton Sea contain fauna similar to that described for the proposed transmission line routes above. However, the salt-marsh, freshwater marsh, and mudflat habitats of the Salton Sea provide important nesting, refuge, and feeding areas for a wide variety of birds and waterfowl that do not utilize drier desert habitats. More than 400 bird species have been reported from the Salton Sea and, on average, more than 1.5 million birds are supported annually (Salton Sea Authority and BOR 2000). This includes a number of special status bird species, including Federal- and State-listed threatened and endangered species. Special status species are discussed in Section 3.4.4.

Because the Salton Sea lies within a basin that extends southward to the Gulf of California and has mountainous barriers on the western, northern, and eastern sides, it commonly attracts seabirds, shorebirds, and waterfowl that are normally associated with coastal environments (Patten et al. 2003). Examples of such species include brant (*Branta bernicla nigircans*), scoters (*Melanitta* spp.), ruddy turnstone (*Arenaria interpes interpes*), red knot (*Calidris canutus*), California brown pelican (*Pelicanus occidentalis californicus*), and yellow-footed gull (*Larus livens*). Even species that are considered to be open ocean species, such as Laysan albatross (*Phoebastria immutabilis*) and shearwaters (*Puffinis* spp.), are occasionally observed at the Salton Sea (Patten et al. 2003).

The heaviest use of the Salton Sea by birds occurs in the vicinity of areas with freshwater inflow to the Sea. This includes the area surrounding the mouth of the Whitewater River at the northern end, on the eastern side of the Sea near the mouth of Salt Creek, and at the southern end of the Sea near the mouths of the Alamo and New Rivers (Salton Sea Authority and BOR 2000). More than 375 species of birds have been observed at the Sonny Bono Salton Sea National Wildlife Refuge at the southern end of the Sea. Up to 30,000 snow (*Chen caerulescens caerulescens*), Ross (*Chen rossii*), and Canada geese (*Branta canadensis*), and up to 60,000 ducks (mostly ruddy ducks and eared grebes) use the refuge daily during winter months (Krantz 2002; USFWS 2003b). Marsh birds and shorebirds account for more than 6,000,000 use-days each year (USFWS 2003b). Federal-listed species, such as the bald eagle (*Haliaeetus leucocephalus*) and California brown pelican, have been observed, and there is a population of Yuma clapper rail (*Rallus longirostris yumanensis*) that nests at the refuge. The State-listed peregrine falcon (*Falco peregrinus anatum*) has also been observed. Section 3.4.4 contains a discussion of listed species.

The primary sources of food for birds using the Salton Sea are fish and aquatic invertebrates. However aquatic plants, terrestrial invertebrates, amphibians, and reptiles along shorelines and in the adjacent wetlands and agricultural drainage systems also provide significant sources of food for many species. Some bird species, such as cattle egret (*Bubulcus ibis ibis*), geese, and white-faced ibis (*Plegadis chihi*), roost at the Salton Sea but obtain food largely from adjacent agricultural fields and natural habitats (Salton Sea Authority and U.S. BOR 2000).

3.4.3.3 Aquatic Biota

Aquatic habitats at the Salton Sea are associated with freshwater marsh, salt marsh, open water, and mudflats. This section describes the aquatic habitats and the aquatic biota in the Salton Sea, including phytoplankton, aquatic invertebrates, and fish. In addition, the history and current status of Salton Sea sport fishery are presented.

Although the Salton Sea aquatic ecosystem can be characterized as having a relatively low number of species, it has a high rate of productivity that is capable of supporting a large number of individuals of the species that do occur. This productivity results from the high input of nutrients via irrigation drain water. High nutrient levels, together with warm water temperatures and a high level of solar energy input from the sun, encourage rapid production of phytoplankton and benthic algae, which, in turn, supports a high rate of production of the small aquatic organisms that feed on them, such as zooplankton (small animals suspended in the water column) and benthic worms. These small organisms provide a rich food source for fish and birds. However, at times, the decomposition of algal blooms that result from excess nutrients can reduce dissolved oxygen in some areas of the Sea to levels that result in mortality of fish and other aquatic organisms. Such conditions have been implicated in periodic fish kills in some areas.

The zooplankton community of the Salton Sea primarily consists of ciliates, rotifers, copepods, brine shrimp (*Artemia franciscana*), and the larvae of barnacles (*Balanus amphitrite*), pileworms (*Neanthes succinea*), and fish (Salton Sea Authority and BOR 2000). Adult barnacles form mats that line some shoreline areas, and adult pileworms dominate the benthic invertebrate community. Pileworms are especially important in processing detritus and are prominent in nearly all of the food chains of the Salton Sea. Consequently, the loss of pileworms in the Salton Sea would likely affect the survival of multiple other species.

As described in Section 3.2, the current Salton Sea was formed as a result of floods in 1905 through 1907 that broke through irrigation headworks intended to divert water from the Colorado River into the Imperial Valley. Although the initial fish fauna in the newly formed Salton Sea reflected the freshwater species typically found in the Colorado River and in irrigation drainages, these species were unable to survive, as evaporation of water over the years led to increased salinity. Beginning in the 1950s, the California Department of Fish and Game introduced more than 30 species of marine fish into the Salton Sea from the Gulf of California (Walker et al. 1961). Of these, only the orangemouth corvina (*Cynoscion xanthulus*), bairdiella (*Bairdiella icistia*), and sargo (*Anisotremus davidsoni*) became established. Two species of tilapia (Mozambique tilapia [*Oreochromis mossambicus*] and Zill’s tilapia [*Tilapia zillii*]) became established in the Salton Sea after being accidentally introduced in 1964 through 1965. Tilapia are nonnative fish species from Africa that escaped to the Salton Sea from an aquaculture operation and from irrigation ditches where they had been stocked (Riedel et al. 2003). Together, orangemouth corvina, croaker, sargo, and tilapia form the basis of the fishery in the Salton Sea.

Orangemouth corvina is a native of the Gulf of California, and although it only constitutes about 3% of the catch, it is currently considered the primary game fish in the Salton Sea (Riedel et al. 2003). Although young orangemouth corvina feed mostly on zooplankton, pileworms, and other invertebrates, adults are piscivorous (fish-eating) and serve a valuable ecological role as the top aquatic predator. They grow rapidly in the conditions present in the Salton Sea, reaching an average size of approximately 28 in. (70 cm) by 3 years of age (Riedel et al. 2003). Although sampling suggested there was a significant decline in the presence of both egg and larval stages of orangemouth corvina between 1987 and 1989 (Matsui et al. 1991), studies conducted in 1999 and 2000 suggested that more recent stocks of orangemouth corvina might be in better condition than the stocks of previous decades (Riedel et al. 2003).

Bairdiella (also known as Gulf croaker) is native to the Gulf of California and can tolerate salinities ranging from freshwater up to at least 45,000 mg/L (Riedel et al. 2003). The bairdiella population in the Salton Sea was established through stocking of 67 individuals in 1950 and 1951 by the California Department of Fish and Game (Walker et al. 1961), and it is currently the second-most abundant fish in the Sea. Although they are not a substantial part of the fishery in the Salton Sea, bairdiella is occasionally caught by anglers (Riedel et al. 2003). Bairdiella is a small fish that grows to about 10 in. (25 cm) in length. Early young feed primarily on zooplankton and fish eggs, while larger individuals feed primarily on pileworms (Quast 1961). Bairdiella serves as an important forage fish for orangemouth corvina. Riedel et al. (2003) reported that the bairdiella population in 1999 was consistently larger than that reported in an earlier study (Whitney 1961).

Sargo is a schooling fish species that is found from southern Baja California to the northern Gulf of California. Relatively little information is available about the life history of this species in the Salton Sea. Sargo are typically associated with the Sea bottom and feed on benthic organisms such as pileworms and barnacles. Sargo also serve as food for corvina. The sargo reaches an average size of about 10 in. (25 cm) at around 2 years of age (Riedel et al. 2003). Although sargo were once considered a popular game fish, they are currently not abundant in the Salton Sea. It is unclear, however, whether the population is declining (Riedel et al. 2003).

Tilapia can tolerate a wide range of salinity levels, and after salinity in the Salton Sea exceeded 35,000 mg/L in the 1970s, tilapia became the dominant fish species. The actual species composition of the tilapia present in the Salton Sea is unclear, and it is believed that the current stock represents hybrids among three different species — Mozambique tilapia, Zill's tilapia, and Wami River tilapia (*Oreochromis urolepis hornorum*) (Riedel et al. 2003). Tilapia grow to be approximately 16 in. (40 cm) in length and feed on plankton, insects, larval fishes, benthic invertebrates, and plant material. Tilapia currently serve as the most important prey item for orangemouth corvina and fish-eating birds (e.g., pelicans), and also as a popular recreational fish. Although tilapia have a very high salinity tolerance, water temperatures below about 59°F (15°C) have been shown to greatly reduce survival (Riedel et al. 2003). As a consequence, large numbers of tilapia periodically die at the Salton Sea during periods of unusually cold weather.

Although not important from a commercial or recreational fishery perspective, several other fish species occur in the Salton Sea. These species include the sailfin molly (*Poecilia lattipinna*), longjaw mudsucker (*Gillichthys mirabilis*), mosquitofish (*Gambusia affinis affinis*), and desert pupfish (*Cyprinodon macularius*). The desert pupfish, which is the only native species in the Salton Sea, is listed as endangered by both the State of California and the Federal government. Additional information about the desert pupfish is provided in Section 3.4.4.

The sailfin molly is a small fish that is popular with tropical fish hobbyists. It is believed to have escaped into the Salton Sea from tropical fish farms in the 1960s (Salton Sea Authority and BOR 2000). The sailfin molly can tolerate a wide range of salinities, and adults can reportedly withstand salinities as great as 80,000 mg/L (Salton Sea Authority and BOR 2000). In the vicinity of the Salton Sea, it is usually found in freshwater and saltwater marshes and in irrigation ditches. It feeds primarily on plants and small invertebrates, including insect larvae.

The longjaw mudsucker is a small fish that has a native distribution from central California to the Gulf of California. It was introduced into the Salton Sea in 1930 and is mostly found nearshore around cover and in quiet water. It can tolerate very high salinities and has been collected in waters with salinities up to 83,000 mg/L (Salton Sea Authority and BOR 2000). The diet of the longjaw mudsucker consists primarily of invertebrates, although adult fish will also occasionally prey upon small desert pupfish and tilapia. Walker et al. (1961) reported that longjaw mudsucker are eaten by orangemouth corvina in some seasons.

Mosquitofish have been widely distributed in California since 1922, when the species was first introduced to control mosquitoes (Kimsey and Fisk 1969). In the Salton Sea, mosquitofish are most commonly found in the vicinity of freshwater inflows; this species can also tolerate brackish water conditions. Although mosquitofish feed primarily on small invertebrates, they will also eat larval fishes. Predation and competition by mosquitofish have been implicated as potential reasons for the decline of the desert pupfish in the vicinity of the Salton Sea.

3.4.4 Special Status Species

Special status plant and wildlife species are subject to regulations under the authority of Federal and State agencies. Special status species include those species that are listed or being considered for listing as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) (i.e., Federal endangered, threatened, proposed, or candidate species), that are BLM sensitive species, or that are listed as threatened or endangered by the State of California. (In addition, the State of California maintains lists of California Rare Plants, California Special Plants and Animals, and Fully Protected Animals [CDFG 2003]. Some of the species on these California lists are also listed as threatened or endangered at either or both the State and Federal level.)

No plant or animal species listed as threatened or endangered by the USFWS or the California Department of Fish and Game were observed during surveys conducted in the vicinity of the existing transmission line corridor (Loeffler 2001). Two BLM sensitive species, the flat-tailed horned lizard and western burrowing owl, were observed. Federal-listed threatened and endangered species, and their designated or proposed critical habitats, are afforded protection under the Federal Endangered Species Act. California-listed threatened and endangered species are protected under the State's Endangered Species Act of 1984.

However, the list of Federal- and State-listed threatened and endangered species that could be present within areas potentially affected by the projects (i.e., the proposed transmission line routes, the New River and adjacent riparian areas, and the Salton Sea) was developed through consultation with the USFWS (O'Rourke 2004) and with the California Department of Fish and Game. Appendix E contains copies of consultation letters from the USFWS and the California Department of Fish and Game. California species of special concern that could occur along the proposed or alternative transmission line routes, the New River, or the Salton Sea, are not included in this section. California species listed as threatened or endangered are included in Table 3.4-2.

3.4.4.1 Peirson's Milk-Vetch (*Astragalus magdalenae var. peirsonii*)

Peirson's milk-vetch is listed as endangered under the California Endangered Species Act and threatened under the Federal Endangered Species Act. It is a silvery, short-lived perennial plant that is somewhat broom-like in appearance. A member of the pea and bean family, it can grow to 2.5 ft (0.8 m) tall and is notable among milk-vetches for its greatly reduced leaves. Peirson's milk-vetch produces attractive, small purple flowers, generally in March or April, with 10 to 17 flowers per stalk. It yields inflated fruit similar to yellow-green pea pods with triangular beaks.

Peirson's milk-vetch has the largest seeds of any milk-vetch. Large seeds are an important adaptation in dune plants. While small seeds can readily germinate under several inches of moist sand, they may exhaust their stored food before the seedling can emerge from the sand at such depths and begin producing its own food. Large seeds provide a greater reservoir of stored food and enable seedlings to grow a greater distance before emergence and/or depletion of their stored energy.

Pierson's milk-vetch occurs on well-developed desert dunes. In the United States, the plant is known only from the Algodones Dunes (Imperial Sand Dunes); in nearby Mexico, from a limited area of dunes within the Gran Desierto in the northwestern portion of the State of Sonora. It does not occur in the Yuha Desert in the vicinity of the proposed transmission line routes, along the New River corridor, or in the vicinity of the Salton Sea.

3.4.4.2 Algodones Dunes Sunflower (*Helianthus niveus* ssp. *tephrodes*)

The Algodones Dunes sunflower is listed as endangered by the State of California. It is a silvery-white, semi-shrubby perennial in the sunflower family (Asteraceae). The Algodones Dunes sunflower has a woody base, large hairy leaves, and reddish-purple centered flowers surrounded with bright yellow rays. It occurs on unstabilized sand dunes and is known only from the Algodones Dunes system of Imperial County. Recreational use of off-highway vehicles has destroyed a large portion of the vegetation in areas of the Algodones Dunes open to public use, and this is considered to be a major threat to the species (CDFG 2000a). This species does not occur in the vicinity of the proposed transmission line routes or in the vicinity of the New River or the Salton Sea.

3.4.4.3 Desert Pupfish (*Cyprinodon macularis*)

The desert pupfish is a small (up to 3 in. [8 cm] in length) freshwater fish known to occur in isolated southwestern desert drainage systems, including tributaries to the Salton Sea. The desert pupfish is the only native fish species in the Salton Sea and is listed as endangered by the Federal government and the State of California.

The desert pupfish was abundant along the shore of the Salton Sea through the 1950s (Barlow 1961). Numbers declined during the 1960s, and by 1978, pupfish were noted as scarce and sporadic. Declines are thought to have resulted from the introduction of nonnative fish into the Salton Sea (USFWS 1993; Sutton 1999). Surveys conducted around the Salton Sea indicated that desert pupfish were present in a number of canals and shoreline pools on the southern and eastern margins of the Salton Sea and in small pools in Felipe Creek, Carrizo Wash, and Fish Creek Wash near the Salton Sea (Sutton 1999). Localities also include agricultural drains in the Imperial and Coachella Valleys, shoreline pools around the Salton Sea, the mouth of Salt Creek in Riverside County, lower San Felipe Creek and its associated wetlands in Imperial County, and in artificial refuge ponds (Sutton 1999).

The desert pupfish is an opportunistic feeder whose diet consists of algae, minute organisms associated with detritus, insects, fish eggs, and small crustaceans (USFWS 1993; Sutton 1999). It is not considered an important food for wading birds and other fish in the Salton Sea because of its low numbers (Walker et al. 1961; Barlow 1961).

The desert pupfish has a high tolerance for extreme environmental conditions, including wide ranges of temperature, dissolved oxygen, and salinity. Barlow (1958) reported that adult desert pupfish survived salinity as high as 98,100 mg/L in the laboratory. Although the desert pupfish is extremely hardy in many respects, it prefers quiet water with aquatic vegetation. It cannot tolerate competition or predation and is readily displaced by exotic fishes (USFWS 1993).

Because desert pupfish prefer shallow, slow-moving waters with some vegetation for feeding and spawning habitat, shallow pools in the Salton Sea probably do not provide an optimal habitat. Desert pupfish are not known to occur, nor are they expected to occur, in the New or Alamo Rivers because of the high sediment loads, excessive velocities, and the presence of predators (Sutton 1999).

3.4.4.4 Desert Tortoise (*Gopherus agassizii*)

The desert tortoise is listed as threatened by both the Federal government and the State of California. It is a medium-sized tortoise with an adult carapace length of about 8 to 14 in. (20 to

36 cm). Males, on average, are larger than females and are distinguished by having a concave plastron, longer gular horns, larger chin glands on each side of the lower jaw, and a longer tail. Carapace color varies from light yellow-brown (horn color) to dark grey-brown. A composite of characteristics often is necessary to distinguish the desert tortoise from the other species of gopher tortoises, but its most unique feature is its very large hind feet.

The desert tortoise is widely distributed in the deserts of California, southern Nevada, extreme southwestern Utah, western and southern Arizona, and throughout most of Sonora, Mexico. In the Salton Trough, desert tortoise occurs near San Gorgonio Pass and on the alluvial fans of Coachella Valley (USFWS 1994). This widespread and once common species is rapidly decreasing in numbers due to habitat destruction from off-road vehicle use, agriculture, mining, and urban and residential development. Other factors contributing to the overall decline of the desert tortoise include the spread of a fatal respiratory disease and increases in raven populations that prey on juvenile tortoises. Recent data indicate that many local subpopulations have declined precipitously. The appearance of Upper Respiratory Disease Syndrome, not identified in wild tortoises before 1987, may be a contributing factor (USFWS 1994).

Desert tortoise populations are known from many locations throughout the Mojave and Sonoran Deserts of the Southwest. Throughout its geographical range, the desert tortoise typically is found at elevations of 3,500 to 6,000 ft (1,067 to 1,829 m). In Arizona, they have been found as low as 500 ft (152 m) (Mojave Valley, Mojave County) and as high as 5,200 ft (1,585 m) (east slope of the Santa Catalina Mountains, Pima County). Sonoran Desert tortoise shelter sites most often occur on rocky slopes or in washes that dissect the desert scrub. The desert tortoise does not occur in the Imperial Valley, and the nearest known populations to the projects area occur in the Chocolate Mountains to the east.

The desert tortoise requires crumbly, well-drained, sandy soil to construct nesting burrows. They are not found in areas of very cobbly soil or areas with soil types too soft to construct a burrow, or in dry lakes. In the Mojave Desert, the desert tortoise is most often found in association with creosote bush, Joshua tree woodland, and saltbush scrub vegetation communities. The known range for the desert tortoise does not include the desert in the vicinity of the proposed transmission lines, and surveys conducted in the vicinity of the proposed transmission lines did not find indications of use by desert tortoise (Loeffler 2001). Suitable habitat does not occur in the vicinity of the New River or along the southern shorelines of the Salton Sea.

3.4.4.5 Barefoot Gecko (*Coleonyx switaki*)

The barefoot gecko is a medium-sized lizard, 2 to 3 in. (5 to 8 cm) long, with soft skin, fine, granular scales, and a grey-brown body with various black and white spots and bands. This species is known only from five localities in eastern San Diego County and western Imperial County and is listed by the State of California as threatened. It inhabits rocky, boulder-strewn desert foothills and is usually found in areas of massive rocks and rock outcrops at the heads of canyons. The barefoot gecko is nocturnal and insectivorous and spends most of its life deep in rock crevices and subterranean chambers. Because of its limited distribution and the absence of suitable habitat, this species is not expected to occur within the vicinity of the proposed transmission line routes, along the New River, or in the vicinity of the Salton Sea.

3.4.4.6 Flat-Tailed Horned Lizard (*Phrynosoma mcallii)*

The flat-tailed horned lizard is a BLM sensitive species and a California Department of Fish and Game species of special concern (CDFG 2003).

In early 2003 (68 FR 331; January 3, 2003), the USFWS withdrew a proposed rule to list the species as threatened. The USFWS had determined that threats to the species identified in a proposed rule were not as significant as earlier believed, and that the threats to the species and its habitat were not likely to endanger the species in the foreseeable future throughout all or a significant portion of its range.

The distribution of the flat-tailed horned lizard ranges from the Coachella Valley to the head of the Gulf of California and southwestern Arizona. The species typically occurs in areas with fine, sandy soils and sparse desert vegetation. It is also found in areas consisting of mudhills and gravelly flats. The species has declined because of habitat destruction for agriculture and development.

This species was observed during the current surveys and has been observed within the survey corridor during directed surveys conducted by BLM since 1979. In addition, the survey corridor is located within an identified management area, the Yuha Desert Management Area, for the flat-tailed horned lizard (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003). Given the homogeneity of the habitat and the fact that the survey corridor is located within a management area, the entire survey corridor is considered to support the species.

3.4.4.7 Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagles visit the Salton Sea area during annual migrations to forage on fish and other food resources along the shoreline of the sea. Nesting does not occur in the Salton Sea area, but trees in the area provide important habitat for roosting. Although bald eagles may occur within the area, substantial use of the New River or the desert in the vicinity of the proposed transmission line routes is unlikely due to limited foraging opportunities. There is a possibility that bald eagles could occasionally use transmission towers within the transmission line routes as perches.

3.4.4.8 Brown Pelican (*Pelecanus occidentalis*)

California brown pelican (*Pelecanus occidentalis californicus*) is found primarily in estuarine, marine subtidal, and open waters. Nesting colonies are found on the Channel Islands, the Coronado Islands, and on islands in the Gulf of California. Historically, there was little use of the Salton Sea by brown pelicans, which were first confirmed overwintering at the Sea in 1987.

The Salton Sea currently supports a year-round population of California brown pelicans, sometimes reaching 5,000 birds. The brown pelican nested successfully at the Salton Sea in 1996 (nine young produced) and unsuccessfully attempted to nest in 1997 and 1998 (Patten et al. 2003).

Brown pelicans are plunge divers, often locating fish from the air and diving into the water to catch them. They typically congregate at selected roosting locations that are isolated from human activity. Approximately 1,100 brown pelicans died at the Salton Sea from avian botulism in 1996, the largest die-offs to date of pelicans in the United States (USFWS 2004).

3.4.4.9 California Least Tern (*Sterna antillarum browni*)

The California least tern usually nests on coastal beaches and estuaries near shallow waters. Nest sites are located on sand or fine gravel (sometimes mixed with shell fragments) in open areas where they have good visibility for long distances to see the approach of predators. This species is a rare spring and summer visitor to the Salton Sea, but apparent increases in sightings over the past decade may indicate that breeding is occurring at the Salton Sea (Patten et al. 2003). In the Salton Sea area, it is most commonly observed on mudflats near the deltas of the New, Alamo, and Whitewater Rivers and may also forage in nearby rivers or ponds areas (Patten et al. 2003). Although the California least tern occurs in the Salton Sea and may occasionally feed in the New River, it is unlikely that this species would nest along the New River because of the absence of suitable nesting areas.

3.4.4.10 Least Bell's Vireo (*Vireo bellii pusillus*)

The least Bell's vireo occurs in riparian areas along the lower Colorado River. Nesting habitat of the least Bell's vireo typically consists of well-developed overstories and understories and low densities of aquatic and herbaceous cover. Least Bell's vireo occurs accidentally in the Salton Sea and New River area during migration. This low level of use is reflected by only two observations of this species at the Sonny Bono Salton Sea National Wildlife Refuge (Patten et al. 2003).

3.4.4.11 Gila Woodpecker (*Melanerpes uropygialis*)

In California, Gila woodpeckers are distributed along the lower Colorado River and occur locally near Brawley in the Imperial Valley. This species typically occurs in desert riparian and desert dry wash woodland habitats but also is found in orchard-vineyard and residential habitats. It formerly was common in the Imperial Valley and was recorded as far north as Coachella Valley at the north end of the Salton Sea. The decline of this species may be attributed to the clearing of riparian woodlands and to competition with introduced European starlings for nesting cavities. Gila woodpeckers eat insects, berries, and cactus fruits, and they nest in cavities of saguaro cacti or riparian trees.

3.4.4.12 Yuma Clapper Rail (*Rallus longirostris yumanensis*)

The Yuma clapper rail is a year-round resident at the Salton Sea and along the lower Colorado River into Mexico (CDFG 1999). Between 1990 and 1999, an average of 365 rails was counted around the Salton Sea, an estimated 40% of the entire U.S. population of this species (Shuford et al. 2000). Yuma clapper rails occur at the south end of the Salton Sea near the New and Alamo River mouths, at the Sonny Bono Salton Sea National Wildlife Refuge, at the Wister Waterfowl Management Area, the Imperial Wildlife Area, and other locations.

The Yuma clapper rail probes in freshwater and saltwater emergent wetlands for aquatic and terrestrial invertebrates and occasionally for small fish. Nests are built in emergent vegetation. The declines in Yuma clapper rail populations have been primarily attributed to loss of marsh habitat (CDFG 1999).

3.4.4.13 Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

The USFWS listed the southwestern willow flycatcher as endangered in February 1995 because of “extensive loss of riparian breeding habitat, brood parasitism by the brown-headed cowbird (*Molothrus ater*), and lack of adequate protective regulations.” This subspecies was listed as endangered by the California Department of Fish and Game in December 1990. Large numbers of willow flycatcher pass through southern California deserts during spring and fall migration (CDFG 2004). It is difficult to differentiate between the endangered subspecies that breeds in southern California and the nonendangered subspecies (*E. t. brewsteri*) that breeds to the north in the Sierra Nevada and Cascade Mountain ranges. There is a period of overlapping occurrence in southern California riparian habitats for these two very similar looking subspecies during spring and fall migrations. At the Salton Sea, willow flycatcher, of undetermined subspecies status, is a common spring and fall migrant (Patten et al. 2003).

Southwestern willow flycatchers nest in riparian habitat characterized by dense stands of intermediate-sized shrubs or trees, such as willows, usually with an overstory of scattered larger trees, such as cottonwoods (*Populus fremontii*). With the loss of preferred habitat throughout the Southwest, southwestern willow flycatchers have been observed utilizing tamarisk thickets for nesting. Because such tamarisk thickets occur along the length of the New River, it is possible that this species could occasionally nest in the projects area.

3.4.4.14 Bank Swallow (*Riparia riparia*)

The bank swallow historically was considered locally common in the lowland regions of California. The species today is extirpated from much of its former nesting range, including all known historical locations in southern California. The bank swallow migrates through the Salton Sea area in April and again in September on its way between South America and its remaining nesting areas in northern California.

3.4.4.15 Yellow-Billed Cuckoo (*Coccyzus americanus occidentalis*)

The western yellow-billed cuckoo once nested from Mexico to southern British Columbia. In California, remnant populations breed along sections of seven rivers, including the Colorado River in the southern part of the state. The yellow-billed cuckoo suffered from wholesale destruction of riparian habitat in California over the last 100 years. Although the yellow-billed cuckoo has not been seen recently in the Salton Sea area, suitable habitat does exist in some of the upper reaches of streams draining into the Sea, such as the Whitewater River.

3.4.4.16 Elf Owl (*Micrathene whitneyi*)

The elf owl, considered endangered by the State of California, is the smallest owl in North America. It is approximately 5.5 in. (13.9 cm) long, with a short tail, yellow eyes, a white breast with rust or brown streaks, and plumage spotted with buff and white on a gray or brown base. The elf owl is migratory and only occurs during the breeding season in California, arriving in March and leaving in October. Almost 70% of the records of elf owls in California come from April and May, which is the height of the breeding season (CDFG 2000b).

The elf owl uses cottonwood-willow and mesquite riparian zones along the lower Colorado River. Nesting requires cavities in larger trees with thick walls. Historically, elf owls were recorded at six sites in California. Two of these were near the Colorado River, one about 4 mi (6 km) and the other about 16 mi (26 km) north of Yuma. The other sites were at desert oases west and southwest of Blythe; one was as far from the Colorado River as Joshua Tree National Monument. There are no reports of this species occurring in the vicinity of the proposed transmission line routes or along the shoreline of the New River. A single (presumably) migrating individual was observed near the Salton Sea at Calipatria, California, in September 1995 (Patten et al. 2003).

No elf owls were found during a major survey in 1998 of 51 sites along the Colorado River, and including all of the sites where elf owls had been previously located. Again in 1999, no elf owls were heard during surveys of the major sites where elf owls had been located in 1978 and 1987. The reason for the apparent lack of elf owls in California is unknown, and it is possible that the breeding population has been extirpated from California.

3.4.4.17 Western Burrowing Owl (*Speotyto cunicularia hypugaea*)

The western burrowing owl is a BLM sensitive species and a California Department of Fish and Game species of special concern (CDFG 2003). This subspecies is known to nest throughout most of California. It is a year-round resident and nests from February through August, with peak nesting activity during April and May. In Imperial County, it can be found in desert scrub, grassland, and agricultural areas, where it digs its own or occupies existing burrows. Urbanization has greatly restricted the extent of suitable habitat for this species. Other contributions to the decline of this species include the poisoning of prey species and collisions with automobiles.

Burrowing owls are historically known to exist in the general vicinity of the projects area (CDFG 2003). One burrowing owl was observed on a sandy bank above the desert wash located in the center of the survey corridor. There is a potential for this species to nest and winter within the survey corridor.

3.4.4.18 Peninsular Bighorn Sheep (*Ovis canadensis*)

Peninsular bighorn sheep inhabit dry, rocky, low-elevation desert slopes, canyons, and washes from the San Jacinto and Santa Rosa Mountains near Palm Springs, California, south into Baja California, Mexico. These sheep are known as low-elevation bighorn because they use habitat from a 400- to 4,000-ft (122- to 1,219-m) elevation. Peninsular bighorn sheep eat primarily grasses, shrubs, and forbs. Within the United States, peninsular bighorn are distributed in a metapopulation structure (a group of subpopulations linked by the movement of a limited number of animals) comprised of at least eight subpopulations. In the 1970s, peninsular bighorn sheep were estimated to number nearly 1,200 in the United States and 4,500 to 7,800 in Baja California. Helicopter surveys conducted in the fall of 2002 indicated that approximately 500 peninsular bighorn inhabit the United States. The most recent surveys of Mexico estimate the Baja California Peninsular bighorn population at 2,000 to 2,500.

Principal reasons for the current low population numbers and the endangered status of the peninsular bighorn sheep include (1) disease from domestic cattle; (2) insufficient lamb recruitment; (3) habitat loss, degradation, and fragmentation by urban and commercial development; and (4) predation coinciding with low population numbers.

Typical habitat for the Peninsular bighorn sheep is primarily located to the west of the project area. As a consequence, this species is not expected to occur within the vicinity of the proposed transmission line routes, along the New River, or along the southern edges of the Salton Sea.

3.4.4.19 Palm Springs Ground Squirrel (*Spermophilus tereticaudus chlorus*)

The Palm Springs ground squirrel is a subspecies of the round-tailed ground squirrel that occurs in the Coachella Valley associated with sandy substrates. The current and historical distribution for the Palm Springs ground squirrel is from San Gorgonio Pass to the vicinity of the Salton Sea. It has not been reported to occur in areas surrounding the southern Salton Sea or the Yuha Desert, and suitable habitat does not occur along the New River.

The Palm Springs ground squirrel is typically associated with sand fields and dune formations, although it does not require active blow sand areas. This small ground squirrel seems to prefer areas where sand accumulates at the base of large shrubs that provide burrow sites and adequate cover. They may also be found in areas where sandy substrates occur in creosote bush scrub and desert saltbush, or desert sink scrub that supports herbaceous growth.

3.5 CULTURAL RESOURCES

Cultural resources include archaeological sites and historic structures and features that are protected under the NHPA. Cultural resources also include traditional cultural properties that are important to a community's practices and beliefs and that are necessary to maintain a community's cultural identity. Cultural resources that meet the eligibility criteria for listing on the *National Register of Historic Places* (NRHP) are considered "significant" resources and must be taken into consideration during the planning of Federal projects. Federal agencies also are required to consider the effects of their actions on sites, areas, and other resources (e.g., plants) that are of religious significance to Native Americans, as established under the American Indian Religious Freedom Act (P.L. 95-341). Native American graves and burial grounds, including human remains, sacred and funerary objects, and objects of cultural patrimony, are protected by the Native American Graves Protection and Repatriation Act (P.L. 101-601).

3.5.1 Background

Human settlement in the Colorado Desert region extends back roughly 10,000 years. While a considerable amount of information has been collected for the Baja Peninsula Region, more archaeological research has taken place on coastal areas rather than inland areas because of the higher density of development on the coast. Evidence of past activities in the projects area is primarily associated with Lake Cahuilla, which was formed by the periodic overflowing of the Colorado River into the Salton Basin (Figure 3.1-1). The lake would form every 100 to 150 years (Redlands Institute 2002). Most archaeological sites in the region are associated with this lake.

3.5.1.1 Prehistoric Period

The oldest evidence for people in the Baja Peninsula Region is associated with the San Dieguito Complex (10,000 B.C.–5,000 B.C.). People from this culture appear to have lived primarily along the coast, although some sites have been found inland. Artifacts attributed to this culture include large stone tools that are only worked on one side (unifacial worked stone), stones where flakes were removed in a single direction (unidirectional flake cores), and massive bifacial tools. Tools were made from numerous types of stone. People from this culture appear to have relied on hunting for their main food supply, stopping in any location for short periods of time only (Berryman and Cheever 2001a).

The Pinto Complex (5,000 B.C.–1,500 B.C.) represents a transition to a more refined way of life. This time period is characterized by an expansion into locations away from the coast and a growing reliance on vegetation for food; however, hunting still supplied a major portion of the diet. Artifacts associated with the Pinto Complex include well-made projectile points, knives and scrapers, and grinding stones. The projectile points are large and likely were used on spears adequate cover. They may also be found in areas where sandy substrates occur in creosote bush scrub and desert saltbush, or desert sink scrub that supports herbaceous growth.

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The period associated with the advent of bow and arrow technology is the Amargosa/Elko Period (1,500 B.C.–900 A.D.). The development of this new technology is identified by the smaller projectile points that appear during this time period. The sites are mainly found on the coast and on the Baja Peninsula Region; some sites from this period, however, have been found inland.

During the late prehistoric to early historic period, the populations had expanded considerably. The groups living in what was to become southern California include the Cahuilla, Tipia, Mohave, Halchidhoma, Quechan, and Copcopa. The projects area was inhabited by the Cahuilla and Tipai. These groups had extensive trade networks and relied on horticulture. They utilized Lake Cahuilla when it was present (i.e., when the Colorado River changed its course). The Kumeyaay, part of the Tipai group, lived in the projects area at the time of Spanish contact. These groups lived along permanent waterways until they were forced out by European settlement (O'Leary and Levinson 1991).

3.5.1.2 Historic Period

The first Europeans to explore southern California were the Spanish in the mid-1500s. Extensive exploration did not take place until the establishment of missions on the coast beginning in 1769 (Redlands Institute 2002). The Colorado Desert was an obstacle to avoid during these years of European exploration. The first Spaniard to cross the desert was Juan Bautista de Anza, who crossed a portion of the Colorado Desert in the mid-1770s. European settlement in the California area greatly expanded when gold was discovered in 1849 on the American River near Sutter's Mill. California achieved statehood in the following year. Statehood and gold helped encourage the establishment of railroads into California. The first rail lines into the Salton Basin were laid in 1875. The railroads extended to Yuma in 1877. The introduction of irrigation into the Colorado Desert in 1900 spurred settlement of the region. The towns of Imperial, Silsbery, Calexico, Hester, Holtville, and Brawley all were established by 1904, largely because of the introduction of irrigation to the region. Throughout the 20th century, the Salton Basin has provided rich farmland. Agriculture remains the primary economic activity for the area in the 21st century.

3.5.2 Known Cultural Resources

Five archaeological surveys have been conducted in the project area. The first two were conducted by Cultural Systems Research, Inc., in 1981 and 1982 (Schaefer 1981; Cultural Systems Research, Inc. 1982) and included a part of the existing transmission line ROW. Greenwood and Associates (Greenwood 1983) surveyed areas impacted by construction of the existing line ROW in 1983. WESTEC Services, Inc., also surveyed a portion of the existing ROW area in 1984 (WESTEC Services, Inc. 1984). The fifth survey was conducted by RECON Environmental, Inc., San Diego, California, in 2001, specifically for the proposed projects.

RECON examined an approximately 2,150-ft-wide (655-m-wide) corridor that included the 120-ft (37-m) easement for the existing IV-La Rosita line and 1,000 ft (305 m) on either side of this line. BLM has designated the projects area an ACEC, partially because of the high density of cultural resources found in the region (BLM 1999).

The surveys identified 26 prehistoric sites and 1 historic site. Nine of these sites had been identified prior to the 2001 survey. The majority of these sites are associated with the late prehistoric period. The projects area is located on a portion of the shoreline of Lake Cahuilla. This is the primary reason for the large concentration of sites in such a relatively small area. Most of the sites represent locations where prehistoric peoples were camping along the edge of the lake. Of the 26 prehistoric sites, 23 are recommended as eligible for the NRHP (Berryman and Cheever 2001b). Sites found in the projects area include residential bases, field camps, lithic scatters, ceramic scatters, lithic and ceramic scatters, isolate ceramics, and isolate lithics. A single historic scatter dating to the 1930s was also identified in the projects area but was not eligible for NRHP listing.

3.6 LAND USE

The proposed transmission line routes are located in Imperial County, California (Figure 3.6-1). The land needed for these projects is owned by the Federal government and managed by BLM. The two 120-ft (37-m) wide and 6-mi (10-km) long ROWs would be located within BLM's Utility Corridor N in the Yuha Basin portion of the Colorado Desert. The proposed transmission lines would run from the U.S.-Mexico border to the IV Substation.

3.6.1 Imperial County

Imperial County encompasses 4,597 mi^2 (11,906 km^2). It is bordered on the west by San Diego County, on the north by Riverside County, on the east by Arizona, and on the south by Mexico. Roughly 50% of the county is undeveloped. The primary economic activity in the county is agriculture, with nearly 3 million acres (1 million ha) under irrigation. Water for irrigation is drawn from the Colorado River. The Salton Sea, a 381-mi^2 (987-km^2) lake, is located in the northern portion of the county. The New and Alamo Rivers are found in the southern part of the county as well as the All American Canal.

3.6.2 Federal Land

In 1976, the Federal Land Policy and Management Act, Section 601, established the CDCA in southeast California. Roughly 12 million acres (5 million ha) of the 25 million-acre (10 million-ha) CDCA are public lands managed by BLM. Management practices for this area are defined in the CDCA Final Environmental Impact Statement and Plan issued in 1980 and amended in 1999 (BLM 1999). The current projects area is located on a portion of the public land discussed in this plan.

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Management practices on public land are defined as multiple use, sustained yield (BLM 1999). This approach attempts to balance the needs and desires of the public with the natural and cultural resources found on the land. Management of the land should allow the public to enjoy the resources in a way that will ensure the survival of the resources for the benefit of future generations.

The BLM Plan designated 40,069 acres (16,215 ha) of the CDCA known as the Yuha Basin as an ACEC because of the dense concentrations of archaeological sites in this region and because it is the habitat of the flat-tailed horned lizard, a BLM sensitive species. A plan outlining the management practices for the Yuha Basin ACEC was developed in 1981 (BLM 1981). In addition, the boundary for the Yuha Basin ACEC was extended to the U.S.-Mexico border in 1985. This designation as an ACEC provides special land use and management requirements intended to enhance and protect the sensitive cultural and biological resources found in the region. The projects area for the proposed transmission lines is located in the Yuha Basin ACEC.

Management practices within the Yuha Basin ACEC include controlled and signed vehicle access, increased field presence, and intensive resource inventories (BLM 1999). The entire Yuha Basin ACEC is designated a Class L (limited) multiple use area in the CDCA Plan. In a limited multiple use area, only low-intensity controlled activities are allowed.

3.6.3 Recreation

The Western Colorado Desert Routes and Travel Designation Plan identifies the recreational activities that are allowed in the Yuha Basin ACEC (BLM 2002). This largely restricts the recreational use of the Yuha Basin ACEC. Travel is allowed on BLM-designated routes only. Routes designated “Limited Use” south of Interstate 8 are restricted to street legal vehicles only. All vehicles are allowed on routes designated “Open.” Parking is permitted adjacent to routes south of Interstate 8 only during daylight hours, except unoccupied vehicles next to the Jacumba Wilderness left by overnight wilderness visitors. Camping is only permitted in designated areas within the Yuha ACEC.

3.6.4 Economic Development

No active sand or gravel mine sites are in the projects area. However, two inactive gravel quarries are within the projects area south of State Route 98. The closest active mining site is 2.5 mi (4 km) west of the projects area (Marty 2003).

As part of the CDCA Plan, several utility corridors were identified. These areas were chosen to guide future development of the nation’s energy system. One of the corridors, Utility Corridor N, is located on the eastern edge of the Yuha Basin CDCA. The IV Substation is located in this corridor. The projects area would be located in Utility Corridor N.

3.6.5 U.S. Customs and Border Patrol

The area where the proposed transmission lines would cross the U.S.-Mexico border is patrolled by the U.S. Customs and Border Patrol Division of the U.S. Department of Homeland Security. Activities undertaken in this area by the Border Patrol include surveillance through manned inspection and recently installed cameras for monitoring any activity along the border. Barriers have been erected on roads that cross the border to restrict motorized access across the border. A restriction on development along the border is identified in a 1907 Presidential Proclamation that requires that no construction be allowed along the border that could inhibit the protection or monitoring of the border.

3.6.6 Wilderness

The CDCA also designates Wilderness Study Areas (WSAs). Roughly 2,094,000 acres (850,000 ha) of the CDCA are recommended for WSAs. The nearest WSA to the project area is 15 mi (24 km) to the west, well outside the proposed and the two alternative routes examined in this EIS.

The California Desert Protection Act of 1994 designated some of the WSAs identified in the CDCA as Wilderness areas. The WSA located to the west of the projects area was designated as the Jacumba Wilderness under the act.

3.7 TRANSPORTATION

Roads in the vicinity of the proposed and alternative transmission line routes are State Route 98, which runs east-west, crossing the routes, linking Calexico and Ocotillo, and State Route 30, which runs north-south between State Route 98 and Westmorland, parallel to the route for approximately 2 mi (3 km) (see Figure 1.1-1). Other roads in the area include Interstate 8, which runs from El Centro to San Diego to the west, County Highway 80, which parallels Interstate 8 between El Centro and Ocotillo to the west, and State Route 86, which links El Centro and Brawley to the north.

Table 3.7-1 shows average annual daily traffic flows over these road segments, together with congestion level designations (levels of service). The levels of service designations used in the table were developed by the Transportation Research Board (1985) and range from A to F. A through C represent good traffic operating conditions with some minor delays experienced by motorists; F represents jammed roadway conditions.

3.8 VISUAL RESOURCES

Assessment of the visual resources potentially affected by the transmission lines uses the BLM Visual Resource Management (VRM) System (BLM 1986a,b). These guidelines suggest a

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Assessment of the visual resources potentially affected by the transmission lines uses the BLM Visual Resource Management (VRM) System (BLM 1986a,b). These guidelines suggest a

TABLE 3.7-1 Average Annual Daily Traffic in the Vicinity of the Existing Line, 2002

Road Segment	Traffic Volume (average annual daily traffic)	Level of Service[c]
State Route 98	1,900[a]	A
County Highway 29	1,485[b]	A
Interstate 8	12,400[a]	A
County Highway 80	1,005[b]	A

[a] Source: State of California, Department of Transportation (2003).

[b] Source: Jorgenson (2004).

[c] Based on DOE/BLM calculations for this EIS.

number of specific steps to be used in identifying and evaluating the scenic quality along the proposed routes. First, the scenic quality in the area is assessed, followed by the establishment of distance zones at discrete intervals from the proposed routes. Visual sensitivity to changes in the visual environment at key viewing points is then established, together with the likely number of viewers at each of these points. Finally, the relative value of scenic resources based on these factors is used to determine a VRM class for use in defining management objectives for the scenic resources in the area through which the proposed lines would pass.

3.8.1 Scenic Quality

The scenic quality of the area through which the proposed and alternative routes would pass was rated according to BLM VRM inventory guidelines (BLM 1986a,b). These guidelines classify discrete areas as A (lands of outstanding or distinctive diversity or interest), B (lands of common or average diversity or interest), or C (lands of minimal diversity or interest), on the basis of their landforms, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications.

The area through which the proposed transmission lines would pass primarily consists of open expanses of desert with generally flat topography and few landscape features, and is largely indistinguishable from large parts of the surrounding area to the north, south, and west. Although the adjacent scenery does enhance the scenic quality of the area through which the transmission lines would be built, mainly through its expansiveness, none of the landscape features in the area could be considered unique within the topographic region in which the proposed lines would be located. Vegetation in the area consists of fairly homogenous desert scrub; a tree line about a mile to the east of where the proposed lines would be built is the most notable vegetation feature in the area. The most notable topographic features are the Coyote and Jacumba Mountains to the west (Figure 1.1-1). On the basis of these descriptors, the scenic quality of the area through which the proposed lines would pass can be rated Class B, indicating that the area is of common scenic value.

3.8.2 Distance Zones

As changes in form, line, color, and texture associated with changes in scenic quality become less perceptible with increasing distance to viewers, the distance zone in which the projects are readily perceptible has an important influence on their overall impact. Distance zones, as defined in the BLM VRM system, were used to classify the proposed transmission line routes. The combined area of the foreground-middleground zones is the area between the viewer and a distance of 3 to 5 mi (5 to 8 km); the background zone includes the area 3 to 5 mi (5 to 8 km) from the viewer up to 15 mi (24 km) (Figure 3.8-1). In addition, a seldom seen zone is defined as the area more than 15 mi (24 km) beyond any given viewing point. The viewing zone for the proposed lines is limited to the area near State Route 98. Because of the low, sparse, and fairly uniform vegetation and featureless topography, the proposed lines would only be visible in the foreground-middleground distance zone.

3.8.3 Visual Sensitivity

Public concern for change in scenic quality along the proposed transmission line routes was measured in terms of high, medium, or low sensitivity to changes in the landscape from two key observation points (Figures 3.8-2 and 3.8-3). Sensitivity ratings for the proposed routes, as defined in the BLM VRM system, take into account the type of user, the amount of use, the level of public interest and adjacent land uses, and viewer duration.

The proposed transmission lines would be located in an isolated area with a relatively low level of recreational use and few local residents (Figures 3.8-2 and 3.8-3). Other local activities are limited to agriculture, transportation, and electricity transmission facilities. None of the highways in the vicinity of the transmission line routes are designated as “scenic highways.” (State of California, Department of Transportation 2004.) Since there are few viewers in the area likely to be sensitive to changes in visual quality and the area lacks unique landscape features, the visual sensitivity of the projects area can be classified as low.

3.8.4 Visual Resource Management Classes

The BLM uses four VRM classes to manage visual resources:

- Class I is typically designated to protected areas and allows for ecological changes and only very limited management activity, with a view to preserving the existing landscape. The level of change allowed for should be very low and not attract attention.

FIGURE 3.8-2 View from Key Observation Point 1, 0.7 mi (1.13 km) East of Existing IV-La Rosita Line on State Route 98

- Class II aims to retain the existing elements of a landscape, with changes repeating the basic elements of form, color, and texture found in the most important landscape features. Landscape management activities should not be evident, with the level of change maintained at a low level. Any visible contrast with the characteristic landscape should not attract attention.

- Class III aims for partial retention of the existing landscape with only moderate changes allowed in the characteristic landscape. Contrast with the characteristic landscape may be evident and should begin to attract attention; changes should remain subordinate within the existing visual landscape.

- Class IV includes activities that lead to significant modification of the existing character of the landscape. The level of change may be high, and contrasts may attract attention and are likely to be a visible feature of the landscape. Landscape management should attempt to minimize the impact of contrasting activities through the careful location of activities and minimal disturbance. Some mitigation of impacts through the repetition of elements of the characteristic landscape may be required.

On the basis of analysis of scenic quality, distance zones, and visual sensitivity, the BLM-managed lands within which the transmission lines would be located can be classified as Class III.

FIGURE 3.8-3 View from Key Observation Point 2, 1.3 mi (2.1 km) East of Existing IV-La Rosita Line on State Route 98

3.9 SOCIOECONOMICS

A region of influence (ROI) comprising Imperial County was used to describe socioeconomic conditions for the projects area. The ROI is based on the residential locations of construction and operations workers directly related to transmission line activities and captures the area in which these workers would spend their wages and salaries. The ROI is used to assess the impacts of site activities on employment, income, and housing. Since it is assumed that construction of the lines would require no permanent in-migration of workers, there would be no impacts on population, community services, and community fiscal conditions. Because there may be some short-term relocation of workers during construction, the impacts on temporary housing within the county are assessed.

FIGURE 3.8-3 View from Key Observation Point 2, 1.3 mi (2.1 km) East of Existing IV-La Rosita Line on State Route 98

3.9 SOCIOECONOMICS

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3.9.1 Population

A large proportion (77%) of the population of Imperial County (142,361 in 2000) is located in incorporated places in the Imperial Valley (U.S. Bureau of the Census 2001a), a region of irrigated agricultural land in the south-central part of the county. Over the period 1990 to 2000, the population in the county grew at an average annual rate of 2.7%, significantly higher than the annual state rate of 1.3%. Within Imperial Valley, the majority of the population is located in three incorporated places — El Centro (population of 37,835 in 2000), Calexico (27,109), and Brawley (22,052) (see Figure 1.1-1). Smaller communities in the Valley include Imperial (7,560), Calipatria (7,289), and Westmorland (2,131) (U.S. Bureau of the Census 2001a). Average annual population growth rates in El Centro and Brawley ranged from 1.5 to 2% over the period 1990 to 2000; growth rates in Calexico were slightly higher at 3.8% per year.

3.9.2 Employment

Irrigated agriculture is one of the dominant economic activities in the county, employing 9,100 people, nearly 28% of total county employment (Table 3.9-1). The most important crops include alfalfa, cotton, sugar beets, wheat, lettuce, carrots, and cantaloupes (USDA 1999). Services (9,350 people employed) and wholesale and retail trade (8,200 people employed) dominate the nonagricultural portion of the economy; activities in these industries contribute to more than 53% of total employment in the county.

TABLE 3.9-1 County Employment by Industry, 2001

Sector	Employment	% of County Total
Agriculture[a]	9,078	27.6
Mining	175	0.5
Public utilities	291	0.9
Construction	1,479	4.5
Manufacturing	1,588	4.8
Transportation and warehousing	1,274	3.9
Trade	8,199	24.9
Finance, insurance, and real estate	1,416	4.3
Services	9,348	28.4
Total	32,888	

[a] 1997 data (USDA 1999).

Source: U.S. Bureau of the Census (2001b).

3.9.3 Unemployment

Unemployment in the county has steadily declined during the late 1990s from a peak rate of 6.9% in 1993 to the current rate of 4.9% (Table 3.9-2) (U.S. Bureau of Labor Statistics 2003). Unemployment in California currently stands at 6.6%.

TABLE 3.9-2 County Unemployment Rates

Period	Rate (%)
Imperial County	
1992–2002 Average	5.2
2003 (current rate)	4.9
California	
1992–2002 Average	7.0
2003 (current rate)	6.6

Source: U.S. Bureau of Labor Statistics (2003).

3.9.4 Income

Personal income in Imperial County stood at almost $2.7 billion in 2001 (in 2003 dollars) and is expected to remain at $2.7 billion in 2003 (Table 3.9-3). Personal income grew at an annual average rate of growth of 0.7% over the period 1990 to 1999. With population growth exceeding income growth in the 1990s, county personal income per capita fell over the period from $22,940 in 1990 to $18,588 in 2001.

3.9.5 Housing

Housing in the county showed modest growth over the period 1990 to 2000, growing at 1.8% per year (Table 3.9-4). More than 7,300 new units were added to the existing housing stock during this period, with an additional 3,600 expected by 2003. Vacancy rates in 2000 stood at 10.2% for all types of housing. On the basis of annual population growth rates, more than 47,500 housing units are expected in the county in 2003, of which more than 2,000 would be vacant rental units available to transmission line construction workers. Of these 2,000, 300 would be seasonal-recreational and temporary housing.

TABLE 3.9-3 County Personal Income (2003 dollars)

Parameter	1990	2001	Average Annual Growth Rates 1990–2001	2003[a]
Total personal income ($ millions)	2,507	2,717	0.7%	2,700
Personal income per capita ($)	22,940	18,588	-1.9%	17,573

[a] DOE/BLM projections.

Source: U.S. Department of Commerce (2003).

TABLE 3.9-4 County Housing Characteristics

Type of Unit	1990	2000	2003[a]
Owner occupied	18,907	22,975	24,900
Rental	13,935	16,409	17,800
Total unoccupied units	3,717	4,507	4,900
Total units	36,559	43,891	47,500

[a] DOE/BLM projections.

Sources: U.S. Bureau of the Census (1994, 2001a).

3.10 MINORITY AND LOW-INCOME POPULATIONS

Executive Order 12898 (February 16, 1994) formally requires Federal agencies to incorporate environmental justice as part of their missions. Specifically, it directs them to address, as appropriate, any disproportionately high and adverse human health or environmental effects of their actions, programs, or policies on minority and low-income populations.

The analysis of potential environmental justice issues associated with the proposed transmission lines followed guidelines described in the CEQ's *Environmental Justice Guidance under the National Environmental Policy Act* (CEQ 1997a). The analysis method has three parts: (1) a description of the geographic distribution of low-income and minority populations in the affected area is undertaken; (2) an assessment of whether the impacts of construction and operation of the transmission lines would produce impacts that are high and adverse; and (3) if impacts are high and adverse, a determination is made as to whether these impacts disproportionately impact low-income or minority populations. Information on item (1) is provided in this section. Information on items (2) and (3) is in Section 4.12.

A description of the geographic distribution of minority and low-income population groups was based on demographic data from the 2000 Census (U.S. Bureau of the Census 2001a). The following definitions were used to identify low-income and minority populations:

- **Minority.** Persons are included in the minority category if they identify themselves as belonging to any of the following racial groups: (1) Hispanic, (2) Black (not of Hispanic origin) or African American, (3) American Indian or Alaska Native, (4) Asian, Native Hawaiian, or Other Pacific Islander.

  Beginning with the 2000 Census, where appropriate, the census form allows individuals to designate multiple population group categories to reflect their ethnic or racial origin. In addition, persons who classify themselves as being of multiple racial origin may choose up to six racial groups as the basis of

4 ENVIRONMENTAL CONSEQUENCES

This chapter discusses the environmental consequences associated with the four alternatives described in Chapter 2: no action, proposed action (with the proposed and two alternative transmission line routes), alternative technologies, and mitigation measures. Impacts to resources in the United States due to the construction and operation of transmission lines in Imperial County and operation of the Termoeléctrica de Mexicali (TDM) and La Rosita Power Complex (LRPC) power plants are analyzed.

The following sections address potential impacts to 12 resource areas for each alternative. Because activities associated with transmission line construction and power plant operations affect these areas differently, the discussion of impacts under each section is tailored to focus only on those aspects of each alternative that would have relevant impacts. For example, impacts due to plant operations are analyzed in detail with respect to air quality, water resources, and biological resources, but are not discussed with respect to geology and soils, cultural resources, or visual resources.

Likewise, a number of resource areas would have similar impacts from various alternatives. For example, geology and soil impacts would be similar for all the action alternatives (proposed action, alternative technologies, and mitigation measures). Accordingly, in the sections that follow, a discussion of impacts is not repeated if the impacts are the same as an alternative already discussed.

Finally, impacts from alternative transmission line routes are examined in each resource area as they apply. The discussion of impacts from the alternative routes is presented along with the proposed routes analysis only if the impacts are expected to differ. If no discussion of alternative routes impacts is presented for a given resource area, the reader may assume that impacts for the alternative routes would be the same as those for the proposed routes for that resource area.

The discussion of impacts from the mitigation measures alternative is presented either in qualitative terms or quantitatively on a per unit basis (e.g., fugitive dust emissions reduced per mile of paved road, or quantity of PM_{10} reductions per bus converted from diesel fuel to compressed natural gas). This approach is necessary because the potential locations for many of the mitigation measures are unknown, or DOE and BLM do not have specific information on potential project designs needed to conduct a site-specific analysis.

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. For these areas, because of the particular concerns expressed by the commentors (and the court), the impacts are presented separately for each facility as well as in combination.

4.1 GEOLOGY, SOILS, AND SEISMICITY

This section evaluates the potential impacts to geologic and soil resource attributes from the construction and operation of the proposed transmission lines and two alternative routes in the United States. Construction activities represent the principal means by which geologic and soil resources could be affected.

4.1.1 Major Issues

There were no major issues raised pertaining to geologic and soil resources or seismic conditions.

4.1.2 Methodology

The main elements in assessing impacts to geologic and soil resources are the amount and location of land disturbed during construction, which would include grading for new access roads, excavating for suspension tower footings, and staging of equipment in designated areas. The seismicity analysis addresses the earthquake hazard associated with active fault systems in the project area.

Geologic and soil conditions along the proposed alternative transmission line routes were observed in the field in November 2003. Surveys of the projects area, including topographic surveys, geologic and seismic hazard maps, and soil surveys were also reviewed as part of this analysis.

The impact analysis for geologic resources evaluates effects to critical geologic attributes, including access to mineral or energy resources, destruction of unique geologic features, and mass movement induced by the construction of transmission lines. The impact analysis also evaluates regional geologic conditions such as geologic resources and earthquake potential.

The impact analysis for soil resources evaluates effects to specific soil attributes, including the potential for soil erosion and compaction by construction activities. The soils analysis addresses the discrete area of land within the projects area for the proposed transmission line routes.

The determination of the magnitude of an impact is based on an analysis of both the context of the action and the intensity of the impact to a particular resource. For this analysis, the context is the immediate area of the transmission line routes shown in Figure 2.2-1. The intensity of the impact is considered in terms of the relative land area disturbance on the basis of the required construction techniques and the degree to which the proposed action may adversely affect resources within the designated area of concern. Impacts to unique characteristics of the area, for example, mineral resources, are also considered.

4.1.3 No Action

4.1.3.1 Geology

Under the no action alternative, both Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. Therefore, no impacts to geologic resources would be expected. Current geologic conditions would continue as described in Section 3.1.1.

4.1.3.2 Soils

Under the no action alternative, the transmission lines would not be built; therefore, no prime farmland soils would be disturbed. Erosional processes would continue naturally in undisturbed areas as described in Section 3.1.3.

4.1.3.3 Seismicity

Under the no action alternative, the transmission lines would not be built; therefore, the potential seismic hazards associated with active fault systems in the project area would not be a relevant concern.

4.1.4 Proposed Action

The analysis for this alternative focuses on the 6-mi (10-km) portion of the lines from the U.S.-Mexico border to the IV Substation as it is currently designed and also evaluates the impacts of two alternative routes, one to the east of the existing line but within the BLM utility corridor and the other to the west of the existing line that runs outside the utility corridor and then along the U.S.-Mexico border.

4.1.4.1 Geology

Placement of the transmission lines, access roads and spurs, and temporary staging areas would require some disturbance, removal, and compaction of surface and near surface material. Because of the relatively flat topography of the projects area, however, the potential for slope failure would be low.

No active sand and gravel or fill mining occurs within BLM Utility Corridor N or to the west of it (Marty 2003). Therefore, no impact to geologic resource availability would be expected from construction of the proposed or alternative transmission line routes.

4.1.4.2 Soils

The soils along the proposed and alternative transmission line routes would be affected at the support structure sites, access roads and spurs, construction areas, and staging areas. Although no cultivated land would be disturbed, it is likely that the lower portion of the western alternative route could cross prime farmland.

Temporary and permanent impacts would occur during the construction phase in the immediate area of construction-related activities. Impacts would include an increased potential for soil erosion because of removal of vegetation to prepare the site. Soil erosion would also increase due to soil disturbance associated with grading to construct access roads and spurs, and excavation for installing the tower support structures, the work areas around each tower, pull sites, lay-down areas, and the trench for optical cables. Another impact would be soil compaction due to vehicle usage of the access roads and spurs and heavy equipment within the lay-down areas. Lay-down areas would only be used for the monopoles and A-frames since the steel lattice towers would be delivered by helicopter.

The access road along the existing SDG&E line would be used for north-south access to support structures along the proposed routes. From this main access road, east-west spurs would be constructed to access each tower. Since the Intergen and Sempra towers would be positioned roughly parallel to one another along the existing 230-kV SDG&E line, soil disturbance could be minimized by using one east-west spur to access the two towers at each tower location. The east-west spurs would be graded to create an unpaved roadbed about 10 to 12 ft (3 to 4 m) wide to accommodate construction equipment. Approximately 250 linear feet of new access road (i.e., spurs) would be needed for a maximum of 25 tower and 9 monopole locations (for each line). This is an area of about 3,000 ft^2 (279 m^2) for each tower location, or 75,000 ft^2 (1.72 acres or 0.70 ha) for the lines.

New access roads and spurs of similar width would need to be constructed for the eastern and western alternative routes. The eastern alternative routes would be about 0.5 mi (0.8 km) longer than the proposed routes and would require three additional tower sites for each line. The western alternative route would be about 2 mi longer than the proposed routes and would require 10 additional support structures for each line. Assuming access road lengths of 6.8 mi (10.9 km; eastern routes) and 8.3 mi (13.4 km; western routes) and 250 linear feet for east-west spurs at each additional tower location, it is estimated that construction of access roads and spurs for the eastern and western routes would involve additional areas of permanent soil disturbance of about 10.10 acres (4.1 ha) for the eastern routes and 12.78 acres (5.2 ha) for the western routes.

The installation of steel lattice tower footings would involve excavating a pit of 3 to 4 ft (0.9 to 1.2 m) in diameter to a depth of about 15 ft (4.6 m) at each corner of the tower. Therefore, an area of about 201 ft^2 (18.7 m^2) would be permanently impacted at each lattice tower site

(50.27 ft^2 or 4.7 m^2 for each corner). The disturbed area associated with the installation of monopole footings would be less (about 100 ft^2 or 9.3 m^2) since the footing diameters would range from 8 to 10 ft (2 to 3 m), and only one footing would be needed. For the proposed action, the total area of disturbance for up to 25 lattice towers on both the Sempra and Intergen transmission lines would be about 10,050 ft^2 (934 m^2); the nine monopoles would impact an area of about 1,800 ft^2 (167.2 m^2). Because the eastern and western alternative routes are longer, the soil disturbance due to lattice tower footing excavation would be greater: about 11,256 ft^2 (1,046 m^2) for the eastern routes (with 28 tower sites on each line) and 14,070 ft^2 (1,307 m^2) for the western routes (with 35 tower sites on each line). The number of monopoles for the eastern and western alternative routes would be about 9 and 12, respectively. Permanent soil disturbance associated with the installation of monopole footings would be about 1,800 ft^2 (167 m^2) for the eastern routes and 2,400 ft^2 (223 m^2) for the western routes. Installation of footings for a total of eight crossing (A-frame) structures would permanently impact an area of about 1,609 ft^2 (150 m^2) (201 ft^2 [18.7 m^2] per structure) for the proposed routes and either of the eastern or western alternative routes.

Temporary soil disturbance would occur during construction in the work areas around each tower. The work areas around suspension towers would be about 52 ft by 52 ft (15.8 m by 15.8 m) or 2,704 ft^2 (251 m^2) to accommodate the 30-ft by 30-ft (9.1-m by 9.1-m) base. For the dead-end towers, the work areas would be about 62 ft by 62 ft or 3,844 ft^2 (357 m^2) to accommodate the 40-ft by 40-ft (12.2-m by 12.2-m) base. Subtracting an area of 201 ft^2 (18.7 m^2) of permanent soil disturbance due to footing installation at each tower, the total areas of temporary soil disturbance due to work area activity for suspension towers and dead-end towers would be about 85,102 ft^2 (7,900 m^2) and 58,288 ft^2 (5,411 m^2), respectively for both lines. Because the eastern and western alternative routes are longer, the total soil disturbance due to work area activity is expected to be greater, about 158,408 ft^2 (14,717 m^2) and 193,450 ft^2 (17,972 m^2), respectively.

Temporary soil disturbance would also occur during construction in the pull site and lay-down areas. Pull sites are associated with the steel lattice transmission towers and would involve an area of 30 ft by 50 ft (9.1 m by 15.2 m) or 1,500 ft^2 (139 m^2) at each tower. There are an estimated 25 pull sites for each transmission line under the proposed action; considering the Sempra and Intergen lines together, a total of 75,000 ft^2 (6,968 m^2) or 1.72 acres (0.70 ha) would be temporarily impacted. Since additional pull sites would be needed for each transmission line under both alternative routes, the temporary impacts due to pull site activity along these routes is expected to be greater. Lay-down areas would be used to assemble each monopole. Each pole would be lifted into place using a 90-ton (80-t) crane. For the proposed routes, an area of about 52,481 ft^2 (4,876 m^2) or 1.21 acres (0.49 ha) would be disturbed.

Other areas of temporary soil disturbance associated with construction include an optical line trench (2,602 ft^2 0.06 acres [0.02 ha]) and substation (9.5 acres or 4 ha).

4.1.4.3 Seismicity

The California Department of Conservation, Division of Mines and Geology (now the California Geological Survey) has developed a series of 7.5-minute quadrangle maps delineating active or potentially active fault traces associated with the San Andreas, Calaveras, Hayward, and San Jacinto faults. For efficiency, only faults that are "sufficiently active" (with surface displacement within the past 11,000 years) and "well-defined" (with a clearly detectable trace at the surface or just below the surface) are mapped and evaluated (Hart and Bryant 1997).

Although the Imperial Valley is seismically active, neither the proposed routes nor the alternative routes lie within an Alquist-Priolo fault-rupture hazard zone. On the basis of the California Geological Survey's on-going evaluation of fault zones to date, surface fault rupture is not likely to occur along the proposed or alternative transmission line routes.

4.1.5 Alternative Technologies

The use of more efficient control technologies and/or alternative cooling technologies would not change the transmission line configurations as described under the proposed action; thus, the impacts to geologic and soil resources for this alternative would be the same as those described in Section 4.1.4 for the proposed action.

4.1.6 Mitigation Measures

This alternative would use the same transmission line configurations as described under the proposed action; therefore, the impacts for this alternative for the transmission lines would be the same as those described in Section 4.1.4.

Paving of roads would lead to some temporary, short-term impacts to soils along road ROWs. Some soil compaction or minor erosion could occur from surface disturbance caused by paving equipment and worker vehicles parked along areas being paved. The overall impact of road paving would be beneficial because it would reduce fugitive dust emissions and soil erosion.

Similar impacts could occur at the construction sites of the compressed natural gas fast-fill stations proposed in Brawley or adjacent to the Calexico Unified School District.

Implementation of dust controls, such as chemical dust retardants and crushed rock on areas prone to wind erosion at the Imperial Airport, would be beneficial.

4.2 WATER RESOURCES

Water resources potentially impacted by the proposed action include the New River, the Salton Sea, and the pilot wetland project at Brawley along the New River. The Pinto Wash, which crosses the proposed ROWs, could also be affected by transmission line construction activities. There are no natural wetlands along the New River or the Pinto Wash. Groundwater has been encountered in borings at depths of 25 to 30 ft (8 to 9 m) near the IV Substation.

4.2.1 Major Issues

Major issues pertaining to water resources include:

- Impacts to water quantity and quality (particularly, total dissolved solids [TDS]) in the New River;
- Impacts to water quantity and quality (particularly, TDS) in the Salton Sea;
- Impacts to water quantity, quality (particularly, TDS), and temperature in the Brawley pilot wetland project along the New River; and
- Impacts of using different cooling technologies at power plants.

These topics are discussed in detail below.

4.2.2 Methodology

4.2.2.1 Direct Impacts

To evaluate the direct impacts to water quantity and quality in the New River, existing and historical flow and quality data for the river were compared to projections from each alternative. Changes in flow and depth of flow were used to estimate the impacts to floodplains, wetlands, and erosion potential along the river channel.

Data on power plant operations and pretreatment of Mexicali municipal wastewater were used to estimate changes in salinity (TDS), selenium loading, and concentrations of other water quality parameters (e.g., selenium, TSS, BOD, COD, and total phosphorus) for the New River.

4.2.2.2 Indirect Impacts

Indirect impacts are evaluated in terms of the changes in water quantity and quality at Salton Sea and the pilot wetland project at Brawley. Indirect impacts to groundwater in the Imperial Valley Groundwater Basin are also evaluated.

4.2.2.2.1 Salton Sea. The Salton Sea receives water from many sources, including the Alamo River, New River, Whitewater River, Salt Creek, San Felipe Creek, IID agricultural drains, precipitation, groundwater, and overland flow. The Salton Sea has impaired water quality because of high salinity and high nutrient concentrations (eutrophic conditions with phosphorus being the limiting nutrient). Because the Salton Sea receives water from the New River, operation of the power plants would indirectly affect the quantity and quality of inflow water to the Sea and its depth, surface area, volume, and quality.

The volumetric loss of water resulting from operation of the proposed power plants is compared with mean annual inflows to the Salton Sea. Estimates are then made of the annual change in depth of water and change in surface area of the Salton Sea caused by water consumption during plant operations. These changes are compared with the Sea's mean annual depth and surface area using depth/volume and depth/area curves developed by Weghorst (2001).

Operation of the power plants would also affect the quality of water in the Salton Sea. Impacts to water quality are evaluated in terms of changes in salinity, selenium (a contaminant of concern for the Salton Sea because of its concentration in bottom sediments and biomagnification), and total phosphorus. For salinity, the change in the Sea's TDS was estimated using a mass balance approach (Appendix F). Salinity increases with time in the Sea because salt, unlike water, does not evaporate and is not removed by chemical or physical processes. An estimate was made using mass balances to determine a new rate of salinization for the Sea under conditions of plant operations. Using this new rate of salinization, the time required for the Sea to reach a salinity of 60,000 mg/L (a level detrimental to fishery resources) was then calculated and compared with the time required under existing conditions. The same mass-balance approach was used to estimate the effect of plant operations on selenium and phosphorus concentrations for the Sea.

4.2.2.2.2 Brawley Wetland. About 7 ac-ft (8,600 m^3) of water is pumped annually from the New River and allowed to flow through a series of ponds and rushes that make up the Brawley wetland before being returned to the river. Indirect impacts to the Brawley wetland due to power plant operations would be caused by changes in water quality in the New River (e.g., salinity and TSS, BOD, COD, and total phosphorus loads) since the New River provides source water for the wetland.

Impacts of changed flows because of plant operations were evaluated by comparing the consumptive water loss with mean and low annual flows and flow variability. An additional comparison was made for the water required for operating the pilot wetland at Brawley. Similarly, impacts from additional salinity and selenium loading were compared with mean annual loads and their variability.

4.2.3 No Action

Under the no action alternative, only the EAX unit at the LRPC would be able to operate; the TDM plant would not operate. Water use under this alternative is shown in Table 4.2-1 (p. 4-12). Impacts to water quality are provided in Tables 4.2-2 through 4.2-8 (p. 4-13 through 4-20). The water quality impacts are presented for plant operations under four scenarios: (1) no plants operating, (2) LRPC plant (including both EAX and EBC units) operating alone, (3) TDM plant operating alone, and (4) TDM and LRPC plants combined (proposed action). Because the no action alternative would result in impacts only from operation of the EAX unit at the LRPC and the EAX unit uses about 69% of total water used by the LRPC plant, water quality impacts under the no action alternative would be smaller than those shown for operation of the entire LRPC plant alone and greater than those shown for no plants operating.

4.2.4 Proposed Action

Under the proposed action, DOE and BLM would grant both Presidential permits and ROW grants. This would allow operation of the entire LRPC plant and the TDM plant. Although the EAX export turbine (a portion of the EAX unit) at the LRPC plant would operate under the no action alternative, the impacts to water resources associated with operation of that unit are included in the proposed action because the electrical output of that turbine would be exported to the United States over the proposed transmission lines under almost all circumstances. In

TABLE 4.2-1 Water Use for No Plants Operating, No Action, and Proposed Action

		No Action	Proposed Action		
Water Use (ac-ft/yr)	No Plants Operating	LRPC-EAX[a]	LRPC-EAX and EBC	TDM	Both Plants Operating
Water taken from lagoons	0	6,211	9,015	4,372	13,387
Water consumed by plant(s)	0	4,940	7,170	3,497	10,667
Water discharged by plant(s) after use	0	1,271	1,845	875	2,720
Water discharged from lagoons	33,200	26,986	24,185	28,828	19,813
Net water delivered to New River	33,200	28,257	26,030	29,703	22,533
Percent change in water delivered to New River	NA[b]	-14.9	-21.6	-10.5	-32.1

[a] Water use by the EAX unit at the LRPC plant is about 68.9% of that used by the entire LRPC plant (i.e., the EAX and EBC units).

[b] NA = not applicable.

TABLE 4.2-2 Projected Annual Operating Parameters[a,b]

Parameter	No Plants Operating	LRPC Only	TDM Only	Both Plants Operating
Water Volumes				
From lagoons to power plants (ac-ft/yr)[c]	0	9,015	4,372	13,387
Consumed by plant operations (ac-ft/yr)	0	7,170	3,497	10,667
Discharged after use (ac-ft/yr)	0	1,845	875	2,720
Discharged from lagoons to New River (ac-ft/yr)	33,200	24,185	28,828	19,813
Net volume to the New River (ac-ft/yr)	33,200	26,030	29,703	22,533
Percent change in volume delivered to the New River	0	-21.6	-10.5	-32.1
TDS				
Concentration in lagoon effluent (mg/L)	1,200	1,200	1,200	1,200
Concentration in discharge water (mg/L)	NA[d]	4,800	4,430	NA
Concentration load to New River from discharge water (million lb)[e]	NA	24.1	10.5	34.6
Load to New River from lagoons (million lb)	108.37	78.95	94.10	64.67
Change in load to New River from lagoons (million lb)	0	-29.4	-14.3	-43.7
Total load to New River (million lb)	108.37	103.05	104.6	99.27
Net change in load to the New River (million lb)	0	-5.3	-3.7	-9.0
Percent change in load to the New River	0	-4.9	-3.4	-8.3
TSS				
Concentration in lagoon effluent (mg/L)	59	59	59	59
Concentration in discharge water (mg/L)	NA	5	5	NA[d]
Concentration load to New River from lagoons (million lb)	5.33	3.88	4.63	3.18
Change in load to New River from lagoons (million lb)	0	-1.45	-0.70	-2.15
Load to New River from plant discharge (million lb)	NA	0.025	0.012	0.037
Net change in load to New River (million lb)	0	-1.43	-0.69	-2.12
BOD				
Concentration in lagoon effluent (mg/L)	44	44	44	44
Concentration in discharge water (mg/L)	NA	10	10	NA[d]
Load to New River from lagoons (million lb)	3.97	2.90	3.45	2.37
Change in load to New River from lagoons (million lb)	0	-1.07	-0.52	-1.6
Load to New River from plant discharge (million lb)	NA	0.05	0.024	0.074
Net change in load to New River (million lb)	0	-1.02	-0.50	-1.52
COD				
Concentration in lagoon effluent (mg/L)	162	162	162	162
Concentration in discharge water (mg/L)	NA	15	15	NA[d]
Load to New River from lagoons (million lb)	14.61	10.66	12.70	10.61
Change in load to New River from lagoons (million lb)	0	-3.95	-1.91	-4.0
Load to New River from plant discharge (million lb)	NA	0.075	0.036	0.111
Net change in load to New River (million lb)	0	-3.89	-1.87	-5.76

TABLE 4.2-2 (Cont.)

Parameter	No Plants Operating	LRPC Only	TDM Only	Both Plants Operating
Phosphorus				
Concentration in lagoon effluent (mg/L)	4.3	4.3	4.3	4.3
Concentration in discharge water (mg/L)	NA	1.5	1.5	NA[d]
Load to New River from lagoons (million lb)	0.39	0.28	0.34	0.23
Change in load to New River from lagoons (million lb)	0	-0.11	-0.05	-0.16
Load to New River from plant discharge (million lb)	NA	0.0075	0.0036	0.0.011
Total load to the New River	0.39	0.29	0.34	0.24
Net change in load to New River (million lb)	0	-0.10	-0.05	-0.15
Selenium				
Concentration in lagoon effluent (mg/L)	0.0011	0.0011	0.0011	0.0011
Concentration in discharge water, assuming a 75% reduction[f] (mg/L)	NA	2.5×10^{-4}	2.5×10^{-4}	NA[d]
Load to New River from lagoons (lb)	99.3	72.4	86.3	59.3
Change in load to New River from lagoons (lb)	0	-26.9	-13.0	-40.0
Load to New River from plant discharge (lb)	NA	1.3	0.6	1.9
Total load to the New River (lb)	99.3	73.7	86.9	61.2
Net change in load to New River (lb)	0	-25.6	-12.4	-38.1
Percent change in load	0	26	12	38

[a] For purposes of this analysis, impacts under the no action alternative are conservatively represented by values in the "LRPC only" column. These values are calculated on the basis of the entire LRPC plant operating (including both the EAX and EBC units). Since only the EAX unit at the LRPC plant would operate under the no action alternative, impacts resulting from no action would be about 69% of those identified for the "LRPC only" scenario. Similarly, impacts under the proposed action are conservatively represented by values in the "both plants operating" column.

[b] Abbreviations: BOD = biochemical oxygen demand; COD = chemical oxygen demand; NA = not applicable; TDS = total dissolved solids (salinity); TSS = total suspended solids; LRPC = LaRosita Power Complex; TDM = Termoeléctrica de Mexicali.

[c] To convert ac-ft/yr to m^3/s, multiply by 3.911×10^{-5}.

[d] Discharge from the LRPC and TDM plant occurs at different locations; therefore, no single concentration can be applied to both plants operating.

[e] To convert lb to kg, multiply by 0.4536.

[f] A 75% reduction in discharge water concentration is a standard value for industry (Hammer [1977]).

TABLE 4.2-3 Changes in New River Water Flows Caused by Plant Operations[a]

Physical Parameter	No Plants Operating	Only LRPC Operating	Only TDM Operating	Both Plants Operating
Calexico Gage				
Mean flow (ac-ft/yr)[b]	180,000	172,830	176,503	169,333
Percent change in annual flow	0	-4.0	-1.9	-5.9
Standard deviation in flow (ac-ft/yr)	45,827	NA[c]	NA	NA
Change in flow as a percent of standard deviation	0	15.7	7.6	23.3
Westmorland Gage				
Mean flow (ac-ft/yr)	465,180	458,010	461,683	454,513
Percent change in flow	0	-1.5	-0.8	-2.3
Standard deviation in flow (ac-ft/yr)	30,769	NA	NA	NA
Change in flow as a percent of standard deviation	0	23.3	11.4	34.7

[a] For purposes of this analysis, impacts under the no action alternative are conservatively represented by values in the “LRPC only” column. These values are calculated on the basis of the entire LRPC plant operating (including both the EAX and EBC units). Since only the EAX unit at the LRPC plant would operate under the no action alternative, impacts resulting from no action would be about 69% of those identified for the “LRPC only” scenario. Similarly, impacts under the proposed action are conservatively represented by values in the “both plants operating” column.

[b] To convert ac-ft/yr to m^3/s, multiply by 3.911×10^{-5}.

[c] NA = not applicable.

addition, water use associated with operation of the entire EAX unit (Table 4.2-1) is included in this alternative assuming that the operation of any EAX gas turbine would require operation of the EAX steam turbine which, in turn would require operation of the associated water treatment plant at full capacity. Therefore, impacts to water quality parameters under the proposed action (Tables 4.2-2 through 4.2-8) are conservatively represented, that is, impacts shown under the “both plants operating” column (the proposed action) are higher than the impacts would actually be.

4.2.4.1 Direct Impacts of Plant Operations: New River

Operations of the LRPC and TDM power plants would directly impact the New River by reducing the flow of water that it would receive from the Zaragoza Oxidation Lagoons in Mexicali, Mexico, and modifying its quality. Table 4.2-2 provides information on water use by the two power plants and water quality parameters associated with the water use.

TABLE 4.2-4 Changes in New River Water Depth Caused by Plant Operations[a]

Physical Parameter	No Plants Operating	Only LRPC Operating	Only TDM Operating	Both Plants Operating
Calexico Gage				
Mean depth (ft)	9.52	9.43	9.48	9.39
Percent change in depth	0	-0.95	-0.42	-1.37
Mean depth of flow for mean flow conditions minus the depth of flow for a flow equal to the mean value minus one standard deviation (ft)	0.58	NA[b]	NA	NA
Change in depth as a percent of depth for a flow of one standard deviation less than the mean value	0	15.52	6.90	22.42
Westmorland Gage				
Mean depth (ft)	6.04	5.99	6.02	5.97
Percent change in depth	0	-0.83	-0.33	-1.16
Mean depth of flow for mean flow conditions minus the depth of flow for a flow equal to the mean value minus one standard deviation (ft)	0.20	NA	NA	NA
Change in depth as a percent of depth for a flow of one standard deviation less than the mean value	0	25.00	10.00	35.00

[a] For purposes of this analysis, impacts under the no action alternative are conservatively represented by values in the "Only LRPC Operating" column. These values are calculated on the basis of the entire LRPC plant operating (including both the EAX and EBC units). Since only the EAX unit at the LRPC plant would operate under the no action alternative, impacts resulting from no action would be about 69% of those identified for the "Only LRPC Operating" scenario. Similarly, impacts under the proposed action are conservatively represented by values in the "both plants operating" column.

[b] NA = not applicable.

4.2.4.1.1 Flow of Water in the New River. During operations, the LRPC and TDM plants would extract water from the Zaragoza Oxidation Lagoons, thereby reducing the quantity of water discharged from the lagoons to the New River. With no plants operating, the lagoons would deliver about 33,200 ac-ft/yr (1.30 m^3/s) of water to the New River (Table 4.2-2). This volume of water is about 20% of the average flow of 180,000 ac-ft/yr (7.04 m^3/s) at the Calexico gage at the U.S.-Mexico border.

As shown in Table 4.2.2, operation of the LRPC at 100% power for 365 days per year would consume 7,170 ac-ft (0.28 m^3/s) of water. Operation of the TDM power plant at 100% power for 365 days per year would consume 3,497 ac-ft (0.14 m^3/s). Operation of the power plants would, therefore, reduce the flow of water to the New River from the lagoons and power plant outfalls from 33,200 ac-ft/yr (1.30 m^3/s) (Section 3.2.1.2) to 26,030 ac-ft/yr (1.02 m^3/s) for operation of the LRPC; 29,703 ac-ft/yr (1.16 m^3/s) for operation of the TDM plant; and 22,533 ac-ft/yr (0.88 m^3/s) for operation of both plants. With both plants operating, the net water delivered to the New River from the lagoons and power plant canals would be reduced by about 32% (Table 4.2-2).

TABLE 4.2-5 Changes in New River Water Quality Parameter Concentrations at the Calexico Gage Caused by One Year of Power Plant Operations[a]

Physical Parameter	No Plants Operating	Only LRPC Operating	Only TDM Operating	Both Plants Operating
TDS				
Concentration (mg/L)	2,620	2,717	2,664	2,766
Percent change in concentration	0	3.7	1.7	5.6
Standard deviation of concentration (mg/L)	315	NA[b]	NA	NA
Change in concentration as percent of standard deviation	0	31	14	46
TSS				
Concentration (mg/L)	52.7	51.9	52.4	51.5
Percent change in concentration	0	-1.5	-0.6	-2.3
Standard deviation of concentration (mg/L)	9.6	NA	NA	NA
Change in concentration as percent of standard deviation	0	8.3	3.1	12.5
BOD				
Concentration (mg/L)	27.5	26.5	27.0	25.9
Percent change in concentration	0	-3.6	-1.8	-5.8
Standard deviation of concentration (mg/L)	11.5	NA	NA	NA
Change in concentration as percent of standard deviation	0	8.7	4.4	13.9
COD				
Concentration (mg/L)	53.6	47.6	50.7	44.5
Percent change in concentration	0	-11.2	-5.4	-17.0
Standard deviation of concentration (mg/L)	20.4	NA	NA	NA
Change in concentration as percent of standard deviation	0	29.4	14.2	44.6
Phosphorus				
Concentration (mg/L)	2.00	1.90	1.96	1.85
Percent change in concentration	0	-5.0	-2.0	-7.5
Standard deviation of concentration (mg/L)	0.27	NA	NA	NA
Change in concentration as percent of standard deviation	0	37.0	14.8	55.6
Selenium				
Concentration (mg/L)	0.02100	0.0218	0.0214	0.0223
Percent change in concentration	0	3.8	1.9	6.2
Standard deviation of concentration (mg/L)	0.021	NA	NA	NA
Change in concentration as percent of standard deviation	0	3.8	1.9	6.2

[a] For purposes of this analysis, impacts under the no action alternative are conservatively represented by values in the “LRPC only” column. These values are calculated on the basis of the entire LRPC plant operating (including both the EAX and EBC units). Since only the EAX unit at the LRPC plant would operate under the no action alternative, impacts resulting from no action would be about 69% of those identified for the “LRPC only” scenario. Similarly, impacts under the proposed action are conservatively represented by values in the “both plants operating” column.

[b] NA = not applicable.

TABLE 4.2-6 Physical Changes to the Salton Sea Produced by Plant Operations[a,b]

Physical Parameter	No Plants Operating	Only LRPC Operating	Only TDM Operating	Both Plants Operating
Annual mean inflow (ac-ft/yr)[c]	1,340,000	1,332,830	1,336,503	1,329,333
Percent change in inflow	0	-0.54	-0.26	-0.80
Standard deviation of inflow	78,750	NA[d]	NA	NA
Change in inflow as percent of standard deviation	0	9.1	4.4	13.6
Volume (ac-ft)	7,624,843	7,617,673	7,621,346	7,614,176
Percent change in volume of Sea	0	-0.09	-0.05	-0.14
Elevation (ft MSL)	-227	-227.03	-227.02	-227.05
Change in elevation (ft)	0	-0.03	-0.02	-0.05
Percent change in elevation	0	-0.013	-0.009	-0.002
Standard deviation in water elevation (ft)	0.5	NA	NA	NA
Change in elevation as percent of standard deviation	0	6.0	4.0	10.0
Area (acre)	234,113	234,047	234,082	234,016
Change in area	0	-66	-31	-97
Percent change in area	0	-0.028	-0.013	-0.041
Standard deviation in area	1,100	NA	NA	NA
Change in area as percent of standard deviation	0	6.0	2.8	8.8

[a] For purposes of this analysis, impacts under the no action alternative are conservatively represented by values in the “LRPC only” column. These values are calculated on the basis of the entire LRPC plant operating (including both the EAX and EBC units). Since only the EAX unit at the LRPC plant would operate under the no action alternative, impacts resulting from no action would be about 69% of those identified for the “LRPC only” scenario. Similarly, impacts under the proposed action are conservatively represented by values in the “both plants operating” column.

[b] These values are only accurate to three significant figures (e.g., 1,340,000 ac-ft/yr is only meaningfully represented as 1,340,000 ac-ft/yr). Inflow values in this table are meant to show arithmetically the relatively small changes that occur due to plant operations as compared to baseline conditions.

[c] To convert ac-ft/yr to m^3/s, multiply by 3.911×10^{-5}.

[d] NA = not applicable.

Because flow into the New River from the lagoons and power plants would be decreased by plant operations, flow at the Calexico gage would also be decreased. The average flow of water in the New River at the gage in Calexico, California, is about 180,000 ac-ft/yr (7.04 m^3/s), and the annual average flow at the downstream gage at Westmorland, California, is 465,180 ac-ft/yr (18.19 m^3/s) for the period of record 1980 through 2001 (Section 3.2.1.1 and Table 4.2-3). At the Calexico gage, the volume of water consumed by LRPC and TDM plant operations represents about 4% and 1.9% of the average annual flow in the river, respectively. At the downstream gage at Westmorland, California, the volume of water consumed by plant operations would represent about 1.5% and 0.8%, respectively. These values are less than those

TABLE 4.2-7 Changes to Salton Sea Inflow and Water Quality Due to Plant Operations[a,b]

Physical Parameter	No Plants Operating	Only LRPC Operating	Only TDM Operating	Both Plants Operating
TDS				
Salton Seawater volume (ac-ft)[c]	7,624,843	7,617,673	7,621,346	7,614,176
Change in water inflow to Salton Sea (ac-ft/yr)	0	-7,170	-3,497	-10,667
Change in inflow load (million lb/yr)[d]	0	-5.3	-3.7	-9.0
Concentration resulting from inflow volume reduction (mg/L)	44,000	44,042	44,021	44,063
Percent change in load	0	-0.10	-0.05	-0.14
Rate of Increase				
Total input of salt (million lb/yr)	9,200	9,195	9,196	9,195
Increase in concentration (mg/L/yr)	443.57	443.74	443.57	443.76
Change in rate of concentration increase (mg/L/yr)	0	0.17	0	0.19
Time to reach a concentration of 60,000 mg/L (yr)	36.07	36.06	36.07	36.06
Net concentration resulting from volume change and inflow for 1 year (mg/L)	44,444	44,486	44,465	44,507
Percent change in concentration after one year	0	0.09	0.05	0.14
Phosphorus				
New River load in 1999 (million lb)	1.455	NA[e]	NA	NA
Change in load due to plant operations (million lb/yr)	NA	-0.10	-0.05	-0.15
Percent change in New River load	0	-6.9	-3.4	-10.3
Total load to the Salton Sea in 1999 (million lb)	2.838	NA	NA	NA
Percent change in load	0	-3.5	-1.8	-5.3

[a] For purposes of this analysis, impacts under the no action alternative are conservatively represented by values in the “LRPC only” column. These values are calculated on the basis of the entire LRPC plant operating (including both the EAX and EBC units). Since only the EAX unit at the LRPC plant would operate under the no action alternative, impacts resulting from no action would be about 69% of those identified for the “LRPC only” scenario. Similarly, impacts under the proposed action are conservatively represented by values in the “both plants operating” column.

[b] Values in this table were calculated using methods described in Appendix F.

[c] To convert ac-ft to m^3, multiply by 1,233.64.

[d] To convert lb to kg, multiply by 0.4536.

[e] NA = not applicable.

TABLE 4.2-8 Effects of Dry Cooling on Water Quality in the New River[a]

Parameter	No Plants Operating	Plants Similar to LRPC Operating	Plants Similar to TDM Operating	Plants Similar to Both Operating Plants
TDS (mg/L)	2,620	2,623	2,621	2,624
Percent change	0	0.11	0.08	0.15
Change as percent of standard deviation (315 mg/L)	0	0.95	0.32	1.27
TSS (mg/L)	52.7	52.7	52.7	52.7
BOD (mg/L)	27.5	27.5	27.5	27.5
COD (mg/L)	53.6	53.4	53.5	53.3
Percent change	0	-0.37	-0.19	-0.56
Change as percent of standard deviation (20.4 mg/L)	0	0.98	0.49	1.47
Phosphorus (mg/L)	2.0	2.0	2.0	2.0
Selenium (mg/L)	0.021	0.021	0.021	0.021

[a] For purposes of this analysis, impacts under the no action alternative are conservatively represented by values in the "Plants Similar to LRPC Operating" column. These values are calculated on the basis of the entire LRPC plant operating (including both the EAX and EBC units). Since only the EAX unit at the LRPC plant would operate under the no action alternative, impacts resulting from no action would be about 69% of those identified for the "Plants Similar to LRPC Operating" scenario. Similarly, impacts under the proposed action are conservatively represented by values in the "both plants operating" column.

at the Calexico gage because of additional inflow of water to the New River between the two gage locations. Together, the plants would consume about 5.9% of the annual flow at the Calexico gage and 2.3% of the annual flow at the Westmorland gage.

Flow in the New River at the Calexico and Westmorland gages is variable (Section 3.2.1.1). The standard deviations of annual flows at the Calexico and Westmorland gages are 45,827 and 30,769 ac-ft/yr (1.79 and 1.20 m^3/s), respectively, based on USGS gage data for a 22-year period from 1980 through 2001. The volume of water that would be consumed by LRPC and TDM plant operations represents 15.7% and 7.6% of the standard deviation in flow at the Calexico gage, respectively, and about 23.3% and 11.4% of the flow variability at the Westmorland gage, respectively (Table 4.2-3). The percentage at the Westmorland gage is higher than that at the Calexico gage because the flow is less variable at the downstream location. Together, annual water consumption by the power plants would represent about 23.3% and

34.7% of the standard deviation in annual flow at the Calexico and Westmorland gages, respectively.

Because the flow of water in the New River would be reduced, the depth of the water in the river would also be decreased (Table 4.2-4). Using the relationships presented in Section 3.2.1.1, the depth of the water at the Calexico gage for average annual conditions would be reduced from 9.52 to 9.43 ft (2.90 m to 2.87 m) by operations at the LRPC. This is a decrease of about 0.09 ft (2.7 cm), approximately 1 in. This difference represents a 1.0% change in depth from the mean (average) value, and a 15.5% change relative to the mean depth minus the depth at a flow that corresponds with the mean flow minus one standard deviation (0.58 ft [17.7 cm]) (Section 3.2.1.1). TDM plant operations would reduce the mean depth of the water at the Calexico gage from about 9.52 ft (2.90 m) to 9.48 ft (2.89 m), a difference of 0.04 ft (1.2 cm). Combined operations of the two plants would decrease the mean depth of the water at the Calexico gage to 9.39 ft (2.86 m), a difference of about 0.13 ft (3.9 cm).

Operations at the LRPC plant would also decrease the depth of water at the downstream gage at Westmorland, California (Table 4.2-4). The mean depth of the water at this gage is about 6.04 ft (1.84 m), and the difference in depth between the mean value and the depth for a flow corresponding with the mean value minus one standard deviation for the period of record 1993 through 2001 was 0.2 ft (6.1 cm) (Section 3.2.1.1). The average annual depth of the water due to operations at the LRPC would be 5.99 ft (1.83 m), a decrease of about 0.05 ft (1.5 cm). Operations at the TDM plant would decrease the depth of water at the Westmorland gage to about 6.02 ft (1.83 m), a difference of approximately 0.02 ft (0.6 cm). Combined operations of the two plants would reduce the average annual depth of water at the Westmorland gage by about 0.07 ft (2.1 cm).

Standard Deviation

A statistical measure of spread or variability. The definition for standard deviation is the square root of the variance. In more simple terms, standard deviation is a statistic that tells you how tightly all of the various examples you are looking at are clustered around the mean (average) in a set of data. When the examples are tightly bunched together, the standard deviation is small. When the examples are spread apart, the standard deviation becomes relatively large. In the case of the New River, numerous measurements have been taken of flow rate over a one-year period. The standard deviation of these measurements was then calculated as a measure of the normal variation of flow.

The percent of the standard deviation shown in the tables is presented to show the influence of the power plants to normal variation. A value less than 1 standard deviation falls within the normal range of variation within a system over a given period of time.

As indicated by the above discussion, the largest percentage change in flow would occur at the Calexico gage under combined operations of the LRPC and TDM plants. Because it would use more water, the larger portion of the change would be derived from operations at the LRPC plant. The change in flow would be about 4% of the mean value, which is about 16% of the standard deviation of the flow at this gage. The percent change at the downstream Westmorland gage would be less because of less flow variability at this location.

If the low annual flow for the New River was used for the analysis, the percentage of flow lost to plant use would be increased to about 9% at the Calexico gage. At the Westmorland gage, the combined use of water for the two plants would decrease the flow by 2.6%, which is about 34% of the standard deviation in flow at this location. Because water use for the plants is an average quantity for an assumed power generation of 100% for 365 days per year and the flow in the New River is variable on a less-than-daily basis, changes to flow and depth are best indicated by using mean annual values. Changes in flow and depth produced by power plant operations lie well within the variability of the flows for the New River.

4.2.4.1.2 New River Water Quality. The following sections discuss the effects of water treatment on TDS, TSS, BOD, COD, selenium, and phosphorus and their impacts on New River water quality at the Calexico gage. Secondary treatment of the sewage water used by the power plants also would remove biological constituents, which are not discussed in detail in this EIS. However, the water treatment disinfection processes would produce beneficial impacts to the New River by reducing the presence of fecal coliform and *E. coli* and enterococci bacteria in the discharge water.

TDS. During operations of the power plants, dissolved solids would be added to the New River from three sources: discharge water from the Zaragoza Oxidation Lagoons, discharge water from the LRPC plant, and discharge water from the TDM plant. For purposes of analysis, the TDS in effluent from the lagoons is reported to have a value of 1,200 mg/L (Henao 2004). The TDS concentration in the discharge water from the power plants would be 4,800 mg/L and 4,430 mg/L for the LRPC and TDM plants, respectively (Henao 2004). Water withdrawn from the lagoons for operation of the LRPC and TDM power plants would contain approximately 29 million and 14 million lb (36 and 43 million kg), respectively, of dissolved solids. Approximately 24.1 million lb (11 million kg) from the LRPC and 10.5 million lb (4.8 million kg) from TDM discharge water would later be returned to the New River. This results in a net reduction of annual TDS load in the New River of approximately 5.3 million and 3.7 million lb (2.4 and 1.7 million kg) from operation of the LRPC and TDM power plants, respectively. With both plants operating, the annual TDS load to the New River would be reduced by about 9 million lb (4.1 million kg) or about 8%.

Water discharged from the power plants and the Zaragoza Oxidation Lagoons would mix with water in the New River. Changes in TDS concentration in the river were calculated using a simple, mass-balance mixing model that included the New River, the Zaragoza Oxidation Lagoons, and discharges from the LRPC and TDM power plants (Appendix F). As indicated in Table 4.2-5, the TDS concentration in the New River would be increased by operating the power plants, even though the annual total TDS load to the river would be reduced. This increase in concentration would occur because of the higher TDS concentration in the discharged effluent from the power plants and less water flowing in the river. The TDS concentration increases would be about 4% and 2% of the mean value for TDS in the river due to operations of the LRPC and TDM plants, respectively. Operation of the LRPC plant would have a greater impact on TDS because it would have a greater rate of effluent discharge with a higher TDS value (Table 4.2-2).

The TDS concentration in the New River is variable at the Calexico gage. The standard deviation for TDS is about 315 mg/L (Section 3.2.1.1). Changes in the TDS for the river produced by plant operations would be about 31% and 14% of the observed variability for the LRPC and TDM plants, respectively (Table 4.2-5). Combined, the plants would produce a change that would be about 46% of the standard deviation for TDS. With both plants operating, the increased TDS concentration (about 2,766 mg/L) would be less than the 4,000-mg/L water quality objective for the Colorado River Basin (SWRCB 2003) discussed in Section 3.2.1.1 (Water Quality Guidance for the New River).

TSS, BOD, COD, selenium, and phosphorus. Table 4.2-2 lists the changes that would occur to New River loads for TSS, BOD, COD, selenium, and phosphorus. In all cases, operation of the power plants would reduce the annual loads of these materials. Annual operations of the combined plants would reduce the COD load to the New River by almost 6 million lb (2.72 million kg). Combined operations would also reduce the annual loads for TSS and BOD by about 2 million and 1.5 million lb (907,000 and 680,000 kg), respectively. Phosphorus reduction would be less, about 150,000 lb (68,000 kg).

Table 4.2-5 lists the changes in New River water quality associated with TSS, BOD, COD, selenium, and phosphorus. Except for selenium, all of the parameters would have reduced concentrations under plant operations. The concentration of selenium would increase by about 6% with plants operating. This increase would occur because of reduced flow in the river caused by plant operations. Under average conditions, the change in COD for the river would be greatest (a decrease of about 17%) with both power plants operating. The next greatest change would be for phosphorus (a reduction of about 8%). For the same conditions, BOD in the river would be reduced by almost 6%. These changes would all be less than the observed variability of the individual parameters (standard deviations) and could not be uniquely identified with any specific source; however, the reductions would all be beneficial in helping meet newly formulated sedimentation and dissolved oxygen TMDLs for the New River and Colorado River water quality objectives for total phosphorus (Section 3.2.1.1 — Water Quality Guidance for the New River).

Temperature. The combined effects of LRPC and TDM power plant operations on New River water temperature would be an increase of 0.5°F (0.3°C), using a simple mixing-model approach similar to that used for water quality parameters (Appendix F), the above average values, and assuming that the LRPC discharge water temperature would be similar to that of the TDM plant. This temperature increase is well within the uncertainty of the calculation. In addition, the actual change in temperature is likely to be even less, because the water discharged from the power plants would be transported to the New River through a canal that has a length of about 6 mi (10 km), thereby allowing the discharge water to approach a value more similar to the temperature of the water discharged from the Zaragoza Oxidation Lagoons.

4.2.4.2 Direct Impacts to Floodplains: Pinto Wash and New River

A floodplain assessment was conducted in accordance with DOE regulations for compliance with floodplain and wetlands environmental review as required under 10 CFR Part 1022. The transmission line projects would involve construction of towers within a 100-year floodplain along the applicants' proposed routes or along the eastern or western alternative routes.

4.2.4.2.1 Pinto Wash. Construction of footings for the support structures along the proposed transmission lines could affect the 100-year floodplain for the Pinto Wash. Since the excavations for the footings would be backfilled and the original ground contours would be restored, the impacts associated with these activities are expected to be minimal and temporary. Cylindrical sections of the footings 3 to 4 ft (0.9 to 1.2 m) in diameter would protrude above the ground surface; on the basis of plans for the proposed lines, a maximum of two lattice tower footings for each transmission line would be in the 100-year floodplain. The placement of these footings would result in a minimal permanent change to conditions in the floodplain, with minimal impacts on natural and beneficial floodplain values.

4.2.4.2.2 New River. Along the New River, changes in water flow and depth produced by power plant operations lie well within the variability of the flows for the New River. While plant operations could result in a small theoretical reduction in maximum flood elevation, this change would have no practical effect on the incidence or extent of floods or floodplain function.

4.2.4.3 Direct Impacts to Groundwater

Construction of footings for the support structures along the proposed transmission lines could be deep enough to enter the groundwater zone. Potential impacts to groundwater from construction would be limited to temporary and localized lowering of the water table if it is necessary to dewater an excavation to install a footing.

4.2.4.4 Indirect Impacts of Plant Operations: Salton Sea and Brawley Wetland

Indirect impacts of operating the LRPC and TDM power plants would occur to the Salton Sea and the pilot wetland project at Brawley. These impacts are discussed below.

4.2.4.4.1 Salton Sea. Indirect impacts would occur to the Salton Sea because of operations at the LRPC and TDM power plants. These impacts would be to the physical characteristics of the Sea (volume, depth, and surface area) and its water quality.

Physical characteristics. For purposes of analysis, the following values are used as initial Salton Sea estimates for evaluating impacts to the system: elevation (–227 ft MSL [–69 m]); area (234,113 ac [94,743 ha]); and volume (7,624,843 ac-ft [9.405×10^9 m^3]) (Section 3.2.1.3) (Table 4.2-6). In practice, these parameters are not known precisely and have considerable variability. Use of other, similar initial conditions would not be expected to significantly change the results of the calculations presented here because of the differences in magnitude of the large parameter values and the small changes produced by plant operations.

As discussed previously, operation of the LRPC and TDM power plants would reduce the flow of water in the New River, a major tributary to the Salton Sea. Flow at the Calexico gage, 180,000 ac-ft/yr (7.04 m^3/s), represents about 13% of the total inflow to the Salton Sea (about 1.34 million ac-ft/yr [52.41 m^3/s]) from all sources [Section 3.2.1.3]). The reduction in inflow to the Sea would be about 0.5% for the LRPC plant and 0.26% for the TDM plant. Combined, the net reduction in flow would be less than 1% (approximately 0.8%) of the average value. These changes would be well within the variability of the Sea's inflow (approximately 3.08 m^3/s [78,750 ac-ft] [Section 3.2.1.3]). Combined, the net inflow reduction would be about 14% of the standard deviation of the total inflow.

A decrease in yearly inflow to the Sea would reduce its volume, lower its elevation, and decrease its surface area. As indicated in Table 4.2-6, operation of the LRPC and TDM power plants would decrease the volume of water in the Sea by 7,170 and 3,497 ac-ft (8.84×10^6 and 4.31×10^6 m^3), respectively. These reductions would be less than about 0.1% of the initial volume of the Sea. Because of the large rate of evaporation from the Sea, changes in volume would occur rapidly, and a new state of equilibrium would occur within 1 year.

Salton Sea elevations were calculated using information from Figure 3.2-14 and the reduced volumes of the Sea that would be produced by plant operations. The change in elevation of the Sea would be about –0.03 ft (–0.9 cm) and –0.02 ft (–0.6 cm) for operation of the LRPC and TDM plants, respectively. These values would be about 0.01% each of the initial elevation of –227 ft (–69 m) MSL. The standard deviation of the Sea's elevation is about 0.5 ft (15 cm) (Section 3.2.1.3). Changes in elevations produced by plant operations would account for about 6% and 4% of the Sea's variability (Table 4.2-6). Combined, the loss in elevation of the Sea would be about 10% of the Sea's variability.

Along with a decreased volume and decreased elevation, a reduction in the inflow to the Sea would decrease its surface area. The change in area associated with operating the LRPC and TDM power plants would be about 66 acres (27 ha) and 31 acres (13 ha), respectively. Combined, the area loss would be about 97 acres (39 ha) (Table 4.2-6). These values correspond to losses of about 0.03, 0.01, and 0.04% of the Sea's initial surface area. For a standard deviation in surface area of 1,100 acres (445 ha) (Section 3.2.1.3), operation of the LRPC and TDM plants would reduce the Sea's surface area by about 6% and 3% of the Sea's variability, respectively.

Water quality. Operation of the LRPC and TDM power plants would indirectly impact water quality in the Salton Sea through changes in annual loads delivered to the Sea by the New River. Indirect impacts of decreased loads of BOD, COD, TSS, and pathogens resulting from plant operations (in particular wastewater treatment prior to use) would all beneficially impact the Sea. However, indirect impacts produced by changes in the annual loads of TDS, phosphorus, and selenium would be of greater importance to the overall health of the Salton Sea. These impacts are discussed below.

TDS: Currently, the Salton Sea has a TDS concentration of approximately 44,000 mg/L. For an initial elevation of –227 ft (–69 m) MSL and a volume of 7,624,843 ac-ft (9.405×10^9 m^3) (Section 3.2.1.3), the Sea has about 9.1261×10^{11} lb (4.1388×10^{11} kg) of salt (Table 4.2-7). Under plant operations, the volume of water flowing in the New River to the Salton Sea would be reduced (Table 4.2-3) and its TDS concentration increased.

In the Salton Sea, the rate of evaporation is equal to the rate of water inflow from all sources. Any change in the rate of water inflow (increase or decrease) would result in a concomitant change in the volume of the Sea, its elevation, and its surface area. The change in surface area would likewise result in a change in the rate of evaporation, which would match the new rate of water inflow thus reestablishing the equilibrium between inflow and evaporation and stabilizing the Sea at some new elevation. Because the rate of evaporation of the Salton Sea is very high (about 70.8 in/yr [1.8 m/;yr], Section 3.2.1.3), the Sea would adjust its elevation to the reduced inflow caused by the operation of the power plants very quickly. Although the volume of the Sea would be reduced by plant operations, the total quantity of salt in the Sea would remain the same (except for changes produced by additional inflows containing salt during the time that the Sea is adjusting to a reduced inflow). Using a mass-balance approach (Appendix F), modified salt concentrations were calculated for a reduced Sea volume (Table 4.2-7, under TDS). With both plants operating, the TDS concentration of the Sea would increase by approximately 0.14% to 44,063 mg/L. The dissolved solids concentration would increase by about the same percentage that the Sea's water volume is reduced.

In addition to a change in TDS concentration produced by reducing the volume of the Salton Sea, its TDS would also be affected by changes in the TDS load delivered by the New River. Assuming that the inflow of salt to the Salton Sea with no plants operating is approximately 9,200 million lb/yr (4,172 million kg/yr) (Section 3.2.1.3), the rate of salinity increase can be estimated for given Salton Sea volumes (Table 4.2-7, under rate of increase). In the absence of plant operations, the rate of salinity increase is about 443.6 mg/L/yr. This value agrees well with values cited in Section 3.2.1.3. With both plants operating, the TDS concentration would increase by an additional 0.2 mg/L/yr to about 443.8 mg/L/yr. Even though the salt load from the New River would be decreased by plant operations, the rate of TDS increase in the Sea would go up because of the reduced volumes predicted for the Sea. With both power plants operating, the Salton Sea would reach a salinity of 60,000 mg/L in 36.06 years, for an initial concentration of 44,000 mg/L. This value is 0.01 year (about 4 days) sooner than without the plants operating. With the uncertainty in the input parameters used for this calculation, the rates and times should be considered to be the same and not distinguishable, and the Sea's TDS concentration would reach 60,000 mg/L in about 36 years, with or without the plants operating.

After 1 year of power plant operations, the concentration of TDS in the Salton Sea would be a combination of increases, due to a reduced Sea volume and an increase due to additional salt loading from its tributaries. Table 4.2-7 lists the TDS values predicted after 1 year of plant operations. With both plants operating, the TDS concentration for the Sea would be about 44,510 mg/L. This value can be compared to a TDS value of about 44,445 mg/L for no plants operating for the same time period. This TDS value is expected to be conservative (i.e., higher than the actual value) because not all salts entering the Sea add to its TDS, some precipitate (Section 3.2.1.3). The TDS value predicted for both plants operating for one year is much less than the 60,000-mg/L value that would be detrimental to fishery resources and much less than the precision reported in the measurement (about 2,200 mg/L) (Section 3.2.1.3).

Phosphorus: As discussed in Section 3.2.1.3, phosphorus is a limiting nutrient for Salton Sea eutrophication. Most of the phosphorus enters the Salton Sea from the New River. In 1999, the total phosphorus load to the Sea was about 2.838 million lb (1.287 million kg); of this load, the New River supplied about 1.455 million lb (659,860 kg), or about 50% of the total (Section 3.2.1.3) (Setmire 2000). Operation of the LRPC and TDM power plants would reduce the load of phosphorus to the Salton Sea by 100,000 and 50,000 lb (45,350 and 22,680 kg), respectively. These reductions would be about 7% and 3% of the phosphorus load for the New River, and about 4% and 1.8% of the total phosphorus load to the Sea (Table 4.2-6). Because the concentration of phosphorus in the Sea has been nearly constant for more than 30 years, annual changes in the load of the magnitude estimated for operation of the power plants would be unlikely to change the degree of eutrophication for the Sea. As discussed by Setmire (2000), a 50 to 80% reduction in phosphorus load could be needed to significantly change its eutrophic state. However, any reduction in phosphorus load would be beneficial.

Selenium: Operation of the power plants would reduce the quantity of selenium that would be discharged to the New River and the Salton Sea. However, water consumption by the plants would slightly raise the concentration of selenium in the remaining water of the New River (Table 4.2-5). Operation of the LRPC and TDM power plants would reduce the selenium load to the New River and the Salton Sea by about 26 and 12 lb (11.8 and 5.4 kg), respectively. Most of the selenium inflow is from agricultural land and is largely found in Sea sediments. For a dissolved concentration of 1 ppb in Salton seawater, the mass of selenium present is about 20,740 lb (9,400 kg). Operation of the LRPC and TDM power plants would, therefore, reduce the selenium input to the sea by an amount equivalent to about 0.1% and 0.06% of this quantity, respectively.

4.2.4.4.2 Brawley Wetland. At the Brawley wetland site, water is withdrawn from the New River at a rate of about 7 ac-ft/yr (2.74×10^{-4} m^3/s). No flow measurements have been made at the Brawley wetland site; however, one can conservatively assume that the flow at this location is the same as at the upstream Calexico gage (flow increases in the New River in the downstream direction). For average conditions, the water demand for the Brawley site is about 0.004% of the flow at the Calexico gage.

The low, average, and high annual flows for the New River at the Calexico gage are about 4.62, 7.04, and 10.33 m^3/s (118,000, 180,000, and 264,000 ac-ft/yr), respectively. Even under conditions of the lowest annual flow, the combined consumptive use of water by the power plants would be less than 10% of the flow in the New River (Section 4.2.4.1.1). These flow reductions due to plant operation should not prevent the withdrawal of the water required for the Brawley wetland by the existing pump.

Even with reduced annual loads to the New River, operation of the two power plants would increase the TDS in the river at the Calexico gage by less than about 6% and increase the selenium concentration by about 6%. These increases would occur because of a reduced volume of water flowing in the river. Decreased concentrations would occur for TSS, BOD, COD, and phosphorus (–2.3%, –5.8%, –17.0%, and –7.5%, respectively [Table 4.2-5]). Increases in concentrations of TDS and selenium could cause adverse impacts to the system but should not exceed the tolerance of wetland plants (Section 4.4.4.2), whereas the changes in the other water quality parameters could be beneficial (Section 4.4). In all cases, the changes would be within the range of the parameters' variability.

4.2.4.5 Indirect Impacts to Groundwater

Indirect impacts to groundwater would occur as a result of decreasing flow in the New River, since the New River is a recharge source for groundwater in the Imperial Valley Groundwater Basin. However, since the New River is only one of many recharge sources (contributing about 7,000 ac-ft/yr [0.25 m^3/s]) and the reduction of flow is expected to be low (about 5.9% and 2.3% of the annual flow at the Calexico and Westmorland gages, respectively), the impacts to groundwater resources resulting from the proposed action are expected to be minimal.

4.2.5 Alternative Technologies

This section discusses impacts to water resources from the use of alternative cooling technologies. Impacts from the use of more efficient emission control technologies would be the same as those for the proposed action and therefore are not discussed in this section.

In a dry cooling system, heat is transferred from the steam to the cooling air via radiator-like surfaces (DeBacker and Wurtz 2003). With a dry cooling system, power plant water consumption would be reduced by about 95% (Johnson and Alvarez 2003) in comparison to water required by a wet cooling system.

During hot days, the efficiency of dry cooling is reduced because of the high air temperature (Section 2.3.1.1). Improved efficiency can be achieved by using a wet-dry condensing system. A wet-dry cooling system combines wet evaporative cooling with dry cooling. Wet cooling would only be used when air temperatures were too high to operate a dry system efficiently. Because the wet cooling portion of the wet-dry system would be used only during the hottest days, the quantity of water used would be less than that required for a full wet cooling system.

Since the water requirements for a dry cooling system would be approximately 5% of those required for a wet cooling system, it may be possible that the developer of a power plant using a dry cooling system could purchase water from the local water utility on a regular basis. In any case, the water obtained would require further demineralization at the power plants for use as steam cycle makeup water. Alternatively, the developer may choose to construct a small water treatment plant to supply the plant's water requirements. However, if a wet-dry cooling system were employed, water requirements during the times when the wet cooling system operated would be the same as for the use of a full-time wet cooling system. Therefore, it is likely that a full capacity water treatment plant would be built to support operation of a wet-dry cooling system.

Impacts to water resources for dry cooling and wet-dry cooling are discussed below.

4.2.5.1 Dry Cooling

With dry cooling, the water demand for operating plants similar to the LRPC and TDM power plants would be about 360 and 175 ac-ft/yr (0.14 and 0.007 m^3/s), respectively, assuming that the dry cooling would reduce water consumption by 95%. The combined water use would be 535 ac-ft/yr (0.021 m^3/s). This amount of water is about 2% of the annual discharge from the Zaragoza Oxidation Lagoons to the New River.

Assuming that the steam cycle makeup water needed for dry cooling would be obtained from the Zaragoza Oxidation Lagoons and treated, the flow in the New River at the Calexico gage would be directly impacted and would be reduced from 180,000 to 179,465 ac-ft/yr (7.04 to 7.02 m^3/s) for operating power plants similar to the LRPC and TDM plants, a reduction of about 0.3%. At the Westmorland gage, near the Salton Sea, the flow would be reduced from an average of 456,180 to 455,645 ac-ft/yr (17.84 to 17.82 m^3/s). This reduction is about 0.1% of the annual average flow. For the dry cooling system, most of the water would be lost to evaporation.

If the water needed for dry cooling was obtained from the lagoons, the quality of the water in the New River would be directly impacted. Operation of the power plants would slightly increase the concentration of TDS (Table 4.2-8) because the water from the Zaragoza Oxidation Lagoons would dilute higher upstream concentrations. Concentrations for BOD, TSS, total phosphorus, and selenium in the New River would remain essentially unchanged, and the concentration for COD would slightly decrease (Table 4.2-8).

Indirect impacts to the Salton Sea for the dry cooling alternative would be much less than those of the proposed action and approximately the same as those presented for no plants operating, as shown in Table 4.2-7. Similarly, indirect impacts to the Brawley wetland would be less than those of the proposed action because of the smaller quantity of water that would be removed from the New River and the smaller changes in water quality parameters.

4.2.5.2 Wet-Dry Cooling

With wet-dry cooling, dry cooling would be used on days for which the air temperature was sufficiently low to promote efficient cooling. For hotter days, the system would use wet cooling. The water demand for such a combined system would be bounded by that for the proposed action, which would use wet cooling all of the time, and by that required for dry cooling, which would use a minimum quantity of water. Wet cooling would probably be used about 30 to 40% of the time, primarily during the summer months. Under these conditions, water consumption for operation of plants similar to those of the LRPC and TDM would be about 2,800 and 1,400 ac-ft/yr (0.11 and 0.05 m^3/s), respectively. Direct and indirect impacts of a wet-dry cooling system would be bounded by those produced by wet cooling and dry cooling and would be slightly biased toward the direction of dry-cooling impacts if water use followed a linear relationship with the percentage of time of use.

4.2.6 Mitigation Measures

DOE and BLM have not been able to identify mitigation strategies for reducing impacts to water resources. However, mitigation measures for reducing air impacts, such as paving 22 mi (35 km) of dirt roads and construction of fast-fill compressed natural gas stations, could result in impacts related to soil erosion. Over the long term, paving roads and other surfaces subject to frequent physical disturbance would reduce erosion (and thus potentially reduce sediment discharge to streams). When it rains in the desert, little water penetrates (almost all of it runs off), so the effect of paving on surface runoff is negligible.

4.3 AIR QUALITY

This section analyzes the impacts of the alternatives described in Chapter 2 on air quality in the United States. Impacts in the United States may be a direct result of the air emissions produced during the construction and maintenance of the proposed transmission lines in the United States. This section also analyzes the impacts in the United States that may result from operations of the LRPC and TDM power plants.

4.3.1 Major Issues

Major issues pertaining to air quality include the following:

- Impacts in the United States of NH_3 emissions from the TDM and LRPC power plants and their contribution to secondary particulate formation,
- Impacts in the United States of CO_2 emissions from the TDM and LRPC power plants,
- Quantification of impacts during the phased SCR installation on Mexico-dedicated turbines at the LRPC,

- Concern that air emissions from the TDM and LRPC power plants could exacerbate the health impacts in the United States currently linked to regional air quality, and

- Mitigation of impacts of emissions from the TDM and LRPC power plants by instituting offsets.

These issues are addressed in this section, except for health impacts, which are addressed in Section 4.11.

4.3.2 Methodology

This section describes the methodologies for estimating emissions from the construction and operation of the Sempra and Intergen transmission lines and from the operation of the TDM and LRPC power plants in Mexico.

4.3.2.1 Estimating Emissions from Transmission Line Construction and Operation

Fugitive particulate (PM_{10}) emissions (dust) were estimated for transmission line construction. Emission factors for unpaved roads and construction areas were taken from "Volume I: Stationary Sources" from the document, "Compilation of Air Pollutant Emission Factors," commonly referred to as "AP-42," published by the EPA (2000a). AP-42 provides guidance for estimating fugitive emissions when source-specific emission information is not available. The emission factor for estimating fugitive PM_{10} from unpaved roads is based on an empirical equation that includes the following variables: silt content of the parent soil, average vehicle weight in tons, and surface material moisture under natural conditions. The emission factor yielded is in pounds of PM_{10} per vehicle-mile traveled (VMT). The method for estimating emissions for vehicular travel during transmission tower construction uses generic assumptions for these variables, including a surface soil silt content of 23%, average vehicle weight of 2.2 tons (2 t), and a surface soil moisture during construction of 0.2%. The number of days with measurable rain (greater than 0.01 in. [0.03 cm]) is also taken into account, and the estimate reflects that construction would take place during the rainy season (i.e., winter). The estimated fugitive PM_{10} emissions from construction of four pads for each tower were estimated using emission factors developed by the California South Coast Air Quality Management District (1993). Emissions from helicopter operations to transport completed tower sections were similarly estimated. Emissions from subsequent maintenance and inspection activities along the transmission lines were also derived.

4.3.2.2 Estimating Air Pollutant Concentrations from Power Plant Emissions

The values for the LRPC and the TDM plants were obtained from a combination of the maximum levels described in the Mexican permits (for NO_x and CO), vendor guarantees (for NH_3 slip), vendor estimates (for PM_{10}), and stoichiometric calculations by Sempra and Intergen on the basis of the amounts of natural gas burned for CO_2. Maximum theoretical emission levels were based on operating at full power 24 hours per day, 365 days per year. The actual operation of the plants and the resulting emissions would be less because of scheduled maintenance, forced outages, and varying electrical demands by California.

4.3.2.2.1 Nitrogen Oxide (NO_2), Carbon Monoxide, Ammonia, and Particulate Matter. DOE and BLM have used EPA's AERMOD (the AMS/EPA Regulatory MODel) (EPA 1998) to calculate increments in air pollutant concentrations (NO_2, CO, NH_3, PM_{10}) in the United States as a result of emissions from the TDM and LRPC plants. AERMOD is a steady-state plume dispersion model for assessment of pollutant concentrations from a variety of sources. This model serves as a replacement for ISCST3 (Industrial Source Complex Short Term Dispersion Model 3), which was designed to support the EPA's regulatory modeling. AERMOD simulates transport and dispersion from flat and complex terrain, surface and elevated releases, and multiple sources. It can be applied to rural and urban areas. It is based on an up-to-date characterization of the atmospheric boundary layer and accounts for building wake effects and plume downwash. The model uses hourly sequential preprocessed meteorological data to estimate concentrations for averaging times from one hour to one year.

AERMOD is actually a modeling system with three separate components: AERMOD (AERMIC Dispersion Model), AERMAP (AERMOD Terrain Preprocessor), and AERMET (AERMOD Meteorological Preprocessor). Special features of AERMOD include its ability to treat the vertical inhomogeneity of the planetary boundary layer, surface releases and irregularly shaped area sources, a three-plume model for the convective boundary layer, limitations on vertical mixing in the stable boundary layer, and fixing the reflecting surface at the stack base. A treatment of dispersion in the presence of intermediate and complex terrain is used, which improves on that currently in use in other models. To the extent practicable, the structure of the input or the control file for AERMOD is the same as that for the ISCST3. At this time, the AERMOD contains the same algorithms for building downwash as those found in the ISCST3 model.

AERMET is the meteorological preprocessor for AERMOD. Input data can come from hourly cloud cover observations, surface meteorological observations, and twice-a-day upper air soundings. Output includes surface meteorological observations and parameters and vertical profiles of several atmospheric parameters. AERMAP is a terrain preprocessor designed to simplify and standardize the input of terrain data for AERMOD. Input data include receptor terrain elevation data. Output includes the location and height scale for each receptor, which are the elevations used for the computation of airflow around hills.

The emission rates and stack parameters used are shown in Appendix G. All stack emissions were considered to be released as point sources, and emissions from cooling towers were assumed to be volume sources.

The following meteorological data were used for AERMET: hourly surface meteorological data from Imperial Airport, California (17 ft [5 m] measurement height up to August 15, 2000, and 33 ft [10 m] thereafter), and upper air sounding data from Miramar, San Diego, California. Imperial meteorological data were obtained from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center for the 10-year period 1993 to 2002; AERMOD was run with five years of data, namely, 1993, 1994, 1995, 1998, and 1999.

A center point for each plant (i.e., the center of the TDM plant and the center of the LRPC plant) was determined, and a receptor grid was established as follows: 820-ft (250-m) grids up to 16,404 ft (5,000 m) from the center, 1,640-ft (500-m) grids from 16,404 to 32,808 ft (5,000 to 10,000 m) from the center, and 3,281-ft (1,000-m) grids from 32,808 to 82,021 ft (10,000 to 25,000 m) from the center, and 656-ft (200-m) interval grids on the U.S.-Mexico border. This yielded a 31-mi × 31-mi (50-km × 50-km) modeling domain. The highest concentration among receptor grid locations for each averaging time was selected as the reported modeled concentration.

4.3.2.2.2 Ozone. Regulatory review requirements in the United States and Mexico do not include the photochemical modeling of ozone (O_3). Nevertheless, the potential influence of the TDM and LRPC plants on O_3 levels in the region that may result from their emissions was investigated. To help characterize the actual air chemistry of the region, recent 5-year records (1997 to 2001) of hourly measurements of O_3 and precursor NO_2 were examined from three air quality monitoring sites in Imperial County close to the proposed action and to Mexicali to the south.

The Ozone Isopleth Plotting Package Research (OZIPR) model was used to estimate possible incremental O_3 formation resulting from precursor NO_x and VOC emissions from the power plants in Mexico. OZIPR is based on EPA's Ozone Isopleth Plotting Program (OZIPP) model. OZIPR is a single-day one-dimensional photochemical box transport model that focuses on the atmospheric chemistry that leads to O_3 formation. It is a simple trajectory model capable of utilizing complex chemical mechanisms, emissions, and various meteorological parameters of the lower atmosphere. Its physical representation is a well-mixed column of air extending from the ground to the top of the mixed layer. This idealized air column moves with the wind (along the wind trajectory) but cannot expand horizontally. Emissions from the surface are included as the air column passes over different emission sources, and air from above the column is mixed in as the inversion rises during the day. Complex chemical mechanisms may be input into OZIPR to describe the chemical processes that occur within this modeled air mass. In addition to individual trajectory simulations, the program can use Empirical Kinetic Modeling Approach (EKMA) to estimate O_3 levels from different types and amounts of precursor emissions.

4.3.2.2.3 Carbon Dioxide. The emissions of CO_2 from the TDM plant, LRPC export turbines, and LRPC Mexico turbines were compared with both the total U.S. emissions from fossil fuel combustion and total global emissions from fossil fuel combustion.

4.3.2.2.4 Volatile Organic Compounds. VOC emission inventory data were obtained for the Imperial Valley area from the ARB (ARB 2003b) and for the Mexicali area

(ERG et al. 2003) as discussed in Section 4.3.4.4.2. VOC emissions for the turbines at the TDM facility and the LRPC were estimated using an EPA AP-42 (EPA 2000a) natural gas combustion emission factor. These data were drawn upon in the analysis and discussion of O_3 formation in Section 4.3.4.4.2.

4.3.2.2.5 Secondary PM_{10} from Ammonia. DOE and BLM estimated the amount of secondary PM_{10} ammonium nitrate (NH_4NO_3) that could be formed by the chemical reaction between ambient NH_3 and nitric acid (HNO_3) originating from NO_x emitted from the Mexico power plants. This methodology was based on a production term of 0.6 grams of NH_4NO_3 from 1.0 grams of emitted NO_x, a term that was derived by Stockwell et al. (2000) for wintertime conditions in the San Joaquin Valley. As is discussed in much fuller detail in Section 4.3.4.4.2, because of higher temperatures and lower relative humidities in the Imperial Valley-Mexicali area, this term was believed to overestimate the amounts of NH_4NO_3 formed. Comparisons were made to measurements made by Chow and Watson (1995) of secondary NH_4NO_3 contributions to total PM_{10} (from all sources) in the Imperial Valley-Mexicali area. These were low, in the range of 2 $\mu g/m^3$ to 3 $\mu g/m^3$, or about 1 to 2% of total PM_{10}, adding corroborating evidence that the amount of secondary NH_4NO_3 particulates contributed by the power plants would be very small.

MACT

Maximum achievable control technology (MACT) standards only apply to emission units at a major source of HAPs. To be considered a major source of HAPs, a facility has to emit or have the potential to emit any single HAP at a rate of 10 tons (9 t) or more per year or any combination of HAPs at a rate of 25 tons (23 t) or more per year.

4.3.2.2.6 Hazardous Air Pollutants (HAPs). In the United States, the EPA promulgated the Combustion Turbine National Emissions Standards for Hazardous Air Pollutants (NESHAPs) 40 CFR 63 Subpart YYYY, which is also referred to as the "Combustion Turbine MACT." This MACT standard was published in the *Federal Register* on March 5, 2004 (69 FR 10512). However, on April 7, 2004, the EPA published a proposed rule to delist four subcategories of gas-fired stationary combustion turbines from the "Combustion Turbine MACT" rule (69 FR 18327). In a companion action, the EPA proposed to stay the effectiveness of this rule for lean premix gas-fired turbines (and one other subcategory) prior to their delisting in a final rule that may ensue. Both the Siemens-Westinghouse Model W501F combustion turbines at the LRPC and the General Electric Model 7FA combustion turbines at TDM are lean premix gas-fired turbines. If these combustion turbines were operated in the United States, they would be delisted from the "Combustion Turbine MACT" (i.e., it would not apply).

Notwithstanding, DOE and BLM have estimated HAP emissions for the LRPC and TDM as shown in Appendix H, which comprises a full health risk assessment of HAP emissions from the LRPC and TDM. HAP emissions from the four turbines (export and nonexport) at the LRPC that do not have oxidizing catalysts were estimated to be 35.2 tons/yr (31.9 t/yr). HAP emissions from the two combustion turbines at TDM, which have oxidizing catalysts installed, were estimated to be 9.9 tons/yr (8.9 t/yr). The oxidizing catalysts at TDM were assumed to have a control efficiency of at least 50% in controlling HAP emissions from these units. The potential health risks due to the HAPs and ammonia emissions are discussed in Section 4.11.

4.3.2.2.7 Emissions Excluded from Further Analysis. A key element of the CEQ's NEPA regulations (40 CFR 1502 and 1502.2) involved focusing on significant environmental issues and discussing impacts in proportion to their significance. Consistent with that "sliding scale" approach, the following issues were considered, reviewed, and then excluded from further analysis.

Sulfur dioxide (SO_2). Natural gas contains almost no sulfur or nitrogen. For example, U.S. coal contains an average of 1.6% sulfur, and oil burned at electric utility power plants ranges from 0.5 to 1.4% sulfur. Comparatively, natural gas at the burner tip has less than 0.0005% sulfur, mainly in the form of hydrogen sulfide (H_2S). Thus the burning of natural gas in the TDM and LRPC combine-cycle turbine units reduces many of the emission impacts that are associated with fuels such as coal, oil, or biomass. Forty tons (36 t)/yr of SO_2 emissions are estimated to result from the power plants associated with the proposed action (i.e., from the two TDM turbines, and the EBC and EAX export units at the LRPC), 30 tons (27 t)/yr from the no action alternative (i.e., the three EAX turbines at the LRPC), and 60 tons (54 t)/yr from all of the TDM and LRPC turbines (i.e., the two TDM turbines and the EBC and two EAX units at LRPC). These amounts would correspond to approximately a maximum impact in the United States of 0.005 $\mu g/m^3$ annually for the proposed action and 0.004 $\mu g/m^3$ annually for the no action alternative, compared to an EPA annual significant level (SL) of 1.0 $\mu g/m^3$. The amounts of SO_2 emitted are about 0.00025% and 0.00018% of the total amount of the approximately 15,000,000 tons (13,600,000 t)/yr of SO_2 emissions in the United States. By virtue of the de minimis nature of these SO_2 emissions, no further analysis of their impacts was pursued.

Lead. Lead is not known to be emitted from the burning of natural gas. There are no known emissions of the criteria air pollutant lead from the TDM or LRPC power plants, and no further analysis of lead impacts is pursued in this EIS.

Acidic deposition. Acidic deposition, commonly referred to as "acid rain," describes the wet deposition of any hydrometeor (rain, snow, or fog) with a pH below 5.5[1] and the dry deposition of acidic gases or particulates. The major causes of "acid rain" are SO_2 emissions and to a lesser extent NO_x emissions. SO_2 and NO_x can be converted to sulfuric acid or nitric acid in the atmosphere, scavenged in water droplets, and deposited as "acid rain." Acid particulates or gases can also be dry deposited. Acidic deposition is deleterious to aquatic resources, plants, forests, structures and materials, animal species, and ultimately human health. It is a large-scale regional issue; that is, impacts can result from emissions hundreds and hundreds of miles away. The greatest impacts occur in the northeastern United States. The maximum emissions from the

1 "Acid rain" in the Northeast United States has a pH as low as 4.3.

proposed action of 40 tons (36 t)/yr of SO_2 (estimated) and of 420 tons (380 t)/yr of NO_x (Table 4.3-1b) represent approximately 0.00025% of the total amount of the approximately 16,000,000 tons (14,500,000 t)/yr of SO_2 emissions in the United States (EPA 2003e) and 0.002% of the approximately 22,000,000 tons (20,000,000 t)/yr of annual NO_x emissions. By virtue of this de minimis attribute as well as minimal NO_2 concentration levels shown to result from the proposed action at a maximum receptor point in the United States (Table 4.3-2), no further analysis of acidic deposition was pursued.

Visibility. SO_2 and NO_x emissions from power plants can form sulfates and nitrates, respectively, which can contribute to regional haze and visibility degradation. EPA Prevention of Significant Deterioration Regulations call for review of such degradation in Class I areas within 62 mi (100 km) of a major source. Although these regulations do not apply to the TDM and LRPC plants in Mexico, their guidelines were adopted as a screening tool to benchmark impact. As has been discussed, only very low levels of SO_2 would be emitted from the TDM and LRPC plants in Mexico, and either would not be construed as a major source for SO_2. As described in Section 3.3.2, the nearest Class I area at the Agua Tibia Wilderness is located in the Cleveland National Forest, about 85 mi (137 km) to the northwest. The maximum allowable increment for a Class I area for NO_2 is 2.5 $\mu g/m^3$ annually. The proposed action results in a maximum annual NO_2 increment in the United States at a receptor point under 6 m (10 km) from the source that is some 50 times less (0.05 $\mu g/m^3$ [Table 4.3-4]). For these reasons, no further analysis of impacts on visibility degradation was pursued.

4.3.3 No Action

Under the no action alternative, the Presidential permits and ROW applications would be denied, and no lines would be built. Therefore, there would be no air quality impacts in the United States from the construction and operation of the lines. For the purposes of the air impacts analysis, it was assumed that the TDM plant, which would use the proposed transmission lines and would have no other outlet for power, would not operate or produce emissions. Impacts in the United States attributed to the TDM plant would be zero.

Under the no action alternative, the EBC unit also would not operate and would produce no emissions. However, electrical output of the entire EAX unit would operate because it would be connected to the CFE system and would export power to the United States over the existing IV-La Rosita line. Therefore, air impacts in the United States would occur. The impacts of operation of the TDM and LRPC plants are presented in Section 4.3.4 as part of the proposed action.

Impacts to air quality under the no action alternative are summarized in Table 4.3-5. This table shows that increases in concentrations of emitted pollutants would not exceed EPA SLs used as benchmarks of impacts at any receptor location in the United States. These results and the secondary air pollutants formed from primary emissions from the plants are presented in detail in Section 4.3.4.

4.3.4 Proposed Action

Under this alternative, Presidential permits would be granted by DOE and corresponding ROWs by BLM, the Sempra and Intergen transmission lines would be constructed simultaneously by the same contractor for transmission of power from the U.S.-Mexico border to the IV Substation in Imperial County, and the TDM power plant and the export turbines at the LRCP power plant would be operated. The impacts of this proposed action alternative are described below.

4.3.4.1 Impacts from Transmission Line Construction

The proposed transmission lines would be constructed from December through April, in order to accommodate BLM's administration of the flat-tailed horned lizard protection program. Construction of the transmission lines would involve setting foundations, which would require the movement of equipment along the routes, as well as the placement of the steel lattice towers by helicopter. The primary equipment to be used in setting foundations would be cement trucks, pickup trucks, and small construction equipment such as backhoes and skip loaders for excavation.

The amount of fugitive dust generated by these sources would depend upon several factors. However, the dust generated by entrainment on vehicle wheels is typically temporary in nature and settles in the immediate vicinity. Such fugitive dust emissions would not materially affect ambient PM_{10} levels in the project region. Water sprayed from truck-mounted equipment would be used sparingly for dust control at access roads, work areas, and when helicopters would be in use at tower sites. Any impacts would be temporary in nature.

Maximum fugitive PM_{10} emissions were estimated from transmission line construction. Conservatively high emission factors for estimating fugitive PM_{10} from unpaved roads (EPA 2000) were used to estimate the maximum PM_{10} emissions that could occur during line construction. Estimates were based on an empirical equation that includes the following variables: silt content of the parent soil, the average vehicle weight in tons, and surface material moisture under natural conditions. Pounds of PM_{10} per VMT were estimated. The estimated emissions for vehicular travel along the unpaved access roads along the existing SDG&E ROW during transmission tower construction include generic assumptions for these variables, including an average soil silt loading of 23%, average vehicle weight of 2.2 tons (2 t), and surface soil moisture during construction of 0.2%. The number of days with likely measurable rain (greater than 0.01 in. [0.03 cm]) was also taken into account, and the estimate reflects that construction would take place during the time of year during which precipitation in the region generally takes place.

Using AP-42 Section 13.2.2, Equation 1, the estimated emission factor used was 2.15 lb (0.98 kg) of PM_{10} per VMT. It was estimated that 18 round-trips per day during the first two months of construction, 8 round-trips per day during the next month, and 5 round-trips per day during the last two months of construction would occur (as discussed below). Assuming that

State Route 98 is the take-off point for traffic to the work site and that the maximum distance from Interstate 98 to the construction (to the north and south) is 3 mi (5 km) (the average distance is 1.5 mi [2.4 km]), the VMT during these trips would be 54, 24, and 15. Therefore, PM_{10} emissions from vehicular traffic to and from the construction site would be 116.1 lb (52.6 kg) of PM_{10} per day for the first two months (54 VMT × 2.15 PM_{10}/VMT), or 3.60 tons (3.3 t); 51.6 lb (23.4 kg) of PM_{10} per day for the next month (24 VMT × 2.15 PM_{10}/VMT), or 0.80 tons (0.73 t); and 32.3 lb (14.6 kg) of PM_{10} per day for the following two months of construction (15 VMT × 2.15 PM_{10}/VMT), or 1.00 ton (0.91 t); making a total of 5.40 tons (4.9 t).

Construction equipment, as well as vehicle traffic associated with the movement of construction workers to and from the site, would also cause air emissions resulting from the combustion of fuel. However, the number of construction equipment vehicles to be used on site and the relatively small number of total construction workers commuting to and from the general project site were not expected to result in a substantial impact on air quality. Any air quality impacts associated with this vehicular traffic would also be temporary in nature.

Tower placement would be performed over a 2- to 3-day period. The towers would be picked up from the lay-down area in Mexico and placed at each location by helicopter. The helicopter movement generally would cause some dust to be generated by downwash from the rotor blades. Such dust generation is similar to that from wind erosion and would be expected to cause entrainment of the loose surface material. The amount of dust generated would be small and would impact only the localized area near the tower base. The projects area is mostly uninhabited desert. However, to control dust, small quantities of water would be sprayed in the area surrounding the tower locations, as mitigation. Application of water could encourage nonnative invasive plant species to grow and would be used minimally.

The estimated fugitive PM_{10} emissions from pad construction are conservatively estimated to be approximately 26.4 lb (11.9 kg) of PM_{10} per acre per day (South Coast Air Quality Management District 1993). The disturbed area for each pad was less than 0.25 acres; therefore, during the construction period the estimated PM_{10} emissions would be about 6.6 lb (2.9 kg) per day or less per pad area. Site preparation for each of the 50 tower pad sites (25 per power line) would proceed at a pace of about one and one-half pad sites per day. Thus, up to 9.9 lb (4.5 kg) of PM_{10} per day could be emitted during pad preparation. Site preparation would take about 34 days to complete. Thus, a conservative estimate of PM_{10} emissions from pad preparation would be 0.17 tons (0.15 t).

For the helicopter operations delivering the preconstructed towers from Mexico, an emission factor of 21.3 lb (9.7 kg) of fugitive PM_{10} per hour may be assumed (South Coast Air Quality Management District 1993). It was estimated that helicopter operations would last a maximum of 10 hours over a 3-day period. Thus, maximum fugitive dust emissions from helicopter operations would be 213 lb (97 kg) or 0.11 tons (0.10 t).

Associated construction impacts along the proposed routes — such as grading access roads along the transmission line routes, temporary work areas around each tower, temporary pull sites for transmission line tensioning, and temporary lay-down areas — would be permanently impacted (e.g., tower sites). A total of 9.3 acres (3.8 ha) would be subject to construction activity at some time. Over the construction period, any activity at any individual location would typically be completed in less than a week. However, if it is conservatively assumed that work would extend 1 month (31 days) over 9.3 acres (3.8 ha), then using the AP-42 emission factor of 80 lb (36 kg) (EPA 2000a) of total suspended particulate per day per acre for a construction area and AP-42 factors of 0.5 for PM_{10} and 0.5 for controls, there would be a maximum emission of 2.8 tons (2.5 t) of PM_{10}. To some extent, this value would also overlap the separately derived pad preparation estimate.

There would also be unquantified areas of temporary impact within a 9.5-acre (3.8-ha) construction area of potential effect near the IV Substation. If it is very conservatively assumed that all of this area of potential effect is regarded as a construction site subject to 31 days of activity, 2.9 tons (2.6 t) of PM_{10} would be emitted. This value would be an overestimate.

Thus, the total of PM_{10} emissions over the construction phase of the proposed lines from construction vehicles, pad preparation, helicopter tower placement, and other construction-related activities is conservatively estimated to be a maximum of 11.4 tons (5.40 + 0.17 + 0.11 + 2.8 + 2.9 = 11.4 tons [10.3 t]).

Total PM_{10} emissions from the construction of the western alternative routes and the eastern alternative routes (Figure 2.2-3) were similarly estimated to be 14.4 tons (13.1 t) and 12.3 tons (11.2 t), respectively.

Estimates were made of VOC and NO_x emissions (precursors to O_3 formation) produced during the course of transmission line construction by vehicular activity, operation of construction equipment, helicopter operations, and workers commuting to the site.

As described earlier, vehicular activity was estimated as 54 VMT per day for two months, 24 VMT for one month, and 15 VMT for two months, yielding a total of 5,022 VMT. Using EPA AP-42 emissions factors (EPA 2004c) for light-duty gasoline-powered trucks of 0.62 g/mi for VOC and 0.789 g/mi for NO_x, 0.003 tons (0.003 t) of VOC and 0.004 tons (0.004 t) of NO_x were estimated to be emitted.

Operation of construction equipment would tend to be sporadic; however, emissions were conservatively estimated to be no greater than those from a 200-brake horsepower (bhp) diesel engine operating for 8 hours a day during the entire 5-month construction period (i.e., 155 days). Applying California diesel standards (ARB 2004) of 1.00 g/bhp-h for VOC and 5.8 g/bhp-h for NO_x, a total of 0.273 tons (0.243 t) of VOC and 1.59 tons (1.44 t) of NO_x were estimated to be emitted.

Worker commuter activity was conservatively estimated to be the equivalent to no more than 10 workers driving one single-occupant vehicle an average 40-mi (64-km) round-trip every day for the 155-day construction period, that is, an equivalent of 62,000 VMT. Using EPA AP-42 emissions factors (EPA 2004c) for cars of 0.544 g/mi for VOC and 0.592 g/mi for NO_x, 0.037 tons (0.034 t) of VOC and 0.041 tons (0.037 t) of NO_x were estimated to be emitted.

It was estimated that helicopter operations lifting and positioning tower sections would take 2 to 3 days to accomplish and would involve 10 hours of flight time of a jet turbine twin-engine heavy-lift S-64 Aircrane helicopter. This helicopter burns 500 gal (1,890 L) an hour of Jet A fuel (kerosene), that is, a total of 5,000 gal (18,927 L) during construction operations. Using a VOC emission factor of 2.79 kilotons/megaton of Jet A fuel and an NO_x emission factor of 13 kilotons/megaton of Jet A fuel (NAEI 2004), 0.048 tons (0.044 t) of VOC and 0.222 tons (0.201 t) of NO_x were estimated to be emitted.

Thus total VOC emissions during the construction phase of the proposed transmission lines were conservatively estimated to be a maximum of 0.361 tons (0.327 t), and total NO_x emissions were estimated to be 1.86 tons (1.69 t). VOC and NO_x emission estimates for the western and eastern alternative routes were virtually the same.

4.3.4.2 Impacts from Transmission Line Operations and Maintenance

The newly installed transmission lines would require periodic maintenance of the transmission towers, insulators, and conductors. Operations and maintenance would involve operators driving to the appropriate towers and performing the tasks required. This would generate additional traffic in the area. To assess the scale of emissions, if it is assumed in the course of operations and maintenance that a maximum of two round-trips per month are undertaken along the ungraded roads along the transmission towers, it would follow that 13 lb (6 kg) per month of fugitive PM_{10} would be generated, or approximately a maximum of 0.08 tons (0.07 t) per year.

Likewise, a maximum of 0.10 tons (0.09 t) per year of PM_{10} emissions were estimated to be generated during operations and maintenance for the western alternative routes and 0.88 tons (0.80 t) per year for the eastern alternative routes.

Emissions of NO_x and VOC would be negligible, namely 0.0002 tons (0.0002 t) per year for both, as would also be the case for the western and eastern alternative routes.

Coronal discharge (“corona”) can be associated with the operation of high-voltage transmission lines. Because corona represents an adverse energy loss, high-voltage lines, such as the two parallel 6-mi (10-km) stretches of the Sempra and Intergen transmission lines, are designed to minimize it. The primary adverse effect of corona is the production of very small amounts of noise (“buzz” and “crackle”) and radio interference. However, corona activity of a transmission line can produce very small amounts of gaseous oxidants in air, mainly O_3 and oxides of nitrogen (NO and NO_2). Localized maximum contributions of O_3 at ground level under the proposed transmission lines during the most favorable conditions for corona formation, which occur during heavy rain, are orders of magnitude less than ambient levels.

4.3.4.3 Conformity Review

> **Maintenance Area**
>
> A maintenance area is an area that has been redesignated from nonattainment to attainment of the NAAQS for a criteria air pollutant pursuant to a request submitted by the state to the EPA. At the same time, the state submits a revision to the SIP for a 10-year maintenance plan.

Section 176(c) of the CAA requires that Federal actions conform to the appropriate SIP. The final rule for "Determining Conformity of Federal Actions to State or Federal Implementation Plans" was promulgated by the EPA on November 30, 1993 (58 FR 63214) and took effect on January 31, 1994 (40 CFR Parts 6, 51, and 93). This "Conformity" rule established the conformity criteria and procedures necessary to ensure that Federal actions conform to the SIP and meet the provisions of the CAA. In general, this rule ensures that all criteria air pollutant emissions and VOC are specifically identified and accounted for in the SIP's attainment or maintenance demonstration and conform to a SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. If the action would be undertaken in a Federally classified nonattainment or maintenance area, the provisions of the final rule for conformity apply.

The State of California implements the provisions of the CAA, and this rule was adopted on November 29, 1994, as Rule 925 of the Imperial County Air Pollution Control District.

The proposed action lies within the PM_{10} and O_3 nonattainment area in Imperial County, and thus the provisions of this rule would apply for those criteria air pollutants. However, actions are exempted when the totals of direct and indirect emissions are below specified emissions levels [40 CFR §51.853(b)1]. The applicable level is 100 tons (90 t) per year for PM_{10} in a moderate nonattainment area. VOC and NO_x as precursors to O_3 are governed in an O_3 nonattainment area, and the applicable levels are 100 tons (90 t) per year for both in an O_3 nonattainment area that is not serious or extreme and that is outside an O_3 transport region.

As illustrated in Sections 4.3.4.1 and 4.3.4.2, PM_{10} emissions are considered to be the principal emissions from construction and maintenance of the transmission lines in Imperial County, California, and total less than 12 tons (11 t) in the year of construction, and much less (0.08 tons [0.07 t]/yr) in subsequent years for maintenance thereafter — amounts that are considerably less than the specified levels of 100 tons (90 t)/yr referenced above. VOC and NO_x emission estimates during the construction phase are much lower, namely 0.361 tons (0.327 t) and 1.86 tons (1.69 t), and are negligible in subsequent years for maintenance thereafter — amounts that are also very much less than the specified levels of 100 tons (90 t)/yr referenced above.

Nevertheless, the provisions of the final rule will apply in a nonattainment area if the emissions of concern are above 10% of this area's total emissions [40 CFR §51.853(i)]. The proposed action is considered to be a "regionally significant action" subject to full conformity analysis if the emissions exceed this 10% threshold. The SIP totals for Imperial County are approximately 24,000 tons (22,000 t)/yr for PM_{10}, 15,000 tons (14,000 t)/yr for VOC, and 17,000 tons (15,000 t)/yr for NO_x (EPA 2004a). The maxima of 11.4 tons (10.3 t)/yr of PM_{10}, 0.361 tons (0.327 t) of VOC, and 1.86 tons (1.69 t) of NO_x estimated to result from construction, and 0.08 tons (0.07 t)/yr of PM_{10} and the negligible amounts of VOC and NO_x emitted during operation and maintenance of the transmission lines can be seen to be considerably less than 10% of the respective regional emissions. Thus, pursuant to the provisions of 40 CFR §51.853(b)(1) and 40 CFR §51.853(i), the proposed action is exempt from any further review for conformity determination for PM_{10} emissions.

As noted in Sections 4.3.4.1 and 4.3.4.2, PM_{10}, VOC, and NO_x emissions from the construction or operation and maintenance of the western or eastern alternative routes are substantially similar to the proposed routes, such that they would be excluded from any general conformity determination (emissions are well below the applicable levels of 100 tons [90 t]/yr).

4.3.4.4 Power Plant Operations

4.3.4.4.1 Annual Emissions. Tables 4.3-1a and 4.3-1b show the estimated maximum annual emissions of criteria pollutants NO_2, CO, NH_3, and PM_{10}. Listed are the annual emissions from the TDM plant and annual emissions from the LRPC EBC and EAX export units, as well as annual emissions from the two EAX units designated for Mexico's electricity market.

Listed are the criteria pollutants NO_2, CO, and PM_{10} that result from the burning of natural gas in the gas-fired turbines and that are emitted via the power plant stacks. Tables 4.3-1a and 4.3-1b list the small amounts of additional PM_{10} that can be emitted from the cooling towers.

Tables 4.3-1a and 4.3-1b also list emissions of other compounds, namely, CO_2, resulting from the burning of natural gas in the gas-fired turbines, and NH_3, from two sources: slip from the SCR process and cooling tower drift evaporation (described in Chapter 2).

Table 4.3-1a lists emissions from all units at the TDM and LRPC plants. Table 4.3-1b lists the aggregate emissions directly associated with the proposed action. These include emissions from the entire TDM plant, the EBC unit, and the EAX export unit, even though power from the latter unit could be transported to the United States over the existing transmission line. Also included are emissions from the no action alternative and from all units at both plants.

4.3.4.4.2 Power Plant Impacts under the Proposed Action. The proposed transmission lines that connect to the IV Substation would transmit power exported from the TDM facility and the EBC and EAX export turbines, respectively. The combined impact of the TDM facility and the LRPC EBC and EAX export turbines upon air pollutant concentration levels at receptor points in the United States was estimated using AERMOD modeling based on the emission data listed in Tables 4.3-1a and 4.3-1b and described in Section 4.3.2.2.1. The impacts of the TDM plant, LRPC EBC and EAX export turbines, and EAX Mexico turbines were also estimated.

TABLE 4.3-1a Criteria Air Pollutants and Other Compounds Emitted from the TDM and LRPC Power Plants: by Turbine[a]

		La Rosita Power Complex		
		Export		Mexico
Pollutants	TDM (two turbines) (tons/yr)	EBC (tons/yr)	One EAX Turbine (tons/yr)	Two EAX Turbines (tons/yr)
Spring 2003 Onward				
CO	181	727	727	1,454
PM_{10} from stack	237	229	229	458
PM_{10} from cooling towers	19	9	9	18
Total PM_{10}	256	238	238	496
CO_2	2,500,000	1,300,000	1,300,000	2,600,000
Through March 2005				
At LRPC, SCR on export EBC and EAX, no SCR on two Mexico EAXs				
NO_2	187	136	95	1,910
NH_3 slip from SCRs	276	148	74	0
March 2005 Onward				
At LRPC, NO_2 SCR added on two Mexico EAXs				
NO_2	187	136	95	190
NH_3 slip from SCRs	276	148	74	148

[a] Very small amounts of NH_3 are emitted from the cooling towers; approximately 1 ton (1 t)/yr per turbine. For simplicity, these amounts are not displayed.

The emission rates and stack parameters used in calculating the values in Tables 4.3-1a and 4.3-1b are shown in Appendix G. All power plant operations were assumed to be at full load, that is, operated for 24 hours per day for 365 days per year. All stack emissions were considered to be released as point sources, and emissions from cooling towers were assumed to be volume sources. The effects of building downwash on stack plumes were considered on the emission sources.

The following meteorological data were used in the AERMET module for AERMOD: hourly surface meteorological data from Imperial Airport, California, and upper air sounding data from Miramar, San Diego, California. Imperial meteorological data were obtained from the NOAA National Climatic Data Center for the 10-year period 1993 to 2002. AERMOD was run for 5 years of data, namely, 1993, 1994, 1995, 1998, and 1999.

A center point (i.e., the center of the TDM and LRPC plants) was determined, and a receptor grid was established as follows: 820-ft (250-m) grids up to 16,404 ft (5,000 m) from the center, 1,640-ft (500-m) grids from 16,404 to 32,808 ft (5,000 m to 10,000-m) from the center,

TABLE 4.3-1b Criteria Air Pollutants and Other Compounds Emitted from the TDM and LRPC Power Plants: by Action

Pollutants	No Action: EAX-Export plus Two EAX Mexico Turbines (tons/yr)	Proposed Action: TDM + EBC + EAX-Export (tons/yr)	Cumulative: TDM + All Four LRPC Turbines (export and nonexport) (tons/yr)
Spring 2003 Onward			
CO	2,181	1,635	3,089
PM_{10} from stack	687	695	1,153
PM_{10} from cooling towers	27	37	57
Total PM_{10}	714	732	1,210
CO_2	3,900,000	5,100,000	7,700,000
Through March 2005			
At LRPC, SCR on export EBC and EAX, no SCR on two Mexico EAXs			
NO_2	2,005	418	2,328
NH_3 slip from SCRs	74	498	498
March 2005 Onward			
At LRPC, SCR added on two Mexico EAXs			
NO_2	285	418	608
NH_3 slip from SCRs	222	498	646

and 3,281-ft (1,000-m) grids from 32,808 to 82,021 ft (10,000-m to 25,000 m) from the center, and 656-ft (200-m) interval grids on the U.S.-Mexico border. This yielded a 31-mi × 31-mi (50-km × 50-km) modeling domain. The first-highest concentration among receptors for each averaging time was selected as the reported modeled concentration.

The AERMOD results calculated from the criteria pollutant emissions at TDM and LRPC are shown in Tables 4.3-2, 4.3-3, 4.3-4, 4.3-5, and 4.3-6. Ammonia gas emissions are discussed under health impacts in Section 4.11.

Secondary formation of PM_{10} from plant emissions. PM_{10} in the form of NH_4NO_3 can be produced as a secondary particulate where NH_3 is able to combine with HNO_3 to form NH_4NO_3. Thus DOE and BLM investigated the possible formation of such secondary PM_{10} NH_4NO_3 from NO_x

Secondary PM_{10} Formation

Secondary PM_{10} is formed by chemical reactions in the atmosphere involving precursor air pollutants such as NO_x, SO_2 and organic gases, and other chemical species present in the atmosphere. Secondary PM_{10} formation can extend over hours or days and hence long range transport of precursor gases to secondary PM_{10} can also play a role in determining PM_{10} concentrations.

TABLE 4.3-2 Criteria Pollutant Increases at a Maximum Receptor Point in the United States Resulting from Emissions from the TDM Turbines

Criteria Pollutant	Averaging Period	Concentration at Maximum United States Receptor[a] (μg/m^3)	Significance Level (SL)[b] (μg/m^3)	NAAQS (μg/m^3)
CO	8-hour	0.046	500	40,000
NO_2	1-hour	2.63	NA[c]	NA
NO_2	Annual	0.0226	1.0	100
NH_3	1-hour	3.9	NA	NA
NH_3	Annual	0.033	NA	NA
PM_{10}	24-hour	2.31	5	150
PM_{10}	Annual	0.046	1.0	50

[a] Results derived from AERMOD modeling.

[b] Benchmark level below which a source is not considered to contribute a significant impact on air quality in this analysis.

[c] NA = not applicable.

and NH_3 emissions from the TDM and EBC and EAX export units at the LRPC as a result of the proposed action and the maximum impacts in the United States.

However, NH_4NO_3 PM_{10} can only form under certain conditions, namely the presence of NH_3, HNO_3 formed from NO_x, and in favorable meteorological conditions of low temperatures and high relative humidity. A summary of how NH_4NO_3 may be formed follows so that the reader can track the analytical approach that DOE and BLM used to assess how much may be formed in the Imperial Valley-Mexicali area.

NO_x that is emitted from a power plant or from any other source (only about one-third of the NO_x in the atmosphere comes from power plants) can be converted to HNO_3 in two pathways: during the daytime through photochemical processes and at nighttime through heterogeneous chemistry (chemistry occurring between different phases, i.e., between gaseous and solid-liquid particles). NH_4NO_3 can exist in the atmosphere as a particulate. It is formed from NH_3 and HNO_3 and can exist in equilibrium as a particulate in the atmosphere with HNO_3 and NH_3 as gases. This is represented by the reversible reaction:

$$NH_3\,(g) + HNO_3\,(g) \overset{k = f\,(T,\,RH)}{< ======== >} HN_4NO_3\,(p),$$

where "(g)" notates the gas phase, "(p)" is a particulate, and "k" represents the degree to which the chemical species can react, that is, "the equilibrium constant." The equilibrium constant (k) is a function (f) of temperature (T) and relative humidity (RH).

TABLE 4.3-3 Criteria Pollutant Increases at a Maximum Receptor Point in the United States Resulting from Emissions from the LRPC Export Turbines[a]

Criteria Pollutant	Averaging Period	Concentration at Maximum United States Receptor[b] ($\mu g/m^3$)	Significance Level (SL)[c] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
CO (LRPC turbines without CO oxidizer)	8-hour	3.77	500	40,000
CO (turbines with CO oxidizer)[d]	8-hour	0.470	500	40,000
NO_2	1-hour	5.68	NA[e]	NA
NO_2	Annual	0.051	1.0	100
NH_3	1-hour	3.15	NA	NA
NH_3	Annual	0.028	NA	NA
PM_{10}	24-hour	1.76	5	150
PM_{10}	Annual	0.0677	1.0	50

[a] EBC export turbine plus the EAX export turbine, both equipped with SCR.

[b] Results derived from AERMOD modeling.

[c] Benchmark level below which a source is not considered to contribute a significant impact on air quality in this analysis.

[d] For analysis of the alternative technologies alternative.

[e] NA = not applicable.

In simple terms, temperature and relative humidity influence how much, if any, NH_4NO_3 is formed from the chemical reaction between NH_3 and HNO_3. As temperature falls and relative humidity rises, NH_4NO_3 particulates will deliquesce (liquefy) into aerosols (very small droplets).

Thus how much NH_4NO_3 particulate is formed depends on:

- The amount of HNO_3 at equilibrium, which in turn depends on how much NO_x is available, that is, that which is emitted from the power plants plus that which is already there; and

- The amount of NH_3 that is available from the power plants and other sources; and

- Conditions where low temperatures (T) and high relative humidity (RH) occur.

TABLE 4.3-4 Criteria Pollutant Increases at a Maximum Receptor Point in the United States Resulting from Emissions from TDM Plus LRPC Export Turbines — Proposed Action Alternative[a]

Criteria Pollutant	Averaging Period	Concentration at Maximum United States Receptor[b] ($\mu g/m^3$)	Significance Level (SL)[c] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
CO (LRPC turbines without CO oxidizer)	8-hour	3.92	500	40,000
CO (turbines with CO oxidizer)[d]	8-hour	0.647	500	40,000
NO_2	1-hour	3.76	NA[e]	NA
NO_2	Annual	0.0542	1.0	100
NH_3	1-hour	4.05	NA	NA
NH_3	Annual	0.061	NA	NA
PM_{10}	24-hour	2.45	5	150
PM_{10}	Annual	0.11	1.0	50

a EBC export turbine plus the EAX export turbine, both equipped with SCR.

b Results derived from AERMOD modeling.

c Benchmark level below which a source is not considered to contribute a significant impact on air quality in this analysis.

d For analysis of the alternative technologies alternative.

e NA = not applicable.

If the background concentrations of ambient NH_3 and HNO_3 were known, NH_4NO_3 levels as a result of the operations of the power plants could be estimated also. Unfortunately, in common with much of the United States, they are not. Stockwell et al. (2000) were able to derive a production term of 0.6 grams of NH_4NO_3 from 1.0 grams of NO_x emitted. However, this term was derived only for wintertime conditions in the San Joaquin Valley (the only season where the formation of secondary particulates is a problem there) where temperatures are low and relative humidities are high. These conditions do not entirely translate across to the hotter desert-like climate of the Imperial Valley-Mexicali region. Where these conditions do not apply, under high temperatures and low relative humidities, such a production term would be much lower (i.e., <<0.6 grams NH_4NO_3 per 1.0 grams of NO_x).

Nevertheless, DOE and BLM used the San Joaquin-derived production term to estimate the formation of NH_4NO_3 from NO_x emissions for the proposed action (the operation of the TDM facility, and EBC and EAX-export units at the LRPC), as well as for other operational scenarios for the Mexico power plants. The San Joaquin NH_4NO_3 production term was recognized to represent a highly conservative overestimate. Estimates of NH_4NO_3 PM_{10} that could be formed were made based on the plant NO_x emissions from the power plants that could produce HNO_3, which would then react with available ambient NH_3 to form NH_4NO_3. NH_3

TABLE 4.3-5 Criteria Pollutant Increases at a Maximum Receptor Point in the United States Resulting from the Three EAX Turbines — No Action Alternative[a]

Criteria Pollutant	Averaging Period	Concentration at Maximum United States Receptor[b] ($\mu g/m^3$)	Significance Level (SL)[c] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
CO (LRPC turbines without CO oxidizer)	8-hour	5.63	500	40,000
CO (turbines with CO oxidizer)[d]	8-hour	0.70	500	40,000
PM_{10}	24-hour	2.58	5	150
PM_{10}	Annual	0.100	1.0	50
Through March 2005				
SCR on EAX export turbine, no SCR on two EAX Mexico turbines				
NO_2	1-hour	27.8	NA[e]	NA
NO_2	Annual	0.25	1.0	100
NH_3	1-hour	1.03	NA	NA
NH_3	Annual	0.009	NA	NA
March 2005 Onward				
SCR on all three EAX turbines				
NO_2	1-hour	3.98	NA[e]	NA
NO_2	Annual	0.036	1.0	100
NH_3	1-hour	3.09	NA	NA
NH_3	Annual	0.028	NA	NA

[a] The three EAX turbines operating.

[b] Results derived from AERMOD modeling.

[c] Benchmark level below which a source is not considered to contribute a significant impact on air quality in this analysis.

[d] For analysis of the alternative technologies alternative.

[e] NA = not applicable.

would be available from all regional sources and not just the small amount emitted from the power plants. (That is, it is the NO_x emissions and not the NH_3 emissions from the power plants that would determine how much NH_4NO_3 could form.)

Next AERMOD was used to estimate the maximum concentration of NH_4NO_3 at a receptor point in the United States of the amounts of NH_4NO_3 that had been estimated to form at the power plants in Mexico. Results for the proposed action indicated low concentration levels on the order of 1.0 $\mu g/m^3$ NH_4NO_3 24-hour PM_{10} and 0.03 $\mu g/m^3$ NH_4NO_3 annual PM_{10}. These

TABLE 4.3-6 Criteria Pollutant Increases at a Maximum Receptor Point in the United States from the TDM and All Four LRPC Units[a]

Criteria Pollutant	Averaging Period	Concentration at Maximum United States Receptor[b] ($\mu g/m^3$)	Significance Level (SL)[c] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
CO (LRPC turbines without CO oxidizer)	8-hour	7.67	500	40,000
CO (turbines with CO oxidizer)[d]	8-hour	1.09	500	40,000
PM_{10}	24-hour	4.07	5	150
PM_{10}	Annual	0.17	1.0	50
Through March 2005				
At LRPC, SCR on export EBC and EAX, no SCR on two Mexico EAXs				
NO_2	1-hour	30.3	NA[e]	NA
NO_2	Annual	0.293	1.0	100
NH_3	1-hour	4.05	NA	NA
NH_3	Annual	0.061	NA	NA
March 2005 Onward				
At LRPC, SCR added on the two Mexico EAXs				
NO_2	1-hour	6.41	NA	NA
NO_2	Annual	0.0781	1.0	100
NH_3	1-hour	5.51	100	NA
NH_3	Annual	0.080	100	NA

[a] EBC export, EAX export, and two EAX Mexico turbines at the LRPC.

[b] Results derived from AERMOD modeling.

[c] Benchmark level below which a source is not considered to contribute a significant impact on air quality in this analysis.

[d] For analysis of the alternative technologies alternative.

[e] NA = not applicable.

estimates were based on the conservative assumption that the San Joaquin-derived production factor is equally applicable to the Imperial Valley-Mexicali region, and thus were regarded as substantial overestimates.

Chow and Watson (1995) in a study of PM_{10} in the Imperial Valley-Mexicali area concluded that secondary NH_4NO_3 contributions (from all sources) to regional PM_{10} are low, in the range of 2 $\mu g/m^3$ to 3 $\mu g/m^3$ for 24-hour measurements. These data, which encompass all regional sources of NH_4NO_3, provide strong corroborating evidence that the modeling of around 1 $\mu g/m^3$ 24-hour concentration levels using a San Joaquin-based production term applied to a single NO_x source (of approximately 500 tons (454 t) per year in a regional background of tens of thousands of tons per year) represents a gross overestimate.

In conclusion, the body of the above analysis indicates that secondary formation of NH_4NO_3 as a result of NO_x (and any NH_3) emissions from the TDM and LRPC power plants is de minimis, and thus little associated impact can be ascribed.

Ammonia-Rich Area

The Imperial Valley is an inland valley under intensive agricultural production stimulated by large-scale irrigation. Agriculture that includes, crop production, cattle, cattle feedlots, and sheep rearing forms an important component of the border area economy. NH_3 emissions are dominated by agricultural and livestock sources. Feedlots in the Mexicali area and Imperial Valley are a major NH_3 source. NH_3 emissions from livestock arise mainly from the decomposition of urea in animal wastes, and ammonia output reflects the nitrogen input from feed. Other regional agricultural sources are emissions from fertilizers, crops, and the decomposition of agricultural vegetation. The EPA Tier Emission Report from the National Emission Inventory Database for Criteria and Hazardous Air Pollutants (EPA 2004a) lists the 1999 emissions of NH_3 as 12,310 tons/yr (11,167 t/yr). Area emissions of NH_3 for Baja state, including agriculture, are listed as more than 9,000 tons/yr (8,165 t/yr) (which may be an underestimate). In summary, this Imperial County/ Mexicali region can be regarded as an NH_3-rich area.

Ozone formation. Regulatory review requirements in the United States and Mexico do not include the photochemical modeling of O_3. Nevertheless, the potential influence of the TDM and LRPC plants on O_3 levels in the region that may result from their emissions were investigated. NO_2 is one of the primary precursors in O_3 formation, along with VOC in the form of reactive organic gases already present in the ambient atmosphere. NO_x emissions are one of the major criteria air pollutants from the Mexico power plants, as indicated in Tables 4.3-1a and 4.3-1b. To model O_3 formation with reaction-based algorithms, background data on VOC levels are needed. Such data are not recorded in the Salton Sea Air Basin. Thus, an alternative approach was developed to help characterize O_3 formation in this region.

DOE and BLM examined recent 5-year records (1997 to 2001) of hourly O_3 and NO_2 measurements to help characterize ozone formation in the region. DOE and BLM examined data from three air quality monitoring sites in Imperial County close to the proposed action and Mexicali to the south. These data are available from the ARB (ARB 2002). Two of these sites were in Calexico, Calexico-Ethel Street and Calexico-East, operated by the ARB; one site was at El Centro, El Centro 9th Street, operated by the Imperial County Air Pollution Control District. In common with all other monitoring sites in the Salton Sea Air Basin, no VOC or hydrocarbon data are collected at these sites.

Figures 4.3-1, 4.3-2, and 4.3-3 plot 5 years of hourly data measurements of O_3 and NO_2 at Calexico-Ethyl Street, Calexico-East, and El Centro 9th Street for the 5-year period 1997 through 2001 (approximately 44,000 data points each). As the figures show, the data at each site are similar, reflective that each site is generally representative of the general region. As indicated, high O_3 levels mainly occur at lower NO_2 levels — not higher NO_2 levels. In fact, these plots indicate a condition in which introducing more NO_2 reduces O_3. Thus, they support the conclusion that these sites represent an urban-like region where O_3 formation is VOC-limited, not NO_2-limited. The high availability of regional NO_2 from vehicular sources, particularly in the urban Mexicali area immediately south, is likely the cause.

Ozone Formation

Fossil-fueled power plants emit primarily NO_x, CO, and PM_{10}. Nitric oxide, NO, and a small amount of NO_2 are initially produced in the turbine combustion zones. NO vented into the atmosphere undergoes subsequent oxidation to NO_2. These two compounds also interchange in the atmosphere. Ozone, O_3, is a secondary pollutant formed in the presence of sunlight from a variety of precursors that include NO_x (where NO_x = NO + NO_2), VOC, and CO. The chemical processes in O_3 formation are favored by sunshine and stagnant air. A simple synopsis of O_3 formation involves breaking down NO_2 by ultraviolet radiation to NO and O (where O is an oxygen atom), followed by O reacting with an oxygen molecule to form O_3. However, the entire process is more complex and can be nonlinear (i.e., output is not necessarily proportional to input). A series of tropospheric photochemical reactions involving reactive OH and HO_2 radicals play a role in producing O_3, along with oxygenated products such as nitric acid, peroxy acetyl nitrate, aldehydes, and organic acids. Nitrogen dioxide can also be regenerated by these series of reactions. Particulates and short-lived radicals form as well. VOC could be regarded as a "fuel" for O_3 formation in urban-like environments where there is plenty of available NO_2. In addition, CO that originates from incomplete combustion in fossil fuels or that is formed from the oxidation of methane in the atmosphere can produce O_3 in an NO-rich environment, but can also remove O_3 in an NO-depleted environment. Freshly emitted NO can scavenge O_3, producing NO_2, and high NO_2 levels can form other products, such as nitric acid, that block the initial oxidation step for VOC, and thus prevent the net formation of O_3. Sometimes a decrease in NO_x emissions may even lead to an increase in O_3. Ozone formation in urban-like environments tends to be VOC-limited (i.e., adding VOC may increase O_3, whereas adding NO_x may not, and may in fact decrease O_3). As air masses move away from industrial urban centers, the VOC/NO_x ratio tends to become higher, and at the high VOC/NO_x ratios typical of more rural settings, O_3 formation tends to be NO_x-limited (i.e., adding NO_x may increase O_3 levels, whereas adding VOC may not).

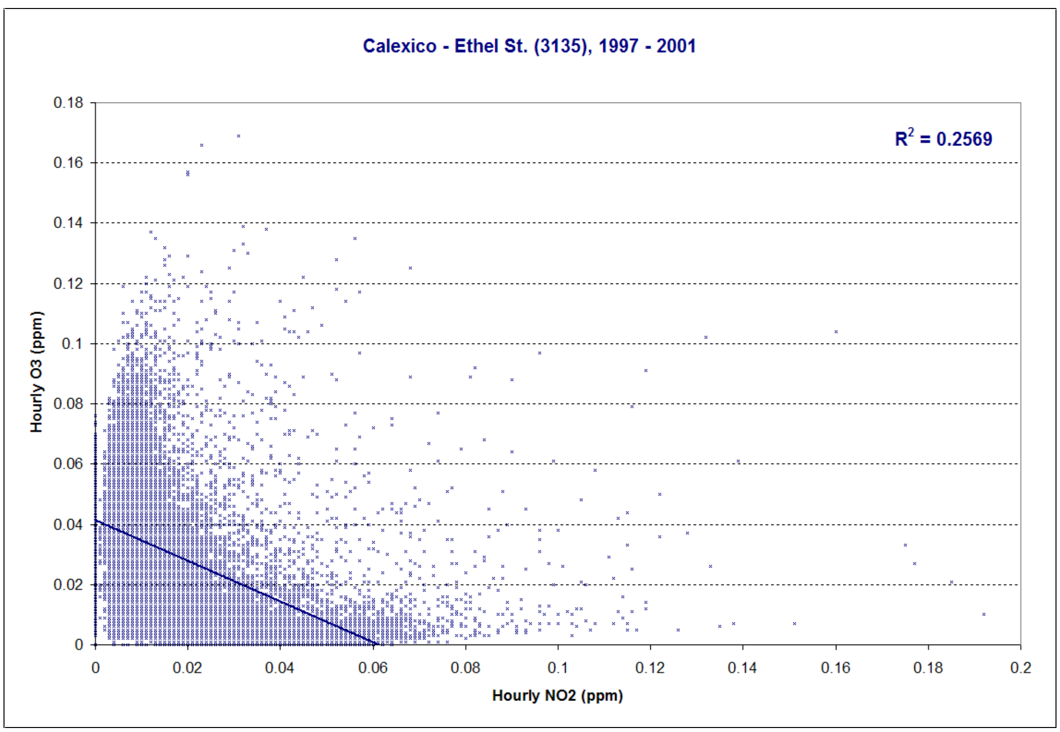

FIGURE 4.3-1 Hourly O_3 and Hourly NO_2, 1997–2001, Calexico-Ethyl Street

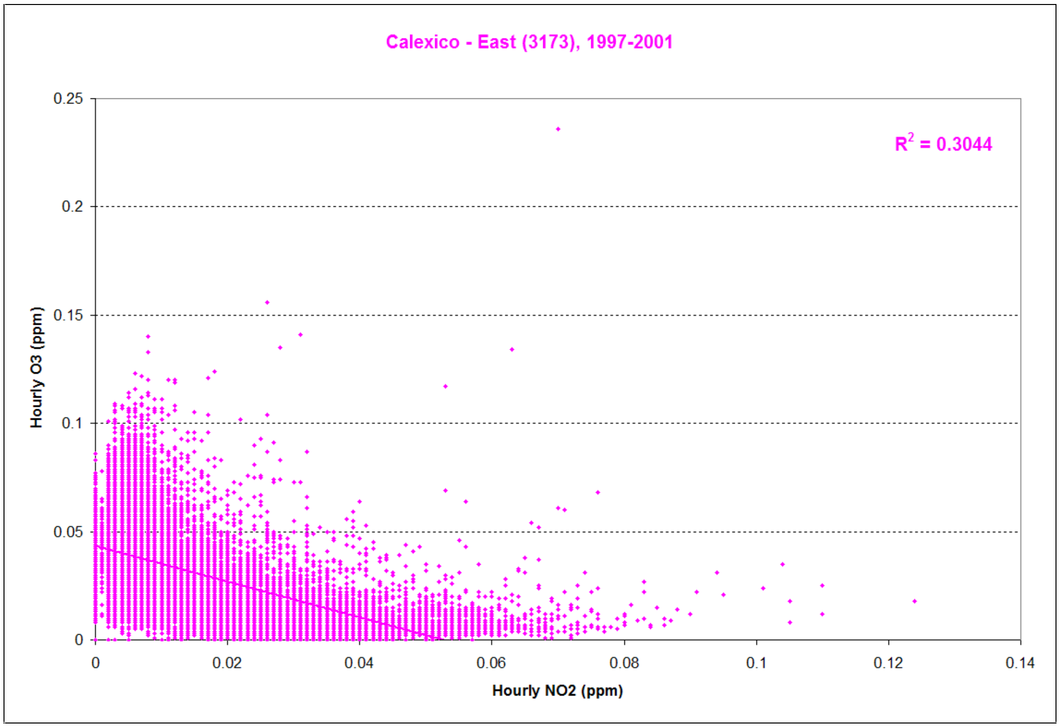

FIGURE 4.3-2 Hourly O_3 and Hourly NO_2, 1997–2001, Calexico-East

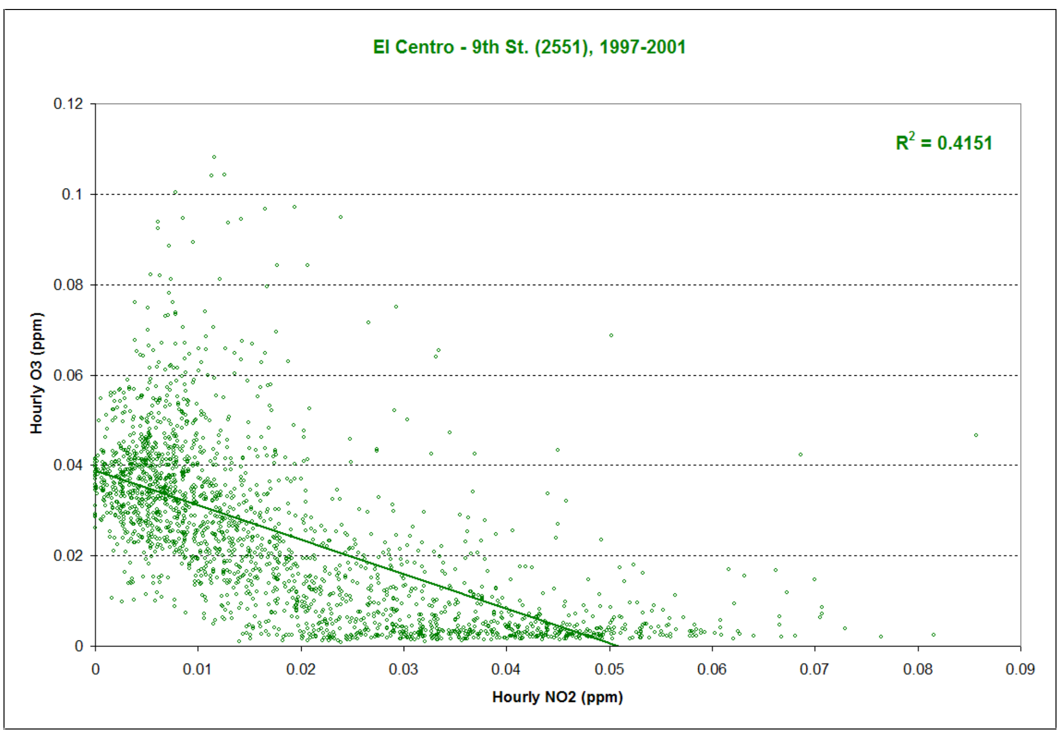

FIGURE 4.3-3 Hourly O_3 and Hourly NO_2, 1997–2001, El Centro-9th Street

It would be simplistic to consider a regression line (or "trend" line) as a "model" for a regional O_3 formation function. However, a regression line and a corresponding regression coefficient are shown on each plot merely to illustrate the trend of deceased O_3 levels with increased NO_2 levels. Figure 4.3-4 plots all of the O_3 and NO_2 data for all three sites (approximately 131,000 data points). Here, the similarity between sites is readily apparent, and the overlaying regression lines show that the overall O_3-decrease/NO_2-increase trends for each site are nearly identical.

This examination characterizes the Imperial County-Mexicali area within the Salton Sea Air Basin to be VOC-limited. Introducing more NO_2 would not increase O_3; in fact, the reverse could hold true.

Ozone modeling. The EPA OZIPR model was used to estimate possible incremental O_3 formation. Having already characterized the Imperial Valley-Mexicali region to be urban-like and VOC-limited, surrogate default input data from the Phoenix Arizona area was used for OZIPR model runs. Data such as mixing heights, temperature, relative humidity, and VOC speciation were used because such contemporaneous data or speciation data were not available for the Imperial County-Mexicali area. The absence of VOC air concentration measurements in the Salton Sea Air Basin and Mexicali area hinders flexibility in photochemical modeling approaches. However, CO and NO_x data extracted from the ARB data base for the Imperial

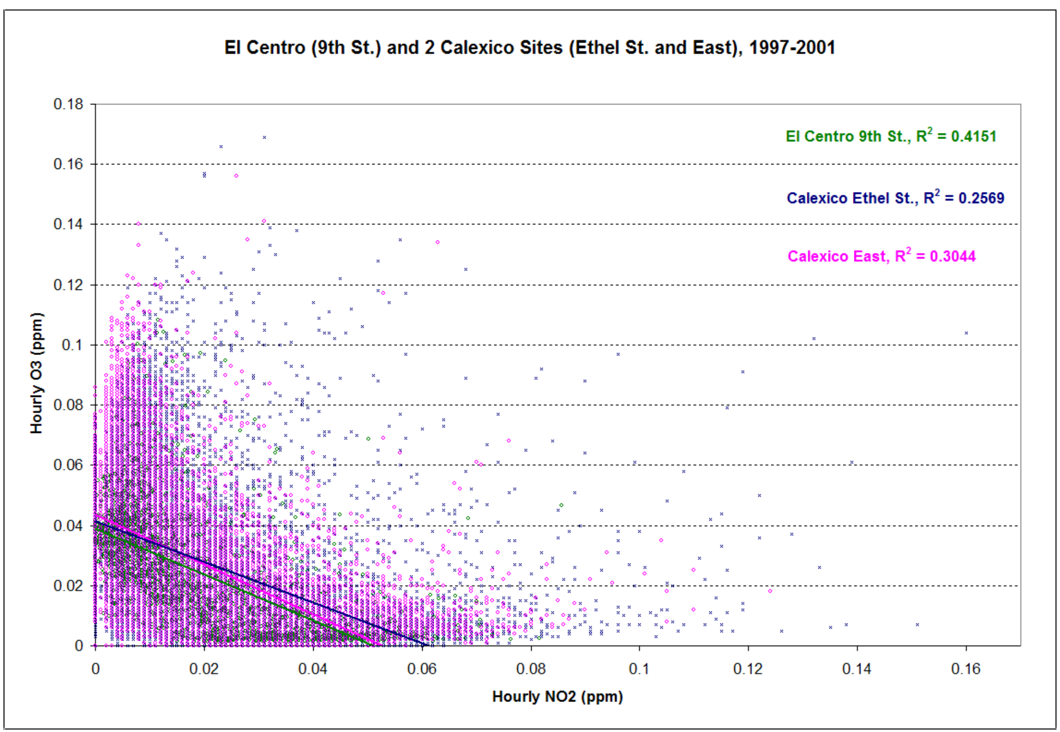

FIGURE 4.3-4 Hourly O_3 and Hourly NO_2, 1997–2001, Calexico-Ethyl Street, Calexico-East, and El Centro-9th Street

County-Mexicali area were used for the initial conditions of CO and NO_X in the OZIPR modeling. Emissions inventory data for VOC, NO_X, and CO for the combined Imperial County (ARB 2004) and Mexicali area (ERG et al. 2003) were also drawn upon as input parameters. Initial model conditions were estimated based on an average of 7 a.m. to 9 a.m. actual measured concentration values. Estimates of O_3 formation were modeled over an 8 a.m. to 8 p.m. time frame, the time frame during which peak O_3 concentrations occur, typically mid-afternoon. Because uncertainties could be associated with the use of default parameters, model runs were made in which these default parameters were varied. These "sensitivity" tests showed that the results for predicted O_3 concentrations remained relatively consistent; that is, modeled estimates were not unduly influenced by the initial default parameters chosen.

OZIPR was used to predict maximum O_3 concentrations for the following scenarios:

- Baseline regional conditions (i.e., assuming no power plants existed or operated).
- The time period March 2004 through March 2005, that is, the proposed action alternative (TDM + LRPC EBC unit + EAX export turbine) plus the two Mexico EAX units with no SCRs installed.
- The time period March 2005 onward, that is, the proposed action alternative (TDM + LRPC EBC unit + EAX export turbine) plus the two Mexico EAX units each with an SCR installed.

Photochemical modeling cannot meaningfully exclude the contemporaneous operation of the Mexico EAX units.

Model results are displayed in Table 4.3.7 and show that NO_X emissions from the Mexico power plants would produce a very marginal decrease in ambient O_3 concentrations. O_3 levels were estimated to decrease by -0.0027 ppm (-5.3 $\mu g/m^3$) for the proposed action alternative (i.e., the TDM power plant plus the LRPC EBC unit and EAX export turbine, all with SCRs installed). The two EAX units for Mexico at the LRPC would operate contemporaneously with the proposed action.

When SCRs are installed on the Mexico EAX units in March 2005 to further reduce NO_X emissions (their operation is outside of the proposed action), a smaller decrease in O_3 levels was estimated, namely -0.0002 ppb (-0.4 $\mu g/m^3$). That is, adding SCRs for NO_X control decreases NO_X emissions but has the effect of slightly increasing modeled O_3 concentrations.

Under the no action alternative (i.e., the EAX export turbine switches to CFE distribution), modeling shows that O_3 levels could marginally increase (not decrease) because of lower NO_X emissions resulting from the closures of the TDM power plant and of the EBC unit at the LRPC. Photochemical modeling of the no action alternative cannot meaningfully exclude the contemporaneous operation of any EAX unit.

TABLE 4.3-7 OZIPR Modeled Changes in O_3 Concentrations as a Result of Power Plant Operations

	Modeled O_3 Concentration	Change in O_3 Concentration as a Result of Power Plant Operations
Baseline: No Power Plants Operating	0.1365 ppm, 267.3 µg/m^3	NA[a]
March 2004 – March 2005 Proposed Action: TDM+EBC+EAX export	0.1348 ppm, 263.9 µg/m^3	-0.0027 ppm, -5.3 µg/m^3
Plus: Two Mexico EAXs with no SCRs		
March 2005 Onward Proposed Action: TDM+EBC+EAX export	0.1363 ppm, 266.9 µg/m^3	-0.0002 ppm, -0.4 µg/m^3
Plus: Mexico EAXs with SCR		

[a] NA = not applicable.

In conclusion, OZIPR modeling of O_3 formation under the NO_x-rich VOC-limited conditions that appear to apply in the Imperial Valley-Mexicali area does not indicate any meaningful decrease (or increase) in O_3 levels as a result of the operation of the TDM or LRPC power plants.

Impacts compared to EPA significant levels. The estimated levels of NO_2, CO, and PM_{10} shown in Tables 4.3-2 through 4.3-6 are compared to NAAQS and EPA SLs established for these criteria pollutants. The regulatory jurisdiction of the EPA does not pertain to air pollutant emissions in Mexico; nevertheless, a useful benchmark is found within EPA air permitting regulations, and permitting guidance can be drawn upon to help assess the significance of these predicted increases from Mexico sources at the United States border and points north. In the context of permitting a major source or major modification in the United States, the EPA has established SLs for the criteria pollutants NO_2, SO_2, CO, and PM_{10}, below which a major source or modification will not be considered to cause or contribute to a violation of NAAQS for which no additional air quality analysis is required [40 CFR 51.165(b)(2) and 40 CFR 51, Subpart W, Appendix S, III.A]. Where air dispersion modeling is performed, the EPA does not require a full impact analysis when pollutant emissions from a proposed source or modification would not increase ambient concentrations by more than the prescribed SLs. Thus, SLs may be generally regarded as thresholds below which impact is not viewed to be significant. Conversely, emissions exceeding a SL would only require that a full impact analysis be performed. However, it should be emphasized that although these SLs have regulatory provenance as de minimis values in the context of regulating U.S. sources, they are referenced here (in the context of the impact of a Mexico source to a U.S. receptor) merely for purposes of NEPA review to act as benchmarks or yardsticks to help the decision maker or the reader assess how significant any actual level of an air pollutant might be in terms of any potential impact. These levels do not represent a “must pass” litmus test.

As shown in Table 4.3-4 for the proposed action, the maximum increase in ambient concentrations of air pollutants in Imperial County associated with emissions from the export turbines are below SLs established by the EPA. Likewise, as shown in Tables 4.3-2, 4.3-3, and 4.3-6, the same finding holds true; that is, maximum increases in ambient concentrations of criteria air pollutants in Imperial County remain below SLs for the TDM plant alone, the LRPC export units alone, and all turbines from both plants, respectively. For the no action alternative, Table 4.3.5 shows increases in ambient concentrations of criteria air pollutants in Imperial County, and they are also below SLs. Thus, in reference to these benchmark SLs, the combined impacts on air quality from the generating facilities in Mexico exporting power to the United States would be minimal.

This finding that the impact levels at the U.S. receptor points would be small and below SLs is consistent with the influence of general regional surface winds. As illustrated in the wind

Regulatory Citations to “Significance Levels”

40 CFR 51.165(b)(2) states:
“A major source or major modification will be considered to cause or contribute to a violation of a national ambient air quality standard when such source or modification would, at a minimum, exceed the following ***significance levels*** *at any locality that does not or would not meet the applicable national standard:”* (significance levels shown in a table that follows.)

40 CFR 51, Subpart W — Determining Conformity of General Federal Actions to State or Federal Implementation Plans, Appendix S to Part 51 — Emission Offset Interpretative Ruling III.A states: *“This section applies only to major sources or major modifications which would locate in an area designated in 40 CFR 81.300 et seq. as attainment or unclassifiable in a State where EPA has not yet approved the State preconstruction review program required by 40 CFR 51.165(b), if the source or modification would exceed the following* ***significance levels*** *at any locality that does not meet the NAAQS.* (Significance levels shown in a table that follows.)

EPA’s *New Source Review Workshop Manual: Prevention and Significant Deterioration and Nonattainment Area Permitting*, Draft, October 1990 (only issued as a draft), Chapter C, The Air Quality Analysis, Section IV, “Dispersion Analysis,” in determining the impact area where air dispersion modeling needs to be carried out in the analysis of prevention of significant deterioration (PSD) increments, states:

“The proposed project’s impact area is the geographical area for which the required air quality analyses for the NAAQS and PSD increments are carried out. This area includes all locations where the significant increase in the potential emissions of a pollutant from a new source, or significant net emissions increase from a modification, will cause a significant ambient impact (i.e., equal or exceed the applicable ***significant*** *ambient impact* ***level****, as shown in [table of significance levels]. The highest modeled pollutant concentration for each averaging time is used to determine whether the source will have a significant ambient impact for that pollutant.”*

rose figures (Figures 3.3.2 through 3.3.11 in Section 3.3.1), for much of the year, the winds that transport air pollutants and other species mainly blow from the United States into Mexico; that is, Mexico would be generally more influenced by airborne U.S. sources than the United States would be influenced by airborne Mexico sources. Nevertheless, Mexicali, as a major city, represents a higher source term for air pollutants than Imperial County. In the hot summer months of June, July, and August, surface winds from Mexico into the United States tend to dominate.

4.3.4.4.3 Global Climate Change and Carbon Dioxide Emissions. Change in global climate or global warming as a consequence of ever-increasing concentrations of "greenhouse gases" in the Earth's atmosphere is regarded to be a worldwide environmental issue. Climate change and its possible acceleration have become the subject of much scientific and political debate in regard to a relationship of increased global temperatures to the increasing concentrations of greenhouse gases, and CO_2 emissions in particular, brought about by human activities. Incoming radiation from the Sun reaches the Earth's atmosphere as long wavelength radiation (ultraviolet), intermediate wavelength radiation (visible light), and shorter wavelength radiation (infrared). About 90% is intermediate or shorter wavelength (visible light or near infrared), and less than 10% is longer wavelength (ultraviolet). The Earth's atmosphere allows most of this radiation to penetrate to the surface and warm it. This heat is radiated back up into the atmosphere as short wavelength infrared radiation. Greenhouse gases in the atmosphere can absorb some of this outgoing infrared energy, retaining heat. This is popularly known as the "greenhouse effect," the analogy being the trapping of heat by the glass panels of a greenhouse. (This term is somewhat of a misnomer because the main effect of the glass in a greenhouse is to retain the warm air inside and not let it escape, whereas the Earth's atmosphere does not act as such a physical barrier.)

The primary greenhouse gases are water vapor, CO_2, methane, nitrous oxide, O_3, and other species such as halocarbons, perfluorocarbons, and sulfur hexafluoride. Although these greenhouse gases only form a small percentage of the atmosphere, their collective effect is to keep the average temperature of the Earth's surface about 60°F (16°C) warmer than it would otherwise be, making life as we know it today possible. Water vapor is the most abundant greenhouse gas in the atmosphere and is natural in origin. The second most abundant greenhouse gas is CO_2, and is both natural and anthropogenic. However, CO_2 concentrations in the atmosphere have continuously increased at an ever-rising rate from approximately 280 parts per million by volume (ppmv) in preindustrial times to 373 ppmv in 2002, a 33% increase, and most of this increase has occurred in the last 100 years. The primary cause of such a rise has been recognized to be the ever-increasing rate of CO_2 emissions from fossil fuel burning by man.

Carbon dioxide emissions. Since there is no Federal regulatory guidance on CO_2 emissions, an analysis was conducted that focused on a comparison between global and U.S. emissions and the total emissions from the no action and proposed action alternatives. That comparison is shown in Table 4.3-8 as well as comparisons for the two TDM turbines that exclusively export power to the United States, the two turbines at the LRPC that export power to the United States, and all of the power plants in Mexico (i.e., TDM plus LRPC). Because CO_2 is stable in the atmosphere and essentially uniformly mixed throughout the troposphere and stratosphere, climatic impact does not depend on the geographic location of sources. Therefore, an increase of CO_2 emissions at a specific source effectively alters CO_2 concentrations only to the extent that it contributes to the global total of fossil fuel burning that increases global CO_2 concentrations.

As Table 4.3-8 indicates, the percentage increase in CO_2 emissions contributed by the TDM plant and the two LRPC export turbines under the proposed action is approximately 0.088% compared with total U.S. emissions from fossil fuel combustion and 0.023% compared with global emissions. The percentage increase in CO_2 emissions contributed by the three LRPC EAX turbines used under the no action alternative is 0.017% compared to global emissions and 0.066% compared to United States emissions. The expected impacts to global climate change would be negligible. Comparative estimates are based on maximum CO_2 emissions from the respective turbines; actual operational emissions would be lower.

The gas-fired combined-cycle systems used at the TDM and LRPC plants use state-of-the-art General Electric Model 7FA and Siemens-Westinghouse 501 F gas-fired turbines, respectively, and result in a current thermal efficiency of just under 60%, much higher than conventional power plants. This efficiency and associated low CO_2 emissions are well suited for global climate change initiatives addressing energy needs. The mitigating displacement of less efficient generation that otherwise results in higher CO_2 emissions and the economic efficiencies of these projects all resonate with the international commitments and with current U.S.-stated goals in helping address the balance between environmental concern and economic needs.

TABLE 4.3-8 Comparison of Annual CO_2 Emissions from the TDM Plant and LRPC Turbines to 2001 United States and Global Emissions

	Maximum Tons per Year of CO_2	Percentage of CO_2 Emissions from United States Fossil Fuel Combustion[a]	Percentage of CO_2 Emissions from Global Fossil Fuel Combustion[b]
No action: three LRPC EAX turbines	3,889,500	0.066	0.017
Proposed action: TDM plus LRPC export turbines	5,186,000	0.088	0.023
TDM turbines	2,528,000	0.043	0.011
LRPC export turbines	2,593,000	0.044	0.012
LRPC Mexico turbines	2,593,000	0.044	0.012
TDM plus LRPC export and Mexico turbines	7,714,000	0.13	0.035

[a] U.S. CO_2 emissions in 2001 from fossil fuel are estimated to be 1.57 billion metric tons of carbon equivalent (MMTCE), or 5.87 billion tons (5.3 billion metric tons) of CO_2 (EIA 2001).

[b] Global CO_2 emissions in 2001 from fossil fuel are estimated to be 6,567.62 MMTCE or 24.63 billion tons (22.3 billion metric tons) of CO_2 (EIA 2001).

4.3.4.4.4 PM Emissions from Exposed Salton Sea Lakebed. As discussed in Section 4.2, annual inflow to the Salton Sea from the New River would be reduced as a result of the consumptive water loss by the TDM and LRPC power plants in Mexico. The resultant reduction in the area of the Salton Sea from both plants operating is estimated to stabilize to a 97-acre (39-ha) loss, leaving 234,016 acres (94,703 ha) out of a total area of 234,113 acres (94,742 ha) (i.e., a 0.041% reduction), as shown in Table 4.2-6.

Owen's Lake and the Salton Sea

Owen's Lake, located in Inyo County, California, in many ways is analogous to the Salton Sea. It was once an alkali (brine) lake about 110 mi^2 (285 km^2) wide and up to 30 ft (9 m) deep located at the terminus of the Owen's River. The Salton Sea is a brine lake about 360 mi^2 (285 km^2) wide and up to 50 ft (15 m) deep. Owen's Lake supported two steamship lines in the late 1800s. It dried up virtually completely in the late 1920s due to water diversion into the Los Angeles Aqueduct. Because of the exposed salt and alkali flats, frequent dust storms are a major concern, and Owen's Lake is recognized to be the highest single PM_{10} area source in the United States.

DOE and BLM made an estimation of the possible increase in fugitive emissions of PM_{10} by wind erosion of Salton Sea lakebed surfaces exposed by any shrinking of the Salton Sea. To this end, an extrapolation was made to measurements of fugitive dust emissions from Owen's Lake in Inyo County California made by Gillette, Ono, and Richmond (Gillette et al. 2004). Gillette et al. carried out a long-term measurement program and by using a combined modeling and measurement technique derived that 72,000 tons/yr (65,000 t/yr) of PM_{10} were generated from 30 mi^2 (77 km^2) of dust-producing areas on Owen's Lake for a 12-month period between July 1, 2000, and June 30, 2001. If this value was directly proportioned to the 97-acre (39-ha) exposure of Salton Sea lakebed that can be associated with the proposed action, 372 tons/yr (338 t/yr) of fugitive emissions of PM_{10} by wind erosion of exposed Salton Sea lakebed surface was estimated to be produced.

However, this was proportioned to the subset of 30 mi^2 (77 km^2) of dust-producing areas on Owen's Lake out of the 110 mi^2 (285 km^2) of the total exposed lakebed of Owen's Lake. If proportioning was made relative to the total area of the Owen's lakebed, 50 tons/yr (45.4 t/yr) of fugitive emissions of PM_{10} by wind erosion of exposed Salton Sea lakebed surface were estimated. This was viewed to probably somewhat better represent the conditions that would occur at the Salton Sea were the lakebed to be exposed (i.e., to better reflect conditions at Owen's Lake, where not all surfaces were observed by Gillette et al. [2004] to be PM_{10} emissive).

These derived totals likely represent overestimates. The emissive characteristics at Owen's Lake are those of a large expanse of windswept surface, where, over decades of time, particles have crept across the ground, dislodging other particles, and where larger sand-sized agglomerates sandblast the surface. All these actions cause finer particles, including PM_{10}, to mix vertically up into the wind. In fact, Gillette et al. (2004) demonstrated that the amount of PM_{10} generated is generally proportional to these effects.

If the Salton Sea shrank by 97 acres (39 ha), this would translate to a thin strip 7 ft 18 in. (2.3 m) wide around a 110-mi (177 km) shoreline. It is unlikely that a narrow edge of Salton Sea lakebed would display the same emissive characteristics of an open, windswept, dried lakebed of

110 mi^2 (285 km^2) of Owen's Lake. Thus, the total amount of fugitive emissions of PM_{10} by wind erosion of exposed Salton Sea lakebed surface could be estimated to be <<100 tons/yr (<<91 t/yr) as a result of the proposed action.

This analysis assumed that the exposed lakebed surface of the Salton Sea has soil characteristics similar to those of Owen's Lake (composition of clay, salt sediments, etc.) Because this analysis was conducted on two similar brine lakes (one full, and the other empty) and was merely a bounding analysis, this assumption was viewed to be a reasonable working assumption.

4.3.5 Alternative Technologies

Under the alternative technologies alternative, DOE and BLM would grant one or both permits and corresponding ROW grants to authorize transmission lines that connect to power plants that would employ more efficient emissions controls and alternative cooling technologies.

4.3.5.1 More Efficient Emissions Controls

Under the proposed action, the Sempra plant would use SCR and oxidizing catalysts to reduce CO emissions. The Intergen plant also would incorporate SCR systems on all turbines by March 2005. However, the Intergen plant would not utilize CO emissions controls. However, this alternative analyzes the environmental impacts that would be produced from power plants that are constructed to be similar to the TDM and LRPC plants, except that oxidizing catalysts to limit CO would be utilized on all turbines.

Additional CO emissions control technologies were analyzed for a plant similar to the LRPC equipped with CO oxidizers on four turbines. Table 4.3-4 gives estimated maximum air concentrations at receptor locations in Imperial County for this emission control technology for comparison to the proposed action. Table 4.3-6 gives estimated concentrations for this technology for comparison to the cumulative impact of the LRPC and TDM plants from CO emissions as equipped under the proposed action; that is, no oxidizers on LRPC turbines, oxidizers on TDM turbines.

As Table 4.3-4 indicates, the increase in ambient CO concentrations in Imperial County associated with emissions from export turbines equipped with CO oxidizers would be slightly lower than in the proposed action. All values, including those for the proposed action, are well below SLs established by the EPA.

4.3.5.2 Alternative Cooling Technologies

Environmental impacts from the various cooling technologies are primarily of concern in the area of impacts to water resources. However, there are also some considerations for air quality. Dry cooling tends to result in somewhat reduced plant efficiency, on the order of 10 to

15%, especially when outdoor temperatures exceed 90°F (32°C). This reduced plant efficiency means that for a given amount of fuel input, less electricity could be produced. This reduction in electrical output would need to be replaced by other power plants that would burn additional fuel and produce additional emissions. Wet-dry cooling would have intermediate effects on plant efficiency and associated air emissions (DOE and ANL 2002).

Dry cooling would also have the beneficial effect of removing the need for cooling towers that produce emissions of small amounts of NH_3 and PM_{10}. The latter emissions are of greater concern. Table 4.3-4 gives the estimated increase in ambient air concentrations of PM_{10} in Imperial County produced by stack and cooling tower emissions from all export units under the proposed action. Maximum concentrations are below SLs in all cases. These levels would be reduced further for similar plants equipped with dry cooling.

Reductions in PM_{10} air concentrations resulting from cooling tower emissions would be intermediate for wet-dry cooling options.

4.3.6 Mitigation Measures

The mitigation measures addressed under this alternative pertain mainly to offsets of air emissions from the power plants. The Notice of Intent (NOI) (68 FR 61796) gave two examples of mitigation measures that could be considered to offset emissions from the power plants: paving of roads and retirement of older automobiles, which typically have high emissions, from use in the Calexico-Mexicali area. DOE contacted the Imperial County Air Pollution Control Office and the Border Power Plant Working Group to obtain suggestions for off-site mitigation measures that could be evaluated under this alternative (Russell 2004; Pioriez 2004a,b,c; Pentecost and Picel 2004; Powers 2004).

These and other mitigation measures can be evaluated on a per-unit, or individual, project basis. For example, reductions in PM_{10} and NO_x emissions that could occur as a result of paving roads, updating engines in agricultural and transportation equipment, and using more efficient, newer automobiles could be assembled into a program that would offset emissions from the power plants. The following evaluates possible elements of such programs but does not specify combinations of elements.

4.3.6.1 Mitigation Measures in Imperial County

The following mitigation measures identified by the Imperial County Air Pollution Control Office are considered under this alternative. Implementation of one or more of these measures would serve to improve air quality in Imperial County.

Paving of Roads: An effective and viable mitigation program would be a road repaving program similar to others that have been carried out in California, Texas, and elsewhere in Mexico. The concept is fairly simple although application would be case-specific. PM_{10} fugitive emissions from unpaved roads are a function of VMTs, vehicle type, speed, soil surface, moisture, and other factors. Once paved, road emissions are substantially reduced.

The Imperial County Public Works Director provided the Imperial County Air Pollution Control Office with a list of about 50 road segments totaling 23 mi (37 km) that could be paved to reduce fugitive dust emissions. Applying the ARB-derived reduction factor of 2.7 lb (1.2 kg) per VMT for unpaved roads, and measurement of the average frequency of vehicle trips per mile, the number of miles that need to be paved to mitigate a certain amount of PM_{10} emissions can be derived. For example, repaving approximately 23 mi (37 km) of roads could reduce PM_{10} emissions in Imperial County by about 650 tons (589 t).

Retrofitting of Emission Controls on IID Power Plants: Units 2 and 4 of the existing IID steam plant have SCR equipment to control NO_x emissions. Unit 3 does not have SCR equipment, nor do any of the smaller peaker units. The Imperial County Air Pollution Control Office suggested that SCR installation on IID Unit 3 and the peaker units would reduce NO_x emissions in the project area.

Mitigating to Enhance Use of Compressed Natural Gas in Motorized Vehicles: Four projects were identified as follows: (1) provide $150,000 in funding to maintain the El Centro compressed natural gas refueling facility located at Commercial and Fairfield Streets; (2) provide $250,000 in funding for a compressed natural gas fast-fill facility to be constructed at the Calexico Unified School District; (3) acquire land in Brawley, California, for construction of a compressed natural gas facility at a cost of $250,000 to $500,000; and (4) replace or update engines for the current fleet of ten 40-ft-long (12-m-long) Imperial Valley transit buses and 5 smaller buses, at a cost of $4 million to $5 million.

Controlling Imperial Airport Dust: Fugitive dust from natural windstorms and from aircraft (particularly from helicopter landings) occurs frequently at the airport. Funding of $150,000 would be needed either to begin treatment of bare desert soils with either chemical dust retardants or to purchase crushed rock to cover the soil surface in the most sensitive areas. The Imperial Air Pollution Control Office was not able to provide estimates of the amount of land area that would require treatment for fugitive dust control at the airport (Pentecost and Picel 2004).

Retrofitting of Diesel Engines for Off-Road Heavy-Duty Vehicles: This mitigation measure pertains to updating the diesel engines of off-road vehicles used in agriculture, earthmoving, or construction, to reduce particulate and gaseous emissions. Estimated funding of $250,000 would be needed for conversion to more efficient engines with fewer emissions.

4.3.6.2 Mitigation Measures in Mexico

While the above opportunities for mitigation have been identified in Imperial County, the available Emission Reduction Credits are relatively limited overall. Opportunities in the Mexicali region of Mexico are apparently more abundant and could yield greater cost-effectiveness. Evaluation of mitigation measures in Mexico is not required under NEPA; however, these issues are included here for disclosure purposes. A further consideration of mitigations in Mexico is that they would be located in the state of the emission source being mitigated (Mexico), while benefits in Imperial County would also accrue to the extent the mitigations impact air quality there.

It is possible that some mitigation measures may be more efficacious if applied in Mexico. The presentation of these measures in this EIS is intended to be conceptual and is not meant to imply the resolution of issues related to appropriateness or enforceability with respect to their actual implementation.

The following examples are identified as measures that could improve air quality. In brief, improvements in air quality could be achieved through a program to replace older automobiles and buses in the Mexicali area with a newer, less polluting fleet. Also, fugitive dust could be reduced through road paving. Air pollutants emitted by industries that use brick kilns could be reduced by converting the fuel used in firing the kilns to natural gas.

The primary regional sources of PM_{10} in the Mexicali region are fugitive emissions from the many unpaved roads (i.e., roads not covered by concrete or asphalt). Such a program has the advantage of, once undertaken, being passively verifiable and measurable. An example of such an initiative in Mexico already under way is the “Paving and Air Quality Project for the State of Baja California” program (COCEF 2004), which is taking place under the auspices of the Border Environment Cooperation Commission (Comisión de Cooperación Ecológica Fronteriza). The State Public Works Agency (*Secretaría de Asentamientos Humanos y Obras Públicas del Estado de Baja California*) proposes to pave streets in the five major cities in the State of Baja California, namely, Tijuana, Mexicali, Ensenada, Tecate, and Rosarito, to reduce regional PM_{10} emissions. The goal of this program is to pave more than 80% of the streets in 5 years. As this program states: “There are no international treaties or agreements related to this project. However, due to the fact that the border Cities have shared air basins, this project will have positive impacts in both sides of the border.”

PM_{10}, and in particular $PM_{2.5}$, emissions could also be mitigated by stationary diesel engine upgrades (e.g., diesel pumping stations or replacement by alternative power sources) and diesel engine vehicle fleet upgrades. However, such a program would be more complex to implement and measure.

Vehicles are the major regional source of NO_2 and CO in Mexicali. Thus, a mitigation program could focus on vehicle inspection and a vehicle retirement program for older Mexicali vehicles.

4.4 BIOLOGICAL RESOURCES

4.4.1 Major Issues

Major issues pertaining to biological resources include impacts of the proposed transmission lines on native ecosystems, potential impacts of water use by the power plants on the ecology of the Salton Sea, impacts on threatened and endangered species that may exist along the transmission lines, and potential impacts to birds protected by the Migratory Bird Treaty Act.

4.4.2 Methodology

Direct impacts and indirect impacts to biological resources are evaluated in this chapter. For ecological resources, direct impacts are limited to those caused by the construction of transmission lines between the U.S.-Mexico border and the IV Substation. Direct impacts are based on the amount of various types of habitat disturbed by movement of equipment and materials, construction and installation of transmission towers and conductors, and construction of access roads for construction and maintenance of the transmission lines. Because construction impacts would be restricted to BLM lands in the Yuha Desert Management Area, there would be no direct impacts to biological resources associated with the New River or the Salton Sea.

The indirect impacts evaluated in this chapter include potential effects to biological resources associated with the New River or the Salton Sea from changes in water quantity and water quality due to operation of the TDM and LRPC power plants. There is no potential for water quantity or quality changes in the New River to affect biological resources in the vicinity of the proposed transmission lines.

4.4.3 No Action

4.4.3.1 Transmission Line Routes

Under the no action alternative, there would be no construction of additional transmission lines in the United States. Thus, there would be no impacts to biological resources from construction and operation of the proposed transmission lines.

4.4.3.2 New River and Salton Sea

Under the no action alternative, the TDM plant would not operate and the EAX unit at the LRPC would operate. Because the EAX unit uses about 69% of the water used by the entire LRPC, impacts to biological resources in the New River due to changes in water quality and volume under the no action alternative would be smaller than impacts from operation of the entire LRPC, compared with impacts from no plants operating.

The slight change in average water depth of 0.6 in (1.5 cm) at the Westmorland gage on the New River under the no action alternative would not adversely affect riparian vegetation or aquatic organisms. There would be either no effect or a very small negative effect on riparian vegetation from a slight change in the groundwater level in the immediate vicinity of the New River from operation of the EAX unit.

The decrease in COD and phosphorus concentrations projected at the Calexico gage would result in DO concentrations that would improve the survival of fish and invertebrates in the New River. Also, small changes in salinity, CO, phosphorus, and DO are not likely to change the extent of riparian vegetation or the species that utilize this habitat.

Operation of the LRPC alone would reduce the quantity of selenium loading in the New River by less than 0.16% of that reported for the Calexico gage. By the time water would have traveled more than 20 river miles to the Brawley wetland, selenium loads and concentrations would be lower, assuming no reduction occurs in the flow rate of the New River. Immobilization of selenium occurs in sediments, particularly in slow-moving and standing waters such as the wetlands (Lemly 1997). No data were available for selenium concentrations in sediments or water at the Brawley wetland; therefore, there was no evaluation of impacts to wetland vegetation. Since the total load of selenium to the New River is reduced by operation of the power plants, and flow rate reductions from power plant water use would not likely reduce water depth in the stretch of the river that supplies water to the Brawley wetland, adverse impacts to vegetation or the species that utilize this habitat are not expected.

Under the no action alternative, there would be indirect effects on biological resources of the Salton Sea. The time to reach a salinity level of 60,000 mg/L (a concentration detrimental to fishery resources) would be about 36.06 years, compared with 36.07 years with no plants operating (Table 4.2-7). These values are statistically indistinguishable, thus salinity levels in the Salton Sea would occur at essentially the same rate with or without the EAX unit operating. The aquatic invertebrates and fish inhabiting the region of the Salton Sea receiving inflow from the New River should not be adversely impacted by low DO events from entrophication because phosphorus loading would be reduced by EAX unit operations. If salinity levels do not reach concentrations that are critical to survival of aquatic organisms, food resources for birds and other wildlife that utilize the Salton Sea would not be impacted.

4.4.4 Proposed Action

4.4.4.1 Transmission Line Routes

Construction of the proposed transmission lines along the proposed routes would require traversing approximately 6 mi (10 km) of desert habitat between the U.S.-Mexico border and the IV Substation. The following estimates of land disturbance were based on design information and are conservative because the disturbance from the lines as built was somewhat less. This would permanently impact approximately 3.1 acres (1.3 ha) of Sonoran creosote bush scrub and 0.3 acre (0.1 ha) of desert wash habitat adjacent to the existing SDG&E transmission line route from tower bases and new access roads. There would also be temporary impacts to approximately 15 acres (6.0 ha) of Sonoran creosote bush scrub and 0.5 acre (0.2 ha) of desert wash. The acreage of Sonoran creosote bush scrub temporarily impacted would include 9.5 acres (3.8 ha), calculated as the area of potential effects for the transmission lines east and north of the IV Substation. In addition, the calculation of impacts for both vegetation community types is conservative because it does not account for the overlap of temporary impacts from work areas and pull sites at the lattice tower and monopole locations.

Constructing the transmission lines on the alternative routes located to the west or east of the existing SDG&E transmission line (as described in Section 2.2.1.5) would increase the area of terrestrial habitat that would be affected because both alternative routes would be longer than the more direct proposed routes. Traversing the additional distances of the alternative routes would require the installation of additional tower structures. The western alternative routes would be approximately 2 mi (3.2 km) longer, would permanently disturb approximately 9.5 acres (3.8 ha) more than the proposed routes, and would require the installation of about 10 additional transmission line towers. The eastern alternative routes would be approximately 0.5 mi (0.8 km) longer, would permanently disturb an additional 6.8 acres (2.6 ha) of terrestrial habitat, and would require the installation of three additional transmission line towers. In addition, both of the alternative transmission line routes would require construction of new access roads, whereas the proposed transmission line routes would primarily utilize access roads already present along the existing transmission line. Because both alternative routes would traverse Sonoran Desert scrub and dry wash habitats that are similar in composition to those that would be traversed by the shorter routes, it is anticipated that biological resources similar to those described below for the proposed transmission line routes would be affected, although the magnitude of impacts would be proportionally greater.

General impacts to wildlife in the projects area may occur because of increased human activity and noise during construction activities. Birds and large mammals are highly mobile and would likely move out of the way during construction. Many small terrestrial animals may do the same, but some small mammals and reptiles with low mobility may be inadvertently killed by the movement of materials and heavy equipment during construction.

After construction is completed, a relatively low acreage of habitat dispersed over the proposed routes would be lost as vegetated wildlife habitat because of the placement of foundations for transmission line towers and because of soil disturbance in spur road areas. However, even new roads may have some residual habitat value (e.g., as basking areas for reptiles). Because development of new access roads would be required for construction of transmission lines along the longer eastern and western alternative routes than along the proposed routes, greater amounts of temporary and permanent habitat would be disturbed if the alternative routes were utilized.

Bird species, such as neotropical migrants that are protected by the Migratory Bird Treaty Act, would not be adversely impacted by construction of the Intergen and Sempra transmission lines. No habitat loss from clearing that would remove trees or shrubs used by migrating song birds would occur along the proposed and alternative routes. Shrubs and trees used by neotropical migrants moving through desert areas occur typically along desert washes and streams. Streams with water and dry washes lined with shrubs and trees do not exist along the proposed and alternative transmission line routes.

Raptors that occur along the proposed and alternative transmission line routes could use the towers as perching sites. There would be no impact to raptors from electrocution when landing on the towers because the spacing between the conductors and ground wire on the top of the towers exceeds the wing span of the bald eagle (the largest raptor that likely could occur in the projects area).

Construction of the transmission lines would not impact any plants or animals Federally listed as threatened or endangered, but could potentially destroy some plant species considered sensitive by the California Native Plant Society.

No wetlands would be affected by the proposed projects within the transmission line routes, but a total of 0.21 acre (0.08 ha) of desert wash areas, which are considered to be waters of the United States under the jurisdiction of the U.S. Army Corps of Engineers through Section 404 of the CWA (i.e., navigable waters), would be affected along the proposed transmission line routes. This impact would result from placement of tower footings and access roads in the desert wash areas. The largest wash area is Pinto Wash (Figure 3.2-21). These projects would not require a permit from the U.S. Army Corps of Engineers. Nationwide Permit No. 12 covers projects that do not exceed 0.50 acres (0.20 ha) of impacts to wetlands. The area of desert wash habitat within the eastern and western alternative transmission line routes has not been formally surveyed or quantified, but would likely be similar to that within the proposed transmission line routes.

Watering may be used for dust control during construction. Watering, especially when combined with disturbance of the ground surface, may create conditions where invasive nonnative plant species can grow. This appears to have occurred in the past where a stand of tamarisk has become established east of the IV Substation in the area of the proposed transmission line routes.

The area in which the transmission lines would be constructed is located in the Yuha Basin ACEC and in the Yuha Desert Management Area for the flat-tailed horned lizard, a species of special interest to BLM. The applicants have agreed to mitigation measures to minimize impacts (Section 2.2.1.4) to the flat-tailed horned lizard, the western burrowing owl, and other species that BLM considers sensitive biological resources, as indicated in Table 3.4-2. These include measures listed in the Flat-tailed Horned Lizard Rangewide Management Strategy (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003) to mitigate the effects of projects in the Yuha Desert Management Area.

The flat-tailed horned lizard is active during most of the year, but is dormant and hibernates between approximately November 15 and February 15. Hibernation is obligatory, and the animal hibernates in burrows, usually within a couple of inches of the ground surface. In the spring and fall active period, the lizards often move about on the surface during the day. As temperatures rise, flat-tailed horned lizards appear to escape extreme daytime temperatures by retreating to burrows. They forage and are most active during the morning and evening. During the night in the active season, the lizards spend the night below the sand, on the surface, or in burrows. When approached, flat-tailed horned lizards often remain still, relying on camouflage for protection. Because of their cryptic coloration, this strategy makes them difficult to detect.

The applicants would attempt to schedule construction to occur as much as possible during the flat-tailed horned lizard's dormant period (November 15 to February 15) and employ all mitigation measures recommended by the management strategy during that period (Section 2.2.1.4). Construction is to be completed in as short a period of time as possible to minimize the length of time that the habitat would be disturbed. However, some construction would probably be necessary during the flat-tailed horned lizard's active period (before November 15 and after February 15). If so, the applicants would employ additional mitigation measures during that period. In addition, the applicants would employ mitigation measures intended to minimize the general disturbance of biological resources and to ensure the restoration of disturbed areas.

Several features of the project, as proposed by the applicants and described in Section 2.2.1.4, would be effective in minimizing harm to biological resources. These include positioning the lattice towers and locating access roads so that permanent disturbance can be minimized. In addition, moving the tower assemblies to their locations in the line by helicopter, rather than assembling them on site, would greatly reduce the amount of disturbance at each tower location. The mitigation recommended in this EIS includes monitoring for flat-tailed horned lizards and western burrowing owls, and would help to limit impacts to other sensitive biological resources. A list of environmental protection measures is provided in Section 2.2.1.4.

4.4.4.2 New River

Since there would not be any direct construction impacts to the New River, there would be no direct disturbance of riparian vegetation under the proposed action for any of the alternative transmission routes identified in Section 2.2.1.5.

There is a potential for indirect impacts to riparian communities associated with the New River to the extent that operation of the proposed power plants results in decreases in New River water levels and in the level of the adjoining water table that supports the riparian communities. As identified in Table 4.2-3, the proposed action could result in a maximum decrease in the average annual depth of the New River of approximately 0.13 ft (4.0 cm) at the Calexico gage and 0.07 ft (2.1 cm) at the Westmorland gage. Much of the dominant existing vegetation in the riparian zone (e.g., tamarisk, iodine bush, saltbush, and mesquite) consists of relatively drought-tolerant species. Also, many of the riparian plant species are phreatophytic (i.e., they seek deep water through the growth of long taproots). Therefore, it is anticipated that such small changes in river elevation would result in, at the most, very small changes in the overall area of riparian vegetation cover along the New River.

In addition, potential changes in New River water quality could occur under the proposed action. The estimated total salinity level of 2,766 mg/L is about 150 mg/L higher than for no plants operating and below the 4,000-mg/L water quality objective for the Colorado River Basin

(SWRCB 2003). Such a small increase in average salinity would have no effect on the growth of riparian vegetation because the plants have high salinity tolerances.

It is also anticipated that the changes in water depth and water quality would not affect the ability to operate and maintain the Brawley wetland that has been constructed adjacent to the New River as part of a pilot project examining the feasibility of using constructed wetlands to improve water quality in the New River. The small change in estimated water depth if the proposed action is implemented should not hinder the ability to pump water into the constructed wetland, since the water intake for the pump used to supply water to the wetland is located deep enough to remain operational under the slightly reduced flows.

To evaluate potential impacts to wetland plant species from water quality changes, particularly changes in salinity, the salt tolerance of wetland plants needs to be considered. Plant species in these two wetland areas include bulrushes, broadleaf cattail, umbrella flatsedge, and littlebeak spikerush (BOR 2002). While information about the salt tolerance of these species is limited, the California bulrush (*Scirpus* [*Schoenoplectus*] *californicus*) is reportedly capable of surviving salinities of up to approximately 6,000 mg/L. Acceptable salinities for some freshwater wetland plants, such as broadleaf cattail and common spikerush (*Eleocharis palustris*), have been estimated at approximately 4,800 mg/L (Warrance et al. 2003). As identified previously, it is estimated that the average salinity in the New River water at the Calexico gage would be approximately 2,766 mg/L under this alternative. There is approximately a 5% chance that salinity would occasionally exceed 3,400 mg/L (2 standard deviations above the mean value) and a less than 0.01% chance that salinity would exceed 4,000 mg/L. The small change in salinity compared with the no action alternative and the small probability of exceeding salinity tolerances of the wetland plants indicate that implementing the proposed action is unlikely to affect the wetland area at Brawley.

Operation of the power plants would reduce the quantity of selenium loading in the New River by about 0.16% of that reported for the Calexico gage. By the time water would have traveled more than 20 river miles to the Brawley wetland, selenium loads and concentrations would be lower, assuming no reduction occurs in the flow rate of the New River. Immobilization of selenium occurs in sediments, particularly in slow-moving and standing waters such as the wetlands (Lemly 1997). No data were available for selenium concentrations in sediments or water at the Brawley wetland; therefore, there was no evaluation of impacts to wetland vegetation. Since the total load of selenium to the New River is reduced by operation of the power plants, and flow rate reductions from power plant water use would not likely reduce water depth in the stretch of the river that supplies water to the Brawley wetland, adverse impacts to vegetation are not expected.

Because implementation of the proposed action alternative would have a very small to no effect on the riparian or wetland habitats along the New River, there would similarly be a very small to no effect on wildlife communities.

The anticipated water quality changes in the New River are expected to have relatively minor impacts to populations of fish and invertebrates that occur in the river between Calexico and the Salton Sea. Even with the slight increase in average salinity, salinity ranges would remain similar to the levels that have occurred historically and would be unlikely to negatively affect the survival or distribution of fish and aquatic invertebrate species.

Phosphorus, which is largely responsible for causing algal blooms that can result in periods of low DO in the river, would be slightly reduced under the proposed action. However, the estimated levels for phosphorus concentrations and BOD at the Calexico gage are only slightly smaller (0.05 mg/L and 0.6 mg/L less, respectively) than levels that would occur under the no action alternative (LRPC operation only), and potential beneficial changes in distributions of fish and invertebrates as a result are also likely to be small. Overall, it is anticipated that the net effects of slightly reduced flows, slightly increased salinity, and slightly reduced nutrient inputs would have a slight impact on the aquatic organisms in the New River.

4.4.4.3 Salton Sea

Implementation of the proposed action would have indirect effects on Salton Sea biological resources as a result of changes in flows, salinity, and nutrient levels from the New River. With both power plants operating, the estimated time for the Salton Sea to reach a salinity of 60,000 mg/L would be 36.06 years, approximately the same as the estimated time under no action (i.e., 36.07 years) (Table 4.2-7). Biological resources would be impacted by increasing salinity before this critical level would be reached, and salinity would be expected to continue to increase under this alternative at a rate similar to that which would occur under the no action alternative.

In the nearer term, the proposed action would result in an estimated annual phosphorus load to the Salton Sea via the New River of approximately 1.305 million lb (0.592 million kg), a decrease of about 3.7% compared with the estimated phosphorus loading with no plants operating. This decrease in phosphorus loading would likely reduce eutrophication of the area of the Salton Sea receiving the inflow and could reduce the frequency (compared with no plants operating) with which low dissolved oxygen events cause mortality of fish and aquatic invertebrates in that portion of the Sea. As long as salinity levels have not reached levels critical for survival of aquatic resources, this could result in increased availability of food resources for birds and other wildlife that utilize the Salton Sea.

Waterfowl and wading birds that migrate through the area or are summer residents of the Salton Sea are also protected under the Migratory Bird Treaty Act. Since there would be a small reduction in the water level in the Salton Sea (i.e., -.05 ft; Table 4.2-6) from operation of the power plants under the proposed action alternative, no impacts would occur to the feeding habitat of waterfowl and wading birds.

4.4.5 Alternative Technologies

This alternative evaluates the impacts of more efficient emissions control technologies and alternative cooling technologies. The following addresses impacts to transmission line routes, the New River, and the Salton Sea from the use of alternative cooling technologies.

Impacts to biological resources from the use of more efficient emissions control technologies would be the same as for the proposed action and therefore are not presented here.

4.4.5.1 Transmission Line Routes

The method used to cool power plants would not affect the potential impacts to biological resources associated with construction of the proposed transmission lines. Consequently, the impacts to biological resources under this alternative would be the same as those described for the proposed action.

4.4.5.2 New River

The potential for indirect impacts to riparian communities and aquatic communities associated with the New River would be reduced if alternative cooling technologies (dry cooling or wet-dry cooling) would be implemented due to lower water consumption. As described in Section 4.2.5, dry cooling technologies would reduce water consumption by approximately 95% compared with the proposed action alternative. The use of wet-dry cooling technology would result in water consumptions that fall between those identified for dry cooling alone and those identified for the proposed action (wet cooling) alternative. Both dry cooling and wet-dry cooling would result in less potential for impacts compared with the wet cooling system under the proposed action. Impacts to biological resources associated with the New River resulting from implementation of alternative cooling technologies would be small.

4.4.5.3 Salton Sea

The potential for some indirect impacts to biological resources in the Salton Sea would be reduced if alternative cooling technologies (either dry cooling or wet-dry cooling combinations) would be implemented. As described in Section 4.2.5, dry cooling technologies would reduce water consumption by approximately 95% compared with the proposed action alternative. The use of a wet-dry cooling technology would result in water consumptions that would fall between those identified for dry cooling alone and those identified for the proposed action (wet cooling) alternative. Impacts to biological resources associated with the Salton Sea resulting from implementation of either the proposed action or the alternative technologies would be small.

4.4.6 Mitigation Measures

Under this alternative, the expected impacts to biological resources would depend on the nature of the mitigation measures. If the paving of roads was selected as the mitigation measure to be employed, a review for proximity to Federal, State-protected, or sensitive species would be necessary to ensure that they are not impacted during paving. If protected species were likely to be impacted, the USFWS and California Game and Fish Department would be contacted before the start of paving or construction activities.

The need for specific measures to protect biological resources would depend on the location of the resources and the kinds of surface and subsurface disturbance that would be necessary to implement the mitigation measure. DOE and BLM have no information on which to conduct an impact analysis of biological resources at the Imperial Airport, or potential locations for compressed natural gas fast-fill facilities at the Calexico Unified School District and in Brawley. Also, the Imperial County Air Pollution Control District Office did not identify specific plans or specific locations of the compressed natural gas facilities that would allow the staff to conduct a biological resources impact assessment.

4.4.7 Special Status Species

This section evaluates potential impacts to special status species, including Federal- and State-listed threatened and endangered species and species considered sensitive by the BLM. Potential impacts to special status species from the various alternatives are summarized in Table 4.4-1.

Many of the special status species identified in Section 3.4.4 do not occur within areas potentially affected by the proposed projects, including Peirson’s milk vetch, Algodones Dunes sunflower, desert tortoise, barefoot gecko, Swainson’s hawk, elf owl, peninsular bighorn sheep, and Palm Springs ground squirrel. Consequently, there would be no impacts to these species under the no action alternative.

4.4.7.1 No Action

As described in Section 4.4.3, it is assumed that there would be no construction of additional transmission lines in the United States under the no action alternative. Because there would be no additional construction within the United States, there would be no impacts to those special status species that may occur in the vicinity of the proposed transmission line routes but not in other areas potentially affected by the projects. Consequently, there would be no effects of the no action alternative on the flat-tailed horned lizard or the bald eagle.

Under the no action alternative, only the EAX unit of the LRPC power plant would be operated. This would produce impacts to water quality and quantity (Section 4.2) greater than for no plants operating; however, such impacts would be less than those shown for the proposed action because the EAX unit would only use about 69% of the water used when the entire LRPC is operating. Under such operations, water levels, salinity, phosphorus and selenium concentrations, and COD in the New River and in the Salton Sea would remain similar under the no action alternative to the baseline conditions that have resulted in the development of the current ecological communities described in Sections 4.4.3.2 and 4.4.3.3. Assuming that these conditions are maintained, there would be no impacts from the no action alternative to special status species that could occur in riparian or aquatic habitats of the New River or the Salton Sea, including the desert pupfish, bald eagle, brown pelican, Yuma clapper rail, southwestern willow flycatcher, Gila woodpecker, or bank swallow.

TABLE 4.4-1 Potential Impacts to Special Status Species

	Alternatives			
Species	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Plants				
Peirson's milk-vetch *Astragalus magdalanae* var. *peirsonii*	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.
Algodones Dunes sunflower *Helianthus niveus* ssp. *tephrodes*	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.
Fish				
Desert pupfish *Cyprinodon macularius*	No impacts; no changes to habitat conditions compared to current condition.	No impacts; does not occur within Salton Sea areas likely to be affected by potential changes in water levels or water quality.	No impacts; no changes to habitat conditions compared to current condition.	Same as proposed action.
Reptiles				
Desert tortoise *Gopherus agassizii*	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	Potential for impacts if roads to be paved are within desert tortoise habitat.
Barefoot gecko *Coleonyx switaki*	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	Potential for impacts if roads to be paved are within barefoot gecko habitat.
Flat-tailed horned lizard (*Phrynosoma mcallii*)	No impacts; no new transmission lines constructed within occupied habitats.	Potential for habitat disturbance and deaths to individuals within the vicinity of the transmission line routes; impacts would be minimized by implementing protective mitigation measures as identified in Section 4.4.7.4. No impacts in the vicinity of the New River or the Salton Sea.	Same as for proposed action.	Same as proposed action; potential for impacts if roads to be paved are within flat-tailed horned lizard habitat.

TABLE 4.4-1 (Cont.)

	Alternatives			
Species	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Birds				
Bald eagle *Haliaeetus leucocephalus*	No impacts.	No impact to slight beneficial impact due to potential small improvement in food availability at the Salton Sea.	No impacts.	Same as proposed action.
Brown pelican *Pelecanus occidentalis*	No impacts.	No impact to slight beneficial impact due to potential small improvement in water quality and food availability at the Salton Sea.	No impacts.	Same as proposed action.
Yuma clapper rail *Rallus longirostris*	No impacts.	No impact to slight beneficial impact due to potential small improvement in food availability at the Salton Sea.	No impacts.	Same as proposed action.
Swainson's hawk (nesting) *Buteo swainsoni*	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.
Southwestern willow flycatcher *Empidonax traillii extimus*	No impacts; riparian areas unaffected.	No impacts; riparian areas unaffected.	No impacts; riparian areas unaffected.	Same as proposed action.
Elf owl *Micrathene whitneyi*	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.	No impacts; does not occur within potentially affected area.
Gila woodpecker *Melanerpes uropygialis*	No impacts; riparian areas unaffected.	No impacts; riparian areas unaffected.	No impacts; riparian areas unaffected.	Same as proposed action.
Bank swallow *Riparia riparia*	No impacts; riparian areas unaffected.	No impacts; riparian areas unaffected.	No impacts; riparian areas unaffected.	Same as proposed action.

TABLE 4.4-1 (Cont.)

	Alternatives			
Species	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Western burrowing owl *Speotyto cunicularia hypugaea*	No impacts; no new transmission lines constructed within occupied habitats.	Potential for habitat disturbance and deaths to individuals within the vicinity of the transmission line routes; impacts would be minimized by implementing protective mitigation measures as identified in Section 4.4.7.4. No impacts in the vicinity of the New River or the Salton Sea.	Same as for proposed action.	Same as proposed action; potential for impacts if roads to be paved are within western burrowing owl habitat.
Mammals				
Peninsular bighorn sheep *Ovis canadensis*	No impacts; not expected to occur within potentially affected area.	No impacts; not expected to occur within potentially affected area.	No impacts; not expected to occur within potentially affected area.	No impacts; not expected to occur within potentially affected area.
Palm Springs ground squirrel *Spermophilus tereticaudus chlorus*	No impacts; not expected to occur within potentially affected area.	No impacts; not expected to occur within potentially affected area.	No impacts; not expected to occur within potentially affected area.	No impacts; not expected to occur within potentially affected area.

However, this is not necessarily the same as the conditions that would exist if neither of the power plants were operating. As described in Sections 4.4.3.2 and 4.4.3.3, it is estimated that operation of three turbines of the LRPC power plant would result in a decrease in average water depth in the New River of less than 0.6 in. (1.5 cm) at the Westmorland gage, compared with conditions that would exist in the absence of power plant operations. It is also estimated that there would be an increase in salinity in the New River of approximately 97 mg/L compared with no power plant operations and a 0.54% decrease in average inflow to the Salton Sea that could result in a slight (but statistically indistinguishable) increase in the rate at which salinity is increasing in the Salton Sea (see Section 4.2 for additional details). There would also be small decreases in the COD and in the phosphorus and selenium loads to the New River and the Salton Sea, compared to the loading that would occur with no power plant operations (Table 4.2-6).

Because it is very unlikely that the estimated small changes in water levels would result in effects on the riparian vegetation communities associated with the New River or the Salton Sea, special status bird species (i.e., southwestern willow flycatcher, Gila woodpecker, and bank swallow) that might be associated with those habitats are unlikely to be affected. The desert pupfish is highly tolerant of elevated salinity and is unlikely to be affected by the slight differences in salinity between operations under the no action alternative (three gas turbines operational at the LRPC power plant). Decreases in COD and in phosphorus and selenium concentrations would likely have minor beneficial effects on survival of fish and aquatic invertebrates that could result in slight increases in the availability of food resources for birds and other wildlife compared with conditions that would exist in the absence of power plant operations. Thus, while the no action alternative would not adversely impact special status species, the no action alternative may provide a slight benefit compared with no power plant operations to sensitive bird species that eat fish or aquatic invertebrates such as the bald eagle, brown pelican, and Yuma clapper rail.

4.4.7.2 Proposed Action

General ecological impacts of the proposed action are evaluated in Sections 4.4.4.2 and 4.4.4.3. Potential impacts to special status species are described in this section and summarized in Table 4.4-1.

Special status species could be potentially affected by the proposed action through direct impacts from the construction of transmission lines within the eastern portion of the Yuha Desert or through indirect impacts due to changes in water availability or water quality in the New River or the Salton Sea. Consequently, there would be no impacts to these species from the proposed action alternative. Special status species with a potential to occur within areas that could be affected by the proposed action include the desert pupfish, flat-tailed horned lizard, bald eagle, brown pelican, Yuma clapper rail, southwestern willow flycatcher, Gila woodpecker, and bank swallow.

As identified in Section 3.4.4.3, the desert pupfish (Federally and State endangered) occurs in shoreline pools along the southern and eastern margins of the Salton Sea and in agricultural drainage canals. It has not been reported from the New River and is not expected to occur there due to the high sediment loads, unsuitable water velocities, and the presence of predators. The desert pupfish is highly tolerant of elevated salinity (up to approximately 98,000 mg/L in the laboratory). It is estimated (see Section 4.2.4.4) that salinity (TDS) in the Salton Sea would increase by approximately 443.76 mg/L/yr under the proposed action (i.e., both power plants operating), compared with 443.74 mg/L/yr under the no action alternative (LRPC EAX unit operation only). This very small increase in the salinization rate for the Salton Sea would be unlikely to affect the desert pupfish, which is adapted to surviving in highly saline desert pools in which salinity changes rapidly due to evaporation. It is anticipated that the proposed action would not adversely affect desert pupfish in the vicinity of the Salton Sea.

The area in which the transmission lines would be constructed is located in the Yuha Basin ACEC and in the Yuha Desert Management Area for the flat-tailed horned lizard, a BLM sensitive species. The flat-tailed horned lizard is known to occur within the areas that would be affected by the proposed transmission line routes. Consequently, there is a relatively high potential for flat-tailed horned lizard habitats and individuals to be harmed during construction of the transmission lines. These impacts could result from development of additional access or spur roads (new access roads would be needed only for the alternative routes), movement of vehicles or materials across the ground, and excavation of soil for placement of tower foundations.

The applicants have agreed to implement environmental protection measures to minimize impacts to the flat-tailed horned lizard. These measures are identified in Section 2.2.1.4 and include actions listed in the Flat-tailed Horned Lizard Rangewide Management Strategy (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003) to mitigate the effects of projects in the Yuha Desert Management Area. In addition to specific actions to specifically reduce the potential for impacts to the flat-tailed horned lizard, the applicants would employ measures intended to minimize and mitigate for general disturbance of biological resources and assure restoration of disturbed areas. Assuming that the specified actions are implemented during construction, no unacceptable impacts to the flat-tailed horned lizard are anticipated as a result of the proposed action.

While there is a potential for bald eagles (Federally threatened and State endangered) to occur within the vicinity of the proposed transmission line routes, it is relatively unlikely because suitable foraging areas (i.e., open bodies of water containing fish) are not located nearby. The bald eagle is highly mobile and would likely move out of the way during construction, thereby reducing the potential for immediate impacts from construction activities. Because the spacing between the transmission lines would be considerably greater than the wingspan of a bald eagle, electrocution would be highly unlikely if the lines are constructed, although there is a potential for isolated deaths through collision with the conductors. However, the transmission line previously constructed within the utility corridor has been in place for approximately 20 years, and no bald eagle deaths due to the presence of the line have been reported during that time.

Bald eagles commonly occur in the vicinity of the Salton Sea and utilize fish (primarily tilapia) in the Salton Sea as a food source. Consequently, bald eagles could be indirectly affected by the proposed action if it resulted in a decline in fish abundance. However, as discussed in Section 4.4.4.3, the small changes in Salton Sea water levels and salinity levels that could result from the proposed action would result in very small, and likely undetectable effects on fishery resources. The proposed action would also reduce water nutrient levels in the New River, thereby reducing nutrient loading to the Salton Sea. Because elevated nutrient levels in the Salton Sea have been implicated in large, episodic fish kills, nutrient level reductions could result in slightly improved fish survival and an improved food base for the bald eagle. However, because bald eagles will feed on dead fish as well as live fish, benefits to the bald eagle from nutrient reduction is likely to be relatively minor. Overall, it is anticipated that the proposed action will not result in adverse impacts to the bald eagle.

The brown pelican, a Federally endangered species, is known to occur at the Salton Sea. While there will be no direct impacts to the brown pelican from the proposed construction activities, there is a potential for the brown pelican to be negatively affected if the availability of fish resources were to be reduced as a result of changes in water conditions. As discussed above, the small changes in Salton Sea water levels and salinity levels that could result from the proposed action would result in very small, and likely undetectable effects on fishery resources. Concurrent reductions in nutrient loading to the Salton Sea could result in slightly improved fish survival and an improved food base for the brown pelican and other fish-eating birds. Overall, it is anticipated that the proposed action would not result in impacts to the brown pelican.

The Yuma clapper rail, a Federally endangered and State threatened species, is also known to occur at the Salton Sea. While there would be no direct impacts to the Yuma clapper rail from the proposed construction activities, there is a potential for this species to be negatively affected if the availability of fish and invertebrate food items is reduced by the proposed action. For the same reasons as those presented for the brown pelican, above, it is anticipated that there would be no substantial changes in food availability for the Yuma clapper rail. Consequently, the proposed action would not result in impacts to the Yuma clapper rail.

The southwestern willow flycatcher (Federally and State endangered), Gila woodpecker (State endangered), and bank swallow (State threatened) have a potential to occur within the desert scrub riparian areas associated with the New River. All three species are insectivorous, although the Gila woodpecker would also eat fruits and berries on occasion. As discussed in Section 4.4.4.2, the proposed action would not directly (through construction impacts) or indirectly (through small changes in water levels or water quality) alter the extent or composition of the riparian areas along the New River. Furthermore, the small changes in water quality would be unlikely to result in changes in the abundance or composition of aquatic insects that might provide food for these species. Consequently, the proposed action would not affect the southwestern willow flycatcher, Gila woodpecker, or the bank swallow.

The burrowing owl, a BLM sensitive species, is a year-round resident occurring in low growing vegetation and in agricultural fields, and occupies burrows of small mammals and holes along culverts. This habitat occurs at various locations adjacent to the New River and in the vicinity of the proposed transmission lines. Construction of the transmission line is not expected to adversely impact burrowing owls. Construction of the transmission lines would not impact burrowing owls during the breeding period because activities would take place between November and February. Because only small changes would occur to water levels in the New River, no impacts are expected to occur to burrowing owls that may occur in riparian areas.

4.4.7.3 Alternative Technologies

This alternative evaluates the impacts of more efficient emissions control technologies and alternative cooling technologies. The following addresses impacts to transmission line routes, the New River, and the Salton Sea from the use of alternative cooling technologies. Impacts to biological resources from the use of more efficient emissions control technologies would be the same as for the proposed action and therefore are not presented here.

The construction methods and routes for the transmission lines under this alternative would be identical to those identified for the proposed action. Consequently, potential impacts to the flat-tailed horned lizard would be the same as those identified for the proposed action in Section 4.4.7.2.

The use of more efficient emission control technologies would result in no difference in impacts to protected species compared to the proposed action. The alternative cooling technologies would result in a need for less cooling water than the proposed action. While the actual level of water use would depend upon the exact combination of dry and wet cooling technologies, water levels and water quality in the New River and the Salton Sea would still differ only slightly from those identified for the no action or proposed action alternatives. Consequently, it is anticipated that there would be no impacts to the desert pupfish, bald eagle, brown pelican, Yuma clapper rail, southwestern willow flycatcher, Gila woodpecker, or bank swallow from implementation of the alternative technologies alternative.

4.4.7.4 Mitigation Measures

Under this alternative, the expected impacts to protected species would depend on the nature and location of the mitigation measures employed. Site-specific information on the specific biological resources present would need to be obtained prior to implementation of any mitigation measure in order to properly determine the potential for impacts to this resource.

4.5 CULTURAL RESOURCES

4.5.1 Major Issues

There were no major issues raised pertaining to cultural resources.

4.5.2 Methodology

This analysis evaluates the impacts of construction of the proposed and alternative transmission lines on cultural resources. The potential for impacts is identified through examination of the expected activities associated with the projects, with a focus on ground-disturbing activities that would present the greatest potential threat to cultural resources. The locations of construction activities are then compared with the known areas of cultural resources. If a cultural resource could be affected by the projects, cultural resource professionals would need to determine the importance of the site. If a site is considered important, it may be recommended for listing on the NRHP.

The SHPO for each state maintains the records for all archaeological surveys conducted in that state and the NRHP eligibility of the sites in that state. Because of the size of the State of California, the records are kept at regional office centers. A record and literature search was conducted at the Southeast Information Center of the Office of Historic Preservation for information on archaeological surveys conducted in the projects area. The results of this search are presented in Section 3.5. On the basis of the results of the search, areas were identified that required examination for cultural resources. A survey was conducted in the identified areas by RECON Environmental, Inc., of San Diego, California.

BLM sent letters to the appropriate Tribal organizations asking if they had any concerns with the proposed projects. Native American organizations did not respond to these letters; therefore, no concerns were identified.

Once all cultural resources were identified for the projects area, additional research was necessary to determine the NRHP eligibility status of the sites that could be affected by the projects. A treatment plan identifying the research strategy for the additional research was drafted, reviewed, and accepted by the California SHPO. The findings from the additional research were presented in a report to BLM (Berryman and Cheever 2001b). On the basis of this report, additional monitoring of two archaeological sites would be required during construction, as described in Section 2.2.1.4.2.

4.5.3 No Action

Under the no action alternative, both Presidential Permits and corresponding ROWs would be denied, and the transmission lines would not be built. Therefore, no impacts to cultural resources would be expected.

4.5.4 Proposed Action

The analysis for this alternative focuses on the 6-mi (10-km) portion of the lines from the U.S.-Mexico border to the IV Substation as it is currently designed and also evaluates the impacts of two alternative routes, one to the east of the existing line but within the BLM utility corridor and the other to the west of the existing line that runs outside the utility corridor and then along the U.S.-Mexico border.

A cultural resources survey was conducted for the proposed routes to ascertain if any cultural resources are present. The survey discovered 9 previously recorded sites[2] and recorded 18 new sites and 34 isolated artifacts (Berryman and Cheever 2001a). All but one of the sites appear to be from the prehistoric period and are likely related to Lake Cahuilla. The historic period site dates to the 1930s. Twenty-three of these sites have been recommended as eligible for NRHP listing.

Of the sites identified, four would be directly impacted under implementation of the proposed action (sites 4-Imp-7875, 4-Imp-3999, 4-Imp-4962, and 4-Imp-4485/4495). Site 4-Imp-7875 is a small, specialized workstation. Site 4-Imp-3999 appears to be a workstation with only a small part of the site within the proposed routes. The portion of the site within the proposed routes has been partially modified by off-road vehicles. The last two sites, 4-Imp-4962 and 4-Imp-4485/4495, appear to be the remains of hunting and gathering activities. The sites show evidence of contacts outside the Imperial Valley. The periphery of these sites would be impacted by the proposed action. There is also the potential for indirect impacts resulting from the creation

[2] A "site" is typically defined as three artifacts in close proximity. For any fewer than that, the find is referred to as "isolated."

of access roads and spurs, and lay-down areas. A treatment plan for the four potentially eligible sites was developed and approved by the SHPO to mitigate the adverse effects that would result from construction of the transmission lines (Berryman and Cheever 2001a).

The focus of the archaeological fieldwork was the formal determination of NRHP eligibility. Each of the sites that would be impacted by the proposed action was examined to identify the nature and extent of the remains. The results of the examination identified in the treatment plan are presented in Berryman and Cheever (2001b). The report recommended additional monitoring at two of the sites.

The BLM has partially surveyed the western alternative routes for the presence of cultural resources. The western alternative routes were chosen to avoid cultural resources. This would be partially achieved by being west of the Lake Cahuilla shoreline. As a result, the impacts to archaeological resources are expected to be less along the western alternative routes than along the proposed routes. However, the transmission lines in the western routes would run along the U.S.-Mexico border for a greater distance, and the border itself is considered a cultural resource. These routes would have the potential to degrade the appearance of the border by introducing a visual intrusion. If these routes were selected, additional cultural resource surveys would be necessary as well as additional consultation with the California SHPO and the appropriate Native American tribes.

The existing transmission line has been partially surveyed for cultural resources. The use of the western or eastern alternative routes is expected to have a lower potential to impact cultural resources since they would not be located along the Lake Cahuilla shoreline. However, because the complete routes have not been surveyed, additional surveys and consultation with the appropriate Native American tribes and the California SHPO would be required.

4.5.5 Alternative Technologies

Use of more efficient control technologies and/or alternative cooling technologies on power plants in Mexico would not change the transmission line configurations as described under the proposed action; thus, the impacts to cultural resources for this alternative would be the same as those described in Section 4.5.4 for the proposed action.

4.5.6 Mitigation Measures

Under this alternative, the expected impacts to cultural resources would depend on the nature of the mitigation measures. If the paving of roads was selected as a mitigation measure to be employed, a review for proximity to cultural resources would be necessary to ensure that they are not impacted during paving. If cultural resources were to be impacted, the NRHP eligibility status of the sites would have to be evaluated. If found to be NRHP-eligible, protection measures for these sites would have to be developed in consultation with the California SHPO and the appropriate Native American tribes.

Other mitigation measures described in Section 2.4 would also require consultation with the California SHPO prior to undertaking site construction activities. The need for specific measures to protect cultural resources would depend on the location of resources and the kinds of surface and subsurface disturbance that would be necessary to implement the mitigation measure. DOE and BLM have no information on which to conduct an impact analysis of cultural resources at the Imperial Airport, or potential locations for compressed natural gas fast-fill facilities at the Calexico Unified School District and in Brawley. Also, the Imperial County Air Pollution Control District Office did not identify specific plans or specific locations of the compressed natural gas facilities that would allow the staff to conduct a cultural resources impact assessment.

4.6 LAND USE

4.6.1 Major Issues

There were no major issues raised pertaining to land use.

4.6.2 Methodology

This analysis evaluates the impacts of the construction of the proposed and alternative transmission lines on land use. The projects area is located entirely on BLM-managed land. Land use policy for the region was determined through examination of current BLM planning and management documents for the Yuha Basin ACEC and the region in general. The relevant land use policies are described in Section 3.6.

The analysis examines both the amount of land affected by transmission line construction and how compatible the placing of the lines would be to current land use. The compatibility with current management strategies for that location is also examined. Particular attention is given to any special use areas that would be impacted by construction and operation of the transmission lines (e.g., mining areas) and specially designated management areas. The analysis considers total amounts of land disturbed by construction.

4.6.3 No Action

Under the no action alternative, both the Presidential permits and corresponding ROWs would be denied. Land use in the Yuha Basin ACEC would remain limited because of the number of cultural resources found in the area and the habitat for the flat-tailed horned lizard, a BLM sensitive species. Recreation usage would continue as described in Section 3.6.3.

4.6.4 Proposed Action

The environmental impacts to land use associated with granting of the ROWs would be similar for the proposed and alternative routes. Land use would be restricted along the access roads for the new transmission lines regardless of which routes are chosen. Additional impacts would be incurred for the proposed western and eastern alternative routes because each would require a new restricted access road to be built across the desert. The proposed routes would use the existing limited access road. The total amount of permanent disturbance for the western and eastern alternative routes (13.1 and 10.4 acres, respectively [5.3 and 4.2 ha]) would be higher than for the proposed routes reported in Table 2.2-1 (<3.6 acres [<1.4 ha]). The western alternative routes would run partially outside of designated Utility Corridor N and would require alteration of the land use designation for this part of the route. Under the proposed and eastern alternative routes, no alteration of current land use plans would be necessary. Locating the transmission lines east or west of the existing line would create new areas with further restricted land use. However, since the entire area is listed as a limited use area and given the small amount of land needed for the transmission lines, this additional limiting of land use would not represent a major impact.

Two locations in the southern portion of the proposed routes were previously used for the mining of sand and gravel. Mining activities have been discontinued in these areas (Marty 2003). The nearest mining activities are 2.5 mi (4 km) west of the proposed routes and would be unaffected by locating the transmission lines within the proposed or alternative routes.

Recreation activities in the Yuha Basin ACEC are limited to camping. BLM does not allow the use of off-road vehicles in this area except on county roads (BLM 2002). Camping is also allowed only with a permit and only in designated areas. There are no designated camping areas within 10 mi (16 km) of the proposed transmission line routes.

No agricultural activities take place on BLM-managed land. Therefore, using the proposed routes on BLM land is not expected to interfere with any agricultural practices. If the eastern alternative routes were chosen, however, there is some potential for interference with crop-dusting activities. The lower portion of the western alternative routes could cross prime farmland (Section 3.1.3.3).

The use of the western or eastern alternative routes would require that portions of the transmission lines run parallel to the border. The U.S. Customs and Border Patrol Agency discourages practices of this sort because they would require additional patrolling to ensure the integrity of the lines.

4.6.5 Alternative Technologies

Use of more efficient control technologies and/or alternative cooling technologies on power plants in Mexico would not change the transmission line configurations as described under the proposed action; thus, land use impacts for this alternative would be the same as those described in Section 4.6.4 for the proposed action.

4.6.6 Mitigation Measures

The expected impacts to land use would depend on the nature of the mitigation measures. For example, if the paving of roads is selected as a mitigation measure to be employed, increased access to certain remote areas that are currently difficult to access could result in adverse impacts to current land use.

4.7 TRANSPORTATION

4.7.1 Major Issues

There were no major issues raised pertaining to transportation.

4.7.2 Methodology

This analysis evaluates the impact of construction and operation on the local transportation network and compares the number of daily trips to the construction site along specific road segments with existing traffic conditions on these routes. Potential changes in the existing levels of service, which take into account road segment capacity and traffic conditions, are evaluated.

4.7.3 No Action

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. With no construction traffic, there would be no increases in local traffic, and local conditions would continue as described in Section 3.7.

4.7.4 Proposed Action

Small increases in local traffic would be expected throughout the duration of transmission line construction for the proposed and alternative routes. Workers residing locally, including those residing in the area temporarily, would travel to the construction sites by private vehicles. In addition, for the proposed routes, 10 workers would be brought to the construction sites from Mexico by bus on a daily basis. Most workers would travel between the El Centro and Calexico areas and the construction site on State Route 98. For the proposed routes, construction traffic would vary across the 5 months of construction, from 18 round-trips in the first 2 months, falling to 8 in the third month and to 5 in the last two months. Given current levels of service on State Route 98 and the relatively low traffic volumes associated with the proposed action, no impact on existing levels of service over local segments of State Route 98 are expected for any of the routes.

4.7.5 Alternative Technologies

Use of more efficient control technologies and/or alternative cooling technologies on power plants in Mexico would not change the traffic volumes associated with transmission line construction as described under the proposed action; thus, transportation impacts for this alternative would be the same as those described in Section 4.7.4 for the proposed action.

4.7.6 Mitigation Measures

Impacts to local transportation networks would depend on the nature of the mitigation measure. In the short-term, any mitigation-related construction project would increase local traffic.

4.8 VISUAL RESOURCES

4.8.1 Major Issues

There were no major issues raised pertaining to visual resources.

4.8.2 Methodology

This analysis evaluates the potential impacts of the proposed transmission lines on visual resources. The analysis covers (1) the addition of lines along the existing IV-La Rosita transmission line, (2) eastern alternative routes located between the existing line and the Westside Main Canal, and (3) western alternative routes heading south from the substation to the U.S.-Mexico border and then heading east to the existing border crossing point.

The evaluation criteria used to assess the impact of these facilities includes distance, contrast, angle of observation, duration of view, relative size of the project, and light conditions within the vicinity of each facility. Generally, visibility impacts from roadways are not considered to be as sensitive as views from recreational areas or residences, with the duration and role of specific views to individuals being keys to the significance of impacts. However, with very little recreational activity and few residential locations in the vicinity of the proposed and alternative routes, road users constitute the largest single number of viewers of the transmission lines.

To evaluate the impacts of the three routes on road users, data from key observation points established along State Route 98 were used. These points were located 0.7 mi (1.1 km) east of the existing line and 1.3 mi (2.1 km) east of the existing line at the location of the nearest residence. Photographs from these observation points are shown in Figures 4.8-1 and 4.8-2.

FIGURE 4.8-1 Actual View from Key Observation Point 1, 0.7 mi (1.1 km) East of Existing IV-La Rosita Line on State Route 98

FIGURE 4.8-2 Simulated View of the Eastern Alternative Lines (foreground) from Key Observation Point 2, 1.3 mi (2.1 km) East of Existing IV-La Rosita Line on State Route 98

Figure 4.8-1 shows the actual view of the existing IV-La Rosita lines from observation point 1. Figure 4.8-2 simulates the view of the eastern alternative lines (the existing lines are in the background).

4.8.3 No Action

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. No changes in landscape contrast would occur, and the area in the vicinity of the proposed lines would maintain a Class III Visual Resource Management rating.

4.8.4 Proposed Action

The area in the vicinity of each facility is classified as a Class III Visual Resource Inventory Area (see Section 3.8.4). VRM Class III objectives stipulate that the existing character of the landscape should be partially retained and that any level of change should be moderate. While landscape changes may attract attention, they should not dominate the view of casual observers (BLM 1986b).

The photo simulation of the eastern alternative routes (Figure 4.8-2) indicates that the addition of transmission lines would be a prominent addition to the existing landscape for road users. While additional lines along the proposed routes would be a visible feature of the landscape, the lines would be constructed by using steel lattice towers similar to those of the existing line, where the natural light and background landscape elements that show through the structures would diminish the impact of the additional line on the landscape. Given the type of construction used for the towers, the visual impression of the towers would also lessen considerably with distance from the line. Similarly, the view from the nearest residence, located 1.3 mi (2.1 km) east of the existing line (observation point 2, Figure 4.8-2), would not be impacted substantially, given the location of the existing line and the landforms and vegetation between this location and the proposed routes.

Transmission lines built along the alternative eastern and western routes would have impacts similar to those along the proposed routes. Although the lines of the western alternative routes would diverge from those of the existing line, the majority of the divergence would occur south of State Route 98 in a relatively remote part of the county with no readily accessible or inhabited locations. The majority of the alternative western routes north of State Route 98 and the entire stretch of the eastern alternative routes would be within 0.5 mi (0.8 km) of the existing line. Because of the routes' proximity to the existing line, views to road users from key observation points on either side of the transmission routes are not likely to differ substantially between the alternative routes. However, the location of the eastern alternative routes would be closer to the nearest residence and would therefore be a larger aspect of the landscape than lines constructed along either of the other routes (Figure 4.8-2).

Construction and operation of the transmission lines would meet the visual contrast criteria established under the objectives for VRM Class III, whereby the existing character of the landscape would be partially retained, with any level of change being moderate. The project would attract attention to viewers in the area, but it would not dominate views.

4.8.5 Alternative Technologies

Use of more efficient control technologies and/or alternative cooling technologies on power plants in Mexico would not change the transmission line configurations as described under the proposed action; thus, impacts to visual resources for this alternative would be the same as those described in Section 4.8.4 for the proposed action.

4.8.6 Mitigation Measures

The impacts to visual resources would depend on the nature of the mitigation measures. For example, the Imperial County Air Pollution Control District indicated that a compressed natural gas fast-fill station would be similar in appearance and size to a gasoline service station. Thus, the heights of structures would not cause a visual contrast that would attract the attention of viewers.

4.9 NOISE

4.9.1 Major Issues

There were no major issues raised pertaining to noise impacts.

4.9.2 Methodology

Potential noise impacts under each alternative are assessed by estimating the sound levels from noise-emitting sources associated with construction and operations, followed by noise propagation modeling. Examples of noise-emitting sources include heavy equipment used in earthmoving and other activities during construction. Potential noise levels due to these sources were obtained from the literature (HMMH 1995). The proposed transmission lines would be located in a desert area with a naturally occurring background noise level of approximately 35 dB(A) (Miller 2002). For construction, detailed information on the types and number of construction equipment required is not available. Therefore, for the construction impact analysis, it is assumed that the two noisiest sources would operate simultaneously directly under the transmission line (HMMH 1995). For the operations impact analysis, data on noise levels at varying distances from a 230-kV transmission line during rainy conditions were obtained from the literature (BPA 1993). Noise levels at the nearest residence from the alternative routes were estimated by using a simple noise propagation model on the basis of estimated sound levels at the source. The significance of estimated potential noise levels at the nearest residence was assessed by comparing them with the EPA noise guideline (EPA 1974) and measured background noise levels.

4.9.3 No Action

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. Noise levels would continue at background levels of about 35 dB(A).

4.9.4 Proposed Action

4.9.4.1 Construction

During construction of the transmission lines, daytime noise would increase in areas located near the ROWs. Typical noise levels for construction would be about 90 dB(A) at a distance of 50 ft (15 m) from the operating equipment, assuming two pieces of equipment are operating simultaneously (HMMH 1995).

Noise levels decrease about 6 dB as the distance from source doubles because of the way sound spreads geometrically over an increasing distance. The nearest residence to the proposed routes is located 6,900 ft (2,100 m) directly to the east along State Route 98. At this location, noise from construction activities would be 48.6 dB(A). This level would be about 43.8 dB(A) as day-night average sound level (DNL), if construction activities are assumed to be limited to an 8-hour daytime shift. This value is below the EPA guideline level of 55 dB(A) for residential zones, which was established to prevent interference with activity, annoyance, or hearing impairment (EPA 1974). The western alternative routes would be even farther from any residence, and again, the noise impacts during construction would be below the EPA guidance level.

If the eastern alternative routes were used, the distance to the nearest existing residence would be decreased to about 360 ft (109 m) from the center of the ROW along State Route 98. At this distance where construction activity would occur at any one time, the estimated noise level would be 74.3 dB(A) and 69.5 dB(A) as DNL for an 8-hour daytime shift. This value is much higher than the EPA guideline of 55 dB(A) as DNL. However, this construction activity near the residence would be limited to a short duration (less than 1 week) and then move to the next tower. These estimates are probably an upper bound because they do not account for other types of attenuation, such as air absorption and ground effects due to terrain. Since this impact is associated with the construction phase only, it would be temporary and short-term.

4.9.4.2 Operations

There is a potential for noise impacts associated with operation of the transmission lines from corona, which is the electrical breakdown of air into charged particles, caused by the electrical field at the surface of conductors. Corona-generated audible noise from transmission lines is generally characterized as a crackling or hissing noise. Modern transmission lines are designed, constructed, and maintained so that during dry conditions they will operate below the corona inception voltage; that is, the line will generate a minimum of corona-related noise. During dry weather conditions, noise from transmission lines is generally indistinguishable from background noise (35 dB(A) DNL or less) at locations beyond the edge of the ROW (BPA 1993). During very infrequent rainfall events, the noise level at the edge of the ROW would be less than 39 dBA (BPA 1993). This is a low level (typical of the noise level in a library). Because of the arid climate in the region and the distance of receptors from the ROW, the impact of corona-generated audible noise during operation of the proposed and alternative routes is expected to be negligible.

Occasional maintenance activities on the transmission lines and substation would be required. Noise impacts from these activities would be intermittent.

4.9.5 Alternative Technologies

Use of more efficient control technologies and/or alternative cooling technologies on power plants in Mexico would not change the noise levels associated with transmission line construction or operation as described under the proposed action; thus, noise impacts for this alternative would be the same as those described in Section 4.9.4 for the proposed action.

4.9.6 Mitigation Measures

The noise impacts under this alternative would depend on the nature of the mitigation measure. For example, one mitigation measure could be paving roads. This would cause short-term noise impacts from operation of the road paving equipment, especially if the road paving occurred near residential areas. Another mitigation measure, retiring older automobiles, could have beneficial noise impacts (reduction of noise).

4.10 SOCIOECONOMICS

4.10.1 Major Issues

There were no major issues raised pertaining to socioeconomic impacts.

4.10.2 Methodology

Socioeconomic impacts for the proposed and alternative routes are assessed by using data on direct construction employment, employee residential location, cost, and schedule. For this analysis, it was assumed that any variation in the line length between the proposed and alternative routes would be reflected in the project construction schedule and cost rather than in increases in employment in the various occupations involved in constructing the project. Expenditures in each labor and material category are simply scaled on the basis of the line length for each alternative. Construction workforce data for each alternative are combined with data on project material expenditures and used to calculate the indirect impacts of the projects by using IMPLAN input-output regional data (Minnesota IMPLAN Group, Inc. 2004) for Imperial County. Impacts are evaluated for (1) population, housing, and local public services; (2) employment and income; and (3) government revenues.

4.10.3 No Action

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. Local economic activity would continue at the levels described in Section 3.9.

4.10.4 Proposed Action

4.10.4.1 Population, Housing, and Local Public Services

Although a small number of workers are expected to temporarily relocate to Imperial County during construction of the proposed transmission lines, these workers would reside in the county for a maximum of only 5 months, and it is unlikely that the relocated workers would be accompanied by their families. Impacts of the project on the population would therefore be minimal. No impacts to local housing markets are expected, as it is assumed that inmigrating workers would occupy temporary accommodations, with no impact on the local rental housing market. With only a small number of temporary in-migrants, impacts on local public services, including police and fire protection, educational and other local government services, and health and medical resources, would also be minimal.

No new jobs would be created in Imperial County to operate the transmission lines; consequently, no permanent in-migration or population impacts are expected.

4.10.4.2 Employment and Income

Construction of the transmission lines along the proposed or alternative routes would create a small amount of direct and indirect economic activity in the county (Table 4.10.1).

TABLE 4.10-1 Economic Impacts of the Proposed and Alternative Transmission Line Routes in Imperial County in 2002[a]

Parameter	Proposed Routes	Eastern Alternative Routes	Western Alternative Routes
Jobs (number)			
Direct	69	69	69
Total	92	94	101
Labor income (10^6) ($2003)			
Direct	1.4	1.5	1.9
Total	1.9	2.0	2.6
Sales taxes ($ 2003)	25,900	27,300	34,900
Motel occupancy taxes ($ 2003)	6,900	7,300	9,300
BLM lease rental payments ($2003)	2,180	2,300	1,934

[a] Impacts to income and taxes are for 2002, expressed in 2003 dollars.

Construction along the proposed routes would create 69 direct jobs. There would be no increase in direct employment for the alternative routes, but since alternative routes are longer than the proposed routes, slightly more time would be required for construction, with additional labor and material expenditures required to complete lines along these routes. Wage and salary expenditures and material procurement associated with direct expenditures for each alternative route would produce indirect employment impacts ranging from 23 for the proposed routes, to 25 for the eastern alternative routes, and 32 for the western alternative routes. The total employment impact would be 92 for the proposed routes, 94 for the eastern alternative routes, and 101 for the western alternative routes. None of the routes would impact the county employment growth rate for 2002 by more than 1/100th of a percentage point.

Longer construction durations for the alternative routes are reflected in both the direct and indirect labor income impacts (Table 4.10-1). Construction along the proposed routes would produce $1.4 million in direct income and an additional $0.5 million in indirect income, with $1.9 million in income produced in total. Slightly more total labor income would be produced by the eastern and western alternative routes ($2 million and $2.6 million, respectively) compared with the proposed routes.

No new jobs would be created in Imperial County to operate the transmission lines; consequently, no additional employment or income would be generated from line operations.

4.10.4.3 Government Revenues

Impacts of the projects on local government revenues would be slight, with small differences between the proposed routes and the two alternative routes. Sales taxes generated directly by project expenditures and indirectly through the overall increase in economic activity resulting from wage and salary expenditures and material procurement would amount to roughly $25,900 for the proposed route, $27,300 for the eastern alternative routes, and $34,900 for the western alternative routes (Table 4.10-1).

A small number of employees would stay in temporary accommodations for the duration of the project, producing tax revenues through the motel occupancy tax. These revenues would range from $6,900 for the applicants' proposed routes, $7,300 for the eastern routes, and $9,300 for the western routes.

In addition to tax revenues generated by the projects for local and State government, the projects would also generate lease rental revenue for the Federal government through payments made to BLM. These would range from $2,180 for the proposed routes, to $2,300 for the eastern routes, and $1,934 for the western routes (Table 4.10-1).

4.10.5 Alternative Technologies

Use of more efficient control technologies and/or alternative cooling technologies on power plants in Mexico would not produce changes in employment, housing, or government revenues associated with transmission line construction as described under the proposed action; thus, socioeconomic impacts for this alternative would be the same as those described in Section 4.10.4 for the proposed action.

4.10.6 Mitigation Measures

Socioeconomic impacts would depend on the nature of the mitigation measures. However, in general, measures are likely to create local employment as a result of hiring and material procurement. Mitigation-related wage and salary spending and material expenditures would have a beneficial effect on the overall level of economic activity in the county.

4.11 HUMAN HEALTH

4.11.1 Major Issues

Major issues pertaining to human health include (1) particulate matter (PM) emissions associated with transmission line construction activities, and (2) power plant emissions of particulates (PM_{10} and $PM_{2.5}$) and NO_x, (3) releases of NH_3 by emission control equipment installed on the power plants, and (4) potential impacts to individuals with asthma caused by exposure to O_3, a secondary pollutant.

4.11.2 Methodology and Background

The health impacts analysis related to construction and operation of the proposed and alternative transmission lines evaluates the potential effects of electric and magnetic fields (EMFs). Values expected for the field strengths along the transmission lines were taken from the existing published literature, as was information that correlated field strengths with potential health effects. In this analysis, the magnetic field estimates at various distances from the ROW are compared with background levels of less than 1 milligauss (1 mG; 0.1 microtesla [0.1 μT]) and with levels associated with increased health risks (generally above 4 mG, or 0.4 μT). (Because magnetic field strengths are more often given in terms of mG than μT in the literature, the mG unit will be used exclusively in the impacts section of this report.) The field strength at the nearest residence (1.3 mi [2.1 km] to the east of the proposed routes) is estimated to assess the likelihood of adverse effects for residents at that location.

The health impacts analysis related to power plant emissions evaluates particulates (PM_{10} and $PM_{2.5}$), NO_x, and NH_3. NO_x is known to lead to increased O_3 levels under certain conditions, as described previously in Section 4.3. Concentrations of these pollutants based on air modeling results were compared with pollutant concentrations known to impact human health from the published literature in order to determine the effects that power plant emissions might have in the United States. While CO is also emitted from the plants, estimated increases in air concentrations are orders of magnitude below significance levels as described in Section 4.3.4 and Tables 4.3-2 through 4.3-5, and therefore are not of concern in assessing human health impacts.

Impacts due to NH_3 and potential hazardous air pollutant (HAP) emissions were analyzed by preparing a health risk assessment (HRA). As described in Appendix I, the HRA was conducted based on current California Office of Environmental Health Hazard Assessment (OEHHA) risk assessment guidelines (OEHHA 2003), supplemented by ARB Interim Guidance for residential inhalation exposure (ARB 2003c). A Tier 1 point estimate HRA was performed for the no action and proposed action alternatives. For this assessment, significance criteria of an increase of 1 per million in cancer risk and an increase of 1.0 in the chronic and acute hazard indices were used to assess the potential impacts.

To understand the potential health impacts associated with the alternatives, the following background information is presented on EMFs, O_3, NH_3, and particulate matter (PM_{10} and $PM_{2.5}$).

4.11.2.1 Electric and Magnetic Fields

Wherever electric currents flow, EMFs are produced. These fields rapidly decrease in strength with distance from the source. Electric field strengths directly beneath high-voltage power lines can reach up to several thousand volts per meter; typical electric field strengths in homes associated with the 60-Hz alternating-current sources used in the United States range from about 0 to 10 volts per meter (V/m) (NIEHS 2002). The electric field strength along the edge of the ROW for a 230-kV transmission line is about 1.5 kV/m. Power lines and electrical equipment generate both electric and magnetic fields. In recent years, however, the potential for adverse health effects from magnetic fields has been the focus of research, because a few studies have shown associations between magnetic field exposure and some types of cancers (further discussed below). No such associations have been observed for electric fields. A voluntary occupational exposure guideline of 8.3 kV/m and a general public exposure guideline of 4.3 kV/m for electric fields has been developed by the International Commission on Non-Ionizing Radiation Protection (as cited in NIEHS 2002). Since the levels at the transmission line ROWs and also at the nearest residences are lower than these values, and since exposure to electric fields is not currently linked with adverse health effects, electric field effects are not further addressed in this EIS.

Magnetic fields associated with electrical appliances are highly variable, typically ranging from less than 10 mG (1 μT) up to about 1,000 mG (100 μT), at about 0.5 ft (0.2 m) from an operating electrical appliance such as a can opener (EPA 1992). At 4 ft (1.2 m) from the source, almost all magnetic field strengths associated with electrical appliances drop to 10 mG (1 μT) or less.

Other sources of magnetic fields include aboveground and underground power lines. At the edge of a typical 120-ft (37 m), 230-kV aboveground transmission line ROW, the magnetic field strength is about 20 mG (2 μT); at 300 ft (91 m) from the centerline the magnetic field strength is about 0.8 mG (0.08 μT) (BPA 1993), which is the approximate background level. The actual field strengths depend on line design and current levels. For example, inverted delta and split phase line configurations can result in decreases in magnetic field strength at the centerline of 25 and 58%, respectively, in comparison with the typical vertical configuration (Stoffel et al. 1994).

Exposures of the general population are most accurately measured as 24-hour averages, using personal exposure meters. Most people in the United States are exposed to 24-hour average magnetic fields of less than 2 mG (0.2 μT). In a study of 1,000 randomly selected individuals, only 14% had 24-hour average exposures of greater than 2 mG (0.2 μT) and less than 1% had 24-hour average exposures greater than 7.5 mG (0.75 μT) (Zaffanella and Kalton 1998). Some types of work lead to increases in magnetic field exposures, especially for electrical workers, persons working near machines with electric motors, and welders. Time-weighted average exposures for these workers range from about 1 to 40 mG (NIEHS 1999). In one study of exposures of electric utility workers, the average magnetic field exposure for the workers was 9.6 mG (0.96 μT) (London et al. 1994).

The initial concern in the United States over possible adverse health effects associated with EMF started in 1979 with a publication showing an association between childhood leukemia and proximity of homes to power lines (Wertheimer and Leeper 1979). Since then, hundreds of epidemiological and laboratory studies have been conducted. Closeness to power lines has not been found to be a valid risk factor for increased childhood leukemia. However, a weak association, based on epidemiological studies, has been found between measured magnetic field exposures and both childhood and adult leukemia. In 1999, the National Institute of Environmental Health Sciences (NIEHS) completed a review of the data and concluded that there was weak scientific evidence that exposure to extremely low-frequency (ELF) EMFs could pose a leukemia hazard (NIEHS 1999). In 2002, the International Agency for Research on Cancer (IARC) classified ELF magnetic fields as possibly carcinogenic to humans (Group 2B) (IARC 2002). A 2002 California Department of Health Services report also classified exposure to magnetic fields as possibly carcinogenic to humans, as well as possibly causative in adult brain cancer, amyotrophic lateral sclerosis, and miscarriage (Neutra et al. 2002).

Electrical workers, with their higher 24-hour average magnetic field exposures, might be expected to have an elevated rate of leukemia, brain cancer, or other cancers if magnetic fields do cause cancer. Many large epidemiological studies, including tens of thousands of electrical workers, have been conducted. Of five large studies discussed in a NIEHS report (2002), only one reported a small but statistically significant increase of lung cancer and all cancers combined for electrical workers. The other four studies showed no consistent association between magnetic field exposures and cancer.

The United States does not have any Federal standards limiting occupational or residential exposure to 60-Hz EMF. Two states (Florida and New York) have standards for magnetic fields associated with power lines. Florida’s limit for the edge of a 230-kV power line is 150 mG (15 μT); New York’s limit for any power line is 200 mG (20 μT). These levels were generally based on the maximum fields that existing lines produce at maximum load-carrying conditions (NIEHS 2002), rather than health risk criteria.

As stated previously, although high levels of exposure to magnetic fields may increase the risk of certain leukemias, proximity to power lines has not been found to be associated with adverse health impacts. This is likely because there are so many individual sources of magnetic fields in homes and the workplace that elevated exposures from power lines alone cannot be distinguished from these other sources. Nonetheless, in certain locations where homes or offices are close to power lines, the lines contribute to higher levels of exposures.

4.11.2.2 Ozone

Ozone is a lung irritant that causes coughing and difficulty in breathing, especially in individuals who already have respiratory problems. People who exercise vigorously, including active children and adults, are at increased risk when ambient O_3 levels are high. Ozone can also aggravate asthma and other chronic respiratory diseases like emphysema. Repeated exposures can cause permanent lung damage.

As previously discussed in Section 3.3.2, O_3 is regulated as a criteria air pollutant under the CAA. The U.S. air quality standards for O_3 are 120 ppb (1-hour average) and 80 ppb (8-hour average). The State of California also has a 1-hour O_3 standard of 90 ppb. Decreased lung function has been observed at levels lower than the ambient air quality standards, especially for children who already have respiratory problems. A recent study of asthmatic children found that for the group of children with more severe asthma (i.e., those using maintenance medication for their asthma), levels of 1-hour O_3 greater than 59 ppb were significantly associated with wheeze and chest tightness. Levels of 1-hour O_3 greater than 73 ppb were significantly associated with shortness of breath and rescue medication use (Gent et al. 2003).

The EPA uses an “Air Quality Index” (AQI) to advise the public about the hazards associated with O_3 on specific days in specific locations, especially for sensitive groups (i.e., active children and adults, and people with respiratory disease) (EPA 1999a). Hourly O_3 levels between 50 and 64 ppb indicate a moderate risk, during which sensitive groups should consider limiting prolonged outdoor exertion. Hourly levels between 65 and 84 ppb indicate conditions that are unhealthy for sensitive groups, during which they should limit prolonged outdoor exertion; hourly levels between 85 and 104 indicate unhealthy conditions, during which sensitive groups should avoid prolonged outdoor exertion and others should limit exertion. Finally, hourly levels greater than 105 ppb are ranked as very unhealthy, indicating that sensitive groups should completely avoid outdoor exertion and others should limit outdoor exertion. (The EPA ranks these conditions with an AQI corresponding to 0–50, 51–100, 101–150, 150–200, and 201–300; the conversions to hourly O_3 air concentrations were obtained from the State of North Carolina Department of Natural Resources (2004).

4.11.2.3 Particulate Matter

PM is particles of dust, dirt, or liquid droplets that are found in the air. Some PM is large enough to be seen as smoke or haze, while some is so small it cannot be seen with the human eye. PM is a health concern because inhalation of PM can cause respiratory tract irritation and lung disease. It can aggravate asthma and chronic bronchitis. For regulatory purposes, PM is divided into PM_{10} (i.e., the coarse fraction), which is composed of particles nominally 10 μm in diameter or less, and $PM_{2.5}$ (i.e., the fine fraction), which is composed of particles nominally 2.5 μm in diameter or less. The division is useful because the two fractions have different health and environmental impacts. The larger-diameter particles in PM_{10} do not reach the lower regions of the lung but can cause damage to the upper respiratory tract. PM_{10} causes more visibility problems than $PM_{2.5}$. When inhaled, $PM_{2.5}$ reaches the alveolar (lower) region of the lung. The very small particles are not well cleared from this region and may remain for long periods of time. Often the particles are impacted on the alveolar surface, causing irritation.

4.11.2.4 Health Risk Assessment for HAPs and NH_3

The HRA for this analysis was conducted in three steps. First, emissions of HAPs and NH_3 under the no action and proposed action alternatives were estimated. Second, exposure calculations were performed by using the same dispersion model as that used for the air quality assessment described in Section 4.3.2. Third, results of the exposure calculations, along with the respective cancer potency factors and chronic and acute noncancer reference exposure levels (RELs) for each toxic substance, were used to perform the risk characterization to quantify individual health risks associated with predicted levels of exposure. Multipathway risk analyses were also evaluated; the following routes of exposure were used: inhalation, soil ingestion, dermal absorption, mother's milk ingestion, and plant product ingestion.

Emissions of HAPs were calculated by using the maximum fuel input heating rate for each facility and EPA AP-42 emission factors for natural gas-fired combustion turbines. Ammonia emission rates were calculated on the basis of potential ammonia slip from the SCR systems.

The exposure assessment portion of the HRA was conducted by using the EPA model AERMOD (Version 02222). Modeled stack parameters for the turbines represent 100% load conditions, consistent with the criteria pollutant modeling discussed in Section 4.3.2. The maximum ground level concentrations were then used to assess carcinogenic risks (defined as a 70-year residential exposure) and potential chronic and acute health effects on the basis of numerical values of toxicity provided in the OEHHA risk assessment guidelines.

Next, a Tier 1 HRA was performed by using the Hot Spots Analysis and Reporting Program (HARP) model. The Tier 1 HRA utilizes a combination of the average, midpoint, and high-end point estimates to provide a range of potential exposures. Further description of the analysis methodologies is contained in Appendix H.

4.11.3 No Action

Under the no action alternative, both Presidential permits and corresponding ROWs would be denied and the transmission lines would not be built. The electric and magnetic field strengths in the projects area would equal those associated only with the existing SDG&E line.

Also under this alternative, only a portion of the EAX unit at the LRPC plant would operate (the TDM plant and the EBC unit at the LRPC plant would not operate). The power plant emissions of PM_{10} and NO_x are shown in Table 4.3-1b. The resulting air concentration increases from these emissions would be below SLs established by the EPA, as indicated in Table 4.3-5, and human health impacts from these emissions of criteria pollutants would be minimal.

As discussed in Appendix I, the HRA provides a range of potential risks by using average and high-end exposure assumptions. The potential cancer risks due to operation of three turbines at the LRPC were estimated to range from 0.41 per million to 1.50 per million. The potential impacts to chronic and acute hazard indices were modeled to be 0.002 and 0.02, respectively. The chronic and acute risks from the no action alternative are well below the significance level of 1.0.

4.11.4 Proposed Action

4.11.4.1 Electric and Magnetic Fields

Currently, no measured data are available on the magnetic field strength at locations within or along the ROWs for the proposed Intergen and Sempra double-circuit, split-phase transmission lines. Therefore, information from the literature on field strengths for similar split-phase 230-kV transmission lines has been used in this assessment to evaluate expected field strengths. Data for similar 230-kV transmission lines suggest that magnetic field strengths at the centerline ranging from 34 to 48 mG, at 60 ft (18 m) from the centerline (corresponding to the edge of the ROW) ranging from 5 to 8 mG, at 100 ft (30 m) from the centerline ranging from 1.3 to 2.3 mG, and at 200 ft (61 m) from the centerline ranging from 0.19 to 0.35 mG (Stoffel et al. 1994). Because the three 230-kV lines (one existing and two proposed) would run parallel to each other with each line's ROW adjacent to the neighboring line's ROW, the magnetic fields in their vicinity could be somewhat greater than the fields reported in the literature for individual lines. It is also possible that some cancellation of magnetic fields would occur under this alignment of the three lines. Cancellation in single transmission lines has been observed when out-of-phase conductors from each circuit were positioned close to each other (Stoffel et al. 1994). For this assessment, the maximum magnetic field strengths for split-phase transmission lines cited above were assumed, and it was assumed that the fields would be additive.

Assuming additivity of the magnetic fields, estimates of the field strengths at varying distances from the centerlines are given in Table 4.11-1, both for the applicants' proposed transmission routes and for the two alternative routes. For the applicants' proposed routes, the highest field strength would be found directly beneath the center transmission lines (Intergen lines) at a level of approximately 53 mG (48 mG from that transmission line, plus about 2.3 mG from each of the transmission lines located 120 ft [37 m] to either side of the center transmission line). At the edge of the ROW for either the existing line or the new Sempra transmission line, the approximate magnetic field strength would be 11 mG (8 mG from the nearest transmission line 60 ft [18 m] away, plus about 2.3 mG from the transmission line 120 ft [37 m] away, and less than 0.4 mG from the transmission line 300 ft [91 m] away). At 140 ft (43 m) from the edge of the ROW on either side of the transmission lines, the field strength would be less than 0.35 mG, in the range of the background magnetic field strength of less than 1 mG.

Field strengths would be slightly lower if either of the alternative transmission routes was selected; however, the width of the area with a field strength greater than 10 mG would be decreased from 360 ft (110 m) (the width of the ROWs of the three lines combined) to 240 ft (73 m) (the width of the lines combined) (see Table 4.11-1).

In the United States, the proposed transmission line routes would be more than 1,500 ft (470 m) from the BLM land boundary to the east at all locations (see Figure 2.2-1). The eastern alternative routes would be more than 300 ft (91 m) from the BLM land boundary. No residences can be built on BLM property. Since magnetic fields would be at background at locations more

TABLE 4.11-1 Estimated Magnetic Field Strengths Associated with the Proposed and Alternative Transmission Line Routes[a]

	Magnetic Field Strength (mG)			
Transmission Line	Centerline	Western Edge of ROW	Eastern Edge of ROW	200 ft from ROW
Existing SDG&E routes	51	11	16	≤1
Proposed routes[b]				
Intergen	53	16	16	≤1
Sempra	51	16	11	≤1
Western alternative routes[b]				
Intergen	51	8	15	≤1
Sempra	51	15	8	≤1
Eastern alternative routes[b]				
Intergen	51	8	15	≤1
Sempra	51	15	8	≤1

[a] Magnetic field strengths are estimated from published data for split-phase 230-kV transmission lines (Stoffel et al. 1994). Field strengths from the transmission lines are assumed to be additive.

[b] For the applicants' proposed routes, the three transmission lines have 120-ft (37-m) ROWs, and the three ROWs are adjacent to one another, with the existing line farthest west, the Intergen line in the middle, and the Sempra line farthest east. For the western and eastern alternative routes, the two transmission lines have 120-ft (37-m) ROWs and are adjacent to each other, with the Intergen line to the west.

than 140 ft (43 m) from the edge of the ROWs, no exposures above background would occur at residential locations for the proposed routes or either of the two alternative routes. No adverse health impacts would be associated with residential magnetic field exposures from the transmission lines.

Transmission line workers would have higher-than-background magnetic field exposures while working within the transmission line ROWs. Work activities would generally be limited to monthly inspections of towers and poles and other intermittent repair work. Most studies of electrical workers have not shown an association between the worker's elevated exposure levels and cancer risk (Section 4.11.2). Recreational visitors passing within the transmission line ROWs would also have higher-than-background magnetic field exposures for limited amounts of time. Exposure data suggest that these temporary elevated exposures would not result in 24-hour average exposures much greater than background levels and would not result in adverse health impacts.

4.11.4.2 Criteria Air Pollutants

Under the proposed action, the Presidential permits and corresponding ROWs would be granted. Power plant emissions would result in increases in ambient concentrations in Imperial County of NO_x, PM_{10}, and CO at estimated levels given in Section 4.3. As discussed in that section, all such increases would be below SLs established by the EPA and used as a benchmark of air quality impacts. Accordingly, health impacts from plant emissions would not exceed a threshold level of concern for these pollutants.

Section 4.3.4.4.2 discusses the possible secondary formation of O_3 in the atmosphere from the primary emission of the O_3 precursors NO_x and VOC from the power plants. The conclusion of the analysis of O_3 formation in that section is that plant emissions would not contribute to a meaningful increase in O_3 concentrations in Imperial County. Health impacts from secondary O_3 formation would therefore be minimal.

Section 4.3.4.4.2 also discusses PM_{10} emissions from the power plants and the possible generation of secondary PM_{10} in the atmosphere from plant emissions. It presents conservative estimates of corresponding PM_{10} incremental concentration increases in Imperial County resulting from power plant emissions. The proportion of areawide PM_{10} attributable to direct emissions from the power plants would be low in comparison with the total ambient concentrations, as measured at the area air quality monitoring stations (Section 3.3.2). Secondary particulate matter (PM) from power plant emissions would only be a very small fraction of that from other emission sources in the region and would not exceed SLs in combination with direct PM emissions from the plants.

The high incidence of asthma is a particular concern in Imperial County. O_3 and PM in the region are likely to be contributing factors. However, the operation of the TDM plant and the EBC and EAX export units at the LRPC plant would contribute only very minor increases to the O_3 and PM levels in the region, and thus would contribute at most a very small increase in the asthma problem or other air-quality related health problems (Section 4.3.4.4.2).

4.11.4.3 Hazardous Air Pollutants and Ammonia

HAPs emitted from gas-fired power plants comprise a mixture of mainly aldehydes (mostly formaldehyde) and alkyl benzenes, for example, toluene (Appendix H). The HRA results of potential cancer risks due to HAPs emissions from operation of four turbines at the LRPC and two turbines at TDM ranged from 0.60 per million to 2.22 per million, representing the average and high-end exposure assumptions.

The current methodology for making risk management decisions in California requires that a project analyze only the incremental increase in the potential risks due to the project and does not require that existing sources be included in the risk calculations. Risks from existing sources are considered “background” sources of emissions. Therefore, the risks due to the no action alternative (estimated for the three EAX LRPC turbines) are considered background sources and were subtracted from the risks from all six turbines at both plants to obtain the incremental increase in risk from the proposed action. The incremental increase in potential risks are compared to the significance thresholds based on California risk assessment procedures.

The incremental increase in cancer risk from exposure to HAPs (ammonia is not a carcinogen) ranges from 0.20 per million to 0.72 per million for the average and high-end exposure assumptions, respectively. The average and high-end point estimate risks are below the significance threshold of 1 per million. The incremental increase in the chronic hazard index for exposure to HAPs plus ammonia is 0.001, and the incremental increase in the acute hazard index is 0.01, both of which are below the significance threshold of 1.0 for hazard indices.

The Tier 1 high-end point estimate approach defined by OEHHA provides the absolute upper bound of the potential risks. The OEHHA risk assessment guidelines provide options to refine the HRA (Tiers 2 through 4). However, these further refinements were not performed, since the incremental increase in risks due to the proposed action, as estimated in the Tier 1 analysis, are below the significance thresholds.

The same risk calculation methodology used for the alternatives analysis was used to calculate the individual risks associated with operation of the LRPC and TDM power plants. The estimated cancer risk for TDM operating alone (two gas turbines) ranges from 0.06 per million to 0.22 per million. The cancer risk for LRPC operating alone (four gas turbines) ranges from 0.54 per million to 2.00 per million. The TDM risk is much lower due to the fact that there are only two turbines present at TDM compared to four at LRPC. In addition, the TDM turbines are controlled with oxidation catalysts, while the LRPC turbines do not have HAP controls.

4.11.5 Alternative Technologies

Use of more efficient control technologies and/or alternative cooling technologies on power plants in Mexico would not produce changes in the electric and magnetic field strengths associated with the proposed transmission lines as described under the proposed action, thus human health impacts would be the same as those described in Section 4.11.4 for the proposed action.

In terms of air emissions, a difference between wet and dry cooling technologies is that dry cooling would not generate PM emissions from cooling tower drift (Section 4.3.5.2). Because the direct PM emissions from the power plants would not have an adverse impact using wet cooling technology as currently designed, that is, they are below SLs, the decrease in PM emissions from the use of dry cooling technology would result in a minor reduction of adverse impacts. Also, because dry cooling reduces power plant efficiency, power plant emissions would increase accordingly.

4.11.6 Mitigation Measures

The mitigation measures described in Sections 2.4 and 4.3.6 would benefit regional air quality in Imperial County and the Mexicali area. The impacts to human health cannot be determined because design information for the individual mitigation projects has not been developed. Actions such as replacing older automobiles with a newer, less polluting fleet; paving roads; providing natural gas to fuel brick kilns in Mexicali; converting the engines of off-road diesel-powered equipment used in agriculture; increasing the use of compressed natural gas in Imperial Valley transit buses; and installing SCR technology on the IID's Unit 3 at the steam plant — all would result in reductions of pollutant emissions in the project region.

Mitigation measures that would measurably reduce the level of PM in the study area (e.g., retiring older automobiles, paving roads) could result in a small reduction in the number of asthma cases and other respiratory problems in the region. Other sources of O_3 precursors (NO_x and VOCs) in the study area would result in decreased O_3 levels and a reduced number of adverse respiratory effects.

4.12 MINORITY AND LOW-INCOME POPULATIONS

4.12.1 Major Issues

Major issues pertaining to environmental justice impacts include those elements of the projects that could potentially affect low-income and minority populations: (1) noise and dust emissions associated with transmission line construction, (2) transmission line EMF strengths and their effects in the vicinity of the proposed and alternative routes, (3) air pollution resulting from TDM and LRPC power plant emissions and its effects on the residents of Imperial County, and (4) water quantity and quality changes in the Salton Sea and their effects on residents who use the Sea for recreational and subsistence fishing.

4.12.2 Methodology

The environmental justice impacts analysis begins with the identification of minority and low-income population concentrations in census block groups in Imperial County (presented in Section 3.10). It then considers the impacts to all resource areas associated with proposed transmission line construction and operation and air emissions associated with the operation of the TDM and LRPC power plants, as presented in earlier sections of this chapter. If high and adverse impacts for the general population are identified for a particular resource area, disproportionality would be determined by comparing the proximity of the high and adverse impacts to the location of minority and low-income populations. However, if the previous analyses determine that impacts to the general population are not high and adverse as a result of the proposed action, it follows that no disproportionately high and adverse impacts to minority and low-income populations would occur. In this case, no further analysis is conducted in this section.

4.12.3 No Action

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. Demographic conditions would continue as described in Section 3.10.

4.12.4 Proposed Action

Temporary impacts from noise and dust emissions during transmission line construction and more long-term impacts from noise and EMF strengths near the transmission lines during their operation were analyzed at the block group level within a 2-mi (3-km) corridor along the proposed and alternative routes. A comparison to the spatial distribution of minority and low-income populations in Imperial County (Figures 3.10-1 and 3.10-2) shows that the temporary impacts from noise and dust emissions and the more long-term impacts from noise and EMF in the vicinity of the transmission lines would not contribute to high and adverse impacts to the general population or to disproportionately high and adverse impacts to minority and low-income populations in any block group.

The analysis of environmental justice impacts due to power plant emissions were also assessed at the block group level. Block group centroids were matched with the closest air monitoring receptor station to provide data on the local nature of emissions due to power plant operations. For each of the receptor stations, increases in air pollution due to emissions of $PM_{2.5}$ and PM_{10} were found to be below new source significance levels used as a benchmark for negligible impacts (Section 4.3); therefore, these emissions would not contribute to high and adverse impacts to the general population or to disproportionately high and adverse impacts to minority and low-income populations in any block group.

The reduction in New River inflow to the Salton Sea would increase its salinity and nutrient concentration (Section 4.2). Current estimates indicate that even without contributions from the proposed action, salinity levels in the Salton Sea could reach critical levels detrimental to fishery resources in about 36 years. Adverse impacts to fishery resources within the Salton Sea from power plant operations would not result in high and adverse impacts to the general population who fish recreationally at the Sea. Decreases in phosphorus loading as a result of the proposed action, however, could reduce the frequency of low dissolved oxygen events that cause episodic fish kills (Section 4.4).

4.12.5 Alternative Technologies

Use of more efficient control technologies and/or alternative cooling technologies on power plants in Mexico would not change transmission line construction or operations; therefore, impacts to minority and low-income populations would be the same as those described under the proposed actions. The use of emissions control technologies would have beneficial impacts to air quality (Section 4.3) and thus also would generally have beneficial impacts to minority and low-income populations. The use of dry cooling technologies could potentially reduce adverse impacts to the Salton Sea due to the proposed action, however, adverse impacts to biological resources (namely, Salton Sea fisheries) would likely still occur, potentially resulting in disproportionately high and adverse impacts to minority and low-income populations.

4.12.6 Mitigation Measures

The mitigation measures to compensate for power plant air emissions described in Section 2.4 would likely have a beneficial impact to regional air quality. Any improvement of air quality would be viewed as a benefit to low-income and minority populations in the projects area. An assessment of impacts at the census-block level cannot be conducted in this EIS because of uncertainty as to where the mitigation measures would be implemented.

5 CUMULATIVE IMPACTS

Cumulative effects or impacts, as defined by the CEQ, "result from the incremental impact of [an] action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). The analysis presented in this section places project-specific impacts into a broader context that takes into account the full range of impacts of actions taking place over a given space and time. When viewed collectively over space and time, individually minor impacts can produce significant impacts. The goal of the cumulative impacts analysis, therefore, is to identify potentially significant impacts early in the planning process to improve decisions and move toward more sustainable development (CEQ 1997b; EPA 1999b).

Sections 5.1 through 5.3 describe the methodology, regions of influence (ROIs), and reasonably foreseeable future actions for the cumulative impacts assessment. The cumulative impact analyses for each resource area are presented in Section 5.4. These analyses take into account the issues raised in public scoping, as described in Section 1.3, and focus on the effects associated with the proposed action and other alternatives.

5.1 METHODOLOGY

The analysis of cumulative impacts presented in the following sections focuses on the natural resources, ecosystems, and human communities that could be affected by the incremental impacts of the alternatives described in Chapter 2. The cumulative impacts analysis builds upon the analyses of the direct and indirect impacts of the proposed action and alternatives developed during preparation of this EIS and encompasses incremental impacts to human and environmental receptors of the Salton Sea Air Basin, Salton Sea Watershed, Yuha Desert Management Area, and Imperial County.

5.1.1 General Approach

The general approach for the cumulative impacts assessment follows the principles outlined in CEQ (1997b) and the guidance developed in EPA (1999b) for independent reviewers of EISs. The cumulative assessment for the granting of Presidential permits and ROWs for constructing and operating transmission lines from two power plants in Mexicali to the IV Substation near El Centro, California, incorporates the following basic guidelines:

- Individual receptors described in Chapter 4 (Environmental Consequences) become the end points or units of analysis for the cumulative impacts analysis;

- Direct and indirect impacts described in Chapter 4 form the basis for the impacting factors used in the cumulative impacts analysis;

- Impacting factors (e.g., soil disturbance) are derived from a set of past, present, and reasonably foreseeable future actions or activities; and

- The temporal and spatial boundaries of the cumulative impacts analysis are defined around individual receptors and the set of past, present, and reasonably foreseeable actions or activities that could impact them.

The evaluation of incremental impacts generally involves an analysis of the probability of impact, consequences of impact, spatial and temporal extent of the impacting factor and receptor, recovery potential, and potential mitigation actions. Some of these elements can be quantified, such as the spatial extent of the impacting factors, while others may be more qualitative. Wherever possible, analyses and results are based on published literature or scientifically based first principles developed within each discipline. While the application of first principles can be defined as professional judgment, it is typically based on accepted theories, experiments, and analytical constructs developed under the standard scientific methods for each scientific discipline.

5.1.2 Methodological Steps

The cumulative impacts assessment follows the steps presented below:

- ***Step 1: Define Alternatives for the EIS.*** The alternatives considered in this EIS include (1) no action (deny both permit and corresponding ROW applications); (2) proposed action (grant one or both permits and corresponding ROWs to authorize transmission lines that connect to the Mexico power plants, as those plants are presently designed), including two alternative transmission line routes; (3) alternative technologies (grant one or both permits and corresponding ROWs to authorize transmission lines that connect to power plants in Mexico that would employ more efficient emissions controls and alternative cooling technologies); and (4) mitigation measures (grant one or both permits and corresponding ROWs to authorize transmission lines whose developers would employ off-site mitigation measures to minimize environmental impacts in the United States). Each alternative is described in Chapter 2.

- ***Step 2: Define Regions of Influence.*** The cumulative impacts analysis evaluates several ROIs, including the Salton Sea Watershed and the Salton Sea Air Basin, as listed in Table 5.2-1 (p. 5-6). These regions encompass the areas of affected resources in the United States and the distance at which impacts associated with the proposed action and alternatives may occur. ROIs are defined and evaluated with respect to each of the resource areas and vary from one resource area to another, since the affected region under each resource area is likely to be different in spatial extent.

- ***Step 3: Define Past, Present, and Reasonably Foreseeable Actions.*** The list of past, present, and reasonably foreseeable actions is developed from consultations with government agencies and nongovernmental organizations; through public scoping (Section 1.3); and in consultation with knowledgeable private entities, including the current applicants. The past, present, and reasonably foreseeable actions include projects, activities, or trends that could impact human and environmental receptors within the defined ROIs. Past and present actions are generally accounted for in the analysis of direct and indirect impacts under each resource area and carried forward to the cumulative impact analysis. Descriptions of foreseeable future actions considered are provided in Section 5.3. These include projects that have been approved and are either awaiting construction or are presently under construction but are not yet in operation and other projects that have budget approval. Some projects included are considered reasonable on the basis of preliminary discussions or reports but are still in the planning stages; the dates for some of these projects are not known at this time.

- ***Step 4: Develop the List of Receptors.*** The list of receptors (end points) for the cumulative impacts analysis is derived from the receptors identified in Chapter 4. When possible, the receptors are grouped into a smaller number of categories. For example, impacts on habitat condition are described in a way that a number of bird species can be examined collectively, rather than a species-by-species analysis.

- ***Step 5: Incorporate the Direct and Indirect Impacts.*** Direct and indirect impacts developed and evaluated in Chapter 4 are incorporated into the cumulative impacts assessment. Direct impacts are caused by implementing an alternative and occur at the same time and place as the proposed projects. Indirect impacts are caused by the proposed projects, but are later in time or farther removed in distance and are still reasonably foreseeable.

- ***Step 6: Determine the Potential Impacting Factors of Each Past, Present, or Reasonably Foreseeable Action or Activity.*** For each action identified in Step 3, a description of the potential impacting factors is developed. Impacting factors are the mechanisms by which an action affects a given resource or receptor. For example, in the case in which a planned power plant in the air resources ROI may impact air quality, “adding emissions” is the potential impacting factor. Each impacting factor can be a component of more than one action or activity. Impacting factors are listed by resource area for each ROI in Table 5.4.1.

- ***Step 7: Evaluate Cumulative Impacts on Receptors.*** An evaluation of the cumulative impacts is conducted for each receptor or category of receptors. The evaluation considers the impacting factors for the various resource areas and the incremental contribution of the proposed action to the cumulative impact.

The following factors are used to judge the cumulative impact on a receptor:

– Nature of the impact,
– Geographic or spatial extent of the potential impacting factor,
– Geographic or spatial extent of the receptor,
– Temporal extent of the potential impacting factor,
– Regulatory considerations (e.g., threatened and endangered species),
– Potential for effective mitigation of impact, and
– Potential for recovery of the receptor after removal of the impacting factor.

- ***Step 8: Present the Cumulative Impacts.*** The cumulative impacts for each resource area are presented in Section 5.4 and are summarized in Table 5.4-4 at the end of that section.

5.2 REGIONS OF INFLUENCE

The ROIs evaluated for resources in each study discipline making up the cumulative impacts analysis are listed in Table 5.2-1. The geographic boundaries defining these regions are based on the nature of the resource area being evaluated and a consideration of the distance at which an impact may occur.

5.3 REASONABLY FORESEEABLE FUTURE ACTIONS

The cumulative impact analysis incorporates the sum of the effects of the proposed action in combination with past, present, and future actions, since impacts may accumulate or develop over time. The future actions described in this analysis are those that are "reasonably foreseeable;" that is, they have already occurred, are ongoing, are funded for future implementation, or are included in firm near-term plans. Types of proposals with firm near-term plans include:

- Proposals for which NEPA documents are in preparation or finalized;
- Proposals in a detailed design phase;
- Proposals listed in formal NOIs published in the *Federal Register* or State publications;
- Proposals for which enabling legislation has been passed; and
- Proposals that have been submitted to Federal and State regulators to begin the permitting process.

TABLE 5.2-1 Regions of Influence for the Cumulative Impacts Assessment

Resource Areas	Region of Influence
Geologic and soil resources	Transmission line routes
Water resources	
• Surface water resources	New River, Salton Sea
• Wetlands	New River
• Floodplains	New River, Transmission line routes
• Groundwater resources	Imperial Valley Groundwater Basin
Air quality	Salton Sea Air Basin
Biological resources	
• Vegetation communities	Yuha Desert Management Area within BLM lands, New River, Salton Sea
• Terrestrial wildlife	Yuha Desert Management Area within BLM lands, New River, Salton Sea
• Migratory wildlife	Yuha Desert Management Area within BLM lands, Salton Sea
• Aquatic habitats and fish	New River, Salton Sea
Cultural resources	Yuha Desert ACEC within BLM lands
Land use	Yuha Desert ACEC within BLM lands
Transportation	State Route 98
Visual resources	State Route 98
Noise	Yuha Desert Management Area within BLM lands
Socioeconomics	Imperial County
Human health	Salton Sea Air Basin, transmission line routes
Minority and low-income populations	Imperial County

Reported proposals that could not be substantiated were excluded from this analysis.

The following sections describe future actions (some of which have recently been initiated) that have been identified as reasonably foreseeable in the analysis of cumulative impacts. The actions are also summarized in Table 5.3-1. The last section, Section 5.3.7, describes general relevant trends in the Imperial Valley-Mexicali region.

5.3.1 IID Water Conservation and Transfer Project

The IID is implementing a long-term water conservation program to conserve up to 300,000 ac-ft (3.7×10^8 m^3) of Colorado River water per year and to transfer this conserved

TABLE 5.3-1 Foreseeable Future Actions That May Cumulatively Affect Resources of Concern

Description/Responsible Agency	Status	Resources Affected	Primary Impact Location
IID Water Conservation and Transfer Project	Under way	Water, wildlife, vegetation, recreation	Salton Sea
Mexicali Wastewater Treatment Project/CESPM and EPA	Proposed	Water, wildlife, vegetation	New River, Salton Sea
Salton Sea Restoration Project[a]	Proposed	Water, wildlife, vegetation	Salton Sea
Total Maximum Daily Load Program/California Regional Water Quality Control Board	Under way	Water, wildlife, vegetation	New River, Salton Sea
Pilot wetlands on the New River near Brawley and Imperial, California/Bureau of Reclamation and Citizens Congressional Task Force	Under way	Water, wildlife, vegetation	New River, Salton Sea
New wetland construction on the New River, California/Bureau of Reclamation and Citizens Congressional Task Force	Proposed	Water, wildlife, vegetation	New River, Salton Sea
Blythe Energy Project	Proposed	Air quality, human health	Salton Sea Air Basin
CalEnergy Geothermal Project	Under way	Air quality, human health	Salton Sea Air Basin
Wellton-Mohawk Generating Facility[b]	Approved	Air quality, human health	Salton Sea Air Basin

[a] This project is still in the planning phase; specific alternatives are still being developed and were not available for analysis.

[b] The Wellton-Mohawk Generating Facility is located 50 mi (80.5 km) east of the Salton Sea Air Basin.

water to the San Diego County Water Authority, Coachella Valley Water District, and/or the Metropolitan Water District of Southern California. The terms of the water conservation and transfer transactions are detailed in the Quantification Settlement Agreement (QSA) signed on October 10, 2003, by DOI Secretary Gale A. Norton (DOI 2003a). The QSA provides a mechanism for California to reduce its use of Colorado River water so that it is in conformance with its basic apportionment of 4.4 million ac-ft/yr (172.1 m^3/s) in years when surplus water is not available, as specified in *California's Colorado River Water Use Plan* (also known as the California Plan) (Colorado River Board of California 2000). To conserve water under this plan, the IID has developed a conservation plan that includes on-farm irrigation system conservation measures (e.g., specifying farmers' annual allotment of water), water delivery system conservation measures (e.g., reducing or capturing canal seepage), and the fallowing of farmland.

Under the IID-San Diego County Water Authority Transfer Agreement (the largest transfer agreement specified in the QSA), water transfer would ramp up from 10,000 ac-ft (1.2×10^7 m^3) of water in 2003 (delivered in December to Lake Havasu [Arizona]) to 200,000 ac-ft (2.5×10^8 m^3) annually from 2021 to 2077 (DOI 2003a; U.S. Water News 2004). It is expected that approximately 12.9 million ac-ft (1.6×10^{10} m^3) of water will be transferred to San Diego County over the 75-year period (with an initial term of 45 years and a renewal term of 30 years) covered by the agreement.

Implementation of the water conservation and transfer program under the QSA is expected to decrease inflow volumes (and water surface elevation) of the Salton Sea, since all conserved water would be transferred to San Diego County under this agreement. Because of concerns about impacts to the Salton Sea, the parties to the water transfer agreed to deliver "mitigation" water to the Sea in sufficient quantities to avoid material impacts to the Salton Sea's salinity for the first 15 years of the water transfers (through 2018). This mitigation strategy was developed in order to allow the State of California and other concerned parties sufficient time to complete plans for Salton Sea restoration. After 2018, the water transfers would decrease the water surface elevation of the Sea and increase its salinity relative to baseline conditions (Ellis 2004). Under the QSA, the impacts due to the transfer to the San Diego County Water Authority would be partially offset by the transfer of water to the Coachella Valley Water District service area (which would increase the inflow to the Salton Sea from that source) (IID 2002a, 2003a).

The water conservation and transfer program would also increase salinity concentrations in the Salton Sea after 2018. The BOR's Salton Sea Accounting Model predicts that evaporation rates in the Sea will exceed inflow rates. Under baseline conditions, salinity (as TDS) would reach 60,000 mg/L in 2023 and 85,000 mg/L by 2074. Under the proposed water transfers, salinity would reach 60,000 mg/L in 2019 and 142,000 mg/L by 2074 (Ellis 2004).

The EIR/EIS (Salton Sea Authority and BOR 2000) identified biological impacts due to reduced drain flows, reduced surface elevation, and increased salinity in the Salton Sea, including effects to adjacent wetlands dominated by tamarisk and shoreline strand, changes to invertebrate resources (and the shorebirds that feed on them), reductions in fish resources, changes in piscivorous birds, changes in colonial nest/roost sites, changes in the availability of mudflat and shallow water habitat, and diminished pupfish movement along high-salinity drains. None of the impacts to biological resources were categorized as significant with the implementation of the mitigation measures specified in the Habitat Conservation Plan (IID 2002b). The IID has initiated a monitoring and mitigation program to ensure that the mitigation measures are implemented to reduce these impacts (IID 2003b).

5.3.2 Mexicali II Wastewater Treatment Project

The local utility in Mexicali, the Comisión Estatalde Servicios Publicos de Mexicali, has a proposal for funding from the U.S. EPA to build a wastewater treatment plant in a relatively uninhabited area known as Las Arenitas, located approximately 21 mi (33 km) south of the U.S.-Mexico border (EPA 2003b). Construction of this plant will likely be completed by 2005.

The proposed pipeline, pump station, and wastewater treatment plant would be sized to treat and convey as much as 22,501 ac-ft/yr (0.88 m^3/s) or 20.1 million gal/d (880 L/s) of untreated sewage water flowing into the New River. Treated wastewater would be discharged south of the New River drainage basin, into a tributary of the Rio Hardy, which empties into the Colorado River Delta. The reduction of flow to the New River at the border is estimated to be about 11%, with a decrease of total inflow to the Salton Sea of about 1.2 to 1.7%. The EA (EPA 2003c) for this project estimates a 65% reduction in the TSS load and a 43% reduction in the BOD_5 (5-day biochemical oxygen demand) load in the New River at the U.S.-Mexico border; and a 10% reduction in both total phosphorus and orthophosphate loadings to the Salton Sea. Taking into account the reduction in flow to the New River, the annual salinity increase to the Salton Sea due to this action was estimated in the EA to be about 0.2 to 0.3% annually.

5.3.3 Salton Sea Restoration Project

The Salton Sea Restoration Project was initiated by the U.S. Department of Interior (BOR) and the Salton Sea Authority to research and address the deteriorating environmental conditions at the Salton Sea. As part of the DOI's obligation under the Salton Sea Reclamation Act of 1998, a draft EIR/EIS for the project was forwarded to Congress in January 2000 (Salton Sea Authority and BOR 2000). The stated purpose of the restoration project is to "maintain and restore ecological and socioeconomic value of the Salton Sea to the local and regional human community and to the biological resources dependent upon the Sea" (Salton Sea Authority and BOR 2000). Its objectives would focus on stabilizing the water surface elevation; reducing and maintaining salinity levels at or below 40,000 mg/L, and reclaiming wildlife resources and their habitat.

At this time, it is not clear whether new project alternatives will be developed as part of the EIR/EIS; however, a status report containing information of various proposals for restoration of the Salton Sea was delivered to Congress in 2003 (DOI 2003b). This report outlined a new strategy for alternative development that would specify assumptions about inflow reductions under three scenarios. The report highlighted the difficulty in guaranteeing stable inflows to the Sea given the ability of Mexico to affect flows in the New River and other factors such as water conservation measures and the transfer of agricultural water to urban areas. Given these uncertainties and the high cost of implementing any of the alternatives, the report did not make any recommendations (Raley 2003).

In April 2003, the Salton Sea Authority Board endorsed the North Lake Plan, an alternative that would involve constructing an 8.5 mi (13.7 km) long dam to divide the Salton Sea in half. The dam would create an ocean-like basin in the northern half of the Sea and an extensive shallow water habitat in the southern half. This would allow restoration activities to be focused on a smaller lake area in the northern half. The plan would also include the desalinization of Imperial Valley rivers and agricultural irrigation runoff; treated water would then be reused by local farmers so that Colorado River water could be sold to offset the costs of restoration (Kirk 2003; Spillman 2003). A California state advisory committee held its first meeting on January 21, 2004, to begin the process of developing the restoration plan for Salton Sea. The committee, composed of Federal, State, local, and Tribal representatives is required under state law to recommend a restoration plan and funding to the state legislature by 2006 (Henshaw 2004).

Future restoration activities could change water quality conditions in the Salton Sea. Depending on the measures implemented, these changes could affect water resources, biological resources, and air quality. However, since the restoration activities have not been specified in detail at this time, it is not possible to include this action as part of the cumulative analysis.

5.3.4 Total Maximum Daily Load Program

The CWA, Section 303(d), requires states to identify and set priorities for polluted waters and to write pollutant control plans called TMDLs to attain state water quality standards. The TMDL process provides a mechanism for determining the causes of waterbody impairment and for allocating pollutant loads among sources in a given watershed based on the current water quality standards. The TMDL defines the maximum amount of a pollutant that can be discharged (or the amount that needs to be reduced), and it provides a framework for taking action to meet these goals (EPA 2000b).

Under the TMDL program, the Colorado River Basin Regional Water Quality Control Board has developed a list of impaired water bodies in California and has set time lines for developing TMDLs for them. It has identified the Salton Sea Watershed as an impaired (Category 1) watershed with the most significant water quality issues associated with the Salton Sea and its major tributaries, the New and Alamo Rivers, and agricultural drains (CRBRWQCB 1999, 2001). Both the Salton Sea and the New River have been given a high priority for TMDL development. The pollutants identified for the New River and Salton Sea and the target dates for their development are provided in Table 5.3-2. Once a TMDL has been established, the Colorado River Basin Regional Water Quality Control Board develops monitoring and implementation plans to assess the implementation and effectiveness of the TMDL and to specify nonpoint source best management practices, point source controls, and other actions necessary to ensure that the TMDLs are met. The requirements of the TDML program would have to be met by any industry discharging to the watershed.

5.3.5 Wetlands Construction on the New River

The BOR is proposing to construct at least 40 wetlands in floodplains and sediment basins of the New River in Imperial County between the U.S.-Mexico border and the Salton Sea (BOR 2002). As with the pilot wetlands constructed at Brawley and Imperial, the purpose of the wetlands project is to improve the water quality of the New River. The total volume of water in the proposed wetlands would likely be within a range comparable to that in the pilot wetlands: about 21 ac-ft (25,893 m^3) in the Brawley wetland and 127 ac-ft in the Imperial wetland. A 3-year monitoring program at the Brawley site has shown that New River water quality has been improved as a result of these wetlands. Average decreases in total loadings of phosphorus (54%), selenium (27%), BOD (10%), TSS (98%), and fecal coliforms (99.8%) have been recorded.

TABLE 5.3-2 TMDL Pollutants and Time Lines for the New River and Salton Sea

			Target Date for TMDL Development	
Waterbody	Pollutant/Stressor	Probable Source	Start	Finish
New River	Pathogens	Mexico and wastewater treatment plants in Imperial County	1998	2001[a]
	Sedimentation/silt (TSS)	Imperial valley agricultural return flows	1998	2002[b]
	Pesticides	Imperial valley agricultural return flows	2005	2011
	Dissolved organic matter/dissolved oxygen	Mexico	2003	2006[c]
	Trash	Mexico	2004	2007[d]
	Chloroform	Mexico	2007	2011
	Toluene	Mexico	2007	2011
	p-Cymene	Mexico	2006	2009
	1,2,4-Trimethylbenzene	Mexico	2006	2009
	m,*p*-Xylene	Mexico	2005	2008
	o-Xylene	Mexico	2005	2008
	Nutrients	Mexico	2005	2008
	p-DCB	Mexico	2006	2010
Salton Sea	Nutrients[e]	Agricultural return flows, NPDES Wastewater treatment plants, Mexico	2001	2004
	Salts	Agricultural return flows, NPDES Wastewater treatment plants, Mexico	NA[f]	NA
	Selenium	Agricultural return flows	2005	2010

[a] Adopted by Regional Board on October 10, 2001; approved by the EPA on August 14, 2002 (CRBRWQCB 2004a). Maximum numeric targets (most probable number [MPN]/100 mL), established for fecal coliforms, *E. coli*, and enterococci are 40 MPN/100 mL (for <10% of total samples during any 30-day period), 400 MPN/100 mL, and 100 MPN/100 mL, respectively (CRBRWQCB 2002a).

[b] Adopted by Regional Board on June 26, 2002; approved by the EPA on March 31, 2003 (CRBRWQCB 2004a). The new numeric target of 200 mg/L (at Lack Road Bridge) will require a 17% reduction in TSS (CRBRWQCB 2002b).

[c] A draft numeric target of 5.0 mg/L is currently under review.

[d] A draft numeric target of zero floatable debris is currently under review (CRBRWQCB 2004a).

[e] Problem statement can be found at CRBRWQCB (2004a).

[f] NA = not applicable. According to the Colorado River Basin Water Quality Control Board, TMDL development will not be effective in addressing this problem, which will require an engineered solution with Federal, State, and local cooperation.

Source: CRBRWQCB (2002b).

Dissolved oxygen content of water at the Brawley outlet is about 10.8 mg/L, an increase of about 66% (New River Wetlands Project 2001). Members of the Citizen's Congressional Task Force have expressed concerns about the impacts of increased salinity concentrations in the New River, especially in terms of the tolerance levels of the California Bulrush to continuous salinity concentrations as high as 6,000 mg/L. Other stressors for the California Bulrush are high water temperatures, elevated levels of pollutants in river water, and high soil salinity (Barrett 2004).

5.3.6 Power Plant Projects in the Imperial Valley-Mexicali Region

The following power plant projects were identified as reasonably foreseeable for the cumulative impacts analysis:

- ***Blythe Energy Project (Phase II).*** This project would involve the addition of 520-MW, combined-cycle, gas-fired turbines at the existing plant in Riverside County, California. These turbines are projected to be operational in July 2006 (CEC 2004).

- ***CalEnergy Geothermal Project.*** This project would construct and operate a new 180-MW geothermal steam turbine electric generating facility on an 80-acre (32-ha) parcel of land 6 mi (9.7 km) northwest of Calipatria, and a 16-mi (26-km) transmission line within unincorporated Imperial County, California. Plant construction is currently underway (CEC 2004).

- ***Wellton-Mohawk Generating Facility.*** This project would be built near the town of Wellton in Yuma County, Arizona, approximately 50 mi (80.5 km) east of the Salton Sea Air Basin. The project involves the construction of a 260-MW unit capable of producing up to 310 MW at peak performance.

  A second phase would add a similar unit. The project is expected to be online by 2007 (Arizona Corporation Commission 2003).

These projects are shown in Figure 5.3-1 and described in greater detail in Section 5.4.3. No foreseeable future power plants were identified in Mexico. Although preliminary studies were conducted, Sempra has no foreseeable plans to add a second power plant to its TDM facility in Mexicali (Simoes 2004).

5.3.7 General Trends in the Imperial Valley-Mexicali Region

5.3.7.1 Imperial Valley

5.3.7.1.1 Employment Trends in Imperial County. The population of Imperial County in 2003 was 150,900 residents. The largest growth was in Calexico (with a gain of about

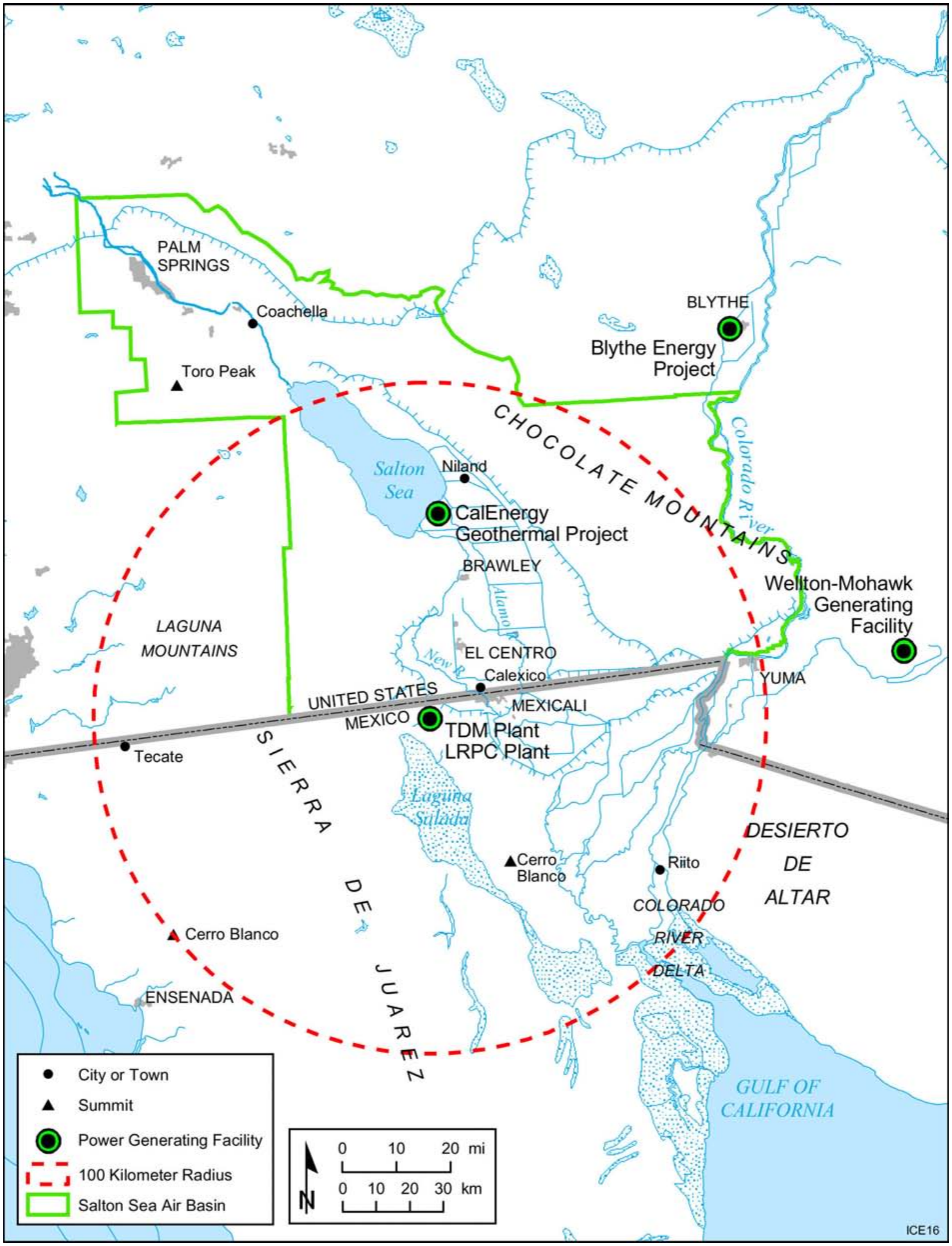

FIGURE 5.3-1 Locations of Reasonably Foreseeable Future Power Plant Projects Potentially Impacting the Salton Sea Air Basin

1,500 residents, a 5% increase over the previous year). The largest industry employers in 2002 were government (32.7%), agriculture (19.7%), and trade, transportation, and utilities (18.5%). Most of the government employment is in the local government component, including local education, city and county government, and Indian tribal government. The most significant employment trend over the past 5 years was the gain in government over agricultural employment (e.g., in 1998, agriculture and government each accounted for 29.0% of employment). The 10% decline in agricultural employment is attributable both to job losses in the farm industries and significant job growth in other industries, including smaller sectors like retail trade. The California Employment Development Department projects the largest job gains through 2006 will be in government and retail trade (and other services) (CEDD 2004).

5.3.7.1.2 Conversion of Farmland to Nonagricultural Use. Between 1987 and 1999, approximately 484,000 acres (195,869 ha) of Imperial County's farmland (about one-fifth of its total 3 million acres [1 million ha]) were irrigated for agricultural purposes (IID 2002a; CEDD 2004). Of this total, about 22,000 farmable acres (8,903 farmable ha) were fallowed and 2,000 acres (809 ha) were leached of salts, leaving an annual net area of about 460,000 acres (186,156 ha) for agricultural production. About 536,000 acres (216,912 ha) were harvested during this period.

In 1999, 160 Imperial Valley farmers agreed to participate in IID's conservation program to save more than 130,000 ac-ft of water each year (ASFMRA 2004). IID estimates that implementing the conservation program could potentially require that some agricultural land (up to 50,000 acres [20,234 ha]) be converted to nonagricultural use (IID 2002a, 2003a). Rotational fallowing (i.e., keeping land out of agricultural production for less than 4 years) could reduce the acreage needed for conversion to help IID meet its conservation goals (IID 2003a). If managed properly, fallowing farmland can reduce the potential for dust emissions since plowing disturbs soil and increases its erodability.

5.3.7.1.3 Precipitation Trends in California. Data from the National Climate Data Center indicate that in 1999, annual precipitation totals for California fell below the long-term mean (1985-2004) of about 3 in. (8 cm). They have continued to decline since then. In 2003, the annual precipitation was about 2 in. (5 cm).

5.3.7.2 Mexicali

5.3.7.2.1 Demographic Trends. Mexicali is one of five major municipalities in Baja California. It has an estimated population (in 2000) of 784,000 and an annual growth rate of 4.9%. Approximately half of its residents participate in the labor force; the unemployment rate is 1.2%.

5.3.7.2.2 Industrial Development. Mexicali is predominantly agricultural and is home to Mexico's first maquiladora operation. An estimated 54,422 people were employed by 184 maquilas as of January 2000. Industry in Mexicali is concentrated in at least 10 industrial parks that host electronics (e.g., computer, television, and semiconductor), metal mechanics (e.g., automotive), plastics, and food/beverage (e.g., export preparation and packing) industries. With the passage of the North American Free Trade Agreement (NAFTA) in 1994 and other treaties with South America, Europe, and Asia, foreign investment has fueled industrial development in Mexicali over the past few decades. However, this growth has slowed in the last two years due to slowdowns in the United States and world economies in 2002 (Mattson-Teig 2003; TeamNAFTA 2004).

5.3.7.2.3 Cross Border Traffic. Cross border traffic at the Mexicali-Calexico port of entry is increasing. This is due mainly to increased diesel transportation (both for importing raw materials from and exporting finished goods to the United States) as a result of development in Mexicali's maquiladora industries. The rapid population (and labor pool) growth in Mexicali has also contributed to this trend, increasing the number of legal border crossings for shopping, and for working in Imperial County farms. Congestion at the port of entry leads to long lines of idling vehicles and excessive waiting times (U.S.-Mexico Chamber of Commerce 2004; Gray 1999).

Maquiladora Industries

A maquiladora is a Mexican Corporation operating under a maquila program approved by the Mexican Secretariat of Commerce and Industrial Development. Companies participating in a maquila program are entitled to foreign investment and management (up to 100%) without the need of special authorization. These companies are also given special customs allowances (e.g., duty-free import of raw materials). Mexico places no restrictions on the kinds of products manufactured, assembled, packaged, processed, sorted, built, or rebuilt (other than requiring special permits for the production of firearms). A maquiladora's products are exported directly or indirectly through sale either to other maquiladoras or to an exporter.

5.4 CUMULATIVE IMPACTS ANALYSES

The cumulative impacts analyses presented in the following sections encompass the direct and indirect impacts associated with both the period of project construction and the post-construction period of operation (covered in Chapter 4), and the potential impacting factors for each of the reasonably foreseeable future actions listed in Table 5.4-1.

The cumulative impacts from the combination of the proposed action and other past, present, and reasonably foreseeable future actions could affect all resource areas; however, the most significant impacts would be to water resources, air quality, and biological resources. Impacts to soil, noise, transportation, and socioeconomics due to the proposed action would be short term (for the construction period) and would therefore not likely contribute to cumulative impacts.

TABLE 5.4-1 Potential Impacting Factors of Reasonably Foreseeable Future Actions, including the Proposed Action, by ROI[a]

Region of Influence *Resource Area* Activity	Impacting Factor
New River	
Surface Water Resources	
TDM and LRPC power plants (proposed action)	Flow reduction Salinity increase Pollutant reduction
IID Water Conservation and Transfer Project	Flow reduction Salinity increase
Mexicali II Wastewater Treatment Plant	Flow reduction Salinity increase Pollutant reduction
TMDL Program	Pollutant reduction
Wetland Construction	Flow reduction Pollutant reduction
Biological Resources	
TDM and LRPC power plants (proposed action)	Habitat impairment/loss
IID Water Conservation and Transfer Project	Habitat impairment/loss
Mexicali II Wastewater Treatment Plant	Habitat impairment/loss
TMDL Program	Habitat improvement
Wetland construction	Habitat improvement
Salton Sea	
Surface Water Resources	
TDM and LRPC power plants (proposed action)	Inflow reduction Salinity increase Pollutant reduction
IID Water Conservation and Transfer Project	Inflow reduction Salinity increase
Mexicali II Wastewater Treatment Plant	Inflow reduction Salinity increase Pollutant reduction
TMDL Program	Pollutant reduction
Wetland construction	Inflow reduction Pollutant reduction

TABLE 5.4-1 (Cont.)

Region of Influence *Resource Area* Activity	Impacting Factor
Biological Resources	
TDM and LRPC power plants (proposed action)	Habitat impairment/loss
IID Water Conservation and Transfer Project	Habitat impairment/loss
Mexicali II Wastewater Treatment Plant	Habitat impairment/loss
TMDL Program	Habitat improvement
Wetland construction	Habitat improvement
Imperial Groundwater Basin	
Groundwater Resources	
TDM and LRPC power plants (proposed action)	Recharge reduction
IID Water Conservation and Transfer Project	Recharge reduction
Mexicali II Wastewater Treatment Plant	Recharge reduction
Salton Sea Air Basin	
Air Quality	
TDM and LRPC power plants (proposed action)	Adding emissions
IID Water Conservation and Transfer Project	Adding emissions (shoreline exposure) Decreasing emissions (fallowing land)
Mexicali II Wastewater Treatment Plant	Adding emissions
Blythe Energy Project	Adding emissions
CalEnergy Geothermal Project	Adding emissions
Wellton-Mohawk Generating Facility	No net contribution to cumulative impacts
Human Health	
TDM and LRPC power plants (proposed action)	Adding emissions
Blythe Energy Project	Adding emissions
CalEnergy Geothermal Project	Adding emissions
Wellton-Mohawk Generating Facility	No net contribution to cumulative impacts

TABLE 5.4-1 (Cont.)

Region of Influence *Resource Area* Activity	Impacting Factor
Yuha Desert Management Area within BLM lands	
Biological Resources	
Transmission line (proposed action)	Wildlife disturbance Vegetation removal Invasive plant species
Cultural Resources	
Transmission line (proposed action)	Site disturbance Artifact removal
Land Use	
Transmission line (proposed action)	No net contribution to cumulative impacts
Noise	
Transmission line (proposed action)	No net contribution to cumulative impacts
State Route 98	
Visual Resources	
Transmission line (proposed action)	No net contribution to cumulative impacts
Transportation	
Transmission line (proposed action)	No net contribution to cumulative impacts
Transmission Line Routes	
Geology and Soils	
Transmission line (proposed action)	Soil disturbance Dust generation
Human Health	
Transmission line (proposed action)	No net contribution to cumulative impacts
Imperial County	
Socioeconomics	
Transmission line (proposed action)	Taxes/revenues
Minority and Low-Income Populations	
Transmission line (proposed action)	Impairment of fishery resources

[a] Abbreviations: IID = Imperial Irrigation District; LRPC = La Rosita Power Complex; NH_3 = ammonia, NO_x nitrous oxides; TDM = Termoeléctrica de Mexicali.

5.4.1 Geology and Soils

The cumulative impacts to geologic and soil resources within the transmission line routes would be the same as those stated for the proposed action since there are no other foreseeable projects in the area. Impacts to soil along the transmission lines tend to be associated with soil disturbance due to construction activities. The potential for increased soil erosion (water and wind) would likely be temporary; soil compaction due to vehicle usage of the access roads and spurs would be more long term.

5.4.2 Water Resources

5.4.2.1 Surface Water Resources

The cumulative impacts analysis for water resources adds estimated increments of impact due to reasonably foreseeable future actions to the direct and indirect impacts identified in Section 4.2 for the proposed action and to the past and present actions included under existing baseline conditions. Impacts include those to the quantity and quality of water in the Salton Sea Watershed, focusing on the New River and the Salton Sea. Cumulative impacts of the proposed action and the reasonably foreseeable future projects were analyzed qualitatively by comparing estimated water demands and, where known, estimated discharge concentrations. Because details of the Salton Sea Restoration Project are still under development, it was not included in this analysis.

Table 5.4-2 lists the quantities of water that would be used by each of the reasonably foreseeable future actions that could impact water resources in the Salton Sea Watershed. The proposed action would represent about 32% of the projected water demand in the short term. Because the IID-San Diego County Water Authority water transfer ramps up from 10,000 ac-ft/yr (0.39 m^3/s) in 2003 to 200,000 ac-ft/yr (7.8 m^3/s) in 2022 (through 2077), the cumulative percentage of water used by the proposed projects would decrease in time to about 12% in 2021 and thereafter. Initially, the largest demand would come from construction and operation of the Mexicali II Wastewater Treatment Plant (Section 5.3.2). With increased volumes of water transferred to San Diego County, however, the water transfer project would eventually use a greater percentage of water. The next largest contributor to impacts after the Mexicali II Wastewater Treatment Plant and the water transfer project would be operation of the LRPC and TDM power plants on the New River.

Because of water demands on the New River from the proposed projects along with the IID water conservation and transfer project and the Mexicali II Wastewater Treatment Plant, the pilot wetland at Brawley would likely suffer some adverse cumulative impacts in terms of water quality. Reduced flows in the New River would increase some concentrations but decrease their annual loads.

TABLE 5.4-2 Water Demands for the Water Resources Cumulative Impact Analysis[a]

Action	Water Demand (ac-ft/yr)	Change in Water Quality in the New River	Change in Water Quality at Salton Sea
LRPC (proposed action)	7,170	TDS: +4%[b] TSS: -1.5%[b] BOD: -4%[b] COD: -11%[b] Phosphorus: -5%[b] Selenium: +4%[b]	TDS: +0.1% Phosphorus: -7%
TDM (proposed action)	3,497	TDS: +2%[b] TSS: -0.6%[b] BOD: -2%[b] COD: -5%[b] Phosphorus: -2%[b] Selenium: +2%[b]	TDS: +0.05% Phosphorus: -3%
IID-SDCWA Water Conservation and Transfer	10,000[c] (2003) to 200,000[c] (2021-2077)	NA	TDS: 60,000 mg/L (by 2019)
Mexicali II Wastewater Treatment Plant	19,800[d]	TSS: -65%[b] BOD: -43%[b] Orthophosphate: -25%[b]	Phosphorus: -10% Orthophosphate: -10%
New wetland construction along the New River in the United States	10 per wetland	TSS: -98% BOD: -19% Phosphorus: -54% Selenium: -27%	NA
Salton Sea Restoration Project	NA	NA	TDS: ≤35,000 mg/L
Total	33,467[e] to 90,467[e]		

[a] Abbreviations: BOD = biochemical oxygen demand; COD = chemical oxygen demand; IIT = Imperial Irrigation District; LRPC = La Rosita Power Complex; NA = not applicable; SDCWA = San Diego County Water Authority; TDM = Termoeléctrica de Mexicali; TDS = total dissolved solids; TSS = total suspended solids.

[b] Denotes water quality changes (in load) at the U.S.-Mexico border.

[c] Source: IID (2002a). Not all of this water demand would affect water quantities. Prior to the transfer, about 70% of the water demand would have been consumed by agriculture; 30% would return to the Sea (see Section 3.2). Therefore, only 30% of the water demand is considered lost to the Sea as a result of the water transfer.

[d] Source: EPA (2003c).

[e] Excludes wetlands projects, which use very little water.

The cumulative effects of past, present, and future actions and water use trends in the Salton Sea Watershed would reduce the volume of flow in the New River. As a result, inflow to the Salton Sea would also be reduced, thus decreasing its elevation and increasing its salinity. Certain activities, for example, the Mexicali II Wastewater Treatment Plant, the wetlands construction projects, and the TMDL program, have a beneficial contribution to cumulative impacts in that they improve overall water quality in the New River by reducing pollutant loadings. The proposed action would contribute to the reduction of flow in the New River and inflow to the Salton Sea, but would have a relatively small contribution. Given the uncertainties related to the restoration activities at the Salton Sea, the long-term magnitude and significance of these impacts is difficult to quantify.

5.4.2.2 Groundwater Resources

The cumulative effects of past, present, and future actions and water use and precipitation trends in the Salton Sea Watershed would reduce the volume of flow in the New River and therefore reduce the volume of recharge to the Imperial Valley Groundwater Basin. The proposed action would contribute to this reduction, but would have a relatively small contribution since the New River is only one of many recharge sources (contributing about 7,000 ac-ft/yr, or 0.27 m^3/s) and the reduction of flow is expected to be low (about 5.9% and 2.3% of the annual flow at the Calexico and Westmorland gages, respectively).

5.4.3 Air Quality

5.4.3.1 Power Plant Emissions

The cumulative impact analysis for air quality adds estimated increments of impact due to reasonably foreseeable future actions to the direct and indirect impacts identified in Section 4.3 for the proposed action and to the past and present actions included under existing baseline conditions. The geographic boundary and the 10- to 20-year time line of the proposed action were also used for the cumulative impact analysis so that cumulative impacts could be tallied on a common basis to the proposed action. The geographic boundary for air quality impacts was delineated by the natural air shed known as the Salton Sea Air Basin, encompassing Imperial County, part of Riverside County, and the border region of Mexicali, Mexico. The scope of the cumulative effects analysis was broadened to encompass reasonably foreseeable future projects that are outside the immediate area of the Salton Sea Air Basin, as described in Section 5.3.6, but considered appropriate because of their proximity to the proposed action.

The foreseeable future projects potentially impacting the Salton Sea Air Basin include the Blythe Energy Project (Phase II), the CalEnergy Geothermal Project (run by subsidiary CE Obsidian Energy, LLC), and the Wellton-Mohawk Generating Facility (Figure 5.3-1). The proposed Blythe Energy Project (Phase II) would be a nominally rated 520-MW combined-cycle power plant consisting of two 170-MW combustion turbine generators and one 180-MW steam turbine generator. Located about 85 mi (137 km) northeast of the proposed projects and just to the north of the Salton Sea Air Basin, this project is projected to be operational in July 2006. Table 5.4-3 summarizes the estimated emissions from this project. Given its location relative to the Salton Sea Air Basin ROI and the small influence of air pollutant transport (because of prevailing westerly surface winds), the contribution of this plant to cumulative impacts in the Salton Sea Air Basin would be minimal.

The CalEnergy Geothermal Project, run by subsidiary CE Obsidian Energy, LLC, would be a 185-MW geothermal steam-powered electric generating facility within the Salton Sea Air Basin near the southeast shoreline of the Salton Sea. In addition to the power plant, the project would consist of a resource production facility, a 161-kV switchyard, 10 geothermal production wells, 7 brine injection wells, and 2 electrical transmission lines (CEC 2004). This would add another geothermal plant to the 10 others in the area, generating a total of about 340 MW of power.

Geothermal plant air emissions are different from those of a natural gas-fired plant. Except for drilling and ancillary equipment, NO_x, and SO_2 would not be emitted, but emissions of NH_3 and H_2S would occur during plant operations. Both NH_3 and H_2S are noncompressible gases contained in the geothermal brine. The project proposes to purchase PM_{10} emission credits through the Imperial County Air Pollution Control District to offset any possible secondary PM_{10} formation from plant NH_3 emissions. To control emissions and impacts of H_2S, CE Obsidian proposes to install bio-oxidizers on new cooling towers and retrofit cooling towers at an existing facility. CE Obsidian has proposed technologies to control 99.5% of all sulfur emissions and estimates that 1-hourly levels of 7.5 $\mu g/m^3$ and NH_3 maximum concentrations of 25.8 $\mu g/m^3$ annually will result. In view of the offsets proposed by CE Osidian, the contribution of this plant to cumulative impacts in the Salton Sea Air Basin would be minimal.

Power Plant Projects Not Evaluated

Power plant projects in the U.S.-Mexico border region mentioned in the press, on organization web sites, organization literature, or in correspondence to DOE and BLM as being proposed or planned were investigated along with avenues of official information such the California Energy Commission or the Comisión Federal de Electricidad (CFE) Mexico. In some instances, projects that were referenced do not exist or were long since abandoned.

A case in point is frequent reference to various “American Electric Power (AEP)” power plant projects proposed for the Mexico border area. Because of AEP’s development activities in Mexico in the late 1990s, it was a participant in the transmission studies, in a Mexicali project proposed in 1997 but abandoned in 1999, and in early discussions in the La Rosita project. Now “AEP projects” are still perpetuated due to citing of documents relating to that era. Despite frequent references otherwise, AEP’s only investment in Mexico is a half-ownership interest in Bajio, a power plant located near San Luis de la Pasz, Guanajuato, in central Mexico, that it is in the process of selling.

The proposed Wellton-Mohawk Generating Facility, located to the east of the Salton Sea Air Basin in Yuma County, Arizona, would be developed in two phases. The first phase would be nominally rated at 260 MW with a peaking capacity of about 310 MW and a second phase of 520 MW with a peaking capacity of about 620 MW via duct burners. Each phase would consist of one combustion turbine, one heat recovery steam generator, and a steam turbine. The first

TABLE 5.4-3 Estimated Annual Emissions from the Blythe Energy Project (Phase II)

Operational Source[a]	NO_x (tons/yr)	PM_{10} (tons/yr)	CO (tons/yr)	SO_2 (tons/yr)	VOC (tons/yr)
CTG/HRSG #3[a]	95.5	26.3	145.4	11.5	12.7
CTG/HRSG#4[a]	95.5	26.3	145.4	11.5	12.7
Cooling Tower (8 cells)	NA[b]	15.7	NA	NA	NA
Cooling Tower for Inlet Air Chillers (4 cells)	NA	3.1	NA	NA	NA
Fire Pump Engine	0.12	0.01	0.15	0.01	0.02
Total	191	71	291	23	25

[a] CTG = combustion turbine generator; HRSG = heat recovery steam generator.

[b] NA = not applicable.

phase could be completed by 2006; the second phase could be online by 2007 (Arizona Corporation Commission 2003). Located about 90 mi (145 km) east of the proposed projects and 50 mi (80.5) east of the Salton Sea Air Basin, the final unit would be the equivalent of the Termoeléctrica de Mexicali (TDM) plant analyzed in this EIS and could be expected to have similar emissions (Table 4.3-2). Given both the distance from the Salton Sea Air Basin ROI and the small influence of air pollutant transport (because of prevailing westerly surface winds), the contribution of this plant to cumulative impacts in the Salton Sea Air Basin would be minimal.

5.4.3.2 Sources of Fugitive Dust

5.4.3.2.1 Dust Emissions from Exposed Shoreline. Because the proposed action, in combination with foreseeable projects like the IID's water conservation and transfer project, would reduce inflow to the Salton Sea, water levels would also decrease, exposing land along the shoreline that is currently submerged and increasing the potential for fugitive dust (PM_{10}) emissions. The decrease in Sea level would drop by about 20 ft (6 m) and expose about 51,000 acres (21,000 ha). (This would correspond to about 73% of the lakebed area of Owen's Lake, a dry salt lake bed in Inyo County, California, known to be the highest single PM_{10} area source in the United States.) The extent of PM_{10} emissions would depend on such factors as sediment and salt deposit erodability, salt crust formation, the frequency of high winds, the potential for revegetation along the shoreline, and mitigation measures taken to stabilize the shoreline and, therefore, is not quantified in this analysis. However, the increase in fugitive dust (PM_{10}) emissions could adversely contribute to cumulative impacts in an Salton Sea Air Basin, which already exceeds State and Federal ambient air quality standards (Section 3.3.2).

5.4.3.2.2 Dust Emissions from Fallowing Agricultural Lands. As part of the IID's water conservation and transfer project, as much as 84,800 acres (34,317 ha) of farmland would be fallowed. The potential for dust emissions would be reduced since the land would not be subject to plowing or other activities that could disturb the soil and increase its erodability. However, if fallowed lands are not properly managed or mitigated (e.g., by using vegetation residue to protect against wind erosion and avoiding tillage), the potential for fugitive dust (PM_{10}) emissions could increase and adversely contribute to cumulative impacts in an air shed that already exceeds State and Federal ambient air quality standards (Section 3.3.2).

In summary, the cumulative effects of past, present, and future actions, including industrial and agricultural trends in the Imperial Valley-Mexicali region, would increase emissions of PM_{10}, NO_x, CO, and NH_3 to the Salton Sea Air Basin. The proposed action would contribute to these ongoing emissions but would have a relatively small contribution (i.e., below EPA significance levels). The impacts of these emissions could be mitigated by offsets or other actions.

5.4.4 Biological Resources

5.4.4.1 Yuha Desert Management Area

The cumulative impacts to biological resources within the Yuha Desert Management Area would be the same as those stated for the proposed action since there are no other foreseeable projects in the area. Transmission line construction would contribute to permanent impacts to vegetation and terrestrial habitat in the ROWs. In addition, watering practices to control dust during construction could encourage the growth of invasive plant species, which also can alter terrestrial habitat. Impacts to wildlife due to human activity and noise during construction are expected to be short-term; however, operation and maintenance of the transmission lines is one of many human activities that would cumulatively impact the Yuha Basin overall, such as agricultural development, urbanization, off-highway vehicle use, roads, and military activities. The applicants have agreed to implement measures to mitigate or minimize impacts to sensitive biological resources like the flat-tailed horned lizard.

5.4.4.2 New River

Because the decrease in water levels in the New River due to the proposed action is estimated to be less than 0.25 ft (8 cm) and most plant species along the river are drought-tolerant or phreatophytic, only small if any impacts on riparian vegetation communities are expected (impacts to terrestrial wildlife communities, therefore, would also be small). Small changes in water levels also should have no impact on the ability to move water to the Brawley wetland (since the pump used to supply water is deep enough to remain operational under slightly reduced flows). Combined with other past, present, and future actions, however, water levels could decrease to a point that would contribute to adverse cumulative impacts to riparian and wetland plant species.

Although salinity increases due to reduced flow are an important impacting factor for water quality in the New River, the salt levels are below the 4,000-mg/L water quality objective for the Colorado River basin and appear to be tolerated by riparian and wetland plant species. Given the potential for adverse effects associated with increasing salinity over the long term and the beneficial effects of the current and proposed wetlands projects and TMDL program, it is not clear whether the net cumulative impact to riparian and wetland plant species would be beneficial or adverse.

The contribution to adverse cumulative impacts to fish and aquatic invertebrate species in the New River of the proposed action is expected to be minimal; however, combined with other past, present, and future actions, salinity and other pollutant concentrations could increase to a point that would adversely impact these species. Water treatment processes implemented at the TDM and LRPC power plants and at the Mexicali II Treatment Plant and the passive treatment process in the wetlands could result in a beneficial contribution to cumulative impacts, especially with regard to phosphorus and BODs.

5.4.4.3 Salton Sea

Cumulative impacts to the Salton Sea due to past, present, and future actions and water use trends in the Salton Sea Watershed relate mainly to flow reductions in the New River that could elevate the concentrations of salt and nutrients discharged into the Sea. Decreases in phosphorus loadings in the New River (due to treatment processes at the power plants) could help to reduce eutrophication in the Salton Sea, thereby lowering the incidence of fish kills. This would increase the availability of food for birds and other wildlife. Under the proposed action, the contribution to adverse cumulative impacts to fish and bird species in the Salton Sea are expected to be minimal. However, combined with other past, present, and future actions, salinity could increase to a point that would adversely impact these species.

5.4.5 Cultural Resources

The cumulative impacts to cultural resources within the Yuha Desert ACEC would be the same as those stated for the proposed action since there are no other foreseeable projects in the area. Increased soil disturbance and accessibility created by access roads built for the projects could contribute to adverse impacts to known and unknown cultural resources at the site. The likelihood of these impacts is minimized, since BLM was consulted and provided input on siting the proposed and alternative routes to avoid cultural resources. A treatment plan for four potentially eligible sites was also developed and approved by the SHPO to mitigate any adverse effects related to construction activities.

5.4.6 Land Use

The cumulative effects of past, present, and future land use trends in the Yuha Desert ACEC (within BLM land) would increase human activity in the desert. The proposed action's contribution to these impacts is expected to be minimal since all construction and maintenance activities associated with the transmission lines would be conducted in consultation with BLM.

5.4.7 Transportation

The cumulative impacts to transportation along State Route 98 would be the same as those stated for the proposed action since there are no other foreseeable projects in this area. The increased construction traffic related to the proposed action would not likely result in adverse impacts since it would be temporary and would involve relatively low traffic volumes.

5.4.8 Visual Resources

The cumulative impacts to visual resources along State Route 98 would be the same as those stated for the proposed action since there are no other foreseeable projects in this area. With very little recreational activity and few residential locations in the vicinity of the applicants' proposed routes or the two alternative routes, road users constitute the largest single number of viewers of the transmission lines. Photo simulations indicate that the addition of transmission lines along any of the proposed routes would not be a prominent addition to the existing landscape for road users. The proposed action, therefore, would not likely contribute significantly to beneficial or adverse cumulative impacts to viewers on State Route 98.

5.4.9 Noise

The cumulative impacts due to noise in the Yuha Desert Management Area would be the same as those stated for the proposed action since there are no other foreseeable projects in this area. During construction of the transmission lines, noise would increase for areas near the ROWs. However, because the nearest resident to the proposed routes is located 6,900 ft (2,100 m) to the east, noise would exceed the EPA guideline of 55 dBA for residential zones only if the eastern alternative routes were used. Factors such as air absorption and ground effects could attenuate the noise level to some degree.

Although noise levels could potentially increase with the operation of the transmission lines as a result of the electrical field at the surface of conductors, the levels are expected to be less than 39 dBA and are considered minimal. Noise levels due to plant operations in Mexico also would not likely be discernable from other background noise for residents of Imperial County.

5.4.10 Socioeconomics

The cumulative effects of past, present, and future actions and employment trends in Imperial County would increase employment in the government; trade, transportation, and utilities; and manufacturing sectors. Although the proposed action would generate government revenues through tax revenues, wage and salary expenditures, and material procurement, most of the socioeconomic impacts resulting from the proposed action would be temporary and would not contribute significantly to beneficial or adverse cumulative impacts in Imperial County. During construction of the transmission lines, employment would increase, as would the need for housing and local public services. No new jobs would be created in Imperial County to operate the transmission lines; therefore, no long-term in-migration or population impacts would be expected.

5.4.11 Human Health

The magnetic field strength at the ROW edge is estimated to be 15 mG. Currently, the nearest resident to the transmission line routes is 300 ft (91 m) from the eastern edge of the eastern alternative routes' ROWs; magnetic field strength at this distance would be at background levels. It is not likely that the proposed action would adversely contribute to cumulative human health impacts.

The cumulative effects of past, present, and future actions, including industrial and agricultural trends in the Imperial Valley-Mexicali region, would increase the incidence of asthma and other air-quality-related health problems in residents of the Salton Sea Air Basin. The proposed action could contribute to these health impacts; however, its emissions would represent only a small portion (i.e., less than EPA significance levels) of the emissions in the region.

5.4.12 Minority and Low-Income Populations

Because the proposed routes would be located entirely within unpopulated BLM land and impacts from noise and dust emission during transmission line construction would be minimal and temporary, the proposed action would not contribute to disproportionately high and adverse cumulative impacts to minority and low-income populations. Similarly, $PM_{2.5}$ and PM_{10} emissions from the TDM and LRPC power plants were found to be below new source significance levels for negligible impacts and thus also would not contribute to disproportionately high and adverse cumulative impacts to minority and low-income populations.

The cumulative effects of past, present, and future actions, and water use and precipitation trends in the Salton Sea Watershed would reduce the volume of inflow to the Salton Sea, thus decreasing the elevation and increasing the salinity in the Sea. Current estimates indicate that even without contributions from the proposed action, salinity levels in the Salton Sea could reach critical levels detrimental to fishery resources in about 36 years. Adverse impacts to fishery resources within the Salton Sea could result in high and adverse impacts to the general population that fishes recreationally at the Sea; these impacts would not be disproportionately high and adverse to those populations that rely on the Sea for subsistence fishing, because the Salton Sea with no plants operating would reach critical salinity levels at essentially the same time (i.e., 4 days sooner over a 36-year period than for the proposed action). The proposed action could contribute to beneficial impacts because it would decrease phosphorus loading (near the New River inlet), and thus reduce the frequency of dissolved oxygen events that cause episodic fish kills.

TABLE 5.4-4 Summary of Anticipated Cumulative Impacts

Discipline Area	Section in EIS	Summary of Impacts
Geology and soils	5.4.1	The cumulative impacts to geologic and soil resources would be the same as those stated for the proposed action since there are no other foreseeable projects in the transmission line routes ROI. Impacts to soil would be localized along the transmission lines and would result from soil disturbance, thus increasing the potential for soil erosion (temporarily) and compaction due to vehicle usage (permanent).
Water resources	5.4.2	The cumulative effects of past, present, and future actions and water use and precipitation trends in the Salton Sea Watershed would reduce the volume of flow in the New River and inflow to the Salton Sea, thus decreasing the elevation and increasing the salinity in the Sea. Some activities, for example, wetland construction, have a beneficial cumulative impact in that they would improve overall water quality in the New River by reducing pollutant loadings. The proposed action would contribute to all these ongoing changes but would have a relatively small contribution. The cumulative effects of past, present, and future actions and water use trends in the Salton Sea Watershed would reduce the volume of flow in the New River and therefore reduce the volume of recharge to the Imperial Valley Groundwater Basin. The proposed action would contribute to this reduction but would have a relatively small contribution since the New River is only one of many recharge sources, and the reduction in flow is expected to be low.
Air quality	5.4.3	The cumulative effects of past, present, and future actions, including industrial and agricultural trends in the Imperial Valley-Mexicali region, would increase emissions of PM_{10}, NO_x, CO, and NH_3 to the Salton Sea Air Basin. The proposed action would contribute to these ongoing changes but would have a relatively small contribution (i.e., below EPA significance levels). The cumulative effects of past, present, and water use and precipitation trends in the Salton Sea Watershed would decrease water levels in the Salton Sea, exposing land along the shoreline. The proposed action, combined with these other actions, would increase the potential for adverse cumulative impacts due to fugitive dust emissions (PM_{10}).

TABLE 5.4-4 (Cont.)

Discipline Area	Section in EIS	Summary of Impacts
Biological resources	5.4.4	The cumulative impacts to biological resources would be the same as those stated for the proposed action since there are no other foreseeable projects in the Yuha Desert Management Area ROI. Transmission line construction would contribute to permanent impacts to vegetation and terrestrial habitat; watering practices to control dust could encourage growth of invasive plant species. Impacts to wildlife due to human activity would be temporary. The cumulative effects of past, present, and future actions and water use trends in the Salton Sea Watershed would reduce the volume of flow in the New River and inflow to the Salton Sea, thus increasing the salinity in both the river and the Sea. Given the potential for adverse effects associated with increasing salinity over the long term and the beneficial effects of the current and proposed wetlands projects and TMDL program, it is not clear whether the net cumulative impact to riparian and wetland plant species in the New River would be beneficial or adverse. The contribution to adverse cumulative impacts to fish and bird species in the Salton Sea would be minimal; however, combined with other past, present, and future actions, salinity could increase to a point that would adversely impact these species.
Cultural resources	5.4.5	The cumulative impacts to cultural resources would be the same as those stated for the proposed action since there are no other foreseeable projects in the Yuha Desert ACEC ROI. Impacts would result from increased soil disturbance and accessibility created by access roads. Consultation with BLM would minimize these impacts.
Land use	5.4.6	The cumulative effects of past, present, and future land use trends in the Yuha Desert ACEC ROI would increase human activity in the desert. Consultation with BLM would minimize these impacts.
Transportation	5.4.7	The cumulative impacts to transportation along State Route 98 would be the same as those stated for the proposed action since there are no other foreseeable projects in this ROI. Impacts resulting from increased construction traffic would be minimal (with relatively low traffic volumes) and temporary.
Visual resources	5.4.8	The cumulative impacts to visual resources along State Route 98 would be the same as those stated for the proposed action since there are no other foreseeable projects in this ROI. The addition of transmission lines would not be a prominent addition to the existing landscape for road users along State Route 98.

TABLE 5.4-4 (Cont.)

Discipline Area	Section in EIS	Summary of Impacts
Noise	5.4.9	The cumulative impacts due to noise in the Yuha Desert Management Area would be the same as those stated for the proposed action since there are no other foreseeable projects in this ROI. Impacts resulting from increased noise during transmission line construction would be minimal (since the nearest resident is 6,900 ft (2,100 m) from the proposed routes) and temporary.
Socioeconomics	5.4.10	The cumulative effects of past, present, and future actions and economic trends in Imperial County would reduce the unemployment rate overall, especially in the government, trade, transportation, and utilities, and manufacturing sectors (though agricultural employment is decreasing). Although the proposed action would generate government revenues through taxes, wage and salary expenditures, and material procurement, these impacts would be temporary and, therefore, would not contribute significantly to beneficial or adverse cumulative impacts in Imperial County.
Human health	5.4.11	The cumulative impacts to human health along the transmission line routes would be the same as those stated for the proposed action since there are no other foreseeable projects in this ROI (other than the existing IV-La Rosita transmission line). The cumulative impacts due to EMF strength at the ROW edge would not adversely contribute to cumulative impacts to residents near the transmission line routes (i.e., 300 ft [91 m] from the routes' edge), and the magnetic field strength at this distance would be at background levels. The cumulative effects of past, present, and future actions, including industrial and agricultural trends in the Imperial Valley-Mexicali region, would increase the incidence of asthma and other air-quality-related health problems in residents of the Salton Sea Air Basin. The proposed action resulting from this action would contribute to these health impacts; however, emissions resulting from this action would represent only a small portion of the emissions in the region.

TABLE 5.4-4 (Cont.)

Discipline Area	Section in EIS	Summary of Impacts
Minority and low-income populations	5.4.12	The cumulative effects of past, present, and future actions, and water use and precipitation trends in the Salton Sea Watershed would reduce the volume of inflow to the Salton Sea, thus decreasing the elevation and increasing the salinity in the Sea. Even without contributions from the proposed action, salinity levels in the Salton Sea could reach critical levels detrimental to fishery resources in about 36 years. Adverse impacts to fishery resources within the Salton Sea could result in high and adverse impacts to the general population that fishes recreationally at the Sea; these impacts would not be disproportionately high and adverse to those populations that rely on the Sea for subsistence fishing, because the Salton Sea would reach critical salinity levels in 36 years without the proposed action. The proposed action could contribute to beneficial impacts because it would decrease phosphorus loading (near the New River inlet), and thus reduce the frequency of dissolved oxygen events that cause episodic fish kills.

6 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

The proposed action analyzed in this EIS is the construction and operation of two transmission lines in Imperial County, California, in order to make power generated at two facilities in Mexico available in the United States. The construction and operation of the transmission lines and the operation of the plants that would supply them would result in some unavoidable adverse environmental impacts in the United States. This section describes these impacts.

6.1 NOISE

During construction, daytime noise would increase in areas located near the ROWs. There are no residences in these areas, and recreational use is limited. Since this impact is associated with the construction phase only, it would be temporary and short-term. During dry weather conditions (which is almost always the case in the study area), noise associated with corona effects would not be audible beyond the ROWs. During very infrequent rainfall events, the noise level at the edge of the ROWs would be less than 39 dBA. This is a low level (typical of the noise level in a library), which would not be expected to create a disturbance.

6.2 SOILS

The transmission line construction process would unavoidably have some affects on soil resources. Soils would be disturbed during the construction of towers, monopoles, and access roads. The construction of footings for towers and monopoles would result in the permanent displacement of soils. Removal of vegetation and compaction would occur in the work areas, with potential impacts on erosion. Soil displacement and compaction would occur during the grading and use of access roads. These impacts would occur on each of the alternative routes. However, construction of the western and eastern alternative routes would result in more disturbance. They would be longer and would require the construction of more towers than the proposed routes, and all new access roads would have to be graded, whereas the proposed routes would make use of existing roads. None of the routes analyzed would cross cultivated land, though it is likely that the lower portion of the western alternative routes would cross prime farmland.

6.3 WATER RESOURCES

The operation of the two power plants in Mexico using wet cooling would unavoidably consume water that would otherwise flow into the New River. This would reduce the flow of water in the New River as it enters the United States, and the flow of the New River into the Salton Sea. Reduced flows would result in lower water levels in both the New River and the Salton Sea, making the New River narrower and the Salton Sea smaller in area. The water treatment facilities associated with the power plants would beneficially remove many impurities from wastewater that would otherwise flow directly into the New River. However, because of the reduction in water volume associated with plant operation, there still would be increases in salinity and in the concentration of selenium in the New River, the Brawley wetlands that draw from the New River, and the Salton Sea. These increased concentrations would have small but adverse effects. Even with increased salinity, the concentration of TDS in the New River would remain less than the water quality objective for the Colorado River Basin.

Each transmission line would require the placement of two lattice towers within the 100-year floodplain at Pinto Wash. Because of their open structure and location on the very edge of the floodplain, only minor amounts of the floodplain would be disturbed (Section 4.2.4.2) with little if any affect on flood levels.

6.4 AIR QUALITY

The transmission line construction phase of the project, the operation and maintenance of the transmission lines, and the operation of the TDM and LRPC power plants in Mexico would affect air quality in the United States. Impacts from construction would include fugitive dust emissions generated by the operation of construction vehicles and the downwash from helicopters used in tower placement. Fugitive dust would be concentrated in the immediate vicinity of the transmission lines and would be of short duration. It is not expected to materially affect ambient PM_{10} levels in the projects region. There would also be exhaust emissions from construction vehicles. Given the small number of vehicles involved, the short duration of construction, and the distance of the construction sites from populated areas, no substantial effect on air quality is expected.

The operation and maintenance of the transmission lines would likewise result in the emission of small quantities of dust and exhaust emissions. The emissions resulting from the relatively infrequent trips required for line maintenance would add little to similar emissions generated by Border Patrol vehicles in the area. Corona effects from the operation of the transmission lines could result in amounts of O_3 and would be a minor contributor to ambient air pollution.

The Mexico power plants' stack emissions would include NO_x, CO, CO_2, NH_3, and PM_{10}. Cooling towers at the plants would also emit small amounts of PM_{10}. Secondary formation of O_3 and PM_{10} could result from the interaction of stack emissions with other substances in the atmosphere or plume. The Imperial Valley is a nonattainment area for PM_{10} and O_3, thus these two pollutants are of most concern. While it is likely that O_3 would be secondarily produced due to the operation of the two plants, the amount expected to reach the maximum U.S. receptor point is so small it would be indistinguishable from ambient background levels. PM_{10} and other criteria pollutants are expected to be below EPA significance levels in the United States. CO_2 emissions are expected to be very small and an insignificant contributor to global warming. Mitigation procedures have been proposed that would further reduce stack emissions and PM_{10} production.

6.5 BIOLOGICAL RESOURCES

All of the transmission line routes analyzed in this EIS pass through the Yuha Basin ACEC and the Yuha Basin Management Area for the flat-tailed horned lizard. A limited amount of Sonoran creosote bush scrub and desert wash natural habitat would unavoidably be destroyed by the construction of the towers, poles, crossing structures, and new access roads under each transmission line route. Habitat for the flat-tailed horned lizard and burrows of the western burrowing owl (BLM species of concern) would be lost. However, the implementation of mitigation procedures for these species during the construction phase would minimize the potential for individuals being killed. Nevertheless, some plant species considered sensitive by the California Native Plant Society could be disturbed. Both the western and eastern alternative transmission line routes would increase the number of routes into the ACEC and the Yuha Basin Management Area, thereby increasing the potential for human disturbance. Disturbance is likely to result both from the use of access roads for line maintenance and as the result of unauthorized recreational use of the roads. In general, the amount of unavoidable disturbance of biological resources would be less for the proposed routes than for the western or eastern alternative routes, because they would be shorter, require fewer towers, require less new road construction, and provide no new access to the ACEC and the Yuha Basin Management Area.

6.6 CULTURAL RESOURCES

The proposed transmission line routes would require the construction of lattice towers within the boundaries of four archaeological sites deemed eligible for inclusion in the NRHP by the California SHPO, resulting in the unavoidable removal of portions of these sites from the archaeological record. However, the SHPO has approved plans for the mitigation of any adverse effects resulting from this action.

Neither the western nor eastern alternative routes have been completely surveyed for cultural resources. However, each avoids the shoreline of ancient Lake Cahuilla and archaeological site density along these routes is expected to be lower. Lower site density would make it easier to avoid archaeological sites when placing towers and roads. However, even along the alternative routes it is possible that some archeological sites could not be avoided and would have to be mitigated by other means that unavoidably would result in the removal of all or portions of some sites.

6.7 VISUAL RESOURCES

There is little recreational activity and no residences within the projects area. The most significant visual impacts of the transmission lines would occur to drivers along State Route 98. Because of the existing SDG&E line paralleling the proposed routes, and the lattice tower structures that allow natural light and background elements to show through, thus partially retaining the existing character of the landscape, any visual impact from the new lines along the proposed routes is expected to be moderate. Transmission lines along the alternative routes would diverge the most from the existing line in the area south of State Route 98. This area is largely uninhabited and receives little recreational use; therefore, the visual impacts of the construction of transmission lines, although greater than along the proposed routes, would still be moderate.

7 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section describes irreversible and irretrievable commitments of resources associated with the implementation of the proposed action or any of the alternatives analyzed in this EIS. A resource commitment is considered *irreversible* when primary or secondary impacts from its use limit future use options. Irreversible commitment applies primarily to nonrenewable resources, such as minerals or cultural resources, and to those resources that are renewable only over long time spans, such as soil productivity. A resource commitment is considered *irretrievable* when the use or consumption of the resource is neither renewable nor recoverable for use by future generations. Irretrievable commitment applies to the loss of production, harvest, or natural resources.

7.1 LAND

The construction and operation of the proposed transmission lines would require the commitment of land for the placement of towers, poles, and crossing structures, and for new access roads. This commitment would be irreversible for the life of the transmission line. While it is possible that these structures and roads could be removed and the natural landscape renewed, this is unlikely in the foreseeable future. While the proposed and alternative transmission line routes would involve the same kinds of irreversible land use, they vary in the amount of new land used (see Section 4.6). The proposed routes would be the shortest and would require the construction of the fewest towers. For the most part, they would make use of preexisting access roads. Only relatively short extensions of roads (spurs) to the new towers would require a new land commitment. Both the western and eastern alternative routes would require the grading of new access roads (Table 7.1-1).

TABLE 7.1-1 Irreversible and Irretrievable Resource Commitments

Resource	Proposed Routes	Western Alternative Routes	Eastern Alternative Routes
Steel lattice towers	50	70	56
Monopoles	9	12	9
A-frames	8	8	8
Conductor cable – mi (km)	27 (44)	34 (55)	29 (46)
New access roads and spurs[a] – ac (ha)	1.72 (0.7)	12.78 (5.2)	10.10 (4.1)
Work areas around towers[b] – ac (ha)	3.4 (1.4)	4.8 (1.9)	3.9 (1.6)

[a] Values represent soil disturbance for new spurs only since there is an access road for the existing line that could be used for the proposed routes.

[b] Value include the area of permanent disturbance (201 ft^2) for the footing excavation at each tower.

7.2 WATER

Limited amounts of water would be irretrievably consumed in the construction of the transmission lines and in the operation of the power plants in Mexico to serve the lines. Both the La Rosita Power Complex (LRPC) and Termoeléctrica de Mexicali (TDM) plants would consume water that would otherwise flow into the New River. Operating at full capacity, the LRPC would consume 7,170 ac-ft (10 ft^3/s) annually and the TDM plant would consume 3,497 ac-ft (5 ft^3/s). This represents about 5.9% of the flow of New River water at the Calexico gage and would reduce the volume of water in the New River accordingly. However, since the main source of water for the U.S. reach of the New River is irrigation runoff from the U.S. side of the border, the effect on the volume of water decreases as the river flows north (see Section 4.2.1 for details). In addition, since the plants must treat incoming water in order to use it, the waters they release into the New River actually improve water quality in the river. Construction of the proposed transmission lines would also require small amounts of water for the mixing of concrete and dust suppression.

Each of the alternative transmission line routes would cross the 100-year floodplain at Pinto Wash in an area where the floodplain divides into two arms. The three routes converge and all cross about the same amount of floodplain. The proposed routes would require the placement of two towers in the floodplain (Tower Location 21). The resulting loss of floodplain would be minor, about 201 ft^2 (18.7 m^2) per tower. The same minor loss of floodplain would be expected if either the western or eastern alternative routes were chosen (Section 4.2.4.2).

7.3 CONSTRUCTION MATERIALS

Construction of the transmission lines would also result in both the irreversible and irretrievable use of common construction materials. The materials used for constructing the towers and monopoles and the concrete for their anchors are ultimately recyclable but would remain an irreversible commitment of resources for the life of the project. The proposed routes would require the construction of 50 steel lattice towers, 9 steel monopoles, and 8 A-frame crossing structures. The western alternative routes would require the construction of 70 lattice towers, while the eastern alternative routes would require the construction of 56 towers. The concrete anchors for each lattice tower would require about 755 ft^3 (21 m^3) of concrete. The proposed routes would require about 27 mi (44 km) of conductor cable. The western alternative routes would require about 34 mi (55 km) of cable, and the eastern alternative routes would require about 29 mi (46 km) (Table 7.1-1).

Small quantities of fossils fuels would be irretrievably consumed during the construction and maintenance of the transmission lines. Aviation fuel would be required for the helicopters used to bring the lattice towers from Mexico. Diesel fuel and gasoline would be consumed by construction and maintenance equipment along the transmission lines. The consumption of fuel during the construction phase would be of relatively short duration. These procedures would require the consumption of a relatively small amount of fuel that would not constitute a long-term drain on local resources.

7.4 BIOLOGICAL AND CULTURAL RESOURCES

The construction and operation of the transmission lines would result in limited irreversible and irretrievable commitments of natural and cultural resources. The areas occupied by the footings or anchors for tower, monopole, and crossing structures, as well as the access roads, would be irreversibly removed from natural habitat for the life of the transmission lines. In addition, some of the desert soil surfaces disturbed in areas of temporary construction activity, such as work areas, pull sites, lay-down areas, and trenches, could result in changes that would be irreversible over the long term. Although some sensitive species might be affected by construction, it is unlikely that threatened or endangered species would be harmed. Habitat for the flat-tailed horned lizard, as well as habitat and burrows for the western burrowing owl (both BLM species of concern), would be lost, although it is unlikely that individual organisms would be destroyed (Section 4.4.4). Of the alternative transmission line routes, the western routes would be the longest, disturb the most amount of land, and result in the greatest loss of habitat (see Table 7.1-1). The eastern routes would be shorter and have less sensitive habitat than the western routes. The proposed routes would result in the least new disturbance of habitat.

Cultural resources, such as archaeological sites, are nonrenewable resources. Their loss is irreversible. The proposed transmission line routes would closely follow an ancient lake shore frequented by prehistoric peoples who left a relatively dense area of archaeological remains. Two tower structures along the proposed routes fall within known archaeological sites determined to be eligible for inclusion in the NRHP by the California SHPO. Excavation for tower supports would irreversibly remove portions of these sites from the archaeological record. However, the California SHPO has approved a plan to mitigate the adverse effects from constructing tower supports at these two sites. It is likely that fewer archaeological resources would be affected by either of the alternative routes. The western alternative routes are laid out such that they would avoid most areas with high archaeological site density. These routes would run well above the ancient lakeshore. Conversely, the shorter eastern routes would lie below the ancient lake shore but would avoid areas of known high archaeological site density.

8 SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

This section discusses the short-term use of the environment and the maintenance of its long-term productivity. A more detailed discussion of impacts and resource utilization associated with this project is presented in Chapter 4. For this EIS, *short term* refers to the period of construction, the time when the largest number of temporary environmental impacts are most likely to occur.

The project area subject to short-term use would be limited to the applicants' proposed power line routes and alternatives. Work areas and pull sites would be needed during the erection of towers, monopoles, and crossover structures, and during the stringing of the conductors. None of the routes analyzed would cross cultivated land; thus, no agricultural lands would be taken out of production. Some prime farmland, not currently used for agriculture, could be affected if the proposed transmission lines were built along the western alternative route. However, construction would occur in the Yuha Basin ACEC and the Yuha Basin Management Area (habitat for the flat-tailed horned lizard), and the natural environment would be disturbed over the short term. Land clearing and construction activities would disperse wildlife and temporarily eliminate some habitats, although mitigation measures should prevent the loss of individual organisms belonging to species of concern. Long-term reductions in biological productivity are possible in some temporary work areas, since the effects of disturbance tend to be more pronounced in arid lands, such as the project area, where biological communities tend to recover slowly.

The transmission lines and associated access roads and spurs would have only limited effects on the long-term productivity of the natural environment, because of the relatively small area they would occupy and limited use of the area by maintenance and monitoring personnel. Effects of long-term occupancy by the transmission lines would include negative encounters between humans and wildlife, such as mortality resulting from maintenance or unauthorized recreational vehicles. The impact of these effects would be greater along both the western and eastern alternative routes than along the applicants' proposed routes. A transmission line with associated access roads already exists along the proposed routes, and new impacts would be fewer. Access roads constructed along the alternative western and eastern routes would increase ease of access to the ACEC, which would likely increase human pressure on this critical habitat.

The generation of power associated with the transmission lines using wet cooling would result in long-term use of water. Over the long term, the amount of water flowing in the New River as it reaches the United States and flowing out of the New River into the Salton Sea would be diminished, although the amount of decrease would be within normal flow fluctuations. Since the plants would treat the water before discharging it into the New River, there would be long-term beneficial reductions in biological pathogens, TSS, BOD, COD, and phosphorus in the river as it flows into the United States. However, while the TDS and selenium loads would be reduced, because of the reduced volume of water, there would be an increase in salinity and in the selenium concentration over the long term in the New River, the Brawley wetland, and the Salton Sea. The reduction of nutrient loads entering the Salton Sea would have a small but beneficial effect on biological resources. That effect would be negligible, however, in the long term, as the Sea's salinity would continue to increase and would overwhelm these short-term benefits. If current trends continue, the Salton Sea will be unable to support aquatic resources in about 36 years.

9 APPLICABLE ENVIRONMENTAL LAWS, REGULATIONS, PERMITS, AND DOE ORDERS

Permits and approvals are required before construction of the proposed transmission lines. Permits regulate many aspects of facility construction and operations, including the quality of construction, fugitive dust control requirements, and discharges of effluents to the environment. These permits would be obtained, as required, from the appropriate Federal, State, and local agencies.

The major Federal laws, regulations, E.O.s, and other compliance actions that apply to the proposed projects identified in Table 9-1. A number of Federal environmental statutes address environmental protection, compliance, or consultation. In addition, certain environmental requirements have been delegated to state authorities for enforcement and implementation. The applicants would conduct their operations in an environmentally safe manner and in compliance with all applicable statutes, regulations, and standards. Although this chapter does not address pending legislation or future regulations, it is recognized that the regulatory environment is subject to change, and that the construction and operation of the projects must be conducted in compliance with all applicable regulations and standards.

TABLE 9-1 Federal Environmental Statutes, Regulations, and Orders[a]

Resource Category	Statute/ Regulation/Order	Citation	Administering Agency	Permits, Approvals, Consultations, and Notifications
Air Resources	Clean Air Act	42 USC §§ 7401 et seq.	EPA	Requires sources to meet standards and obtain permits to satisfy: National Ambient Air Quality Standards (NAAQS), State Implementation Plans (SIPs), New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAPs), and New Source Review (NSR). **Applicability:** No major source permit required under NESHAPs or NSR. No NSPS requirements. SIP requirements may apply.
	CAA: NAAQS SIP	42 USC §§ 7409 et seq.	EPA, Imperial County APCD	Requires compliance with primary and secondary ambient air quality standards governing sulfur dioxide, nitrogen oxide, carbon monoxide, ozone, lead, and particulate matter, and emission limits/reduction measures as designated in each state's implementation plan. **Applicability:** SIP requirements may apply.
Noise	Noise Control Act	42 USC §§ 4901 et seq.	EPA	Requires facilities to maintain noise levels that do not jeopardize the health and safety of the public. Applicability: Applicable to construction noise.
Water Resources	CWA	33 USC §§ 1251 et seq. (Section 401)	CRWQCB, Colorado River Basin Region	Requires EPA or state-issued permits, National Pollutant Discharge Elimination System (NPDES) permits and compliance with provisions of permits regarding discharge of effluents to surface waters and additional wetland protection requirements. **Applicability:** No NPDES permit required. Other requirements may apply.
	CWA	33 USC § 1313 (Section 404)	SWRCB/CRWQCB, Colorado River Basin Region	Requires states to identify waters not attaining water quality standards and to develop discharge limitations known as total maximum daily loads (TMDLs) for specific pollutants that can be allowed without adversely affecting the beneficial uses of those waters. **Applicability:** TMDLs apply to the New River and the Salton Sea.

TABLE 9-1 (Cont.)

Resource Category	Statute/ Regulation/Order	Citation	Administering Agency	Permits, Approvals, Consultations, and Notifications
Water Resources (Cont.)	E.O. 11988: Floodplain Management E.O. 11990: Protection of Wetlands Management	42 FR 26951 May 24, 1977 42 FR 26961 May 24, 1977 10 CFR 1022 (implementing regulations)	Federal agencies	Where there is no practicable alternative to development in floodplains and wetlands, Federal agencies are required to prepare a floodplains and wetlands assessment, design mitigation measures, and provide public review. For floodplain involvement, Federal agencies must issue a Floodplain Statement of Findings. DOE will coordinate its review with other appropriate Federal agencies. Where applicable, DOE will combine floodplains and wetland assessments, public review, and statement of findings with the NEPA process. **Applicability:** Applicable.
Soil Resources	*Farmland Protection Policy Act*	7 USC § 4201 et seq.	NRCS	Minimizes any adverse effects to prime and unique farmlands. **Applicability:** Applicable.
Biological Resources	*Bald and Golden Eagle Protection Act*	16 USC §§ 668 et seq.	USFWS	Consultations should be conducted to determine if any protected birds are found to inhabit the area. If so, Intergen and Sempra must obtain a permit prior to moving any nests that may be required because of construction or operation of project facilities. **Applicability:** Applicable.
	E.O. 13112: Invasive Species	64 FR 6183 February 8, 1999	Federal agencies	Requires agencies, to the extent practicable and permitted by law, to prevent the introduction of invasive species; to provide for their control; and to minimize the economic, ecological, and human health impacts that invasive species cause. **Applicability:** Applicable.
	Migratory Bird Treaty Act	16 USC §§ 703 et seq.	USFWS	Requires consultation to determine if there are any impacts on migrating bird populations due to construction or operation of project facilities. If so, Intergen and Sempra will develop mitigation measures to avoid adverse effects. **Applicability:** Applicable.

TABLE 9-1 (Cont.)

Resource Category	Statute/ Regulation/Order	Citation	Administering Agency	Permits, Approvals, Consultations, and Notifications
Biological Resources (Cont.)	ESA	16 USC §§ 1531 et seq.	USFWS	Requires consultation to identify endangered or threatened species and their habitats, assess impacts thereon, obtain necessary biological opinions, and, if necessary, develop mitigation measures to reduce or eliminate adverse effects of construction or operations. **Applicability:** Applicable.
Cultural Resources	NHPA	16 USC §§ 470 et seq.	DOE/BLM	Requires consultation with the SHPO, land management agencies, and in certain cases, the Advisory Council on Historic Preservation prior to construction to ensure that no significant historical properties (i.e., *National Register of Historic Places*-eligible properties, as defined in the NHPA) would be affected. **Applicability:** Applicable.
	Archaeological and Historical Preservation Act	16 USC §§ 469 et seq.	DOI	Requires DOE to obtain permits for any disturbances of archaeological resources. **Applicability:** Applicable.
	Antiquities Act	16 USC §§ 431–433	DOI	Requires DOE to comply with all applicable sections of the Act. **Applicability:** Applicable.
	American Indian Religious Freedom Act	42 USC § 1996	DOI	Requires DOE to consult with local Native American Indian tribes prior to construction to ensure that their religious customs, traditions, and freedoms are preserved. **Applicability:** Applicable.
	Native American Graves Protection and Repatriation Act	25 USC §§ 3001 et seq.	DOI	Requires DOE to return certain Native American cultural items — human remains, funerary objects, sacred objects, and objects of cultural patrimony — to culturally affiliated Native American tribes and organizations. **Applicability:** Applicable.
	E.O. 13007: Protection and Accommodation of Access to “Indian Sacred Sites”	61 FR 26771 May 29, 1996	DOI	Requires DOE to consider the potential impact of its actions on Native American sacred sites, access to sacred sites, or use of sacred sites. **Applicability:** Applicable.

TABLE 9-1 (Cont.)

Resource Category	Statute/ Regulation/Order	Citation	Administering Agency	Permits, Approvals, Consultations, and Notifications
Cultural Resources (Cont.)	E.O. 13175: Consultation and Coordination with Indian Tribal Governments	63 FR 67249 November 9, 2000	DOI	Requires DOE to consult on a government-to-government basis with tribes and nations. **Applicability:** Applicable.
Worker Safety and Health	*Occupational Safety and Health Act*	5 USC § 5108	OSHA	Requires agencies to comply with all applicable work safety and health legislation (including guidelines of 29 CFR 1960) and prepare, or have available, Material Safety Data Sheets. **Applicability:** Applicable.
	Hazard Communication Standard	29 CFR 1910.1200	OSHA	Requires DOE to ensure that workers are informed of, and trained to handle all chemical hazards in the DOE workplace. **Applicability:** Applicable.
Visual Resources	*Wilderness Act*	16 USC §§ 1131–1136	DOI and USDA	Establishes determination of suitability and establishment of restrictions on activities that can be undertaken in an area designated as a wilderness area, including preservation of wilderness character and natural condition. **Applicability:** Applicable.
	National Trails System Act	16 USC §§ 1241–1249	DOI and USDA	Authorizes a national system of trails to provide additional outdoor recreation opportunities and to promote the preservation of access to the outdoor areas and historic resources of the nation. **Applicability:** Potentially applicable.
	Environmental Quality Improvement Act	42 USC §§ 4371–4375	CEQ	Requires each Federal agency conducting or supporting public works activities affecting the environment to implement policies established under existing law, to provide for enhancement of environmental quality. **Applicability:** Applicable.

TABLE 9-1 (Cont.)

Resource Category	Statute/ Regulation/Order	Citation	Administering Agency	Permits, Approvals, Consultations, and Notifications
Other	NEPA	42 USC §§ 4321 et seq. 40 CFR 1500–1508	CEQ	40 CFR 1500–1508 directs all Federal agencies in the implementation of NEPA. DOE NEPA regulations are in 10 CFR Part 1021, and BLM NEPA regulations are in BLM Handbook 1790-1 and DOI guidance (516DM 1-7). **Applicability:** Applicable.
	Toxic Substances Control Act	42 USC §§ 2011	EPA	Requires Intergen and Sempra to comply with inventory reporting requirements and chemical control provisions of TSCA to protect the public from the risks of exposure to chemicals. TSCA imposes strict limitations on the use and disposal of polychlorinated biphenyl-contaminated equipment. **Applicability:** Applicable primarily to the construction phase.
	Hazardous Materials Transportation Act	49 USC §§ 1801 et seq.	DOT	Requires Intergen and Sempra to comply with the requirements governing hazardous materials and waste transportation. **Applicability:** Applicable primarily to the construction phase.
	Emergency Planning and Community Right-To-Know Act	42 USC §§ 11001 et seq.	EPA	Requires the development of emergency response plans and reporting requirements for chemical spills and other emergency releases, and imposes right-to-know reporting requirements covering the storage and use of chemicals that are reported in toxic chemical release forms. **Applicability:** Applicable primarily to the construction phase.
	Pollution Prevention Act	42 USC §§ 11001–11050	EPA	Establishes a national policy that pollution should be reduced at the source and requires a toxic chemical source reduction and recycling report for an owner or operator of a facility required to file an annual toxic chemical release form under Section 313 of the *Superfund Amendments and Reauthorization Act.* **Applicability:** Potentially applicable.
	Proposed Construction or Alteration of Objects That May Affect the Navigable Airspace	FAA Advisory Circular (AC) No. 70/460-2K	FAA	Each proponent of a project that could pose an aviation hazard must file a "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA. **Applicability:** Potentially applicable.

TABLE 9-1 (Cont.)

Resource Category	Statute/ Regulation/Order	Citation	Administering Agency	Permits, Approvals, Consultations, and Notifications
Other (Cont.)	Obstruction Marking and Lighting	FAA AC No. 70/460-1K	FAA	Objects that may pose a navigation hazard must be marked and lighted according to FAA standards established using the criteria in 14 CFR 77. **Applicability:** Potentially applicable.
	Radio Frequency Device, Kits	47 CFR 15.25	FCC	These regulations prohibit operation of any devices producing force fields, which interfere with radio communications; even if (as with transmission lines) such devices are not intentionally designed to produce radio-frequency energy. The FCC requires each line operator to mitigate all complaints about interference on a case-specific basis. Staff usually recommend specific conditions of certification to ensure compliance with this FCC requirement. **Applicability:** Potentially applicable.
	E.O. 12088: Federal Compliance with Pollution Control Standards	43 FR 47707 October 17, 1978	Office of Management and Budget	Requires Federal agencies to consult with the EPA and state agencies regarding the best techniques and methods for the prevention, control, and abatement of environmental pollution. **Applicability:** Potentially applicable.
	E.O. 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	59 FR 7629 February 16 1994	EPA	Requires Federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. **Applicability:** Minimal applicability since the land crossed by the right-of-way is largely uninhabited.

[a] Abbreviations: AC = Advisory Circular; APCD = Air Pollution Control District; BLM = Bureau of Land Management; CAA = Clean Air Act; CEQ = Council on Environmental Quality; CFR = *Code of Federal Regulations*; CRWQCB = California Regional Water Quality Control Board; CWA = Clean Water Act; DOE = U.S. Department of Energy; DOI = U.S. Department of Interior; DOT = U.S. Department of Transportation; E.O. = Executive Order; EPA = U.S. Environmental Protection Agency; ESA = Endangered Species Act; FAA = Federal Aviation Administration; FCC = Federal Communications Commission; FR = *Federal Register*; NAAQS = National Ambient Air Quality Standards; NEPA = National Environmental Policy Act; NESHAPs = National Emission Standards for Hazardous Air Pollutants; NHPA = National Historic Preservation Act; NPDES = National Pollutant Discharge Elimination System; NRCS = Natural Resources Conservation Service; NSPS = New Source Performance Standards; NSR = New Source Review; OSHA = Occupational Safety and Health Administration; SHPO = State Historic Preservation Officer; SIP = State Implementation Plan; SWRCB = California State Water Resources Control Board; TMDL = total maximum daily load; TSCA = Toxic Substances Control Act; USC = United States Code; USDA = U.S. Department of Agriculture; USFWS = U.S. Fish and Wildlife Service.

10 AGENCIES AND PERSONS CONTACTED

DOE, as the lead Federal agency, has initiated contact with Federal and State agencies regarding the potential alternatives for the Imperial-Mexicali 230-kV Transmission Lines Projects. The BLM maintains a Protocol Agreement with the California SHPO that outlines the process for consultation between the agencies. The BLM, El Centro Field Office, maintains cultural resource information on the property it manages, including Utility Corridor N (the proposed location of the 230-kV lines), and contacts and consults with the California SHPO when a project could impact significant cultural resources. Consultation for the project between BLM and the California SHPO took place in 2001.

Table 10-1 presents a summary of DOE contacts made during preparation of the EIS. Federally recognized Native American groups were contacted previously by BLM to support analyses included in the EA. Chapter 6 of the EA (DOE 2001) includes a listing of the Tribal governments contacted.

TABLE 10-1 Agencies and Persons Contacted by DOE and ANL

Subject	Agency	Activity	Date
Land Management	BLM	Cooperating agency, contact Lynda Kastoll	Ongoing
Biological Resources	California Department of Fish and Game	Letter from Ellen Russell, DOE, to Judy Gibson, Carlsbad Fish and Wildlife Office, Carlsbad, California	January 25, 2004
	Bureau of Reclamation	Site visit of New River and Salton Sea	November 18, 2003
	California Department of Fish and Game	Kimberly Nicol, Environmental Scientist, Eastern Sierra-Inland Deserts Region, Bermuda Dunes, California	January 25, 2004
	Citizens Congressional Task Force on the New River	Site visit at New River Wetlands Project with Marie Barrett, Outreach Coordinator	November 18, 2003
	Sonny Bono Salton Sea National Wildlife Refuge	Site visit with Lester Dillard and Todd Stefanic, Staff Biologists, Calipatria, California	November 19, 2003
	BLM	Gavin Wright, Wildlife Biologist, El Centro Field Office	November 18, 2003
Cultural Resources	BLM	Margaret Hangan, Archaeologist, El Centro Field Office	November 24, 2003
Air Resources	Imperial County Air Pollution Office	Teleconference, Steve Birdsall and Brad Poiriez	February 4, 2004; February 19, 2004
	EPA, Air Resources Board	Consultation with Ronald Rothacker, Dwight Oda, and Pheng Lee, all of Planning and Technical Support	October 2003–February 2004
Alternative Technologies	Border Power Plant Working Group	E-mail to Ellen Russell, DOE, from William Powers	February 4, 2004

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13 GLOSSARY

Acre-foot: The volume of water that covers 1 acre (43,560 feet) to a depth of 1 foot (0.30 meters).

Advisory Council on Historic Preservation: A body appointed to advise the President and Congress in the coordination of actions by Federal agencies on matters relating to historic preservation. This organization participates in National Historic Preservation Act (NHPA) Section 106 consultations that are controversial or precedent setting.

Aesthetics: Referring to the perception of beauty.

Affected environment: Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action.

Air pollutant: An airborne substance that could, in high enough concentrations, harm living things or cause damage to materials. From a regulatory perspective, an air pollutant is a substance for which emissions or atmospheric concentrations are regulated or for which maximum guideline levels have been established due to potential harmful effects on human health and welfare.

Air quality standards: The level of pollutants prescribed by regulation that may not be exceeded during a specified time in a defined area.

Air shed: An area where emitted pollutants may interact or increase in concentration. The delineation of an air shed may be influenced by topographic features such as a land-water interface.

Alluvial deposits: Earth, sand, gravel, and other materials carried and deposited by moving surface water.

Alquist-Priolo Earthquake Fault Zoning Act (1972): California's Alquist-Priolo Act prohibits the building of most types of structures across the traces of active faults and strictly regulates construction in the corridors along active faults (Earthquake Fault Zones). It also defines criteria for identifying active faults.

Ambient air: Any unconfined portion of the atmosphere; open air, surrounding air. That portion of the atmosphere, external to buildings, to which the general public has access.

American Indian Religious Freedom Act of 1978: This act requires federal agencies to consult with Tribal officials to ensure protection of traditional religious and cultural rights and practices.

Ammonia (NH_3) slip: Unreacted ammonia that escapes out to the atmosphere.

Amperes: Measure of the flow of electric current; source of a magnetic field.

Aquifer: A body of rock or sediment in a formation, group of formations, or part of a formation that is saturated and sufficiently permeable to transmit economic quantities of water to wells and springs.

Aquitard: A geological formation that is not capable of transmitting significant quantities of water. It may function as a confining bed.

Archaeological sites (resources): Any location where humans have altered the terrain or discarded artifacts during either prehistoric or historic times.

Archaeology: A scientific approach to the study of human ecology, cultural history, and cultural process.

Artifact: An object produced or shaped by human workmanship of archaeological or historical interest.

Arroyo: A steep-sided and flat-bottomed gulley in an arid region that is occupied by a stream only intermittently, after rains.

Attainment area: An area which the U.S. Environmental Protection Agency (EPA) has designated as being in compliance with one or more of the National Ambient Air Quality Standards (NAAQS) for sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter. Any area may be in attainment for some pollutants but not for others.

Atmospheric dispersion: The dispersion of particulates or gaseous species (such as air pollutants) into the troposphere. It is a function of wind and atmospheric stability.

Background noise: The total acoustical and electrical noise from all sources in a measurement system that may interfere with the production, transmission, time averaging, measurement, or recording of an acoustical signal.

Benthic: Living on the sea floor.

Biochemical oxygen demand (BOD/BOD_5): An indirect measure of the concentration of biologically degradable material present in organic wastes. It usually reflects the amount of oxygen consumed in five days (BOD_5) by biological processes breaking down organic waste.

Black water: Water that contains animal, human, or food waste; untreated municipal wastewater.

Blading: The use of a steel blade or steel fork attachment on a tracked or rubber-tired vehicle that removes vegetation through a combination of pushing and/uplifting motions.

Candidate species: Plants and animals for which the U.S. Fish and Wildlife Service (USFWS) has sufficient information on biological vulnerability and threats to justify proposing to add them to the threatened and endangered species list, but cannot do so immediately because other species have a higher priority for listing.

Capacity: The load for which a generator, turbine, transformer, transmission circuit, apparatus, station, or system is rated. Capacity is also used synonymously with capability.

Carbon monoxide (CO): A colorless, odorless gas that is toxic if breathed in high concentrations over a period of time. It is formed as the product of the incomplete combustion of hydrocarbons (fuel).

Class I, II, and III Areas: Area classifications, defined by the Clean Air Act (CAA), for which there are established limits to the annual amount of air pollution increase. Class I areas include international parks and certain national parks and wilderness areas; allowable increases in air pollution are very limited. Air pollution increases in Class II areas are less limited and are least limited in Class III areas. Areas not designated as Class I start out as Class II and may be reclassified up or down by the state, subject to Federal requirements. Specified Federal lands, including certain national parks and wilderness areas, are mandatory Class I areas and may not be redesignated to another classification. All other PSD (prevention of significant deterioration) areas of the country are designated Class II areas. Currently there are no Class III areas.

Clean Air Act (CAA): (42 USC 7401 et seq.) Establishes (1) national air quality criteria and control techniques (Section 7408); (2) National ambient air quality standards (Section 7409 defines the highest allowable levels of certain pollutants in the ambient air. Because the U.S. Environmental Protection Agency (EPA) must establish the criteria for setting these standards, the regulated pollutants are called criteria pollutants); (3) state implementation plan requirements (Section 4710); (4) Federal performance standards for stationary sources (Section 4711); (5) national emission standards for hazardous air pollutants (Section 7412); (6) applicability of CAA to Federal facilities (Section 7418), (Federal agency must comply with Federal, State, and local requirements respecting control and abatement of air pollution, including permit and other procedural requirements, to the same extent as any person); (7) Federal new motor vehicle emission standards (Section 7521); (8) regulations for fuel (Section 7545); (9) aircraft emission standards (Section 7571).

Clean Air Act Conformity Requirement: Section 176 (c) of the Clean Air Act (CAA) requires Federal agencies to ensure that their actions conform to applicable implementation plans (in most cases, the State Implementation Plan [SIP]) for achieving and maintaining the National Ambient Air Quality Standards (NAAQS) for criteria pollutants.

Clean Water Act (CWA): (33 U.S. Code 1251 et seq.) Establishes requirements for (1) technology-based effluent limitations (Section 301); (2) water quality-based effluent limitations (Section 302); (3) individual control strategies for toxic pollutants (Section 304[l]); (4) new source performance standards (Section 306); (5) regulation of toxics (Section 307); (6) Federal facilities' pollution control (provisions for presidential exception) (Section 313); (7) thermal discharges (Section 316); (8) permits under the National Pollutant Discharge

Elimination System (NPDES) (Section 402); (9) permits for the discharge or dredged or fill materials into navigable waters (Section 404).

Climatology: The science that deals with climates and investigates their phenomena and causes.

Code of Federal Regulations (CFR): All Federal regulations in force are published in codified form in the Code of Federal Regulations.

Community (biotic): All plants and animals occupying a specific area under relatively similar conditions.

Conductor: Transmission line wire strung between transmission line structures to transmit electricity from one location to another.

Corona effect: Electrical breakdown of air into charged particles. It is caused by the electric field at the surface of conductors.

Council on Environmental Quality (CEQ): Established by the National Environmental Policy Act (NEPA). CEQ regulations (40 CFR Parts 1500–1508) describe the process for implementing NEPA, including preparation of environmental assessments and environmental impact statements (EISs), and the timing and extent of public participation.

Criteria pollutant: An air pollutant that is regulated by the National Ambient Air Quality Standards (NAAQS). The U.S. Environmental Protection Agency (EPA) must describe the characteristics and potential health and welfare effects that form the basis for setting or revising the standard for each regulated pollutant. Criteria pollutants are sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter.

Critical habitat: Habitat essential to the conservation of an endangered or threatened species that has been designated as critical by the U.S. Fish and Wildlife Service (USFWS) following the procedures outlined in the *Endangered Species Act* and its implementing regulations (50 CFR 424). See endangered species and threatened species.

Cultural resources: Districts, sites, structures, and objects and evidence of some importance to a culture, a subculture, or a community for scientific, traditional, religious, and other reasons. These resources and relevant environmental data are important for describing and reconstructing past lifeways, for interpreting human behavior, and for predicting future courses of cultural development.

Cumulative impact: The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.17).

Current: Flow of electrical charge.

Decibel (dB): A unit for expressing the relative intensity of sounds on a logarithmic scale from zero for the average least perceptible sound to about 130 for the average level at which sound causes pain to humans. For traffic and industrial noise measurements, the A-weighted decibel (dBA), a frequency-weighted noise unit, is widely used. The A-weighted decibel scale corresponds approximately to the frequency response of the human ear and thus correlates well with loudness.

Deposition: In geology, the laying down of potential rock-forming materials; sedimentation. In atmospheric transport, the settling out on ground and building surfaces of atmospheric aerosols and particles ("dry deposition") or their removal from the air to the ground by precipitation ("wet deposition" or "rainout").

Direct embedment: Type of pole installation that requires excavation of a shaft wider than the pole using a caisson-drilling rig and then subsequent backfilling around the pole.

Direct impacts: Impacts that are caused by the action and occur at the same time and place.

Distance zones: The relative visibility from travel routes or observation points.

Double-circuit: Two sets of lines (circuits) on a single tower (a single circuit consists of three conductors).

Drinking water standards: The prescribed level of constituents or characteristics in a drinking water supply that cannot be legally exceeded.

Ecology: A branch of science dealing with the interrelationships of living organisms with one another and with their nonliving environment.

Ecosystem: A community of organisms and their physical environment interacting as an ecological unit.

Effects: As used in NEPA documentation, the terms effects and impacts are synonymous. Effects can be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health; effects can be direct, indirect, or cumulative. Effects include both beneficial and detrimental impacts.

Effluent: A waste stream flowing into the atmosphere, surface water, groundwater, or soil. Most frequently the term applies to wastes discharged to surface waters.

Elevation: Height above sea level.

Eligible cultural resource: A cultural resource that has been evaluated and reviewed by an agency and the State Historic Preservation Office (SHPO) and recommended as eligible for inclusion in the National Register of Historic Places (NRHP), based on the criteria of significance. The criteria of significance consider American history, architecture, archeology, engineering, and culture. The criteria require integrity and association with lives or events, distinctiveness for any of a variety of reasons, or importance because of information the property does or could hold.

Embedment: See direct embedment.

Emissions: Pollution discharged into the atmosphere from smoke stacks, other vents, and surface areas of commercial or industrial facilities, residential chimneys, and vehicle exhausts.

Emission standards: Requirements established by a State, local government, or the U.S. Environmental Protection Agency (EPA) Administrator that limit the quantity, rate, or concentration of emissions of air pollutants on a continuous basis.

Endangered species: Plants or animals that are in danger of extinction throughout all or a significant portion of their ranges and that have been listed as endangered by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service following the procedures outlined in the Endangered Species Act (ESA) and its implementing regulations (50 CFR Part 424). Some states also list species as endangered.

Endangered Species Act (ESA)*:* (16 U.S. Code 1531 et seq.) Provides for listing and protection of animal and plant species identified as in danger, or likely to be in danger, of extinction throughout all or a significant portion of their range. Section 7 places strict requirements on Federal agencies to protect listed species.

Environmental impact statement (EIS): The detailed written statement that is required by section 102(2)(C) of the National Environmental Policy Act (NEPA) for a proposed major Federal action significantly affecting the quality of the human environment. A U.S. Department of Energy (DOE) EIS is prepared in accordance with applicable requirements of the Council on Environmental Quality (CEQ) NEPA regulations in 40 CFR Parts 1500–1508 and DOE NEPA regulations in 10 CFR Part 1021. The statement includes, among other information, discussions of the environmental impacts of the proposed action and all reasonable alternatives, adverse environmental effects that cannot be avoided should the proposal be implemented, the relationship between short-term uses of the human environment and enhancement of long-term productivity, and any irreversible and irretrievable commitments of resources.

Environmental justice: An identification of potential disproportionately high and adverse impacts on low-income and/or minority populations that may result from proposed Federal actions (required by Executive Order 12898).

Energy: That which does or is capable of doing work. It is measured in terms of the work it is capable of doing; electric energy is usually measured in kilowatt-hours.

Ephemeral stream: A stream that flows only after a period of heavy precipitation.

Epilimnion: Upper waters of a thermally stratified lake, subject to wind action.

Erosion: Wearing away of soil and rock by weathering and the actions of surface water, wind, and underground water.

Ethnographic: Information about cultural beliefs and practices.

Eutrophication: The process by which water bodies, such as lakes, estuaries, or slow-moving rivers and streams are enriched by nutrients (usually phosphorus and nitrogen), which leads to excessive plant growth. This plant growth (often called algae bloom) reduces dissolved oxygen in the water and can lead to fish deaths.

Fault: A fracture or a zone of fractures within a rock formation along which vertical, horizontal, or transverse slippage has occurred.

Federal Land Policy and Management Act: Requires the Secretary of the Interior to issue regulations to manage public lands and the property located thereon for the long term.

Field effect: Induced currents and voltages as well as related effects that might occur as a result of electric and magnetic fields at ground level.

Floodplain: The lowlands adjoining inland and coastal waters and relatively flat areas, including at a minimum that area inundated by a 1% or greater chance flood in any given year. The base floodplain is defined as the 100-year (1%) floodplain. The critical action floodplain is defined as the 500-year (0.2%) floodplain.

Flow: The volume of water passing a given point per unit of time. Same as streamflow.

Formation: In geology, the primary unit of formal stratigraphic mapping or description. Most formations possess certain distinctive features.

Generation: The act or process of producing electricity from other forms of energy.

Generator: A machine that converts mechanical energy into electrical energy.

Gray water: Treated or partially treated sewer water.

Groundwater: Water within the earth that supplies wells and springs.

Groundwater basin: Subsurface structure having the character of a basin with respect to collection, retention, and outflow of water.

Hazardous air pollutants (HAPs): Air pollutants that are not covered by ambient air quality standards, but that may present a threat of adverse human health effects or adverse environmental effects. They are regulated under Section 112 of the Clean air Act (CAA).

Hazardous waste: A category of waste regulated under Resource Conservation and Recovery Act (RCRA). To be considered hazardous, a waste must be a solid waste under RCRA and must exhibit at least one of four characteristics described in 40 CFR 261.20 through 261.24 (i.e., ignitability, corrosivity, reactivity, or toxicity) or be specifically listed by the U.S. Environmental Protection Agency (EPA) in 40 CFR 261.31 through 261.33.

Heavy metals: Metallic elements with high atomic weights (e.g., mercury, arsenic, and lead). They can damage living things at low concentrations and tend to accumulate in the food chain.

Historic properties: Under the National Historic Preservation Act (NHPA), these are properties of national, State, or local significance in American history, architecture, archaeology, engineering, or culture that are worthy of preservation.

Hypolimnion: The bottom waters of a thermally stratified lake. It is isolated from wind mixing and typically too dark for much plant photosynthesis to occur

Impacts (effects): In this environmental impact statement (EIS), as well as in the Council on Environmental Quality (CEQ) regulations, the word impact is used synonymously with the word effect. See effects.

Indirect impacts: Effects that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Infrastructure: The basic installations and facilities on which the continuance and growth of a community or state (e.g., roads, schools, power plants, transportation, communication systems) are based.

Intensity (of an earthquake): A measure of the effects (due to ground shaking) of an earthquake at a particular location, based on observed damage to structures built by humans, changes in the earth's surface, and reports of how people felt the earthquake. Earthquake intensity is measured in numerical units on the Modified Mercalli scale. See Modified Mercalli Intensity scale and magnitude of an earthquake.

Interested parties: Those groups or individuals that are interested, for whatever reason, in the project and its progress. Interested parties include, but are not limited to, private individuals, public agencies, organizations, customers, and potential customers.

Intertie: A transmission line that links two or more regional electric power systems.

Invasive species: An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. "Alien species" means, with respect to a particular ecosystem, any species, including its seed, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.

Invertebrate: Animals characterized by not having a backbone or spinal column, including a wide variety of organisms such as insects, spiders, worms, clams, and crayfish.

Isolated occurrence: A grouping of less than 10 archaeological artifacts or a single undatable feature. These often consist of redeposited material of questionable locational context that are not related to nearby archaeological sites.

Isopleth: A line on a map joining points of equal value.

Kilovolt (kV): The electrical unit of power that equals 1,000 volts.

Landscape: An area composed of interacting ecosystems that are repeated because of geology, land, soils, climate, biota, and human influences throughout the area. Landscapes are generally of a size, shape, and pattern that is determined by interacting ecosystems.

Lithic: A stone artifact that has been modified or altered by human hands.

Load: The amount of electric power required at a given point on a system.

Loam: A rich, permeable soil composed of a mixture of clay, silt, sand, and organic matter.

Low-income population: A population that is classified by the U.S. Bureau of the Census 2000 as having an aggregated mean 1999 income level for a family less than $17,463. This level is adjusted through the poverty index using a standard of living percentage change where applicable.

Magnitude (of an earthquake): A quantity characteristic of the total energy released by an earthquake, as contrasted to “intensity,” which describes its effects at a particular place. Magnitude is calculated using common logarithms (base 10) of the largest ground motion. A one-unit increase in magnitude (e.g., from magnitude 6 to magnitude 7) represents a 30-fold increase in the amount of energy released. Three common types of magnitude are Richter (or local) (ML), P body wave (mb), and surface wave (Ms).

Maintenance area: Area redesignated as attainment within the last 10 years under the Clean Air Act (CAA). See attainment area.

Major source: Any stationary source or group of stationary sources in which all of the pollutant-emitting activities emit, or have the potential to emit, 100 or more tons per year of any regulated air pollutant, 10 tons per year of a single hazardous air pollutant (HAP), or combined HAP emissions exceeding 25 tons per year.

Makeup water: Water added to a cooling tower to replace water lost to evaporation or blowdown.

Mammal: Animals in the class *Mammalia* that are distinguished by having self-regulating body temperature, hair, and in females, milk-producing mammary glands to feed their young.

Management Indicator Species (MIS): Species selected by the U.S. Fish and Wildlife Service (USFWS) for monitoring and analysis because their population changes are believed to indicate the effects of management activities.

Megawatt (MW): The electrical unit of power that equals 1 million watts or 1,000 kilowatts.

Mesa: An isolated relatively flat-topped natural elevation.

Meteorology: The science dealing with the dynamics of the atmosphere and its phenomena, especially relating to weather.

Mineral: Naturally occurring inorganic element or compound.

Minority Population: Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic are minorities. The Council on Environmental Quality (CEQ) identifies these groups as minority populations when either (1) the minority population of the affected area exceeds 50%, or (2) the minority population percentage in the affected area is meaningfully greater than the minority population percentage in the general population or appropriate unit of geographical analysis.

Mitigation: The alleviation of adverse impacts on environmental resources by avoidance through project redesign or project relocation, by protection, or by adequate scientific study. Mitigation includes (1) avoiding an impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of an action and its implementation; (3) rectifying an impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of an action; or (5) compensating for an impact by replacing or providing substitute resources or environments.

Modified Mercalli Intensity Scale: The Modified Mercalli Intensity Scale is a standard of relative measurement of earthquake intensity, developed to fit construction conditions in most of the United States. It is a 12-step scale, with values from I (not felt except by a very few people) to XII (damage total).

National Ambient Air Quality Standards (NAAQS): Standards defining the highest allowable levels of certain pollutants in the ambient air. Because the U.S. Environmental Protection Agency (EPA) must establish the criteria for setting these standards, the regulated pollutants are called criteria pollutants. The criteria pollutants are sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter. See *Clean Air Act.*

National Environmental Policy Act (NEPA): (42 USC 4341, passed by Congress in 1969) NEPA established a national policy designed to encourage consideration of the influences of human activities (e.g., population growth, high-density urbanization, industrial development) on the natural environment. NEPA also established the Council on Environmental Quality (CEQ). NEPA procedures require that environmental information be made available to the public before decisions are made. Information contained in NEPA documents must focus on the relevant issues in order to facilitate the decision-making process.

National Historic Preservation Act (NHPA): (16 USC 470) Provides for an expanded *National Register of Historic Places* (NRHP) to register districts, sites, buildings, structures, and objects significant to American history, architecture, archaeology, and culture. Section 106 requires that the President's Advisory Council on Historic Preservation be afforded an opportunity to comment on any undertaking that adversely affects properties listed in the NRHP.

National Pollutant Discharge Elimination System (NPDES) Permit: Federal regulation (40 CFR Parts 122 and 125) that requires permits for the discharge of pollutants from any point source into the waters of the United States regulated through the Clean Water Act (CWA).

National Register of Historic Places (NRHP): A list maintained by the Secretary of the Interior of districts, sites, buildings, structures, and objects of prehistoric or historic local, state, or national significance. The list is expanded as authorized by Section 2(b) of the Historic Sites Act of 1935 (16 U.S.C. 462) and Section 101(a)(1)(A) of the National Historic Preservation Act.

Native American: Person culturally identified with a Tribe that is indigenous to the United States and who belongs to a Federally recognized Tribe.

Native American Graves Protection and Repatriation Act: This act provides requirements for the treatment, repatriation, determination of ownership, and control of human remains and cultural items on Federal or Tribal lands.

Native vegetation: Plant life that occurs naturally in an area without agricultural or cultivation efforts. It does not include species that have been introduced from other geographical areas and have become naturalized.

Noise: Unwanted or undesirable sound, usually characterized as being so loud as to interfere with, or be inappropriate to, normal activities such as communication, sleep, or study. (See background noise.)

Nonattainment area: An area that the U.S. Environmental Protection Agency (EPA) has designated as not meeting one or more of the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. An area may be in attainment for some pollutants but not others.

Noxious weed: Invasive plant species regulated under Federal or state law. See invasive species.

Obligate species: Plant species that almost always occur in wetlands (i.e., greater than 99% of the time).

Offsets: The concept whereby emissions from a proposed facility that may be a new source of air pollution are balanced by reductions from existing sources to stabilize total emissions in a particular area.

Ozone (O_3): The triatomic form of oxygen. In the upper atmosphere, ozone protects the earth from the sun's ultraviolet rays, but in the lower levels of the atmosphere, ozone is considered an air pollutant. In the lower atmosphere, ozone is formed primarily from a photochemical reaction between nitrogen oxides and volatile organic compounds. Small amounts of ozone can be formed from corona effects on transmission lines.

Particulate Matter: Any finely divided solid or liquid material, other than uncombined pure water.

Peak capacity: The maximum capacity of a system to meet loads.

Peak demand: The highest demand for power during a stated period of time.

Peaker: A power plant that is generally run only when there is a high demand, that is, peak demand, for electricity.

Permeability: The ability of rock or soil to transmit a fluid.

pH: A measure of the relative acidity or alkalinity of a solution, expressed on a scale from 0 to 14, with the neutral point at 7.0. Acid solutions have pH values lower than 7.0, and basic (i.e., alkaline) solutions have pH values higher than 7.0. Because pH is the negative logarithm of the hydrogen ion (H+) concentration, each unit increase in pH value expresses a change of state of 10 times the preceding state. Thus, pH 5 is 10 times more acidic than pH 6, and pH 9 is 10 times more alkaline than pH 8.

Phreatophytic plants: Deep-rooted plants that obtain their water supply from groundwater

$PM_{2.5}$: Airborne particulate matter with a mean aerodynamic diameter less than or equal to 2.5 μm; regulated under the National Ambient Air Quality Standards (NAAQS).

PM_{10}: Airborne particulate matter with a mean aerodynamic diameter less than or equal to 10 μm; regulated under the National Ambient Air Quality Standards (NAAQS).

Prehistoric: Of, relating to, or existing in times antedating written history. Prehistoric cultural resources are those that antedate written records of the human cultures that produced them.

Present value: The worth of future returns or costs in terms of their current value. To obtain a present value, an interest rate is used to discount these future returns and costs.

Prevention of Significant Deterioration (of air quality) (PSD): Regulations established to prevent significant deterioration of air quality in areas that already meet the National Ambient Air Quality Standards (NAAQS). Among other provisions, cumulative increases in sulfur dioxide, nitrogen dioxide, and PM_{10} (particulate matter with mean aerodynamic diameter of 10 μm or less) levels after specified baseline dates; must not exceed specified maximum allowable amounts.

Prime farmland: Soil types with a combination of characteristics that make them particularly productive for agriculture.

Public Involvement Plan: Methodology used by the agency to encourage public participation.

Quaternary: A subdivision of geological time (the Quaternary period), including roughly the last two million years up to the present.

Rain shadow: The region on the lee side of a mountain or similar barrier where the precipitation is less than on the windward side.

Raptor: Birds of prey, including various types of hawks, falcons, eagles, vultures, and owls.

Record of Decision (ROD): A concise public document that records a Federal agency's decision concerning a proposed action for which the agency has prepared an environmental impact statement (EIS). The ROD is prepared in accordance with the requirements of the Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) regulations (40 CFR 1505.2). A ROD identifies the alternatives considered in reaching the decision, the environmentally preferable alternatives, factors balanced by the agency in making the decision, whether all practicable means to avoid or minimize environmental harm have been adopted, and if not, why they were not.

Region of influence (ROI): The geographical region that would be expected to affect a specific resource in some way by the proposed action and/or alternative(s).

Reliability: The ability of the power system to provide customers uninterrupted electric service. Includes generation, transmission, and distribution reliability.

Resource Conservation and Recovery Act: Regulates the storage, treatment, and disposal of hazardous and nonhazardous wastes.

Right-of-way (ROW): An easement for a certain purpose over the land of another, such as a strip of land used for a transmission line, roadway, or pipeline.

Rill: A small channel (usually only a few inches deep) eroded into the soil by surface runoff.

Riparian: Of or pertaining to the bank of a river, stream, lake, or other water bodies.

Runoff: The portion of rainfall, melted snow, or irrigation water that flows across the ground surface and may eventually enter streams.

Saturated zone: The zone in which the voids in the rock or soil are filled with water at a pressure greater than atmospheric pressure. The water table is the top of the saturated zone in an unconfined aquifer.

Scat: The excrement of an animal.

Scenery Management System (SMS): Visual resource tool used by the U.S. Fish and Wildlife Service (USFWS) for the inventory and analysis of aesthetic values of national forest lands as outlined in *Landscape Aesthetics: A Handbook for Scenery Management*.

Scoping: An early, open part of the National Environmental Policy Act (NEPA) process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.

Section 106 process: A National Historic Preservation Act (NHPA) (16 U.S.C. §470 et seq.) review process used to identify, evaluate, and protect cultural resources eligible for nomination to the NRHP that may be affected by Federal actions or undertakings.

Sedges: Grasslike plants.

Sediment: Material deposited by wind or water.

Sedimentation: The process of deposition of sediment, especially by mechanical means from a state of suspension in water.

Seismic: Pertaining to any earth vibration, especially an earthquake.

Sensitive species: Those plants and animals identified by the USFWS Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trend in populations or density and significant or predicted downward trend in habitat capability.

Socioeconomics: The social and economic condition in the study area.

Soil association: A natural grouping of soil types based on similarities in climatic or physiographic factors and soil parent materials. It may include a number of soil associates provided that they are all present in significant proportions.

Solid waste: In general, solid wastes are nonliquid, nonsoluble discarded materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes include sewage sludge, agricultural refuse, demolition wastes, and mining residues.

State Historic Preservation Officer (SHPO): The official within each state, authorized by the state at the request of the Secretary of the Interior, to act as liaison for purposes of implementing the National Historic Preservation Act (NHPA).

State Implementation Plan (SIP): A plan developed at the State level and enforceable by the U.S. Environmental Protection Agency (EPA), in which the State explains how it will comply with air quality standards.

Step-up transformer: Transformer in which the energy transfer is from a low- to a high-voltage winding or windings. (Winding means one or more turns of wire forming a continuous coil for a transformer, relay, rotating machine, or other electric device.)

Stoichiometry: The process of predicting the amount of product and the amounts of reactants in a chemical reaction, using the balanced equation for the reaction.

Stratigraphic: Of, relating to, or determined by stratigraphy; the superposition of layers (soil, rock, and other materials) often observed at archaeological sites.

Substation: Facility with transformers where voltage on transmission lines changes from one level to another.

Surface water: All bodies of water on the surface of the earth that are open to the atmosphere, such as rivers, lakes, reservoirs, ponds, seas, and estuaries.

Switchyard: Facility with circuit breakers and automatic switches to turn power on and off on different transmission lines.

Tail water: Surface water that drains from the low end of an irrigated field when the amount of water added to the field exceeds the infiltration capacity of the soil.

Tap: To tie a substation into an existing transmission line through a connection.

Tap point: The point where two transmission lines interconnect.

Tesla: Unit of measurement of magnetic field.

Threatened species: Any plants or animals that are likely to become endangered species within the foreseeable future throughout all or a significant portion of their ranges and which have been listed as threatened by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service following the procedures set out in the *Endangered Species Act* and its implementing regulations (50 CFR Part 424).

Tile water: Subsurface water that drains via tiles from an irrigated field.

Traditional cultural property/use area: Areas of significance to the beliefs, customs, and practices of a community of people that have been passed down through generations.

Transformer: A device for transferring energy from one circuit to another in an alternating-current system. Its most frequent use in power systems is for changing voltage levels.

Transmission line: The structures, insulators, conductors, and other equipment used to transfer electrical power from one point to another.

Tribe: A Federally recognized American Indian political entity.

U.S. Environmental Protection Agency (EPA): The independent Federal agency, established in 1970, that regulates Federal environmental matters and oversees the implementation of Federal environmental laws.

Vertebrate: Animals that are members of the subphylum Vertebrata, including the fishes, amphibians, reptiles, birds, and mammals, all of which are characterized by having a segmented bony or cartilaginous spinal column.

Volatile Organic Compounds (VOCs): A broad range of organic compounds that produce vapors at relatively low temperatures, such as gasoline and solvents.

Volt: The unit of voltage or potential difference. It is the electromotive force which, if steadily applied to a circuit having a resistance of one ohm, will produce a current of one ampere.

Voltage: Potential for an electric charge to do work; source of an electric field.

Water rights: Permits or licenses issued by the State Water Resources Control Board.

Watershed: The land area that drains into a stream. The geographic region within which water drains into a particular river or body of water.

Watt: The absolute meter-kilogram-second unit of power equal to the work done at the rate of one joule per second or to the power produced by a current of one ampere across a potential difference of one volt.

Wetland: An area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas.

Yield: A measure of the availability of water to meet authorized purposes, sometimes defined in terms of the ability to meet project needs within specific time periods.

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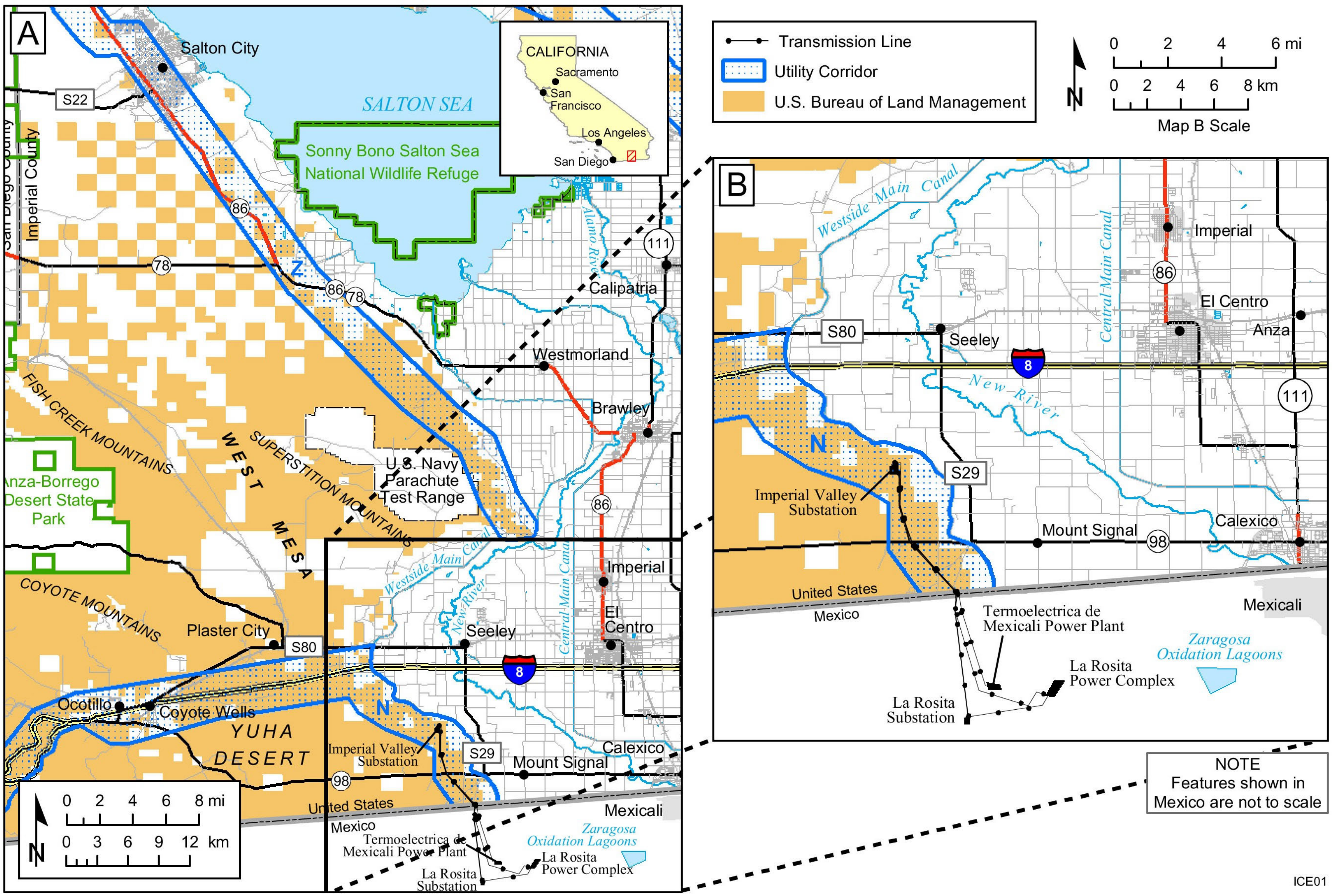


FIGURE 1.1-1 Regional Setting for Imperial-Mexicali 230-kV Transmission Lines

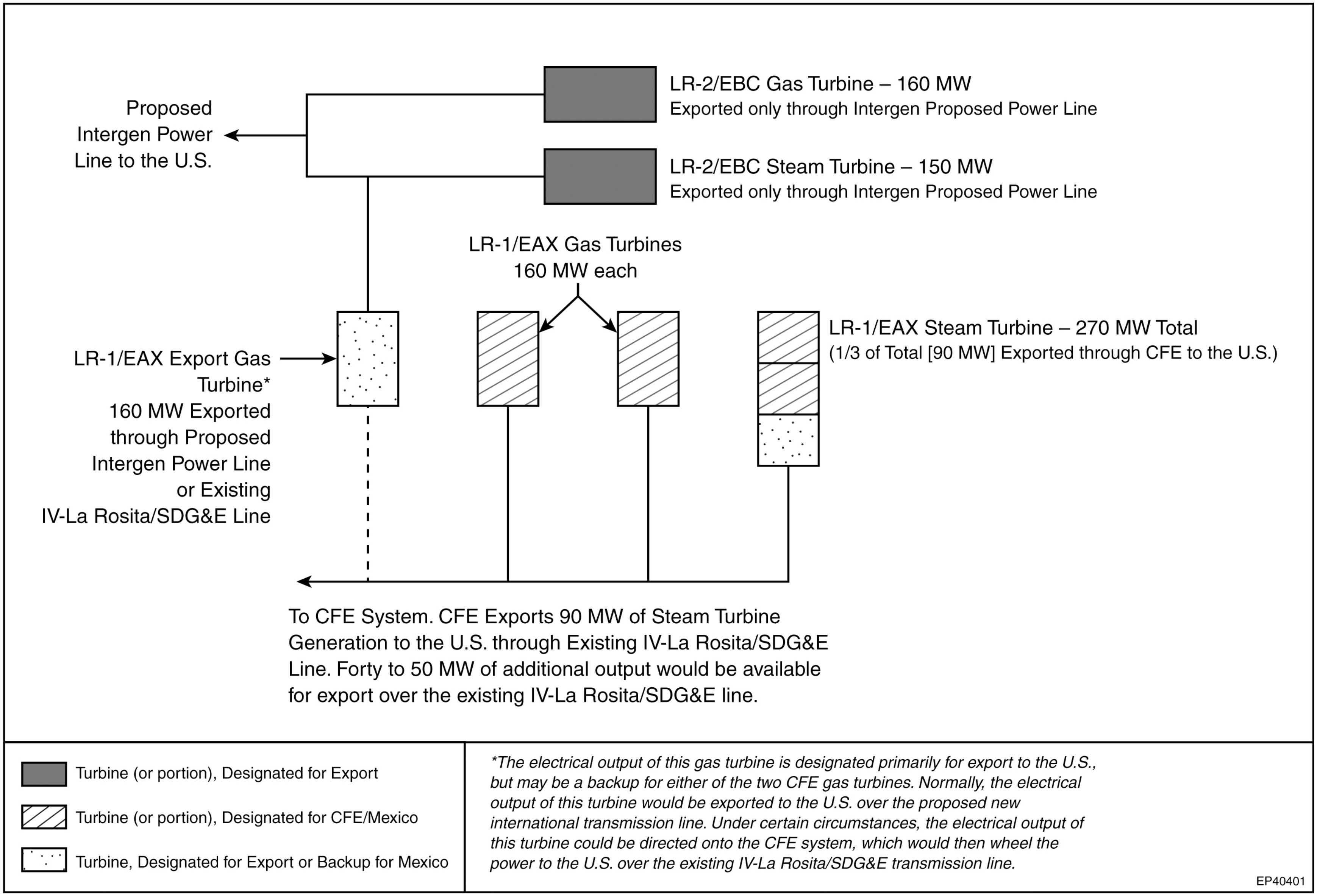


FIGURE 1.1-2 La Rosita Power Complex: Electrical Distribution

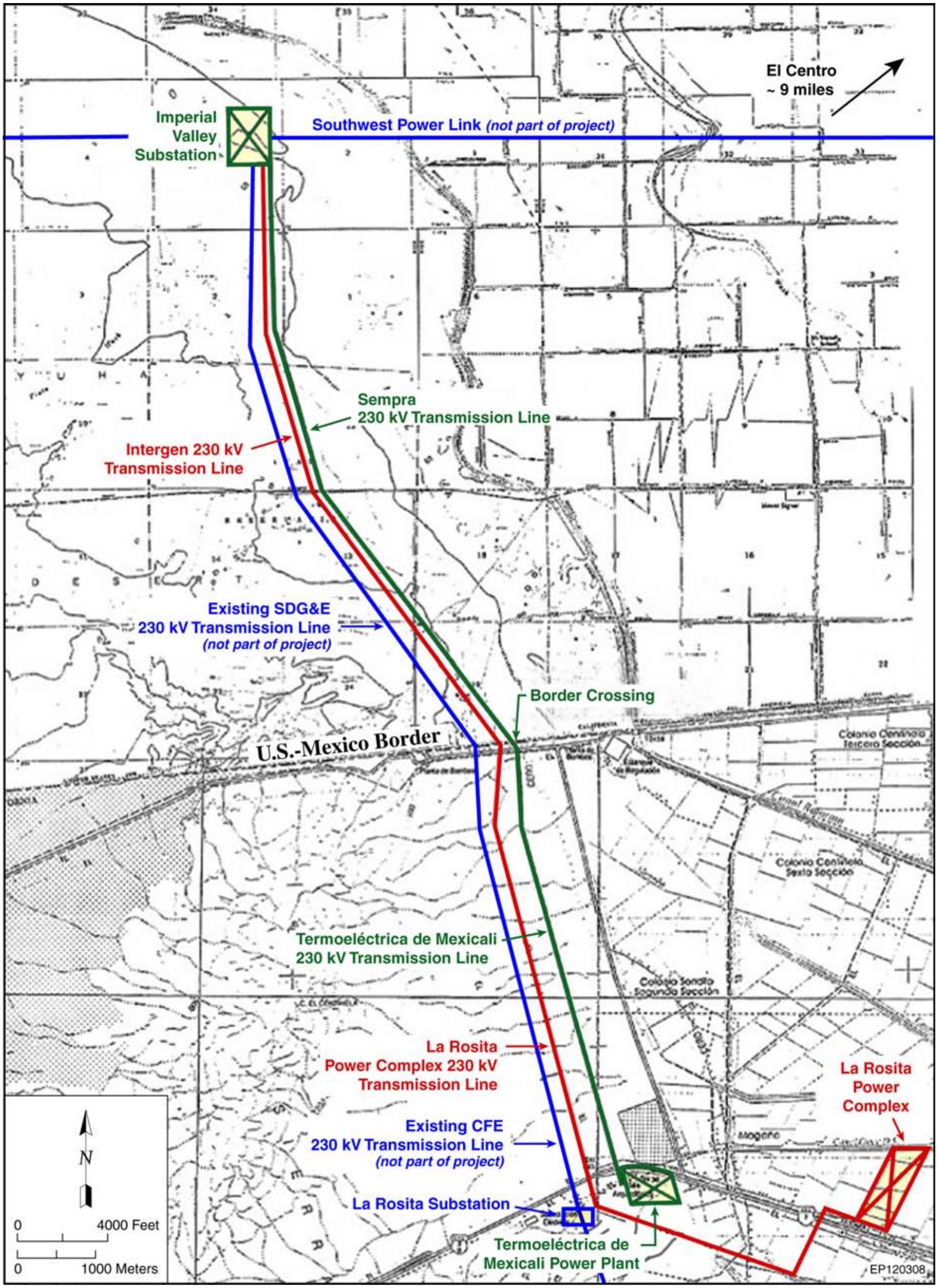


FIGURE 2.2-1 General Area Map Showing the Proposed Transmission Lines

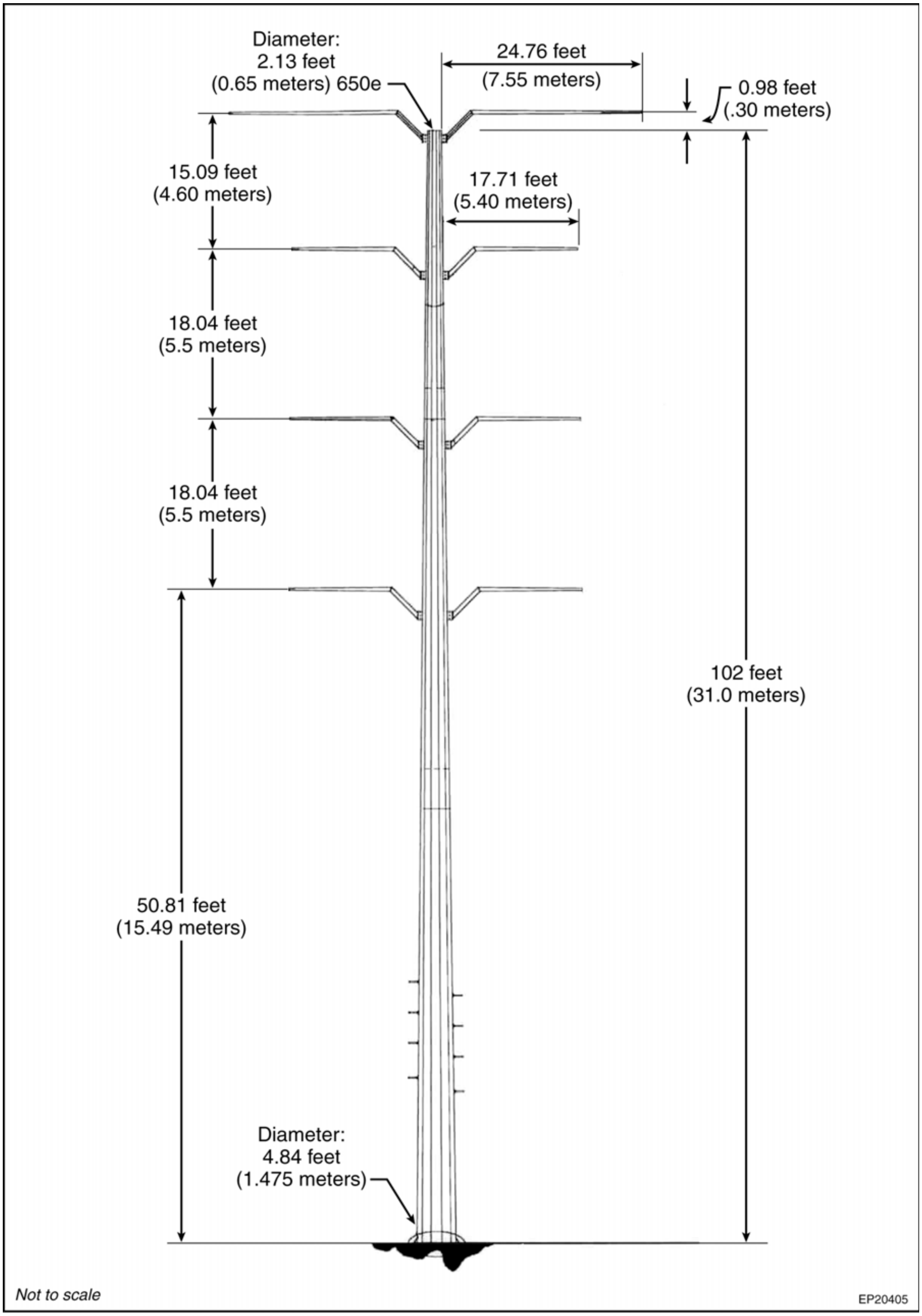


FIGURE 2.2-10 Deflection Monopole

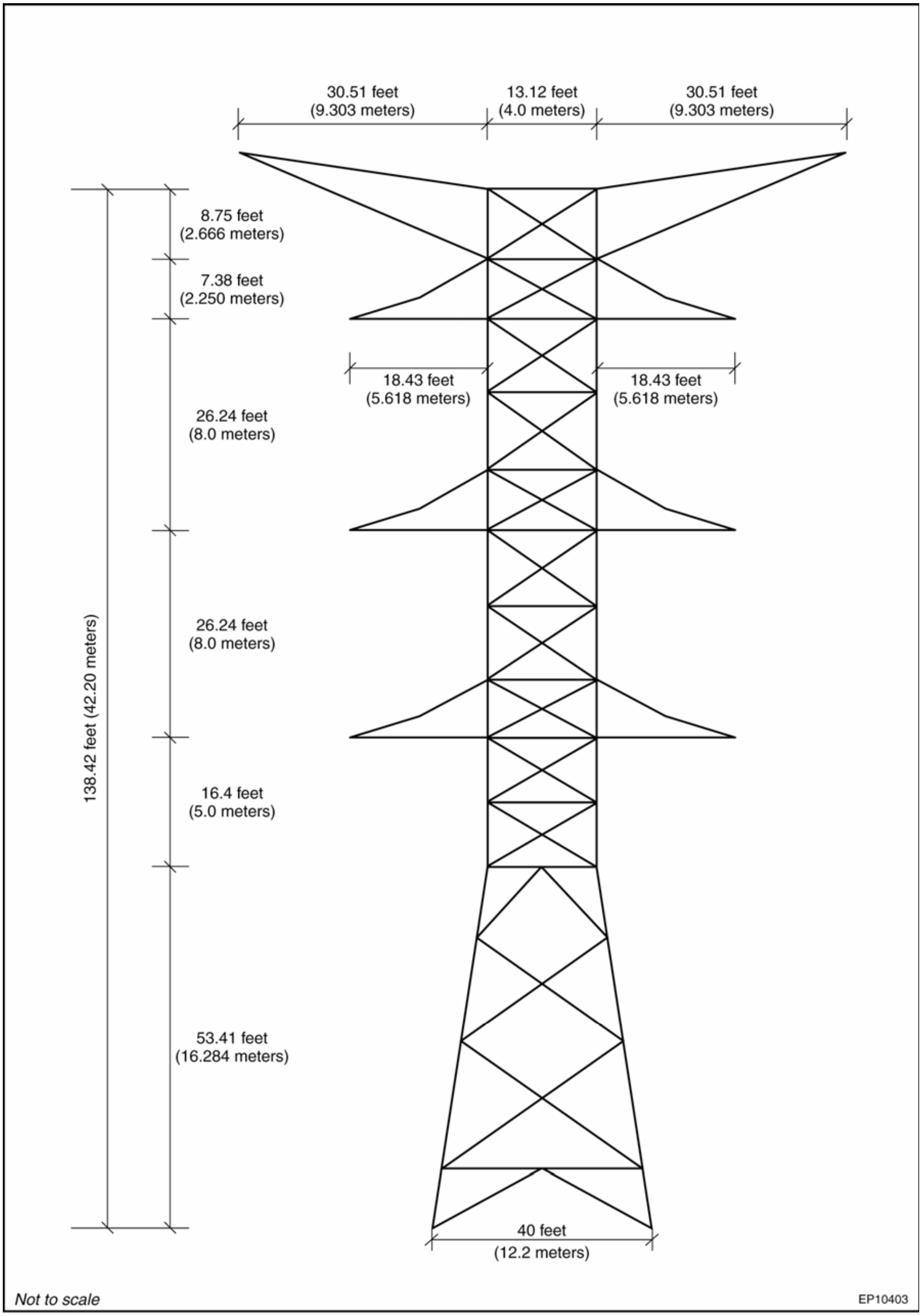


FIGURE 2.2-11 Dead-end Tower

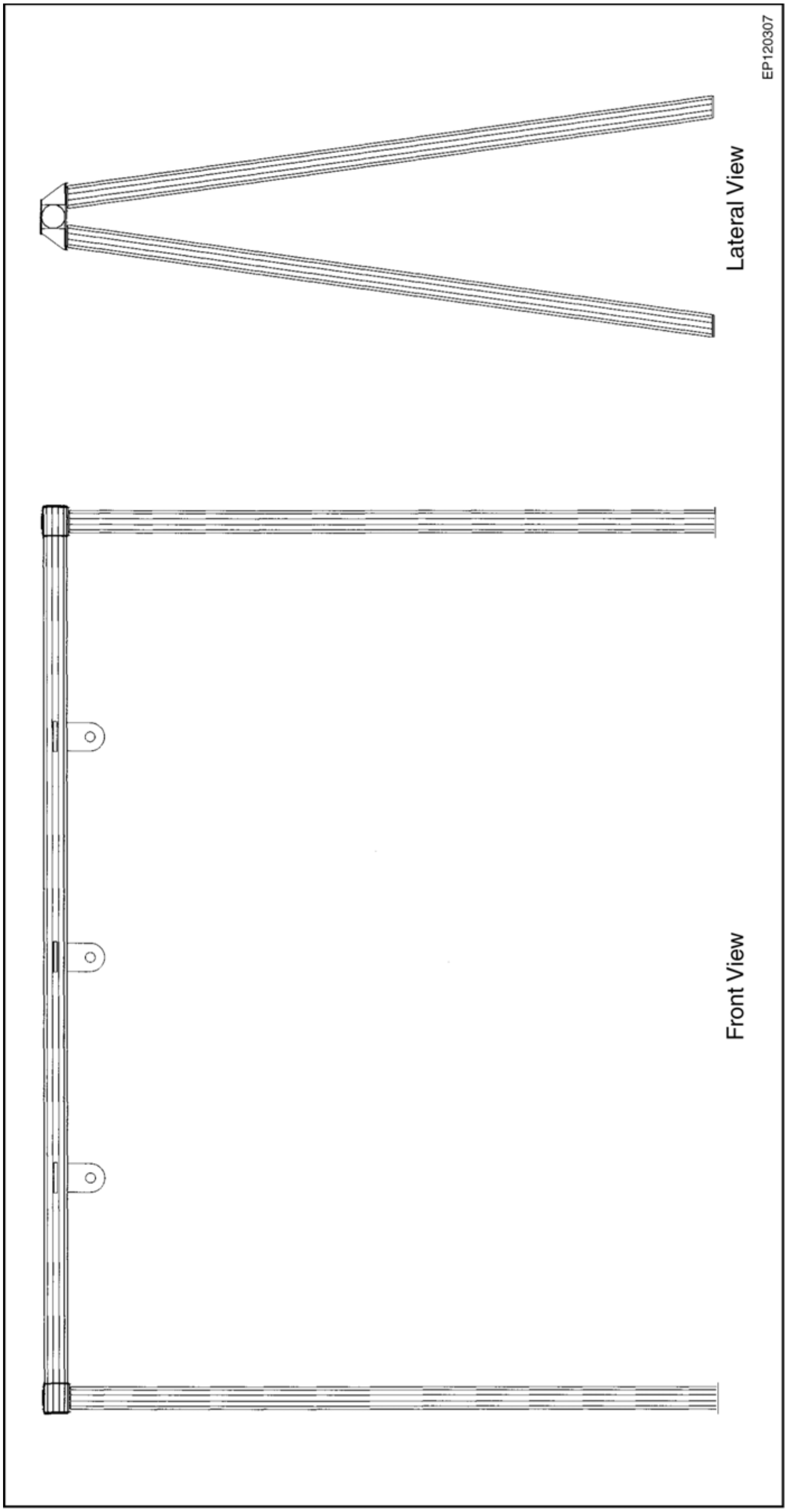


FIGURE 2.2-12 Crossing Structure

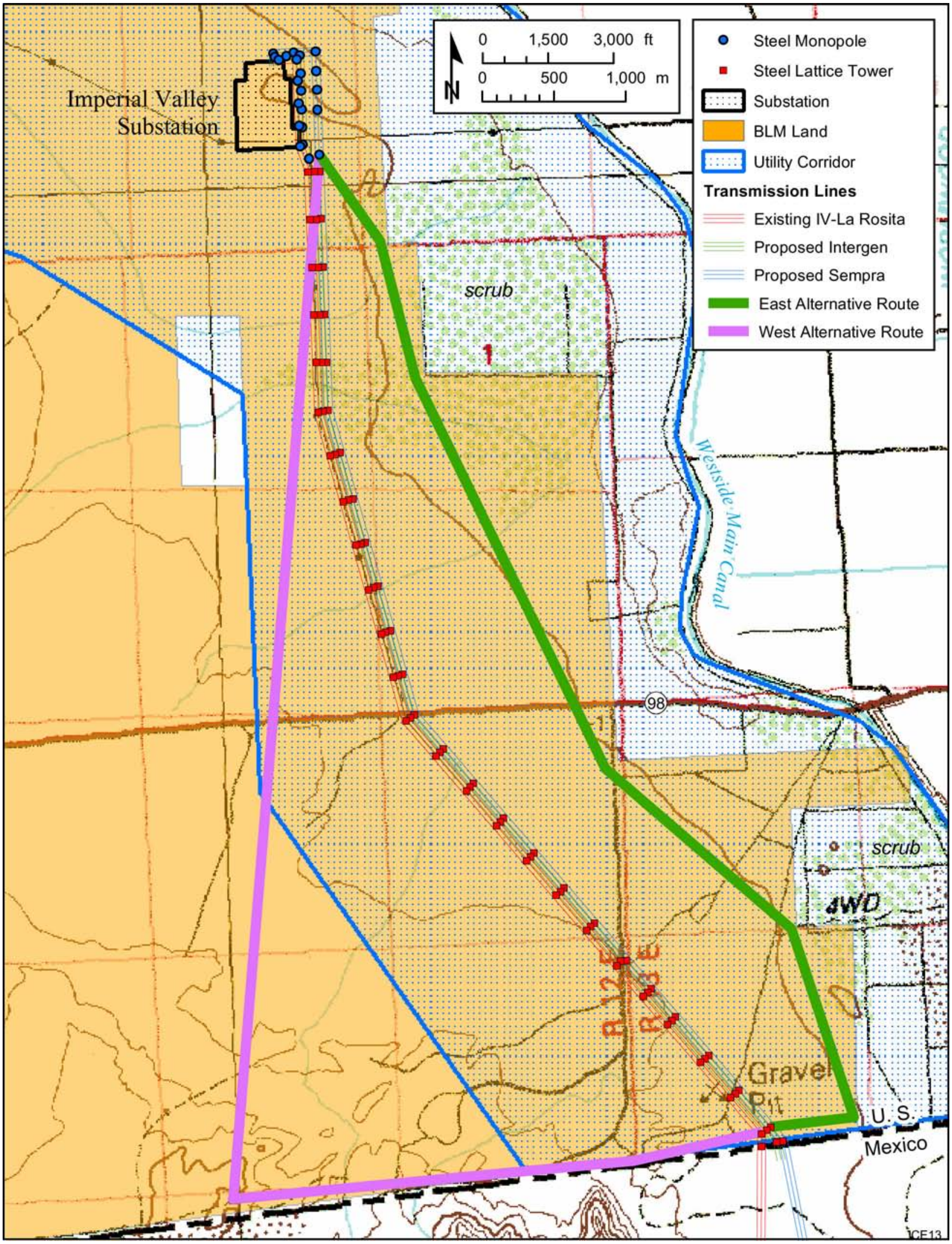


FIGURE 2.2-13 Alternative Transmission Line Routes

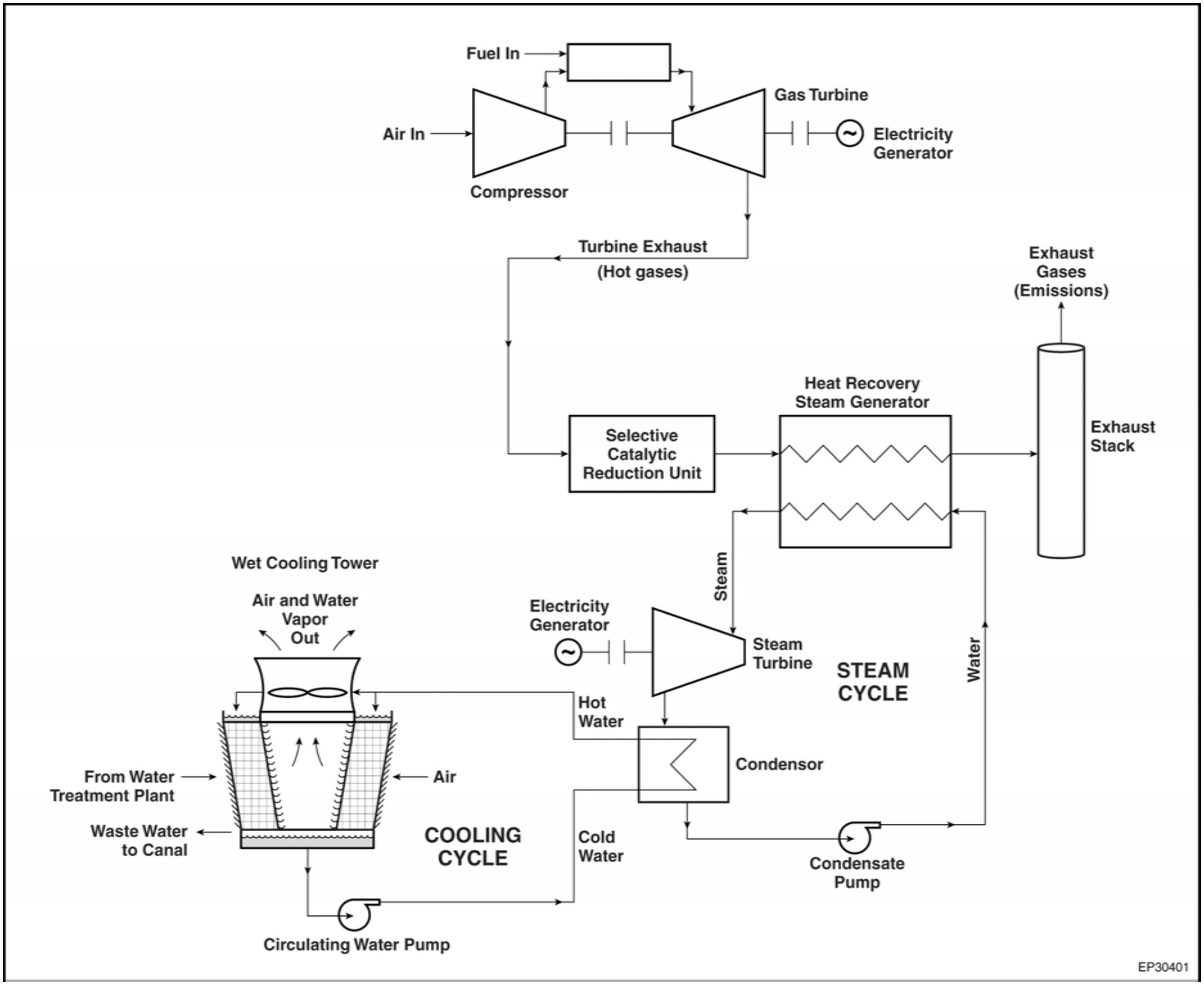


FIGURE 2.2-14 General Engineering Features at the LRPC and TDM Power Plants

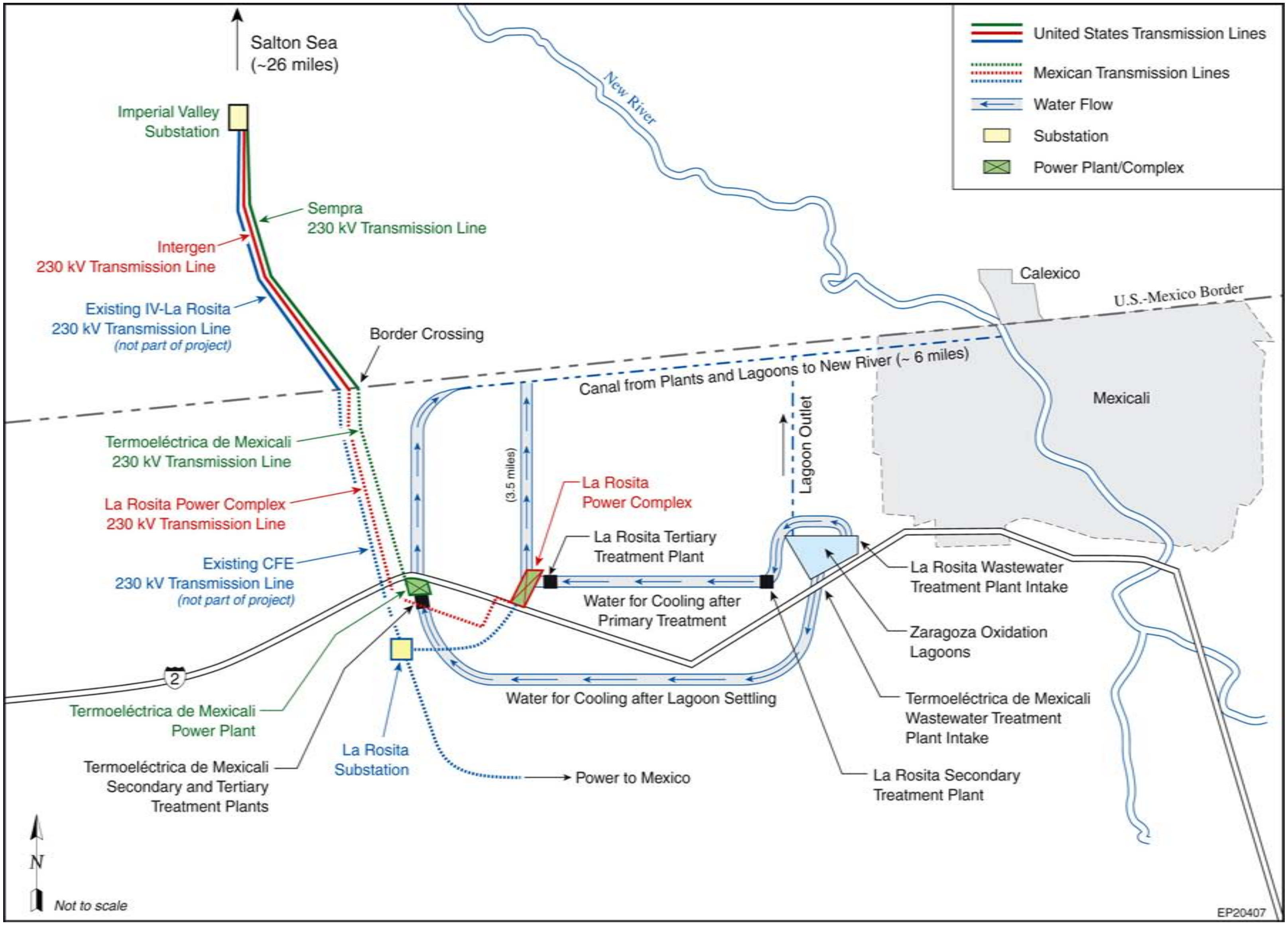


FIGURE 2.2-17 Water Supply Cycle for LRPC and TDM Power Plants

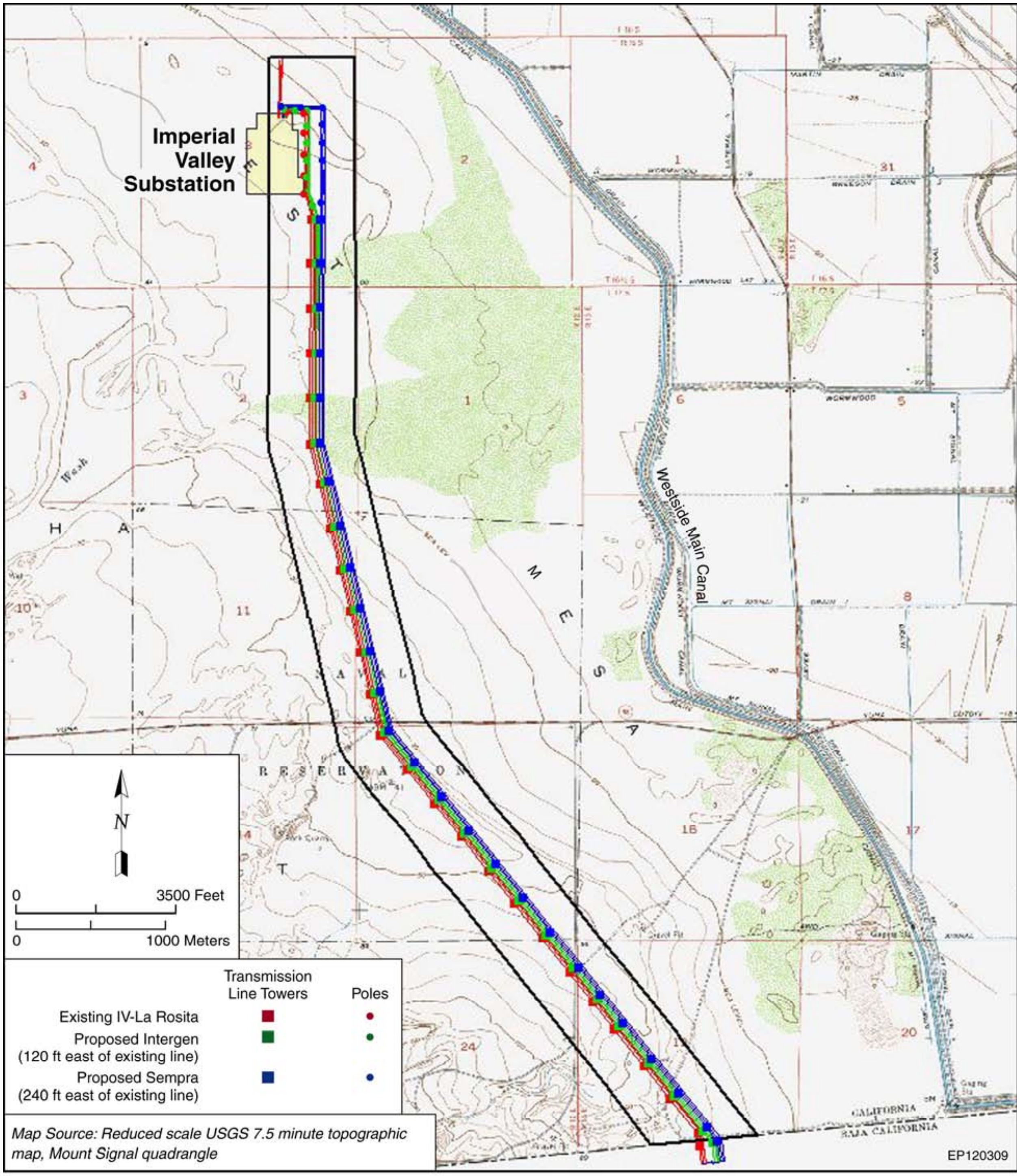


FIGURE 2.2-2 Location of Existing and Proposed Transmission Lines as Shown on USGS Topographic Map

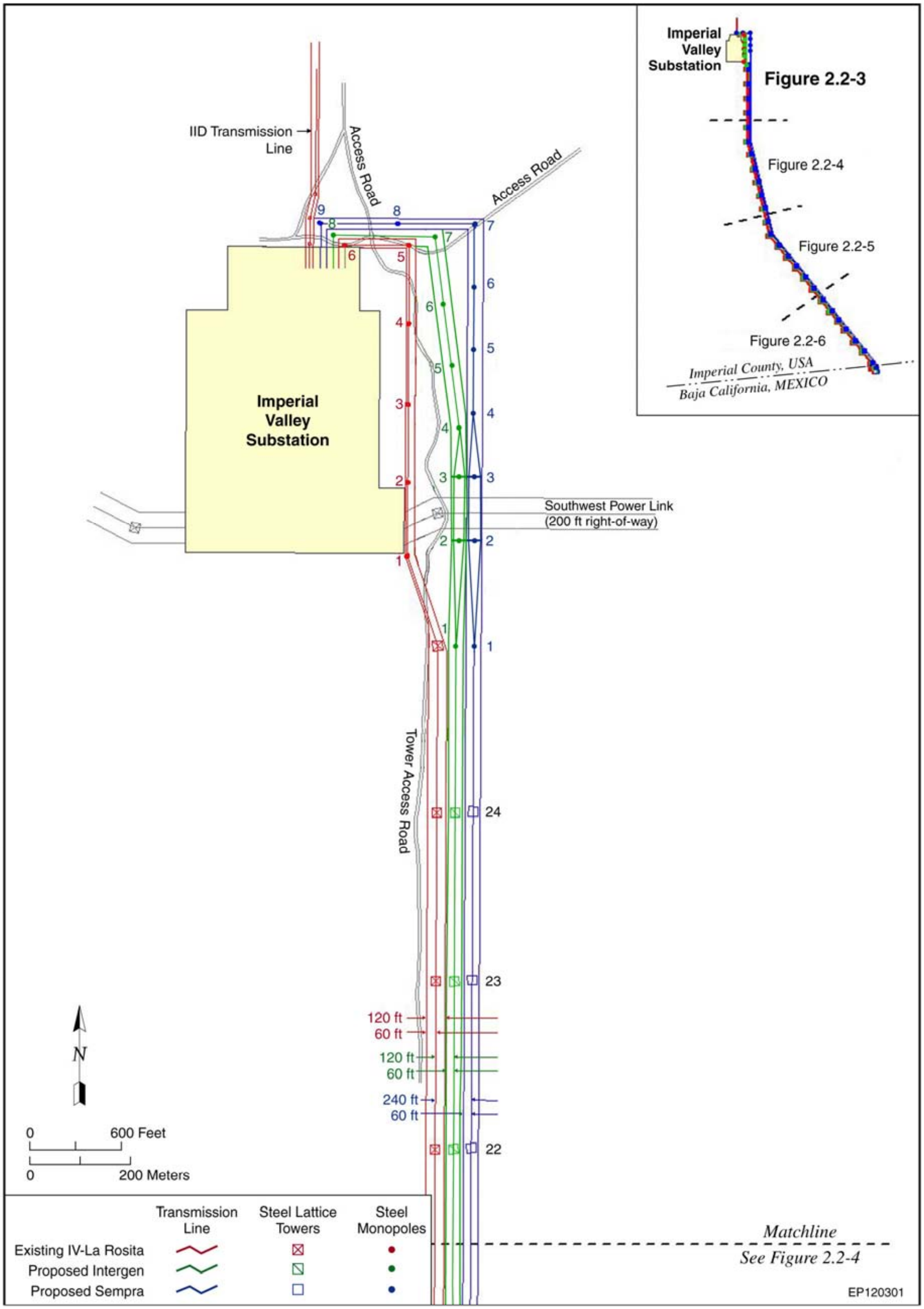


FIGURE 2.2-3 Projects Plan — Segment A

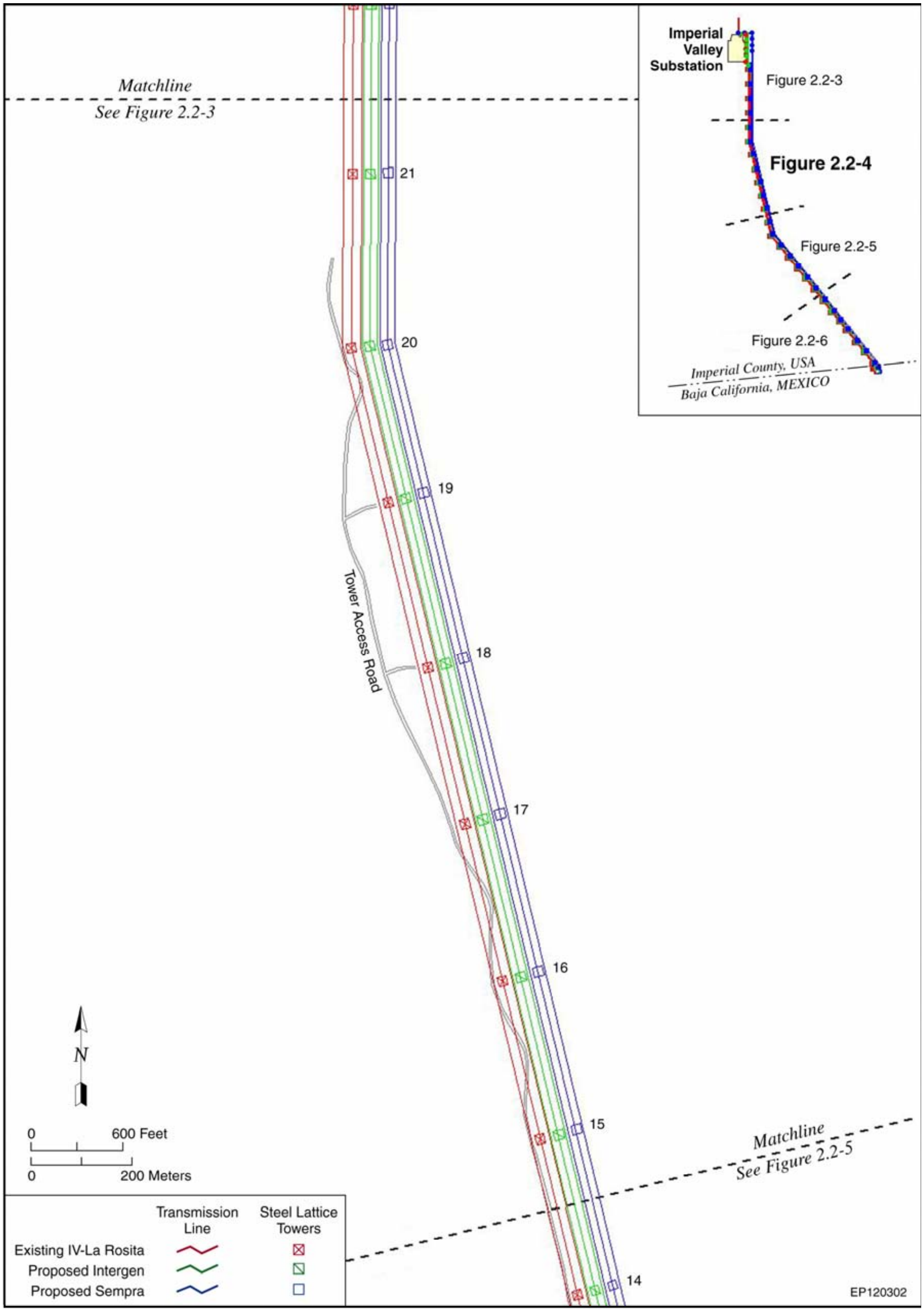


FIGURE 2.2-4 Projects Plan — Segment B

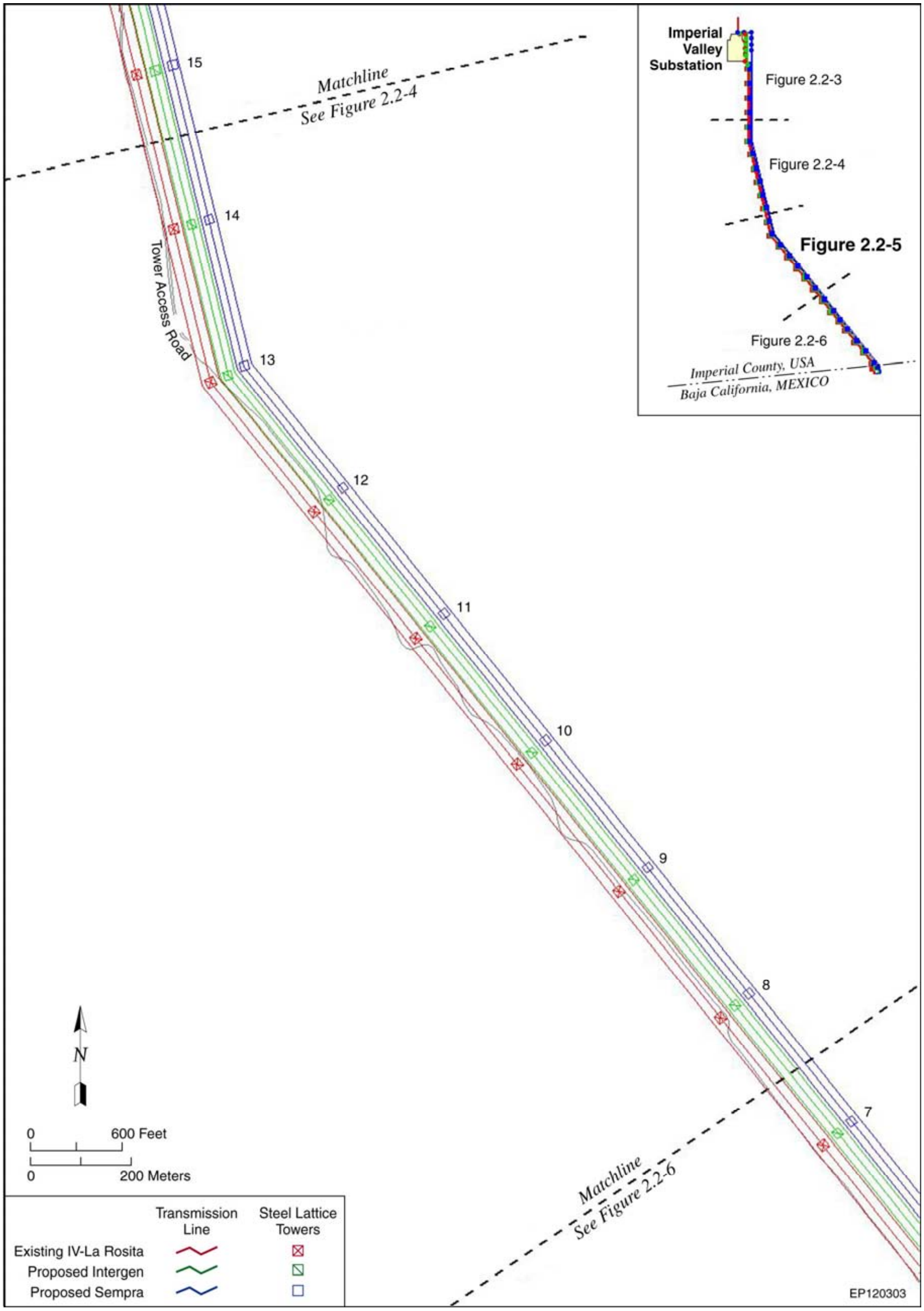


FIGURE 2.2-5 Projects Plan — Segment C

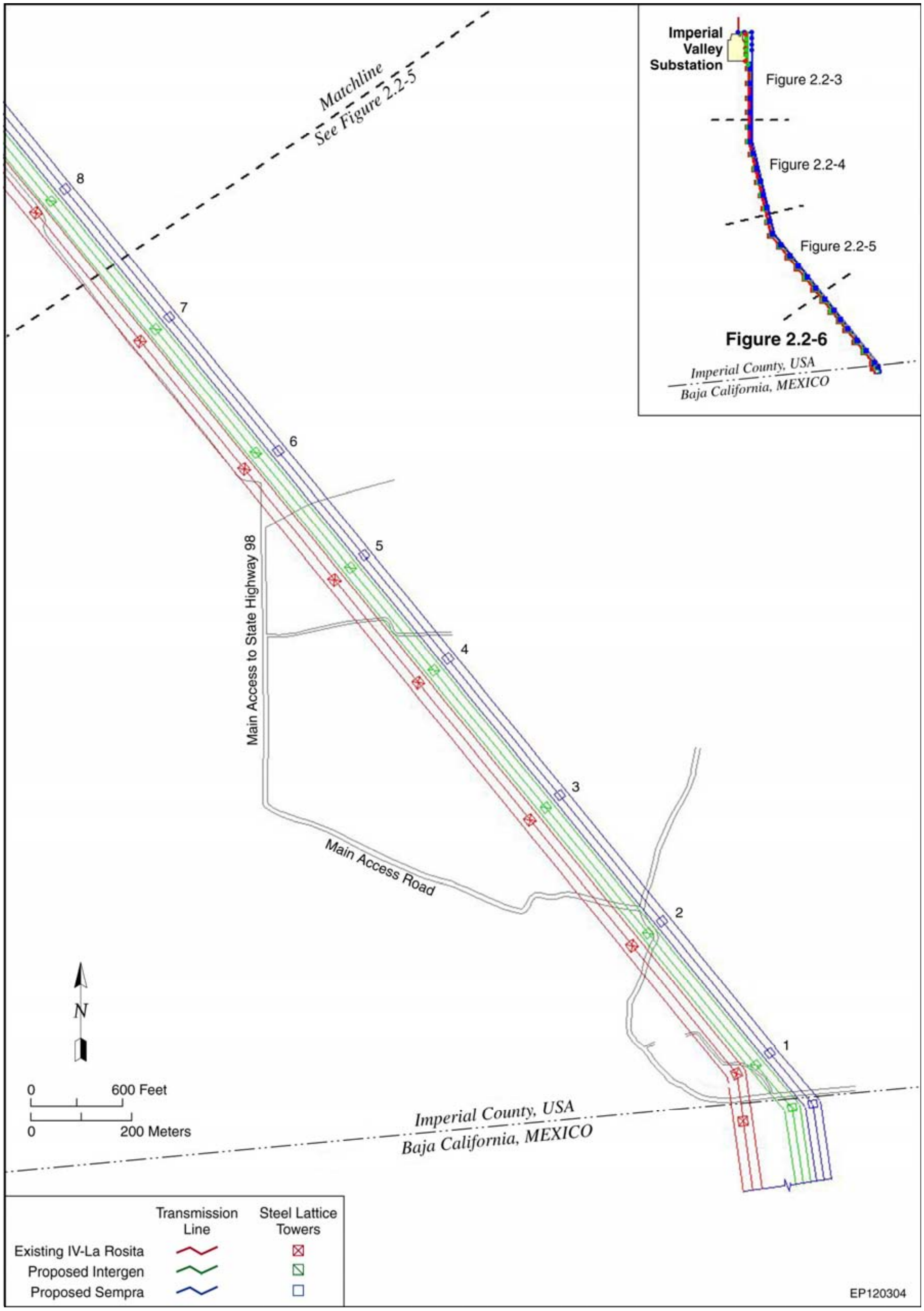


FIGURE 2.2-6 Projects Plan — Segment D

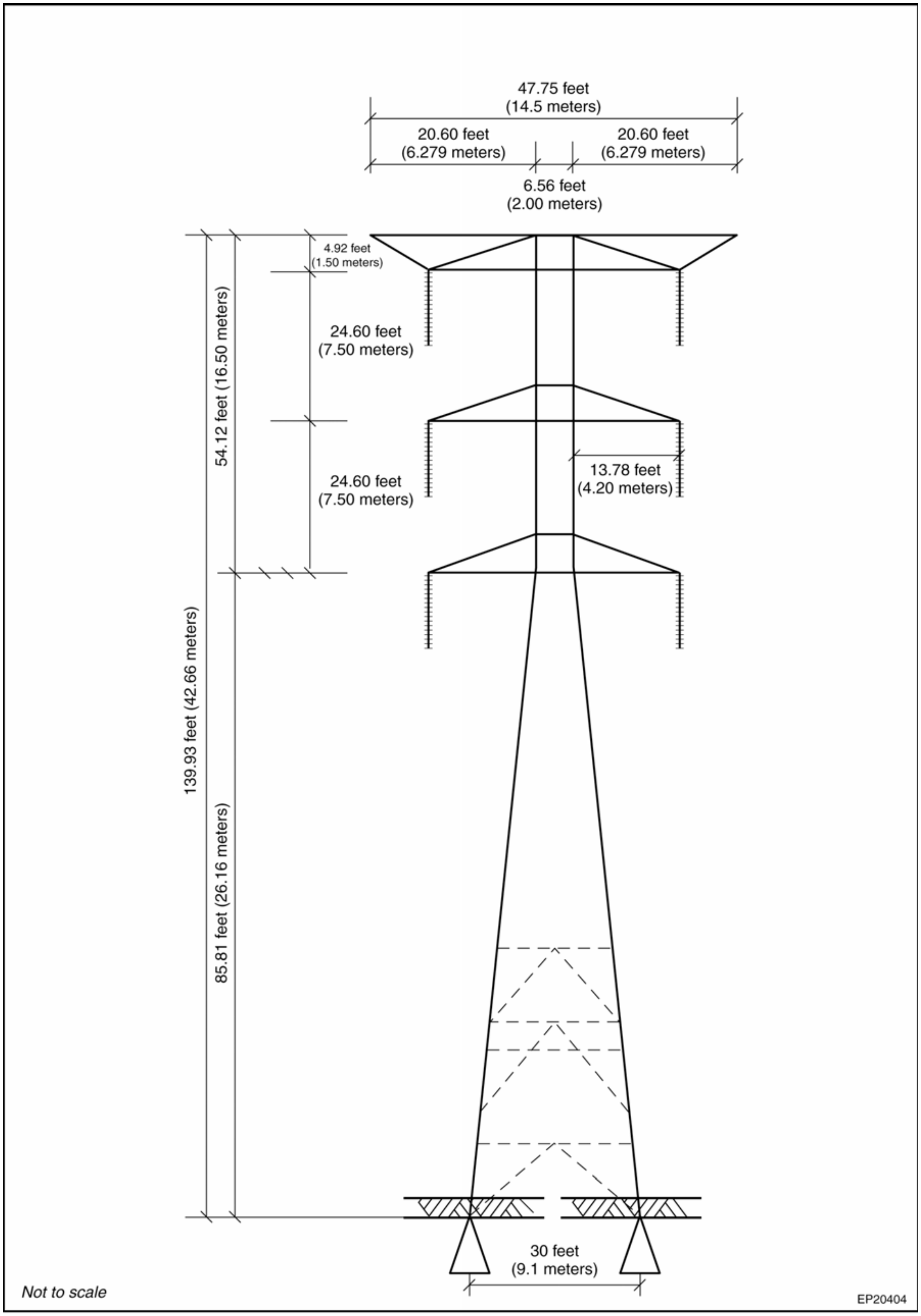


FIGURE 2.2-7 Suspension Tower

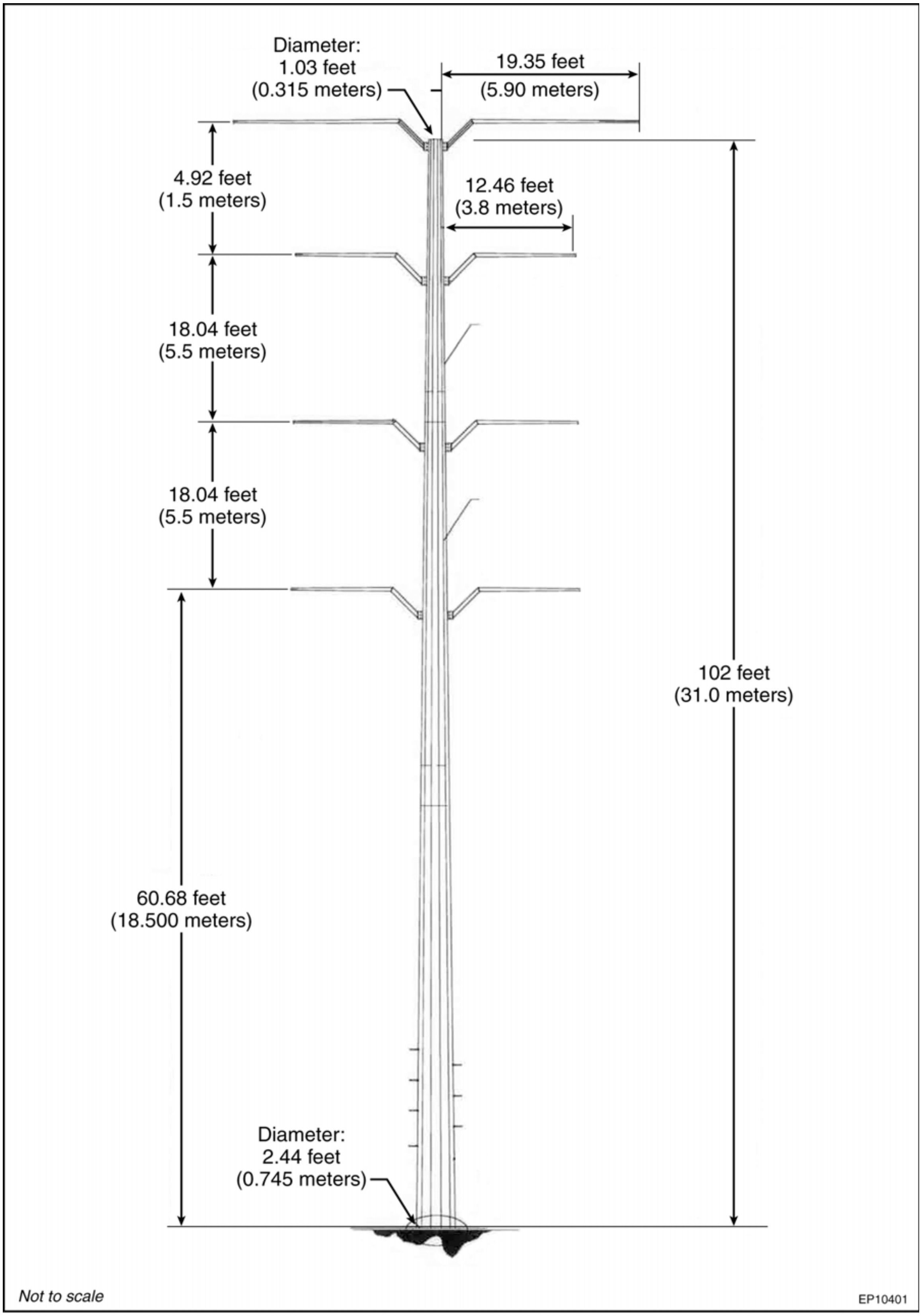


FIGURE 2.2-8 Suspension Monopole

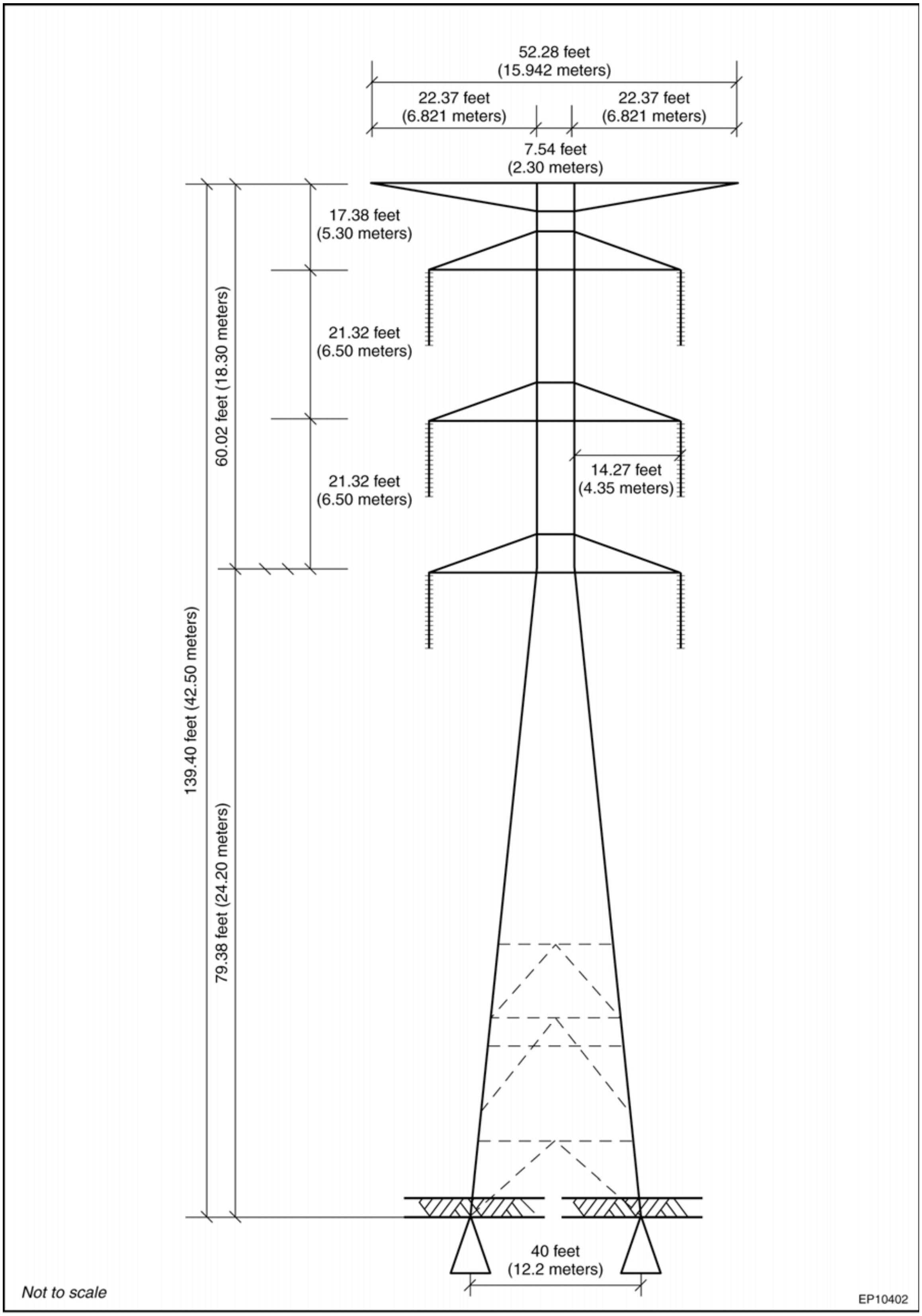


FIGURE 2.2-9 Deflection Tower

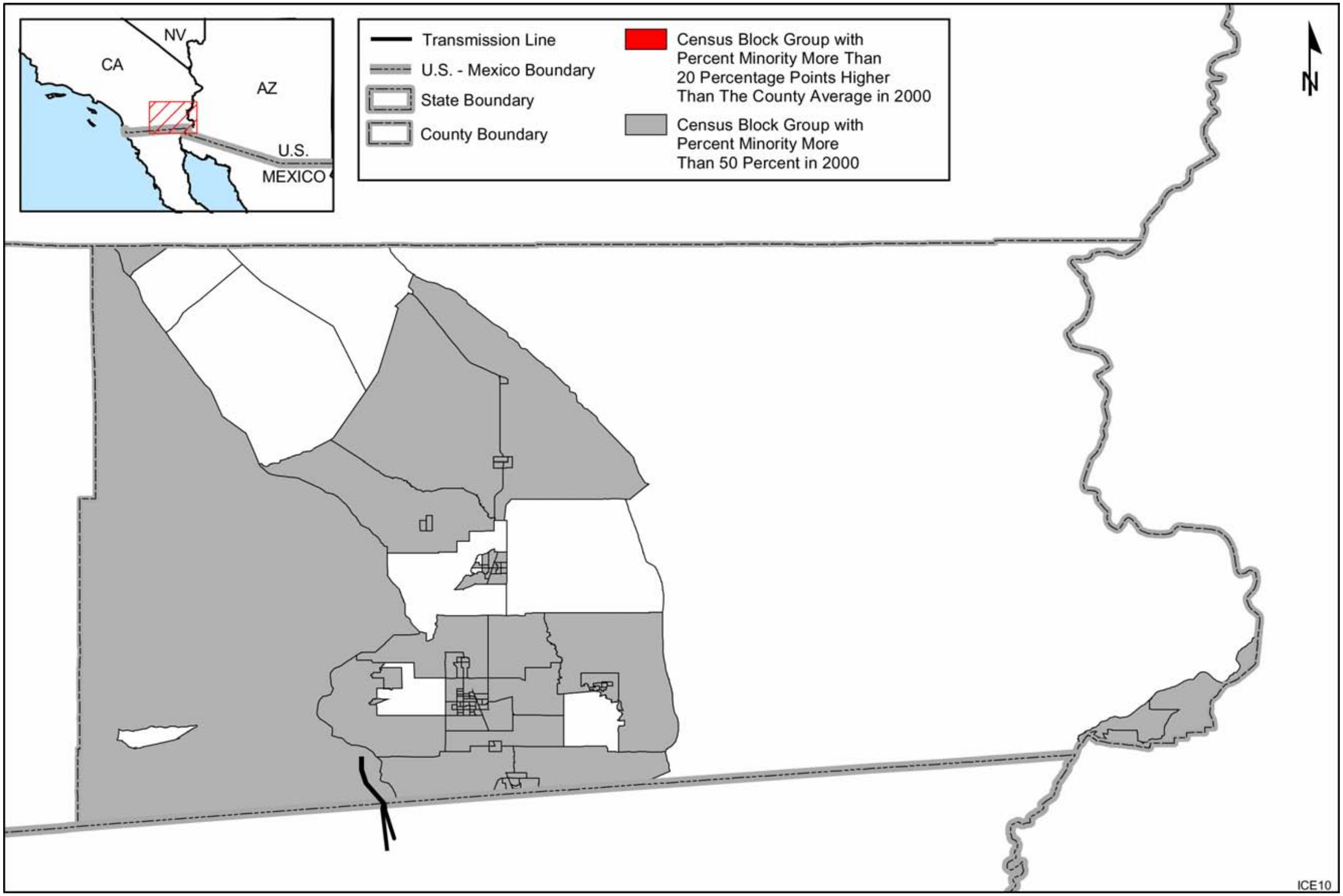


FIGURE 3.10-1 Minority Population Concentration in Census Block Groups in Imperial County (Source: U.S. Bureau of the Census 2001a)

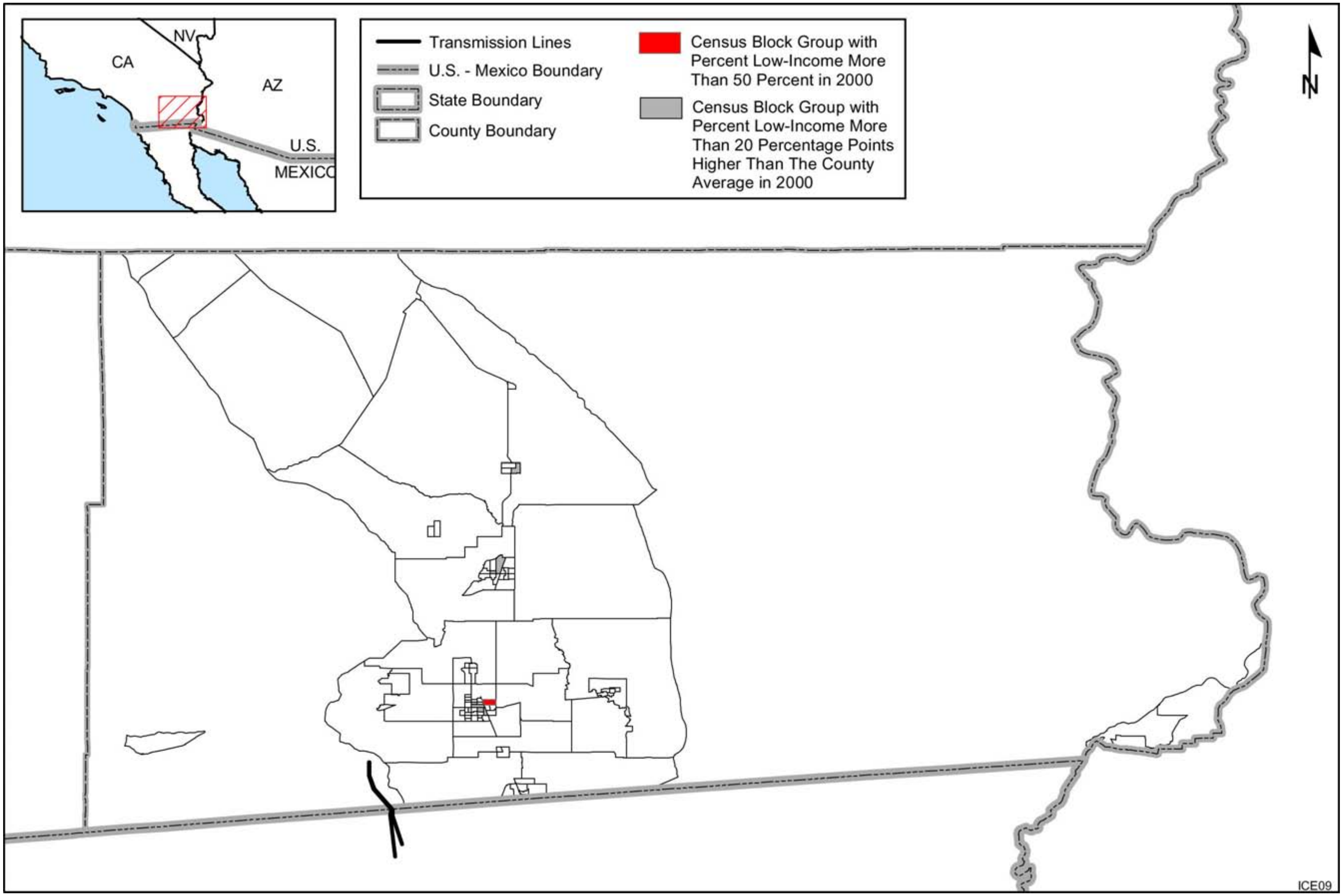


FIGURE 3.10-2 Low-Income Population Concentration in Census Block Groups in Imperial County (Source: U.S. Bureau of the Census 2001a

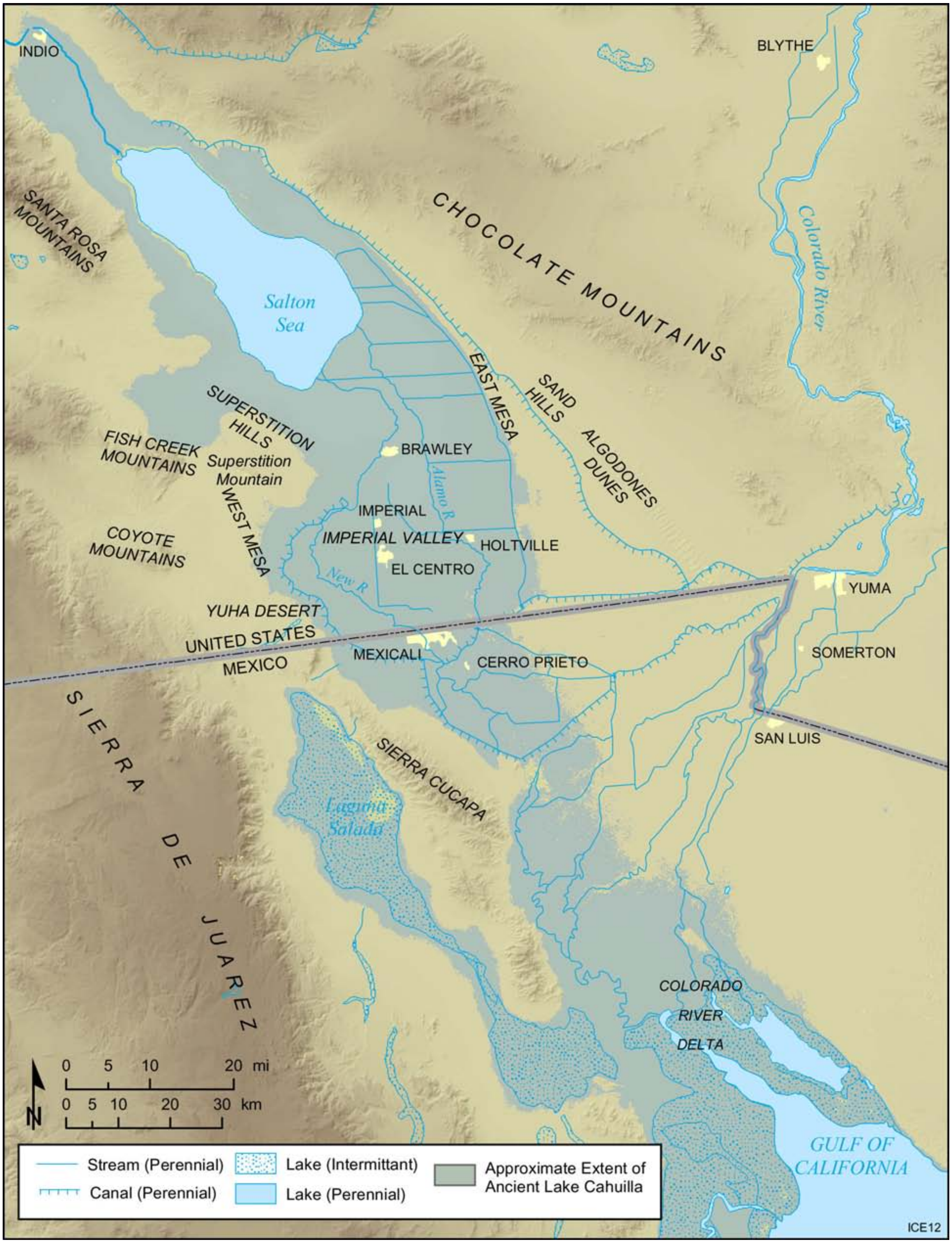


FIGURE 3.1-1 Physiographic Features of Imperial Valley Area

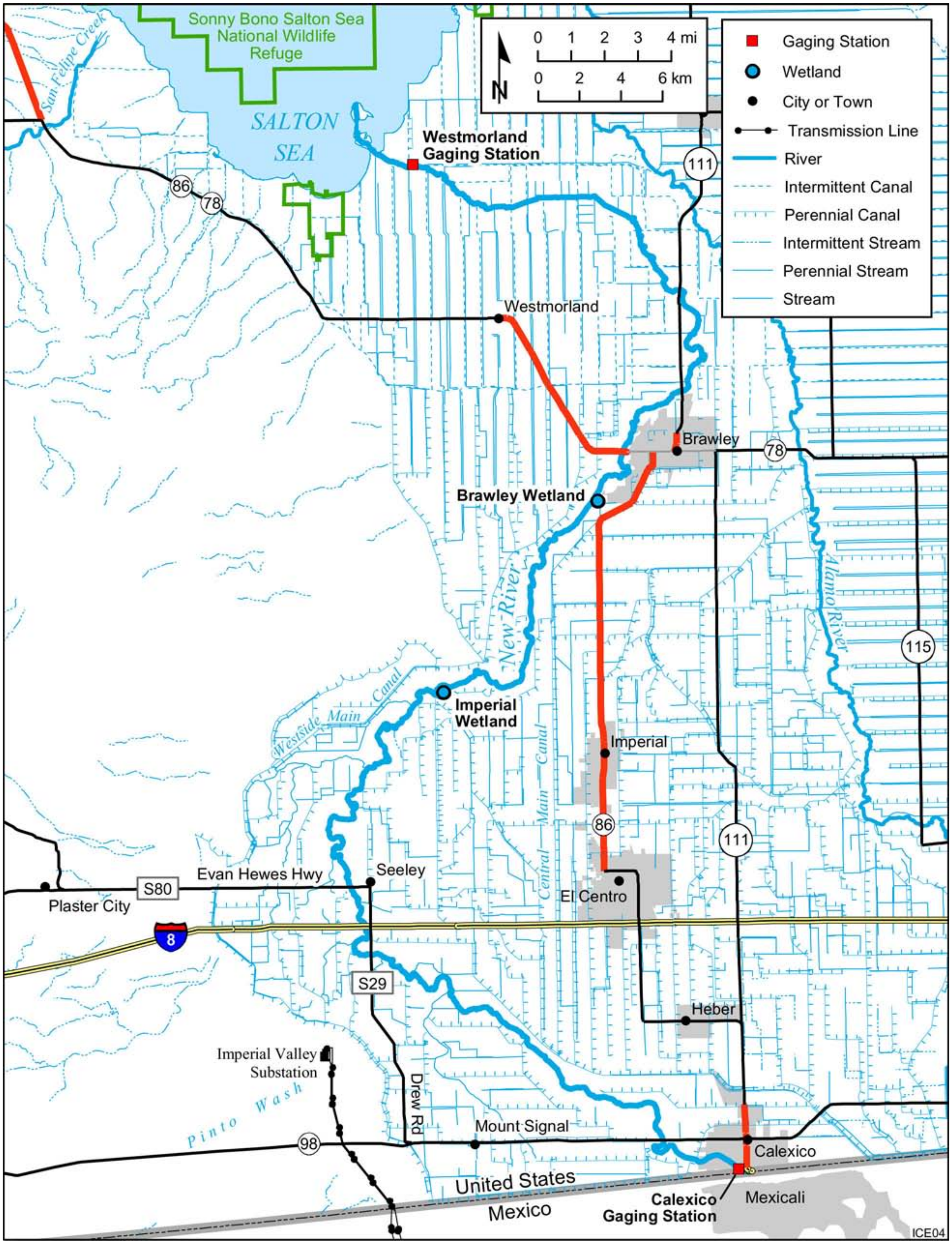


FIGURE 3.2-1 Course of the New River in the United States

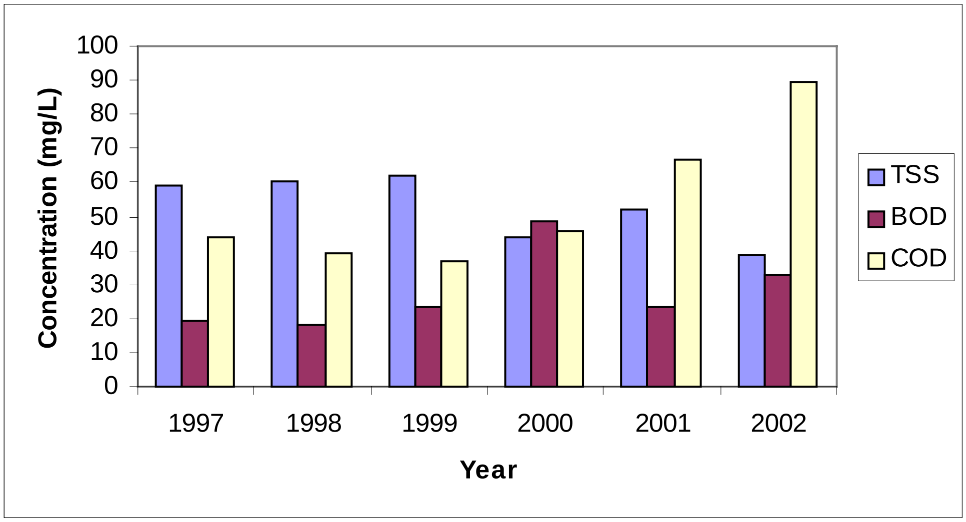


FIGURE 3.2-10 Yearly Averages for Water Quality at the Calexico Gage on the New River at the U.S.-Mexico Border (Source: CRBRWQCB 2003a)

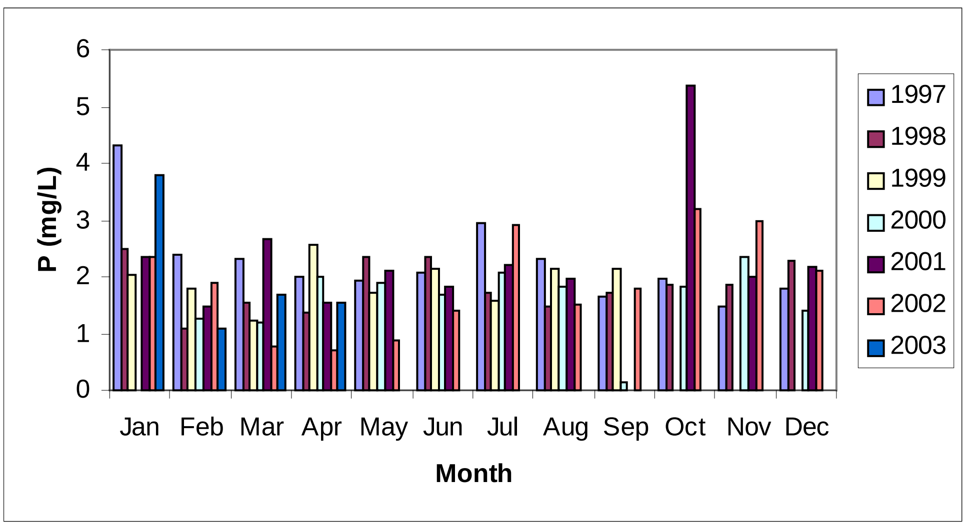
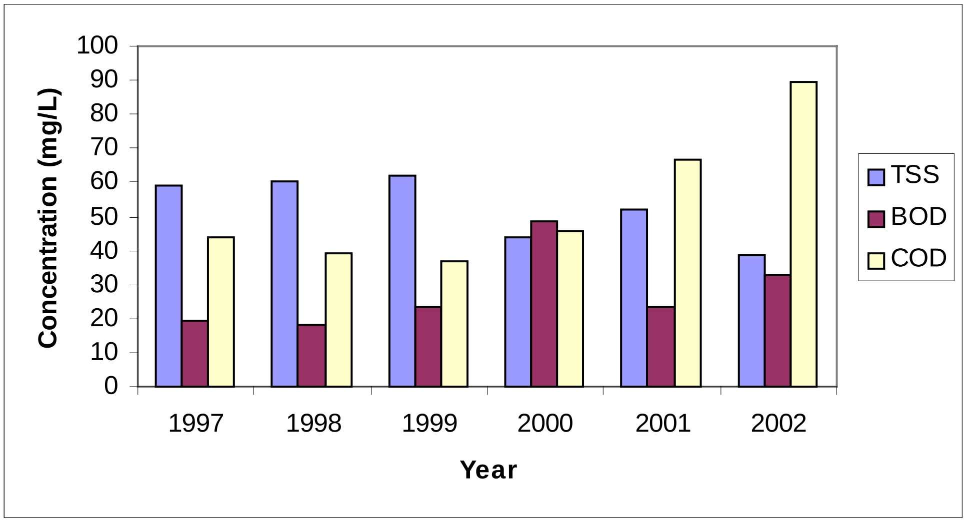


FIGURE 3.2-11 Concentration of Total Phosphorus at the Calexico Gage on the New River at the U.S.-Mexico Border (Source: CRBRWQCB 2003a)



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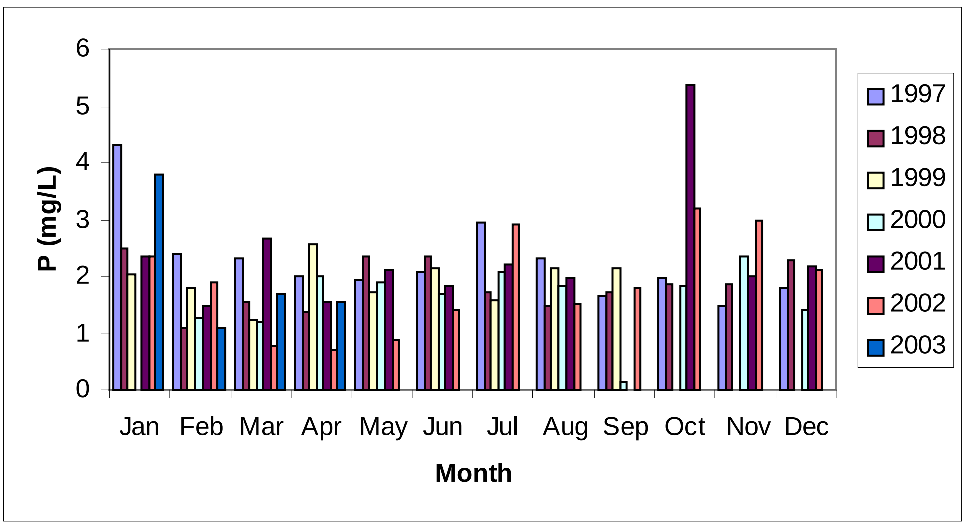

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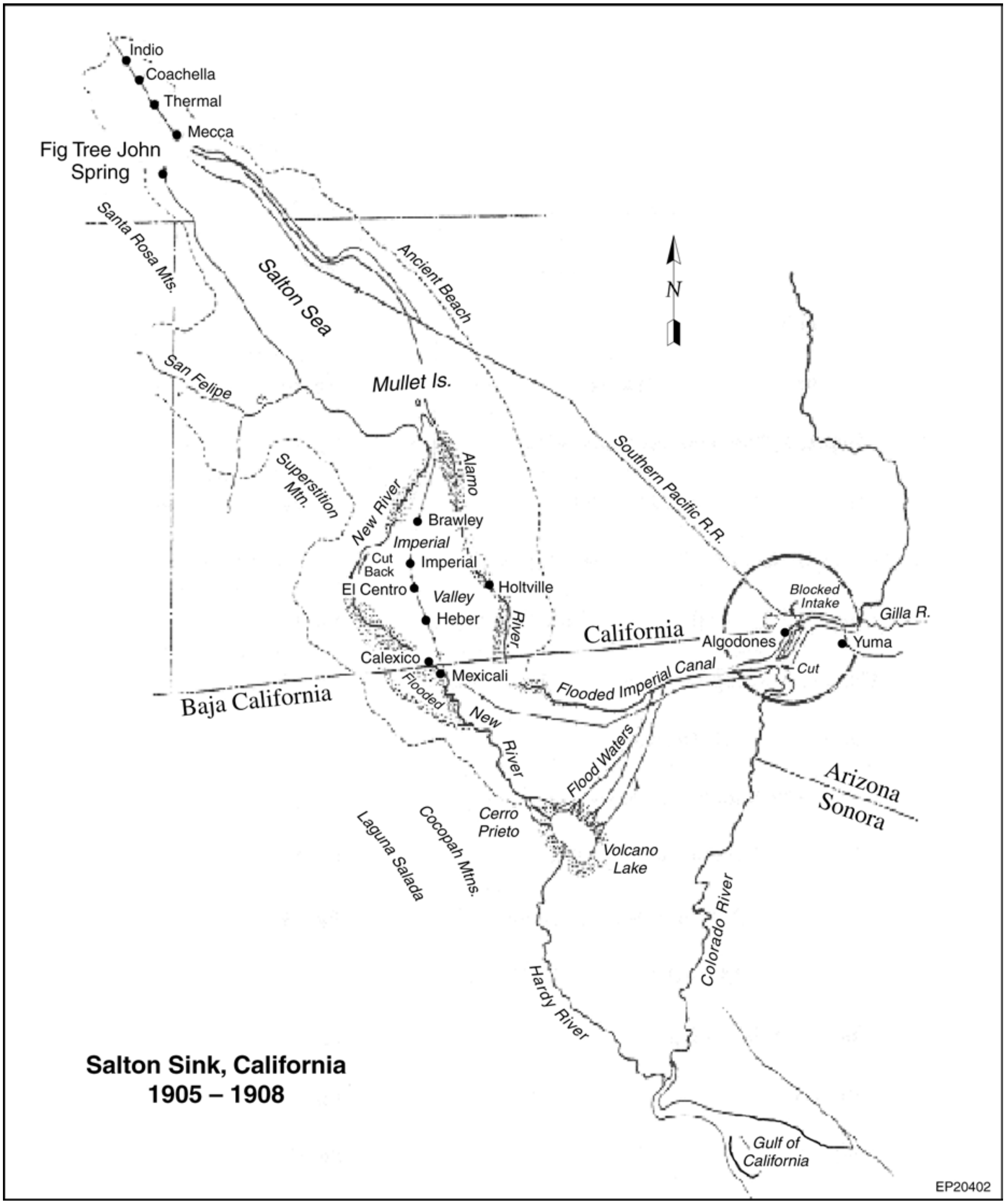


FIGURE 3.2-13 Areas Flooded during Creation of Contemporary Salton Sea (Source: Laflin 1995)

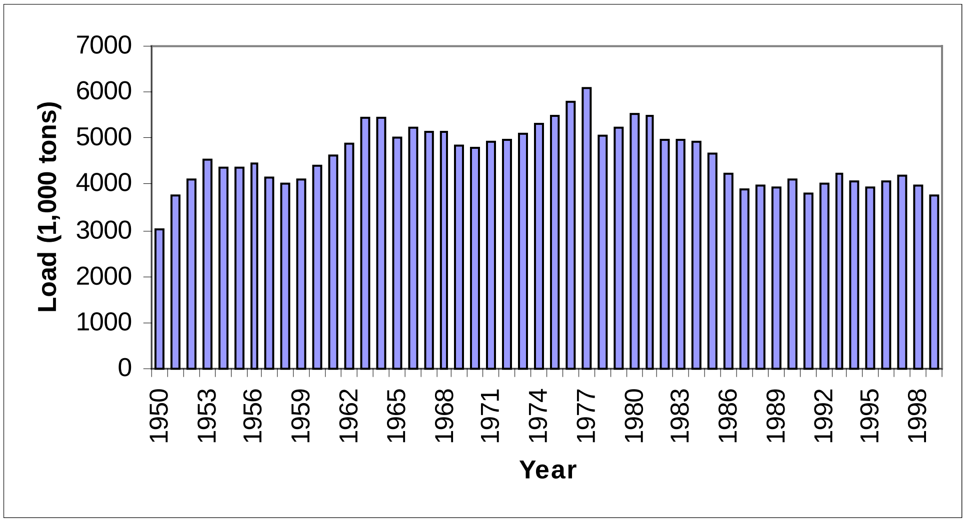


FIGURE 3.2-18 Total Salt Load in Inflow to the Salton Sea (Source: Weghorst 2001)

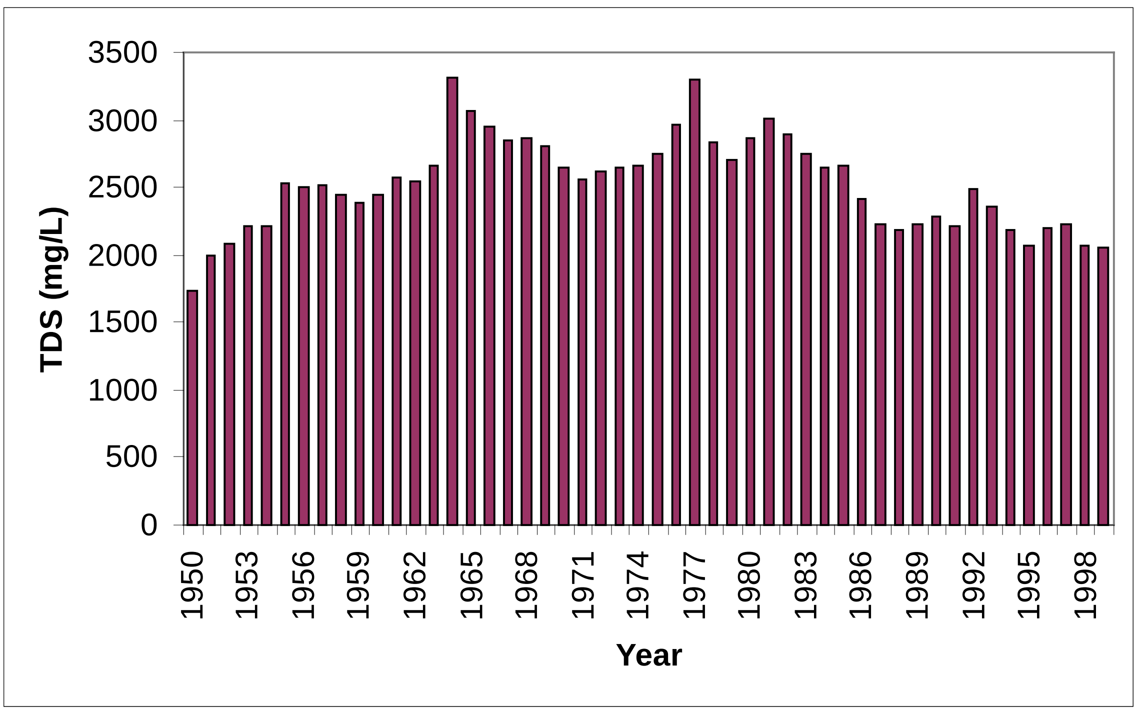
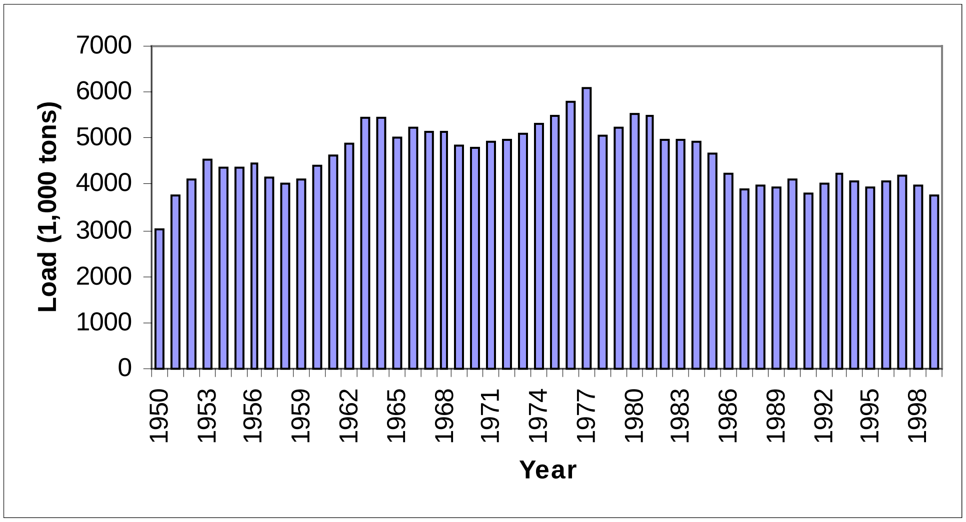


FIGURE 3.2-19 Total Dissolved Solids in Inflow to the Salton Sea (Source: Weghorst 2001)



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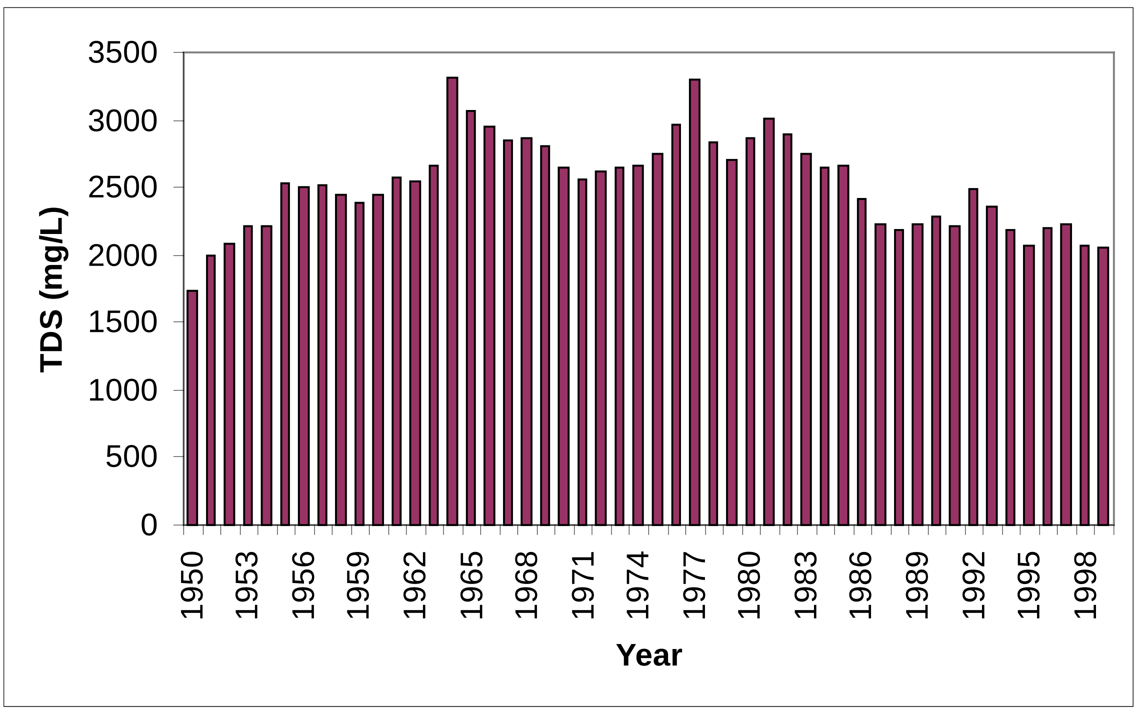

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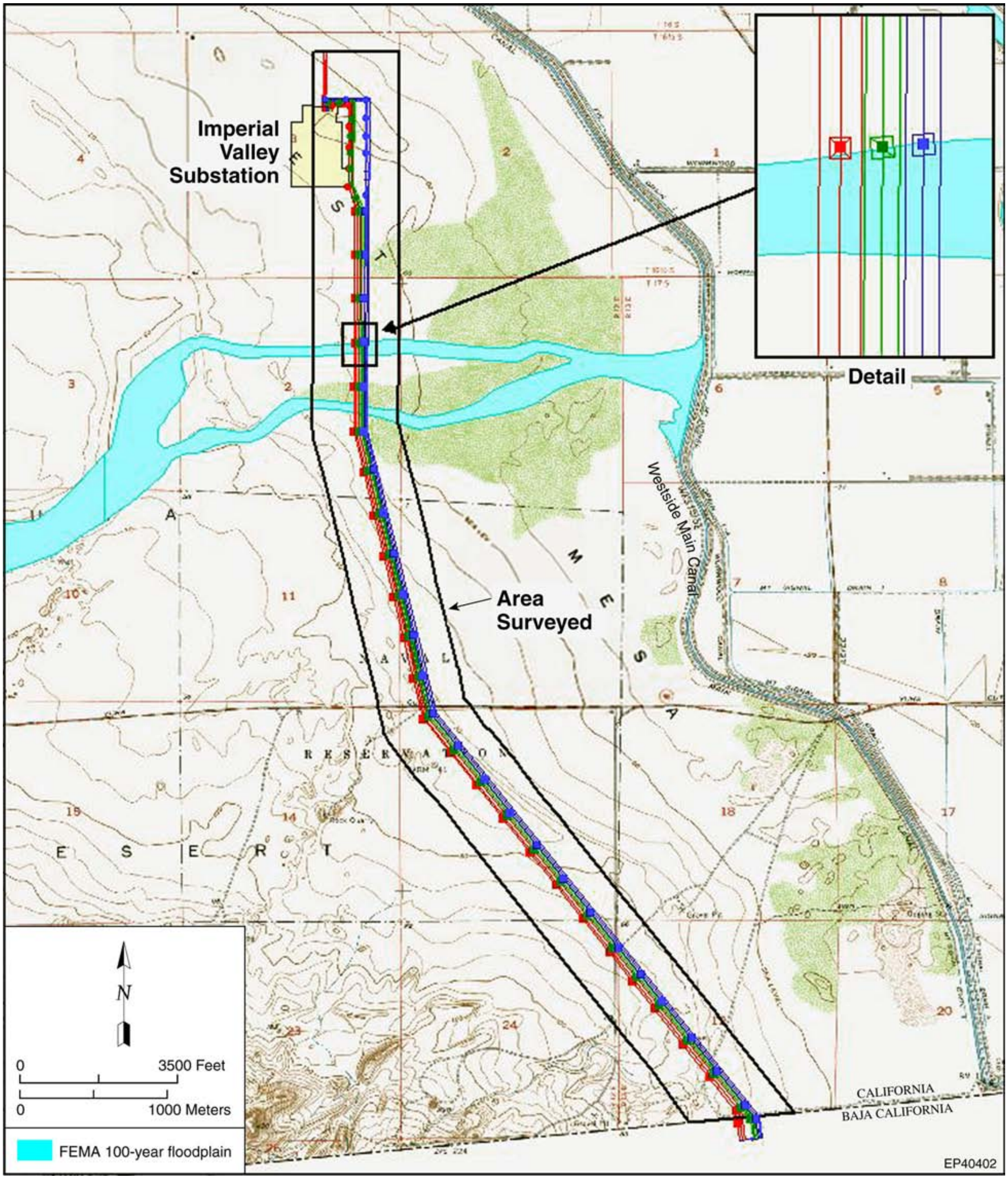


FIGURE 3.2-21 FEMA 100-Year Floodplain of Pinto Wash

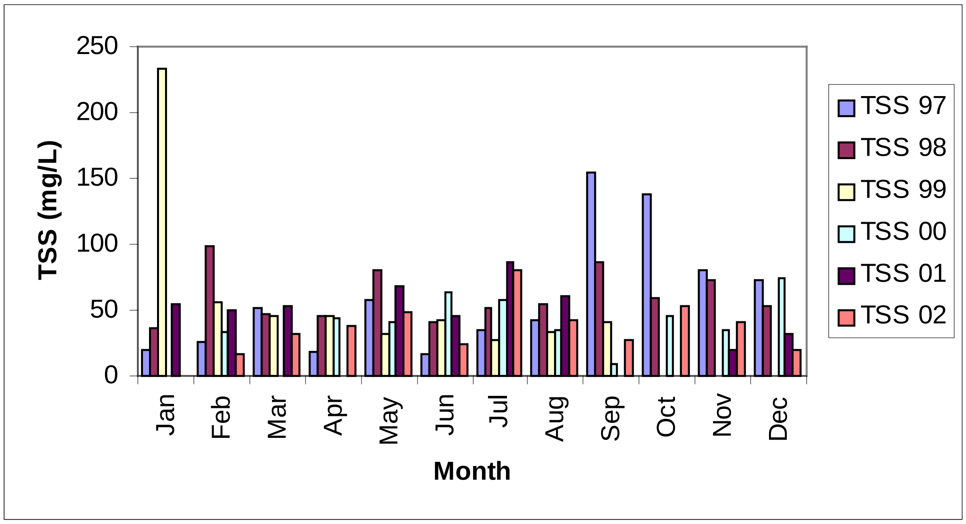


FIGURE 3.2-7 TSS (mg/L) Recorded at the Calexico Gage on the New River at the U.S.-Mexico Border (Source: CRBRWQCB 2003a)

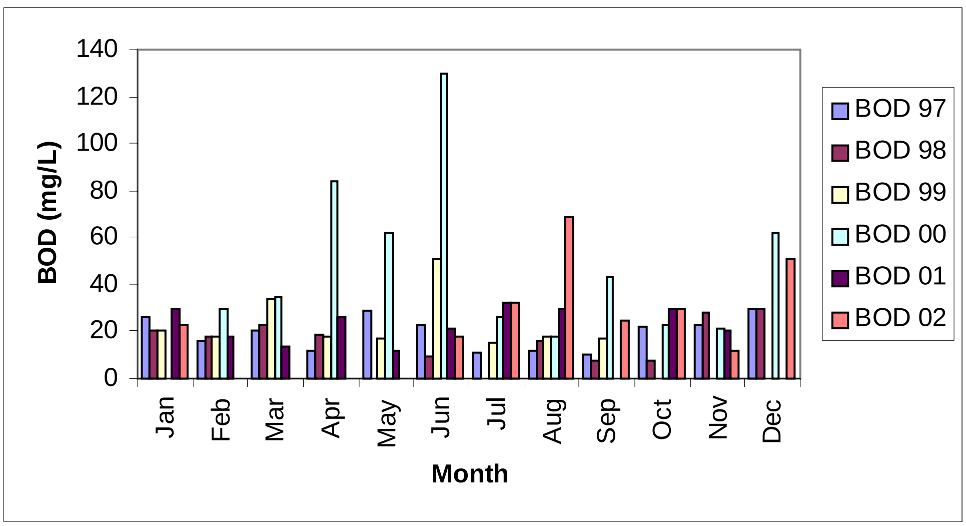
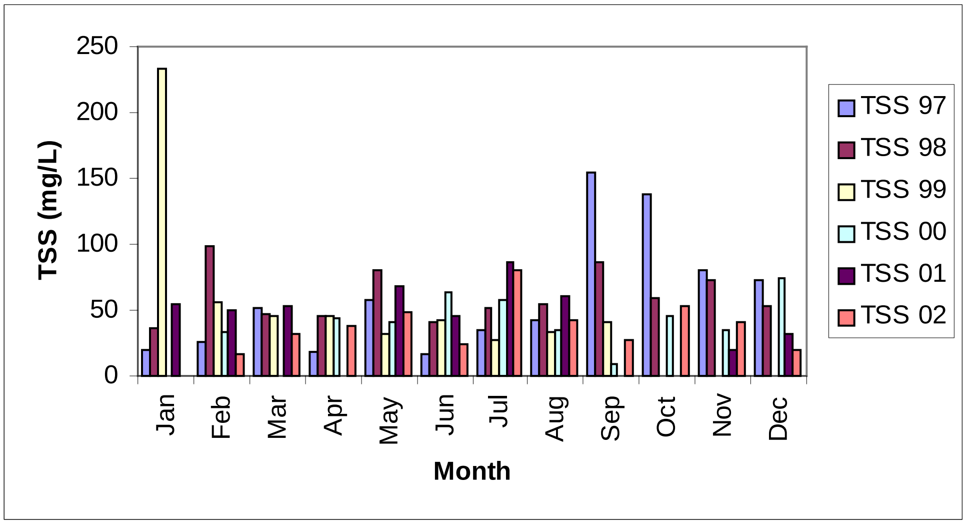


FIGURE 3.2-8 BOD (mg/L) Measured at the Calexico Gage on the New River at the U.S.-Mexico Border (Source: CRBRWQCB 2003a)



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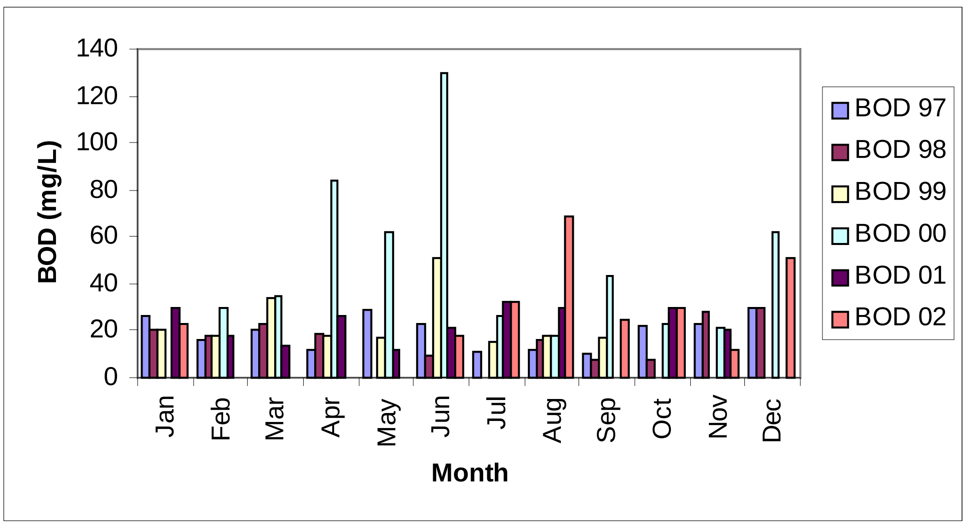


FIGURE 3.2-8 BOD (mg/L) Measured at the Calexico Gage on the New River at the U.S.-Mexico Border (Source: CRBRWQCB 2003a)

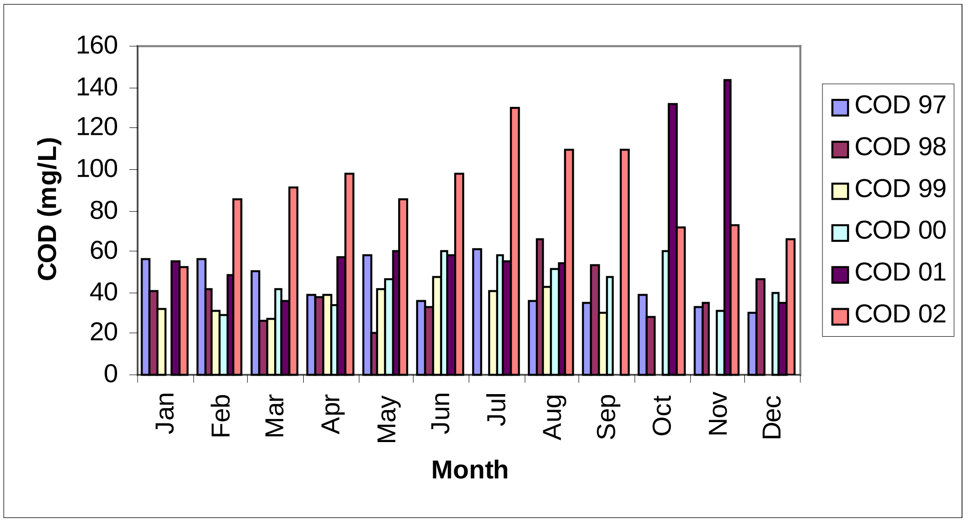


FIGURE 3.2-9 COD (mg/L) Measured at the Calexico Gage on the New River at the U.S.-Mexico Border (Source: CRBRWQCB 2003a)

TABLE 3.2-3 Average Values for TSS, BOD, COD, and Phosphorus

						Load (tons)		
Year	TSS (mg/L)	BOD (mg/L)	COD (mg/L)	P (mg/L)	Flow (ft^3/s)	TSS	BOD	COD
1997	59.3	19.5	44.1	2.3	217	12,670	4,170	9,420
1998	60.4	17.9	39.0	1.8	249	14,810	4,390	9,560
1999	61.8	23.1	37.0	1.9	254	15,460	5,780	9,250
2000	44.0	48.5	45.4	1.6	225	9,750	10,750	10,060
2001	52.2	23.3	66.8	2.3	201	10,330	4,610	13,220
2002	38.6	32.5	89.2	1.3	–[a]	–	–	–
Mean	52.7	27.5	53.6	2.0				
Standard deviation	9.6	11.5	20.4	0.27				

[a] A dash indicates no data available.

Source: CRBRWQCB (2003a).

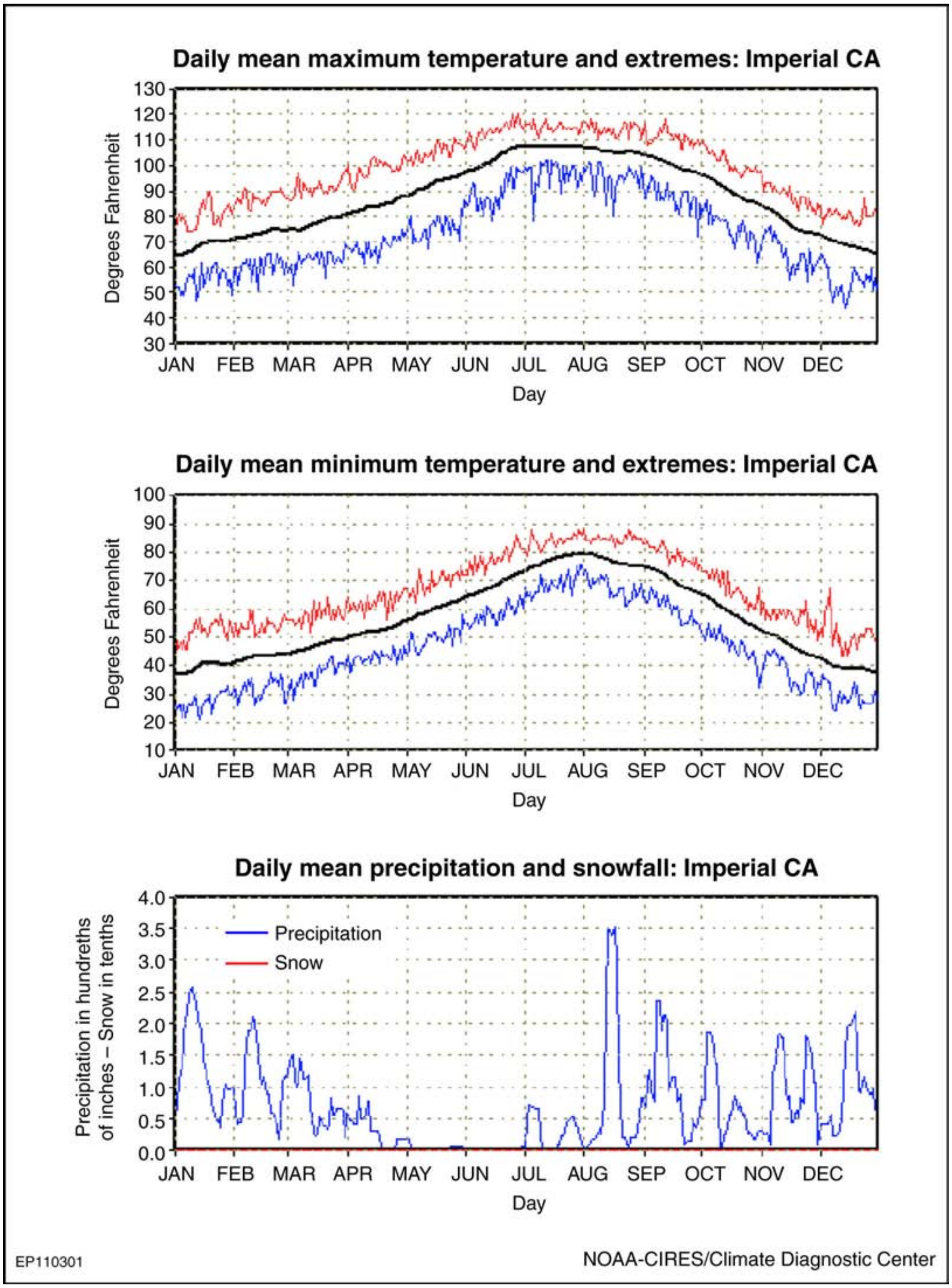


FIGURE 3.3-1 Annual Variation of Temperatures and Precipitation in Imperial County

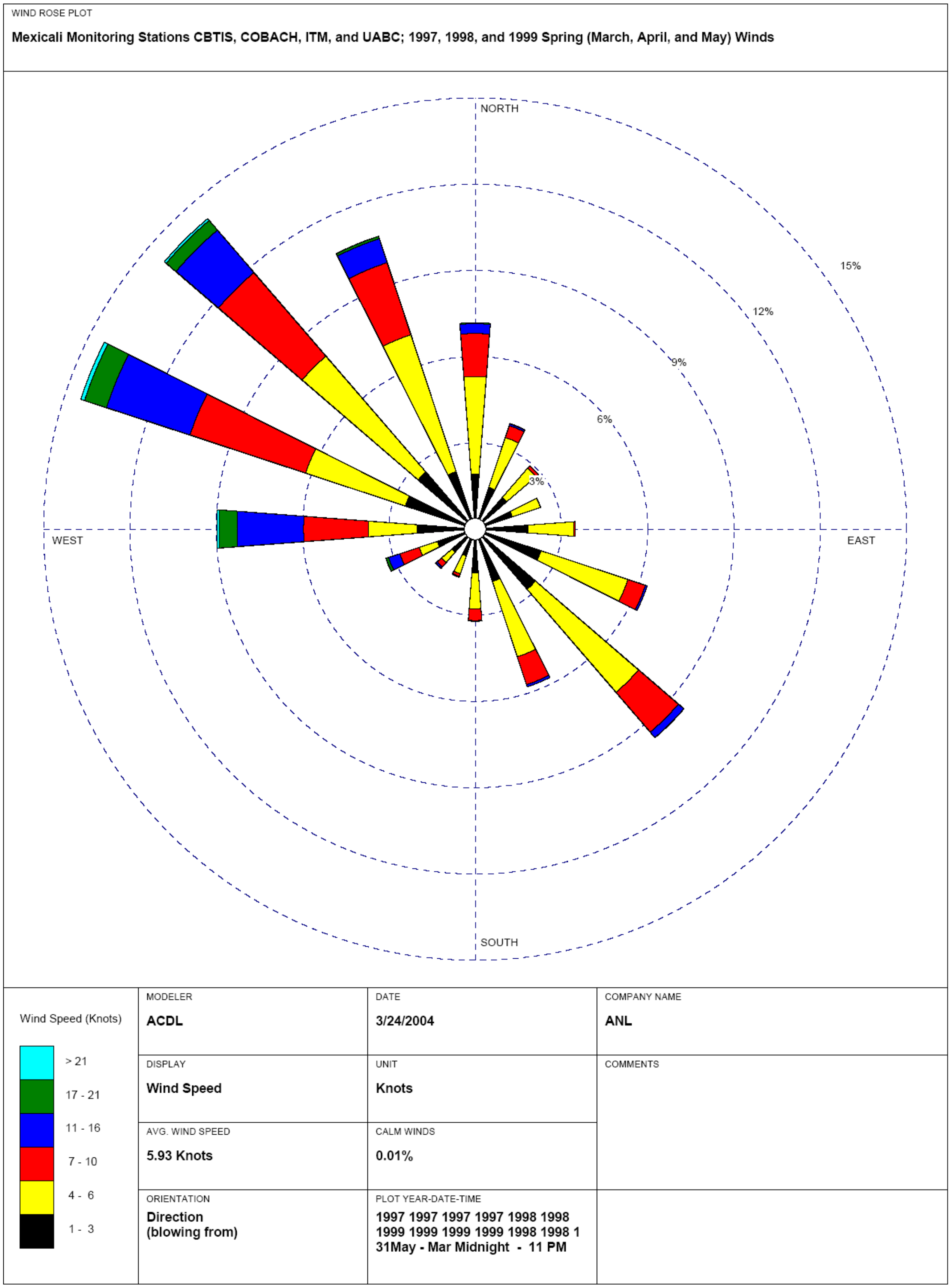


FIGURE 3.3-10 Mexicali Monitoring Stations CBTIS, COBACH, ITM, and UABC: Spring (March, April, and May) Winds, 1997, 1998, and 1999

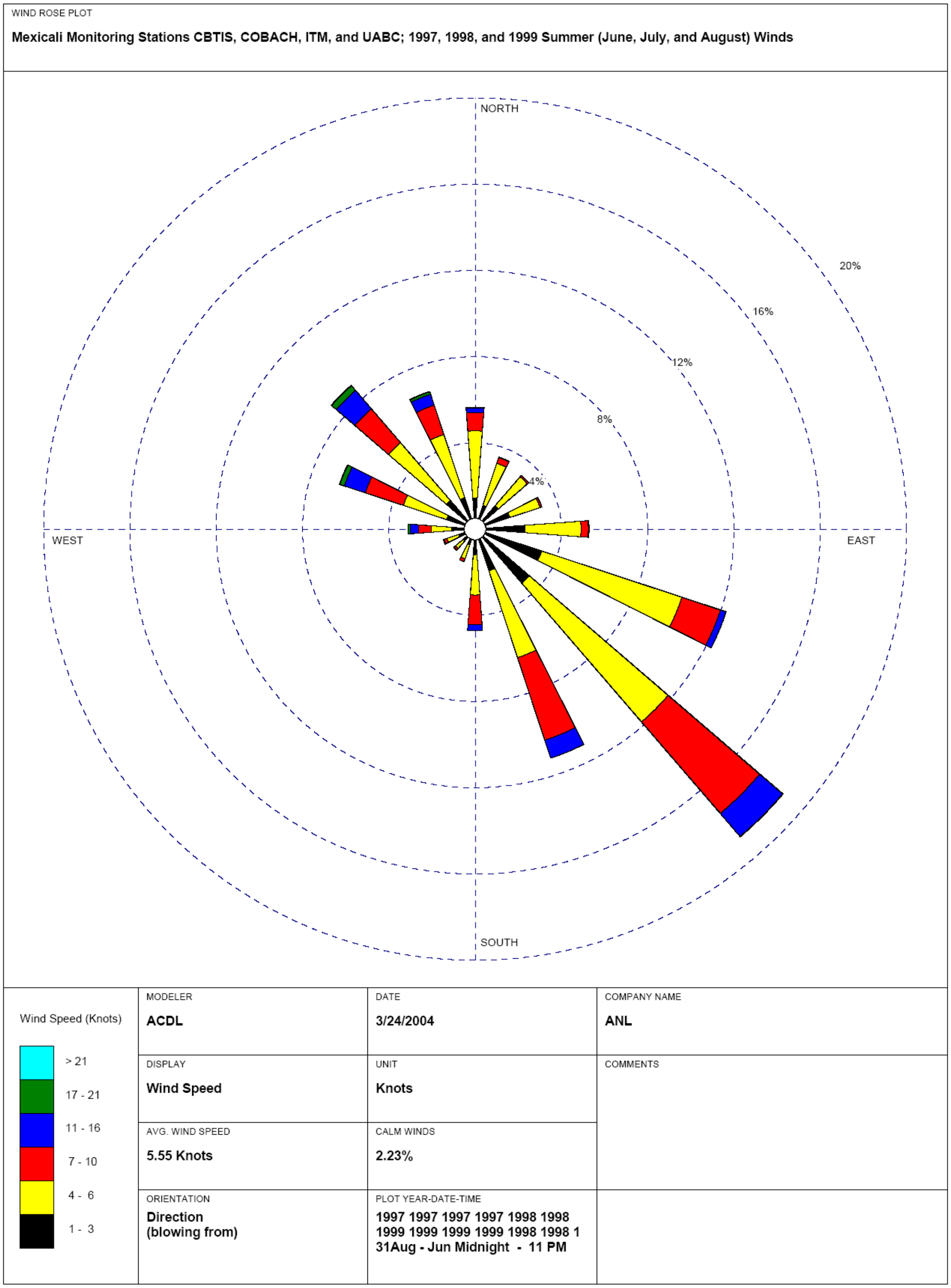


FIGURE 3.3-11 Mexicali Monitoring Stations CBTIS, COBACH, ITM, and UABC: Summer (June, July, and August) Winds, 1997, 1998, and 1999

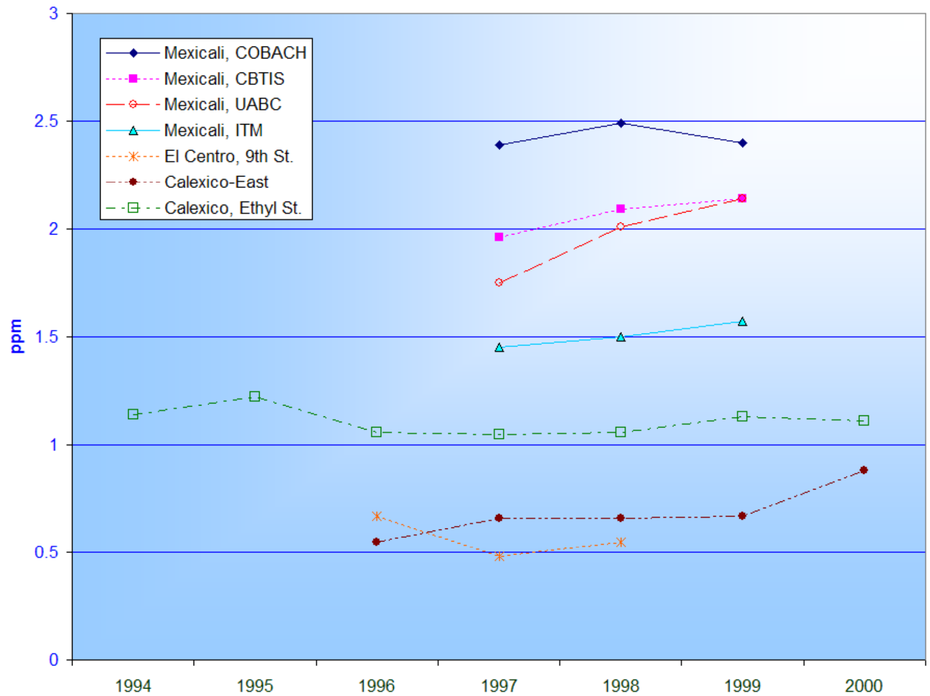


FIGURE 3.3-14 Carbon Monoxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

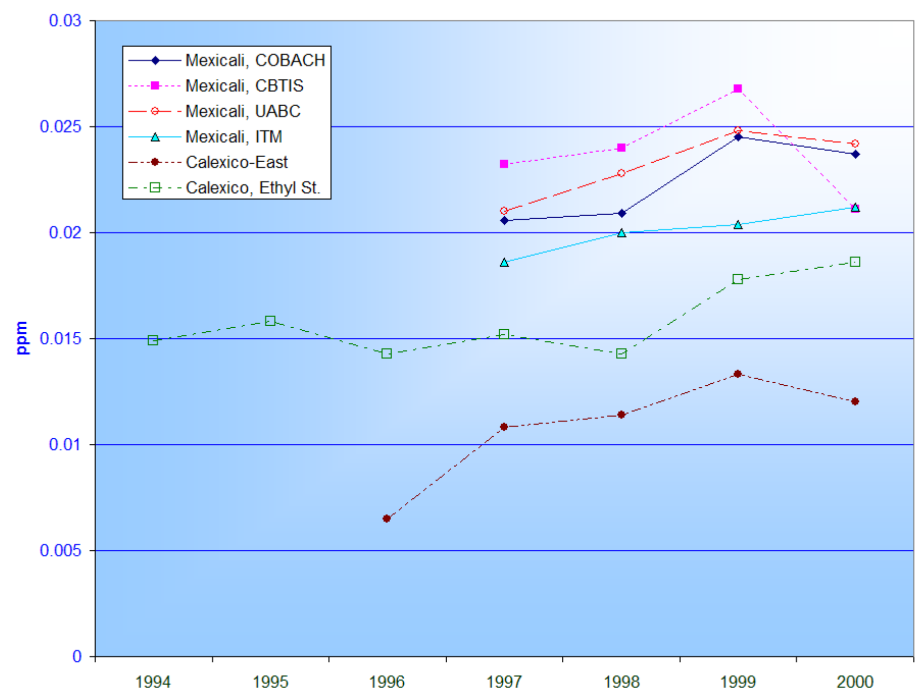


FIGURE 3.3-15 Nitrogen Dioxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

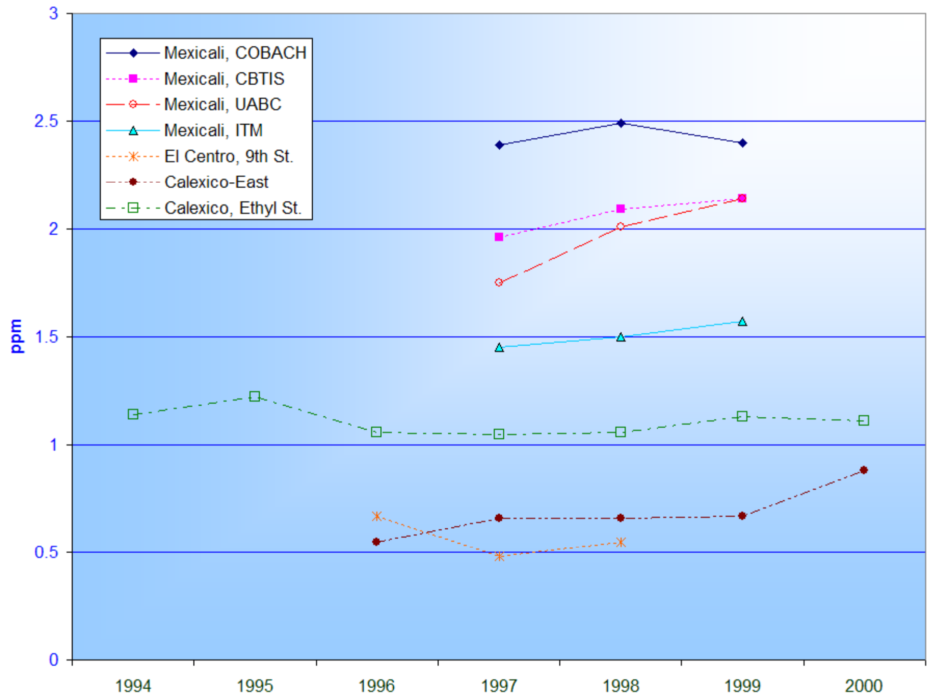


FIGURE 3.3-14 Carbon Monoxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

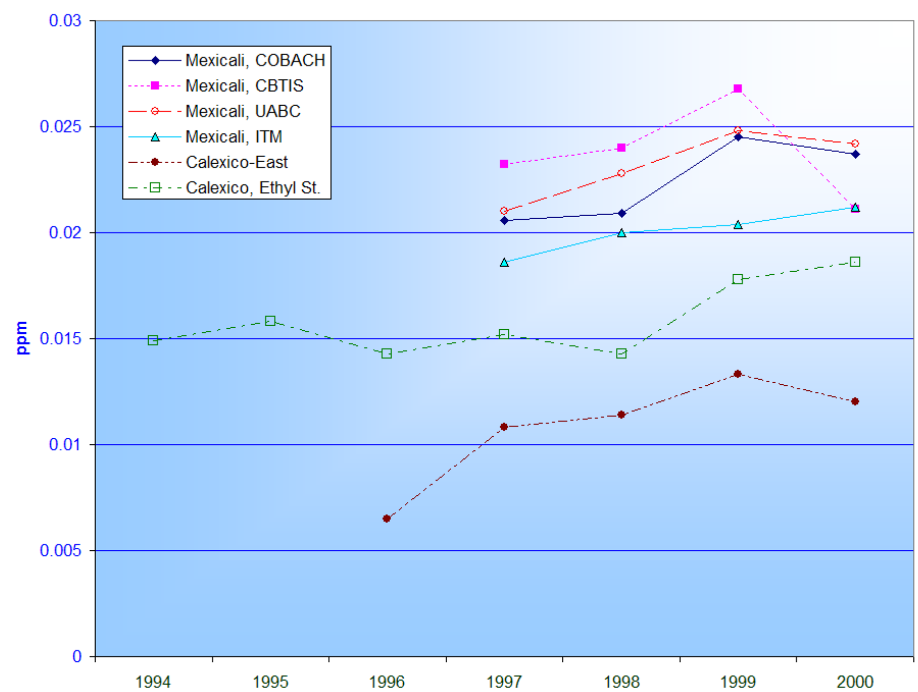


FIGURE 3.3-15 Nitrogen Dioxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

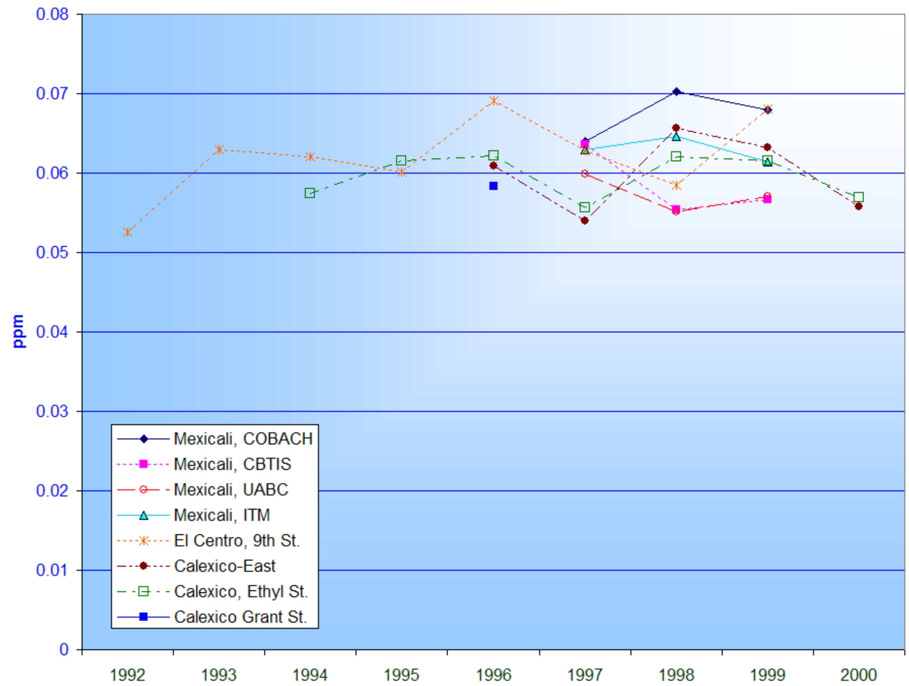


FIGURE 3.3-16 Ozone Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

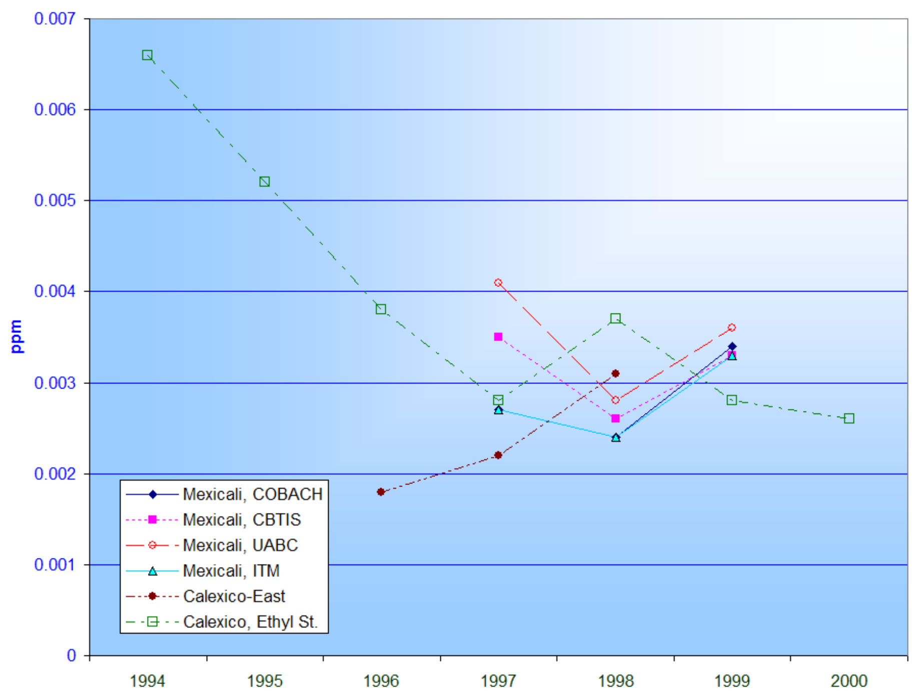


FIGURE 3.3-17 Sulfur Dioxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

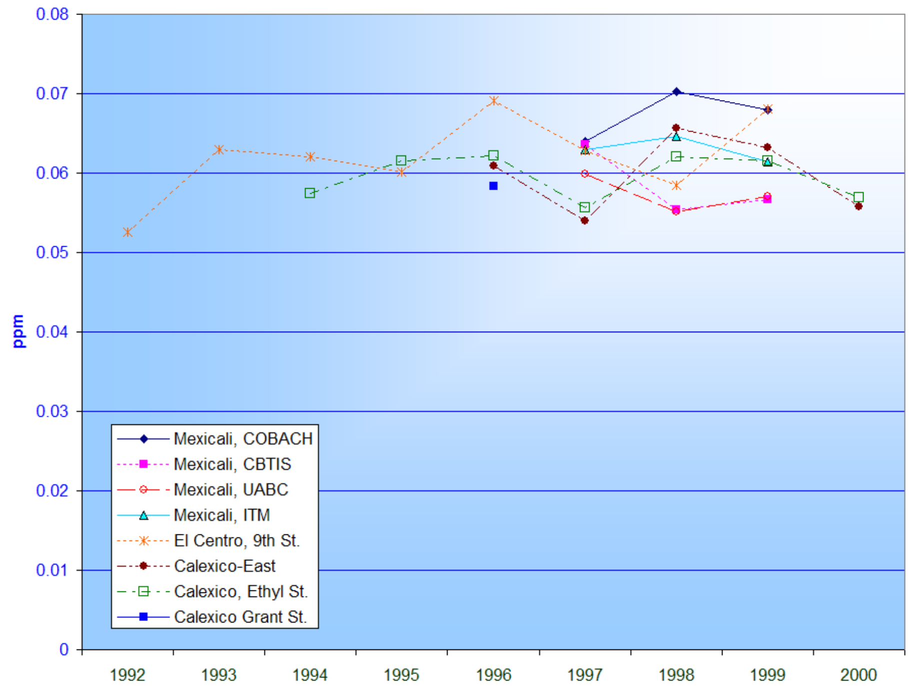


FIGURE 3.3-16 Ozone Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

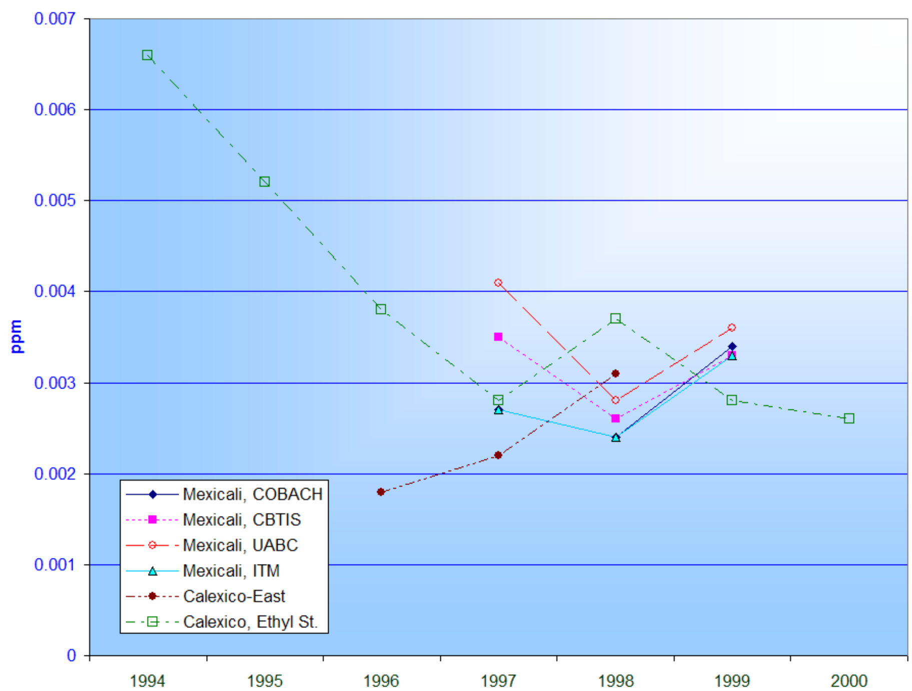


FIGURE 3.3-17 Sulfur Dioxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

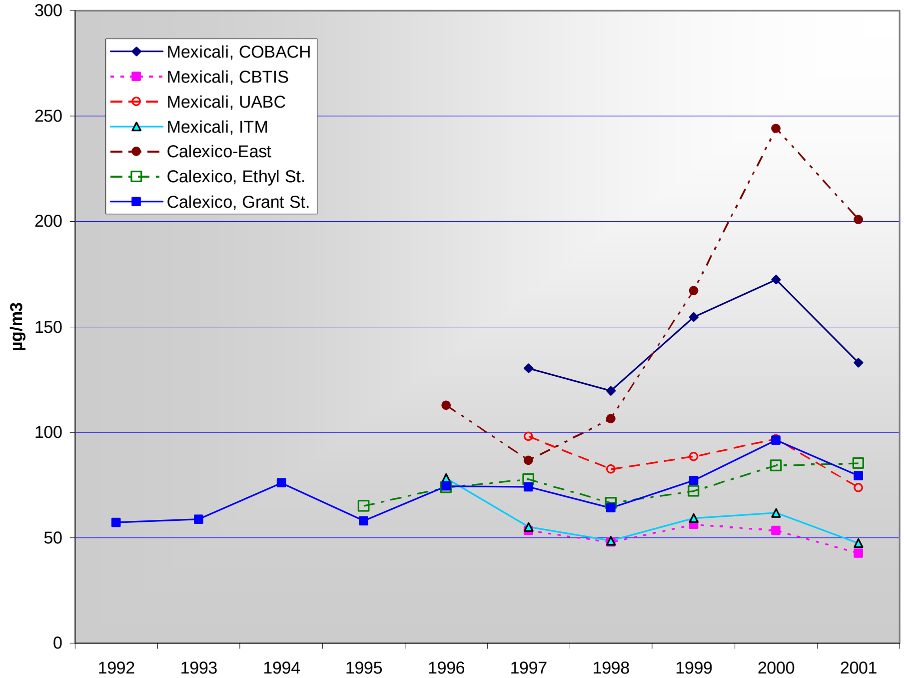


FIGURE 3.3-18 PM_{10} Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

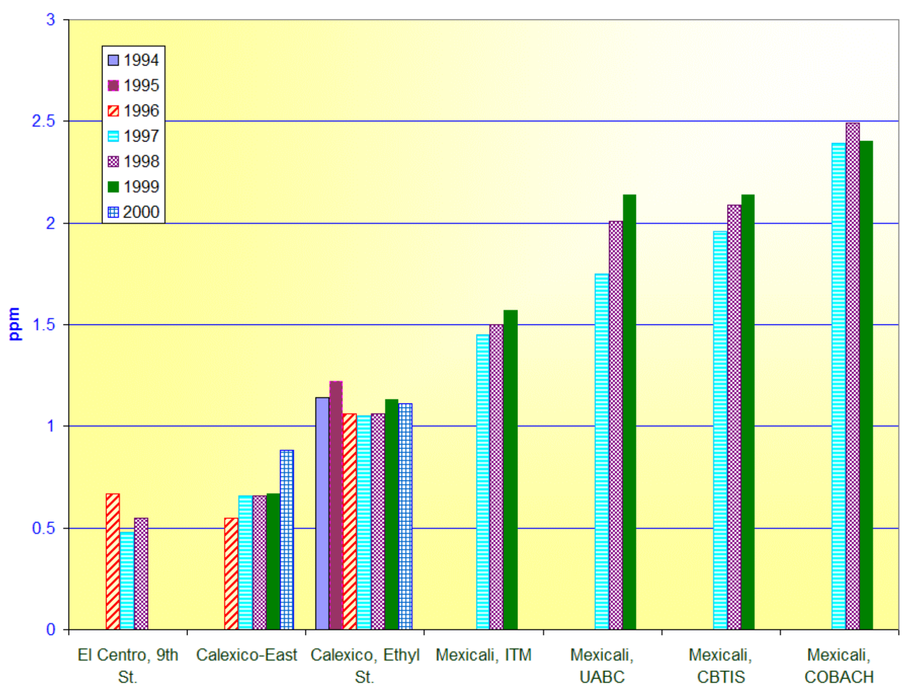


FIGURE 3.3-19 Bar Graph of Carbon Monoxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

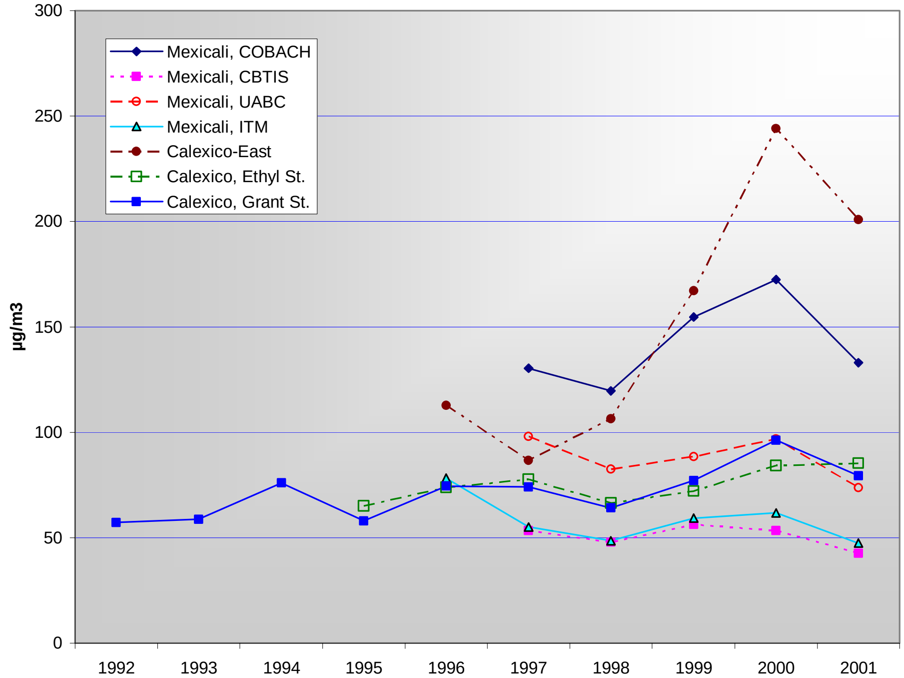


FIGURE 3.3-18 PM_{10} Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

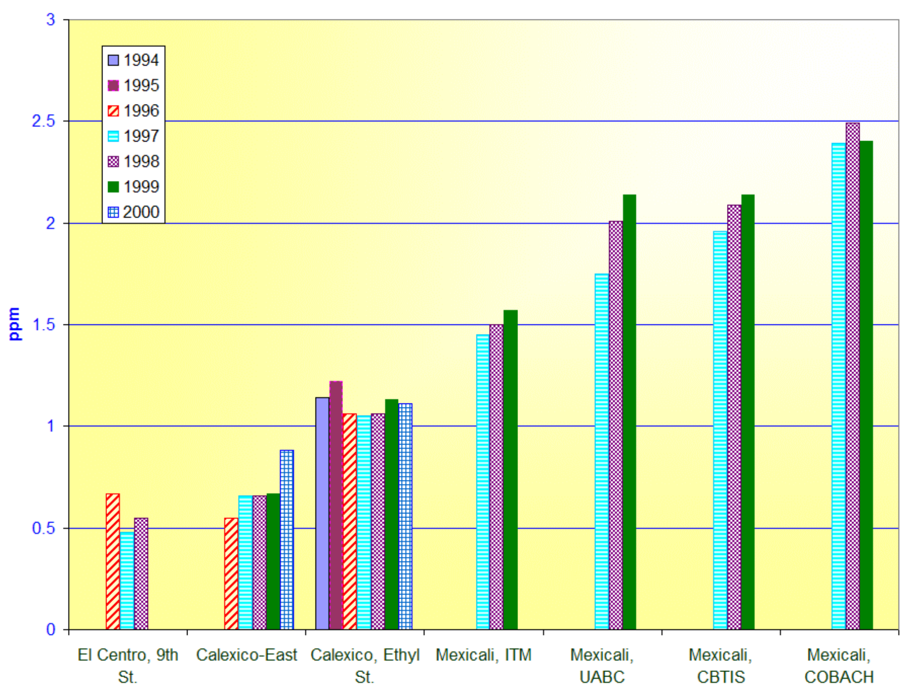


FIGURE 3.3-19 Bar Graph of Carbon Monoxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

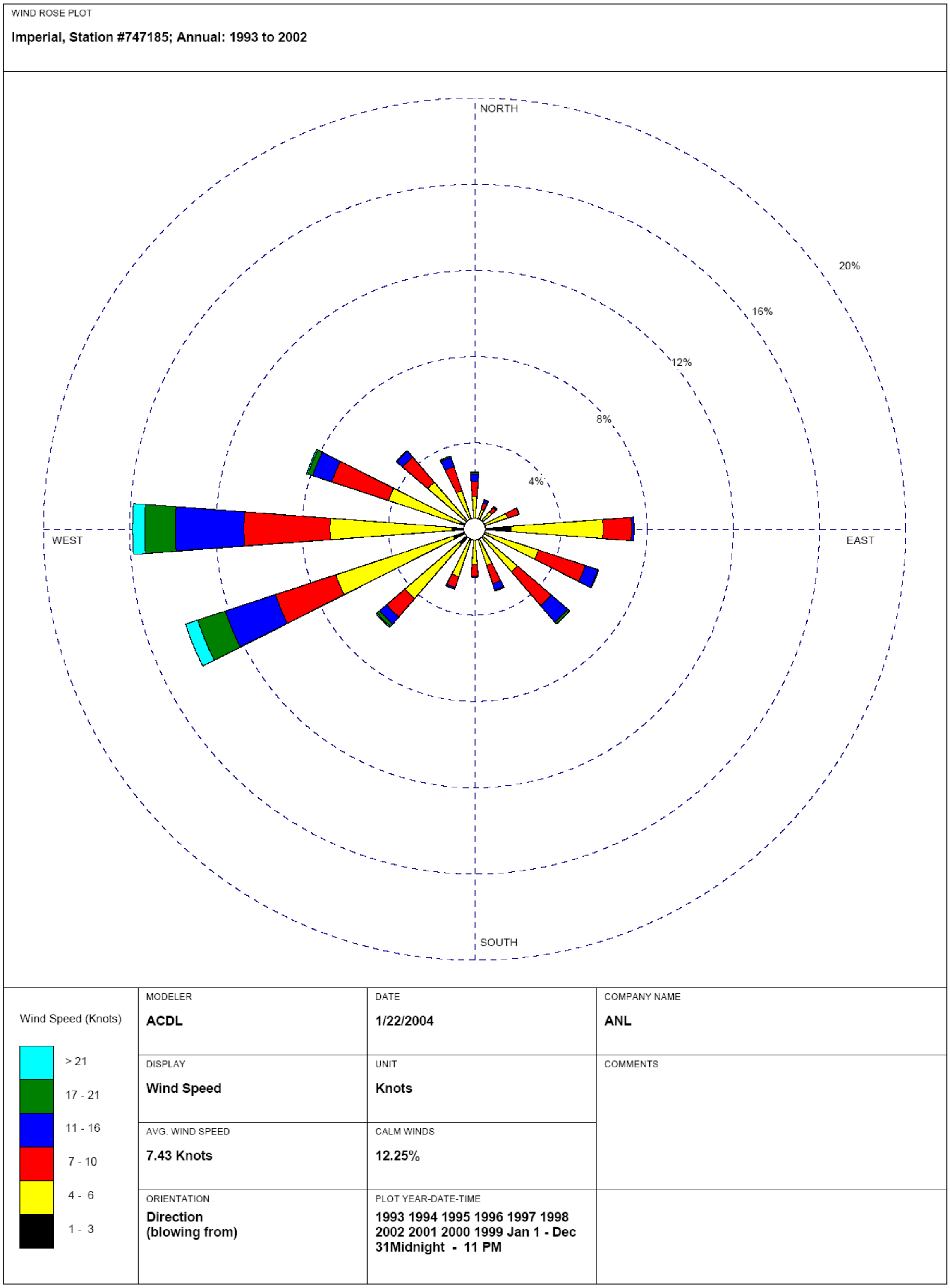


FIGURE 3.3-2 Imperial, Imperial County: Annual Winds from 1993 through 2002

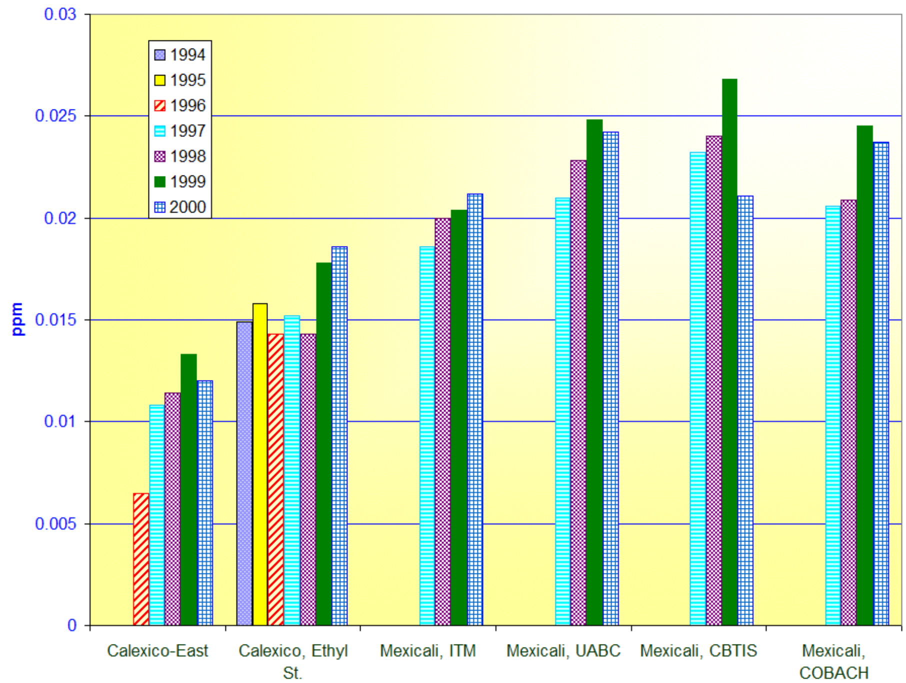


FIGURE 3.3-20 Bar Graph of Nitrogen Dioxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

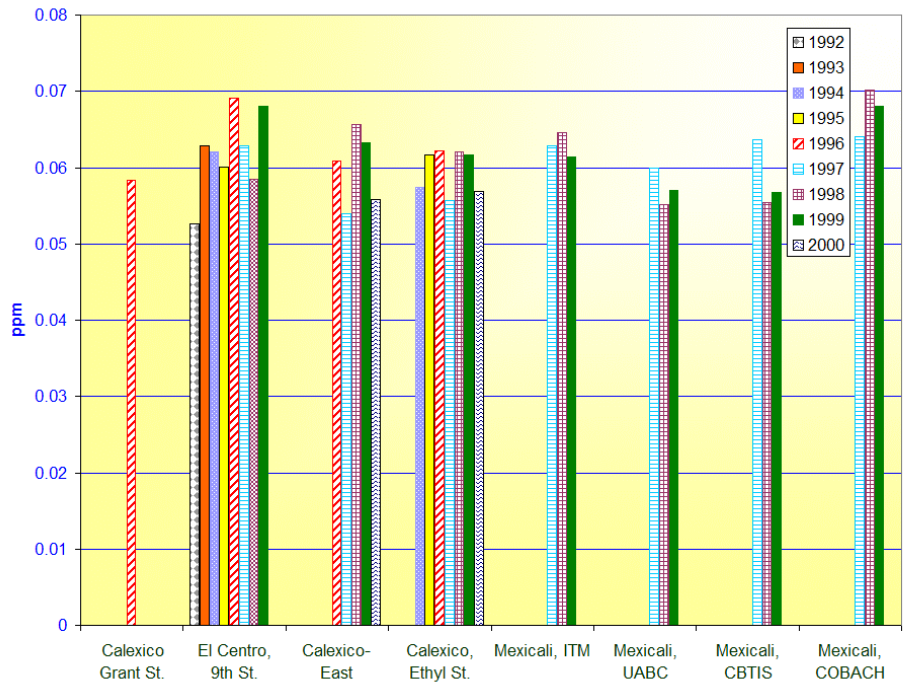


FIGURE 3.3-21 Bar Graph of Ozone Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

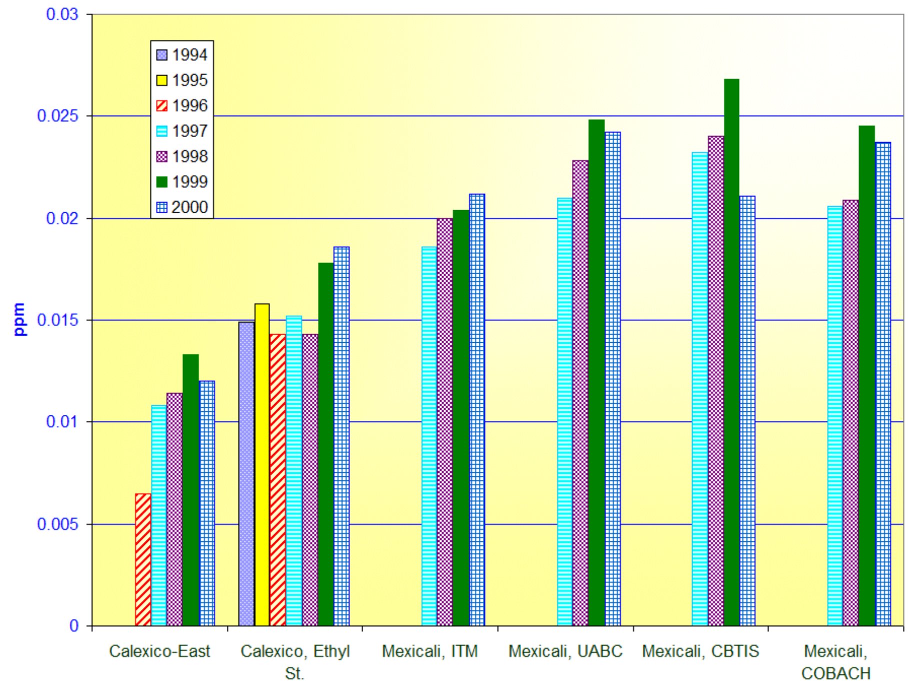


FIGURE 3.3-20 Bar Graph of Nitrogen Dioxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

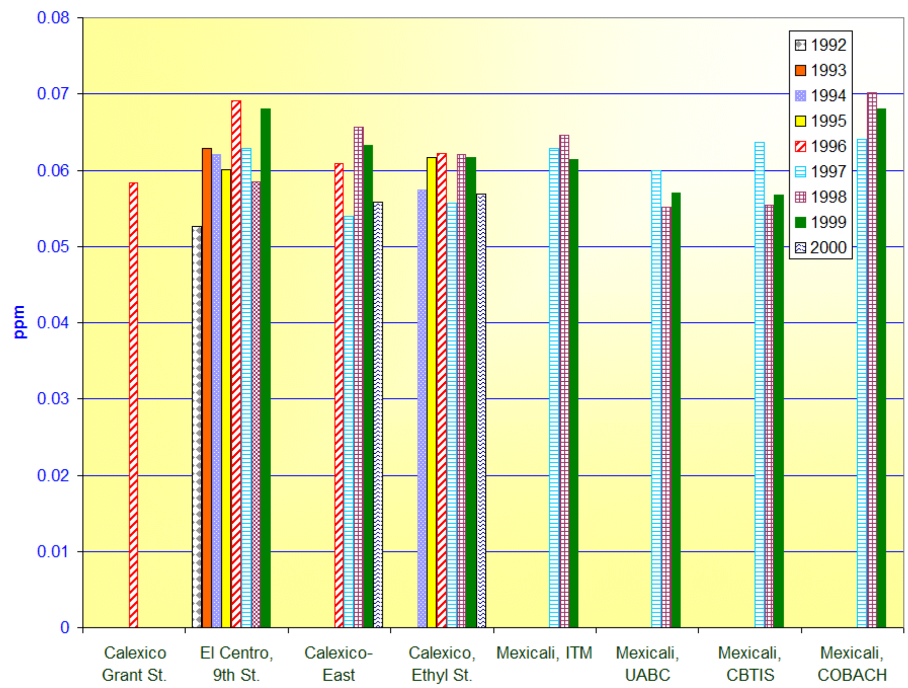


FIGURE 3.3-21 Bar Graph of Ozone Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

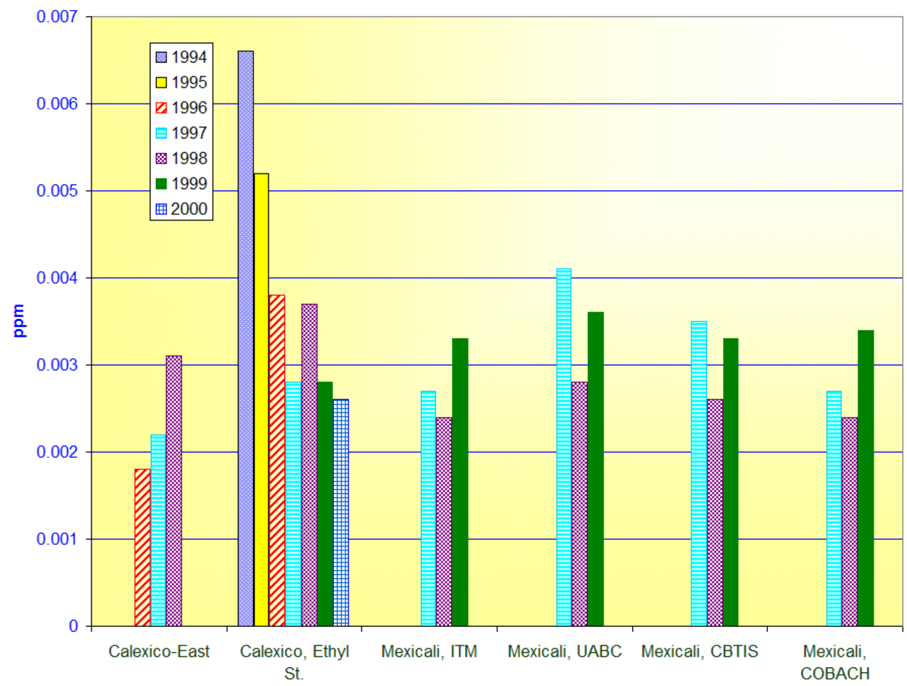


FIGURE 3.3-22 Bar Graph of Sulfur Dioxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

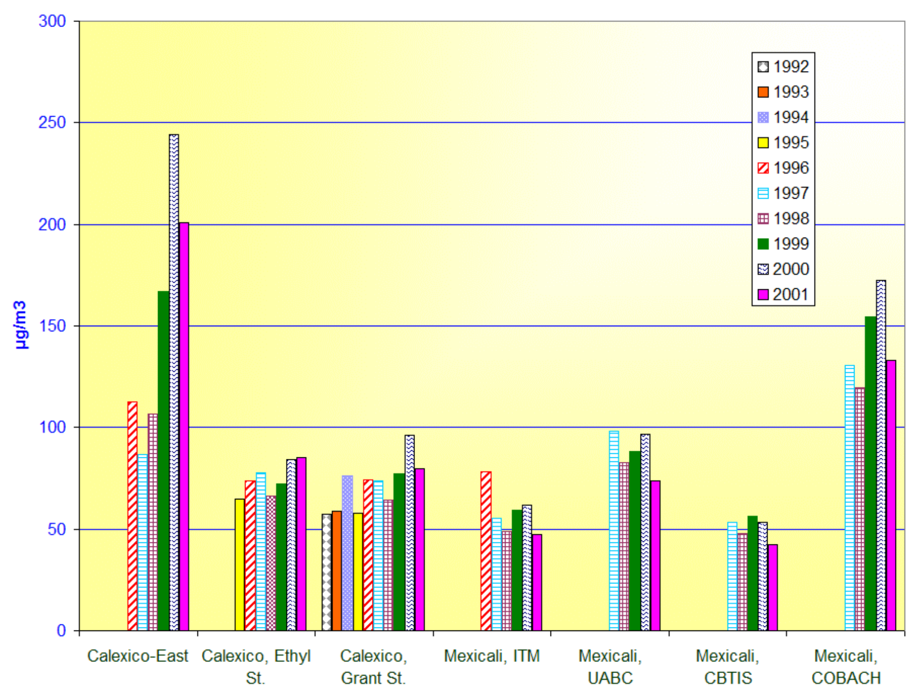


FIGURE 3.3-23 Bar Graph of PM_{10} Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

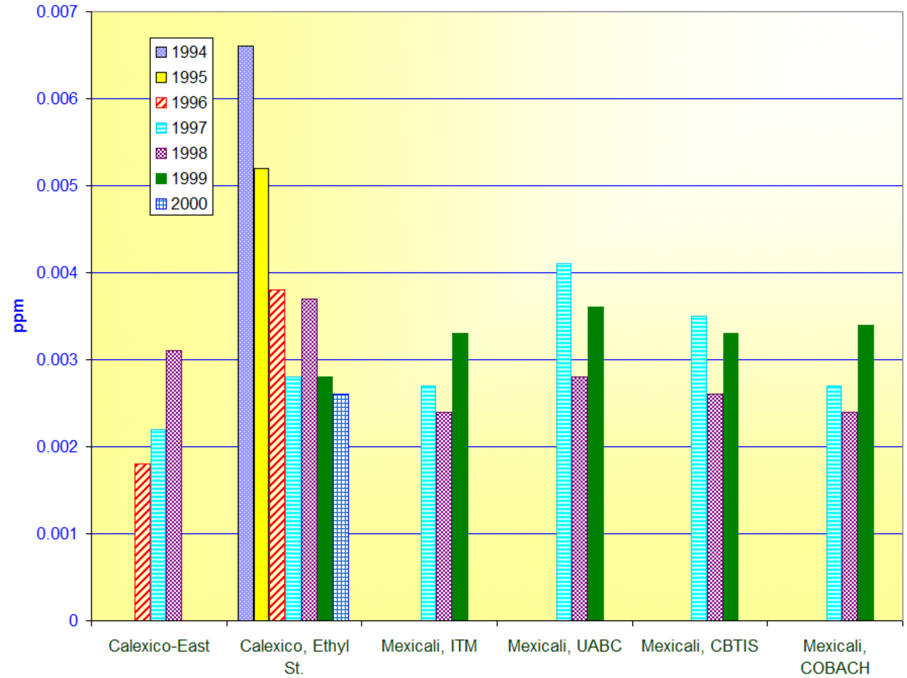


FIGURE 3.3-22 Bar Graph of Sulfur Dioxide Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

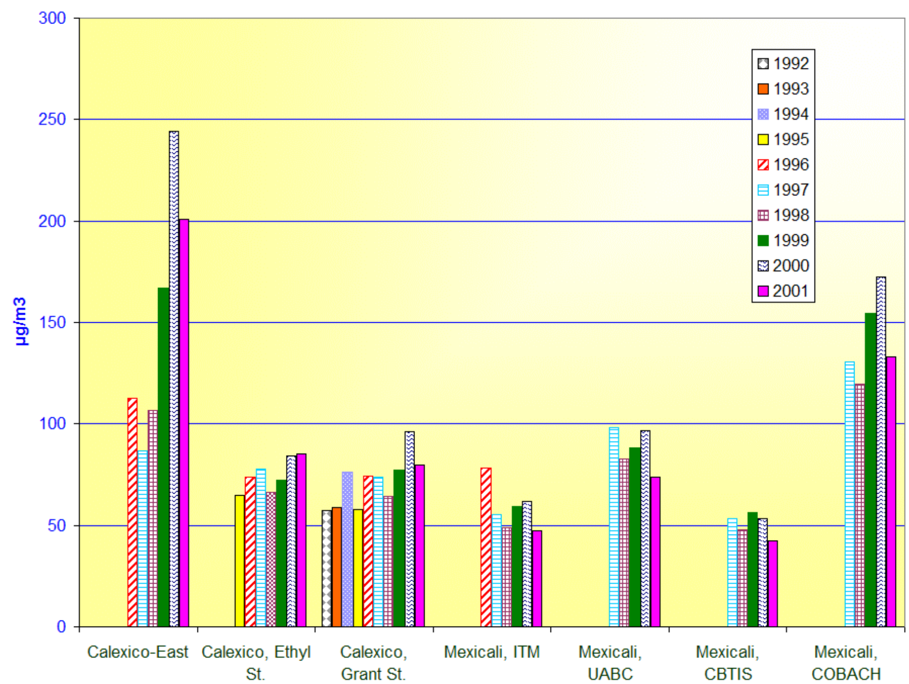


FIGURE 3.3-23 Bar Graph of PM_{10} Annual Arithmetic Means for U.S. and Mexico Monitoring Stations

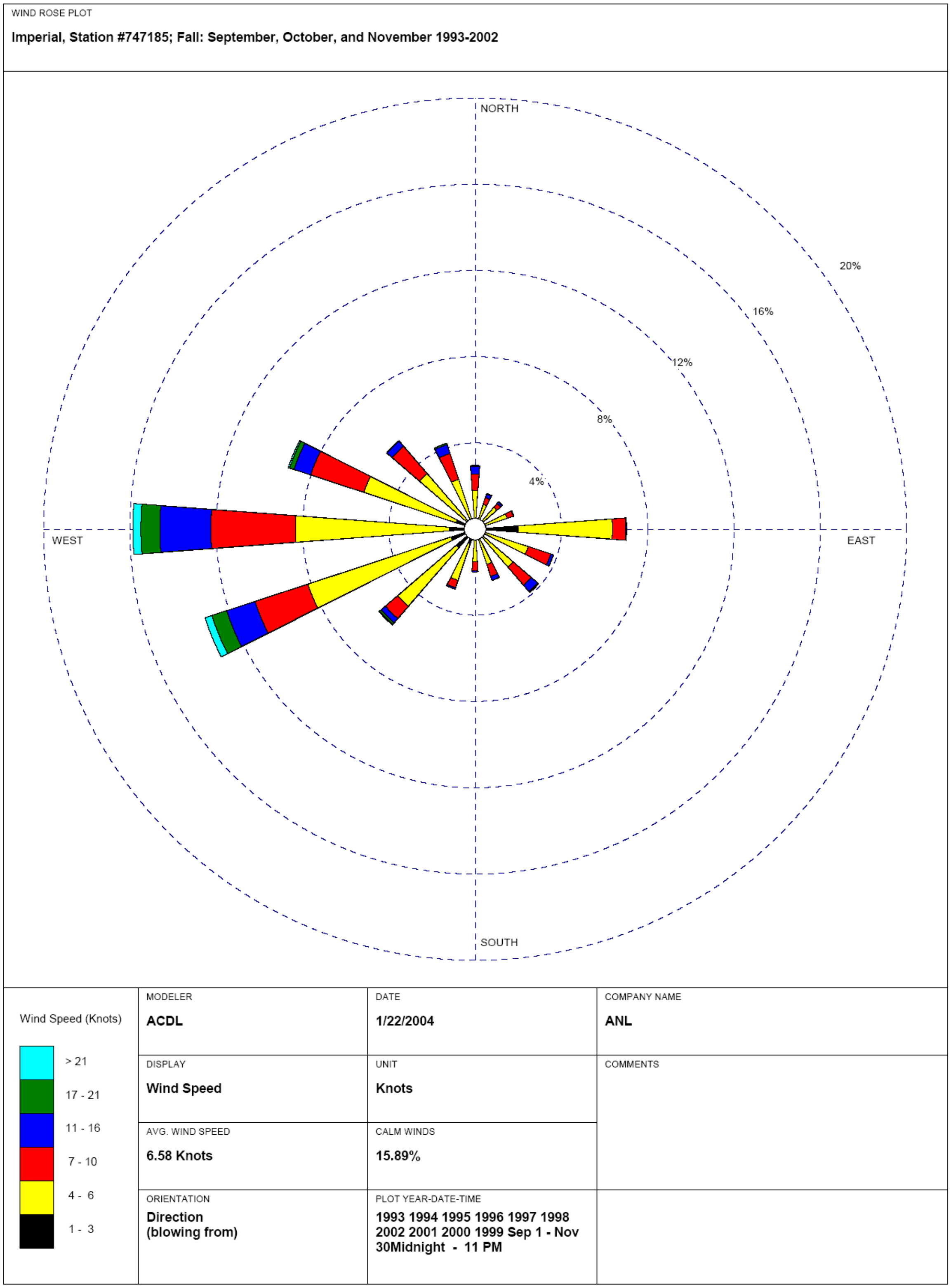
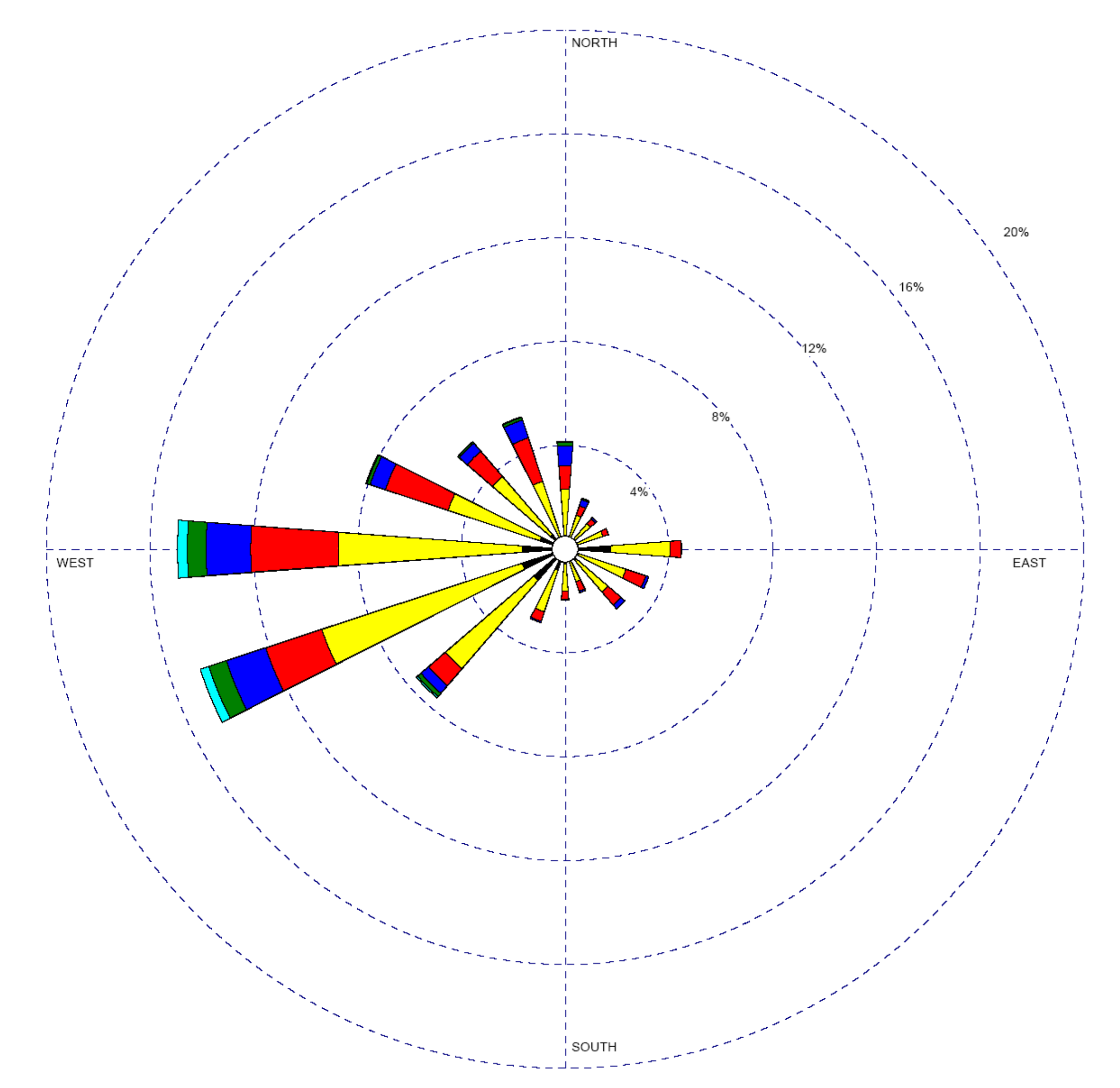


FIGURE 3.3-3 Imperial, Imperial County: Fall (September, October, and November) Winds from 1993 through 2002

WIND ROSE PLOT

Imperial, Station #747185; Winter: December, January, and February 1993-2002



Wind Speed (Knots)	MODELER	DATE	COMPANY NAME
> 21	**ACDL**	**1/22/2004**	**ANL**
17 - 21	DISPLAY: **Wind Speed**	UNIT: **Knots**	COMMENTS
11 - 16	AVG. WIND SPEED: **6.45 Knots**	CALM WINDS: **16.45%**	
7 - 10	ORIENTATION: **Direction (blowing from)**	PLOT YEAR-DATE-TIME: **1993 1994 1995 1996 1997 1998 2002 2001 2000 1999 Check Date ReportRange Midnight - 11 PM**	
4 - 6			
1 - 3			

FIGURE 3.3-4 Imperial, Imperial County: Winter (December, January, and February) Winds from 1993 through 2002

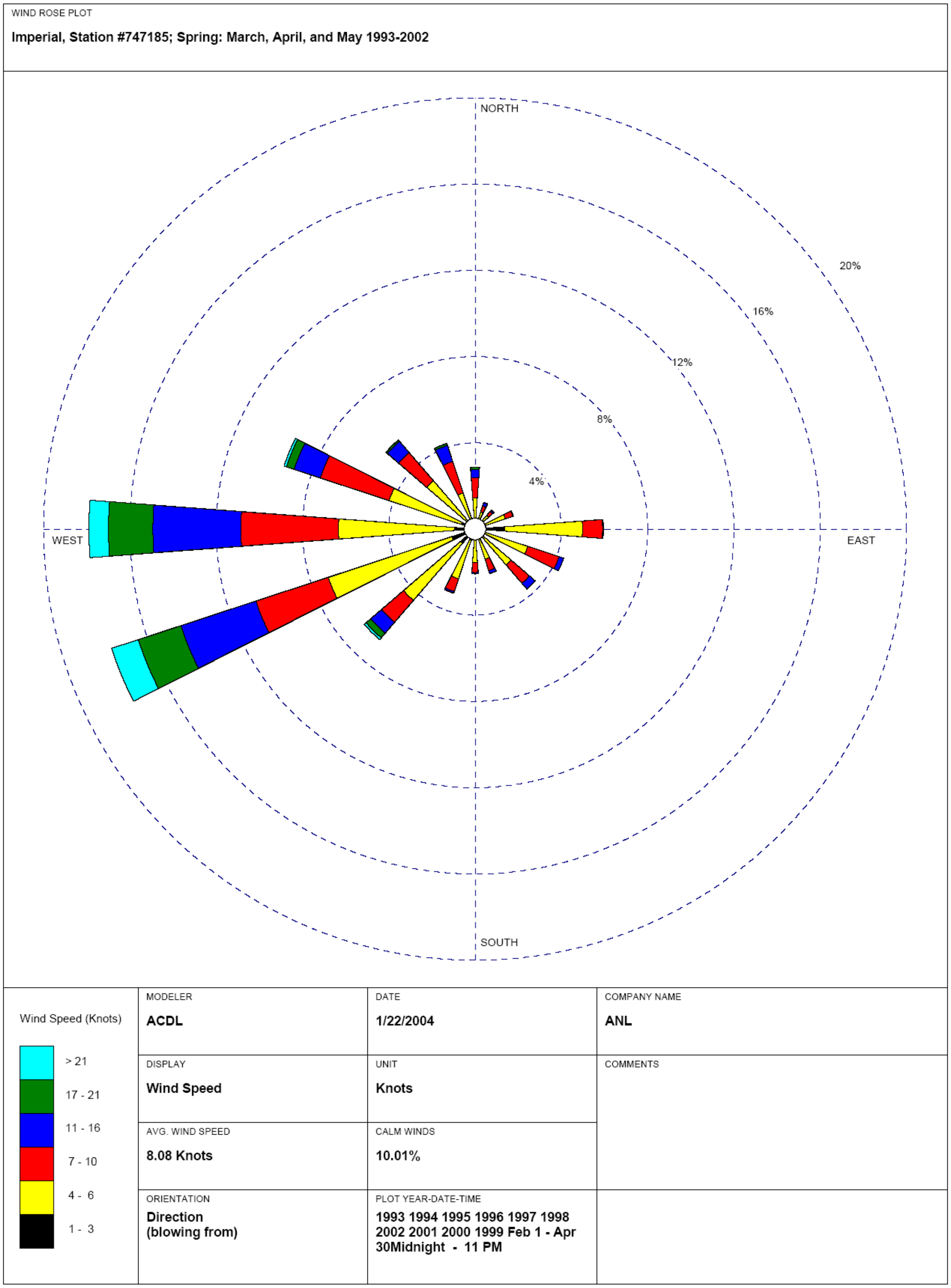
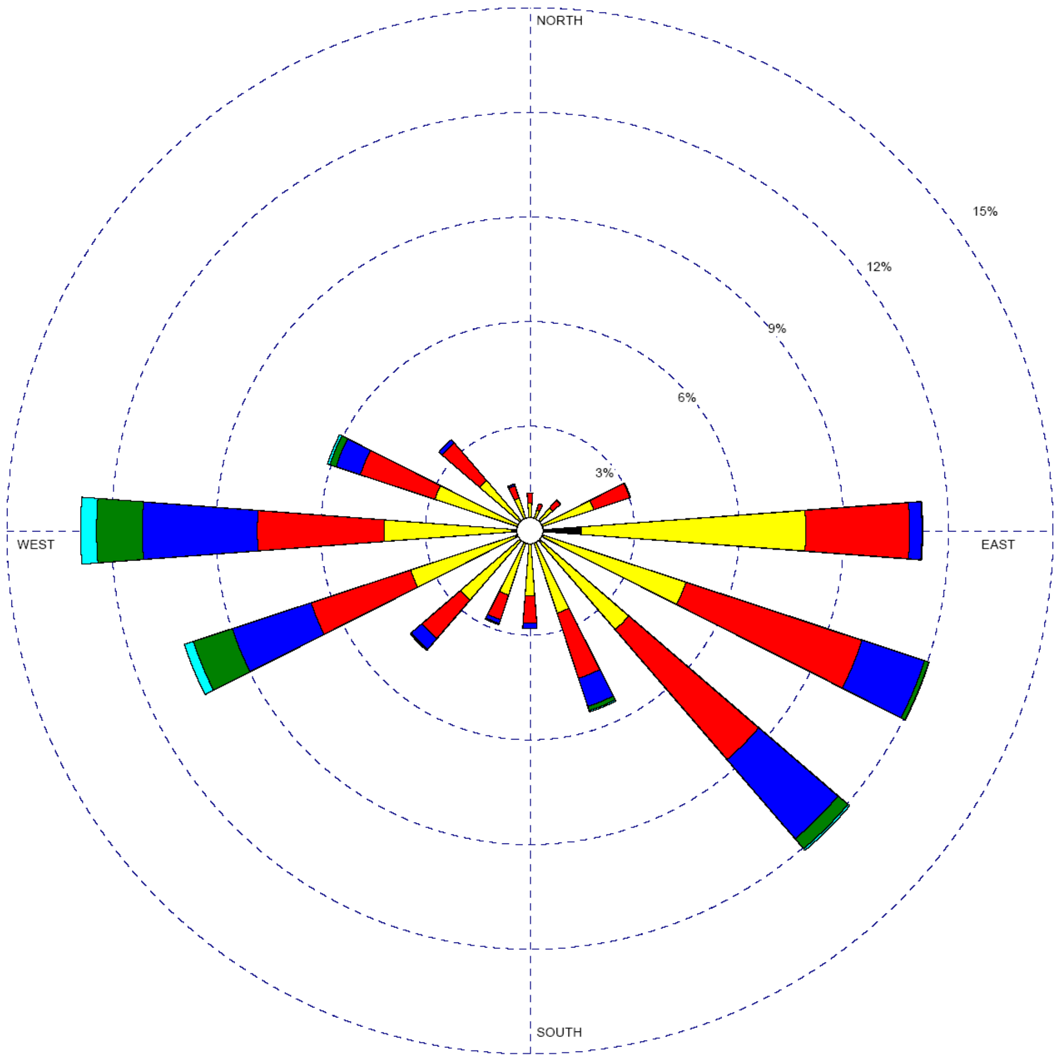


FIGURE 3.3-5 Imperial, Imperial County: Spring (March, April, and May) Winds from 1993 through 2002

WIND ROSE PLOT

Imperial, Station #747185; Summer: June, July, and August 1993-2002



Wind Speed (Knots)	MODELER	DATE	COMPANY NAME
> 21	**ACDL**	**1/22/2004**	**ANL**
17 - 21	DISPLAY **Wind Speed**	UNIT **Knots**	COMMENTS
11 - 16	AVG. WIND SPEED **7.90 Knots**	CALM WINDS **8.52%**	
7 - 10 4 - 6 1 - 3	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1993 1994 1995 1996 1997 1998 2002 2001 2000 1999 Jun 1 - Aug 31Midnight - 11 PM**	

FIGURE 3.3-6 Imperial, Imperial County: Summer (June, July, and August) Winds from 1993 through 2002

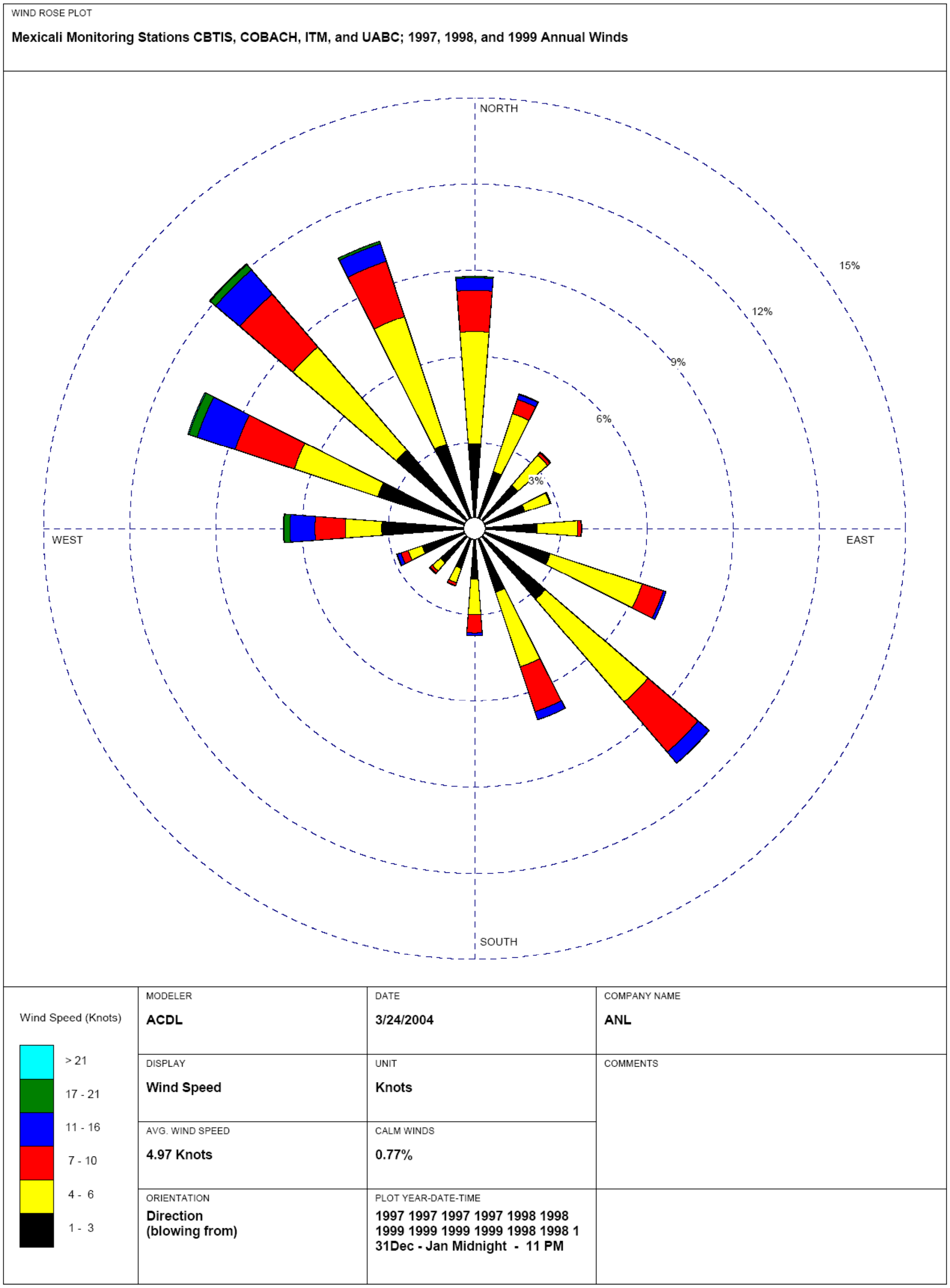


FIGURE 3.3-7 Mexicali Monitoring Stations CBTIS, COBACH, ITM, and UABC: Annual Winds, 1997, 1998, and 1999

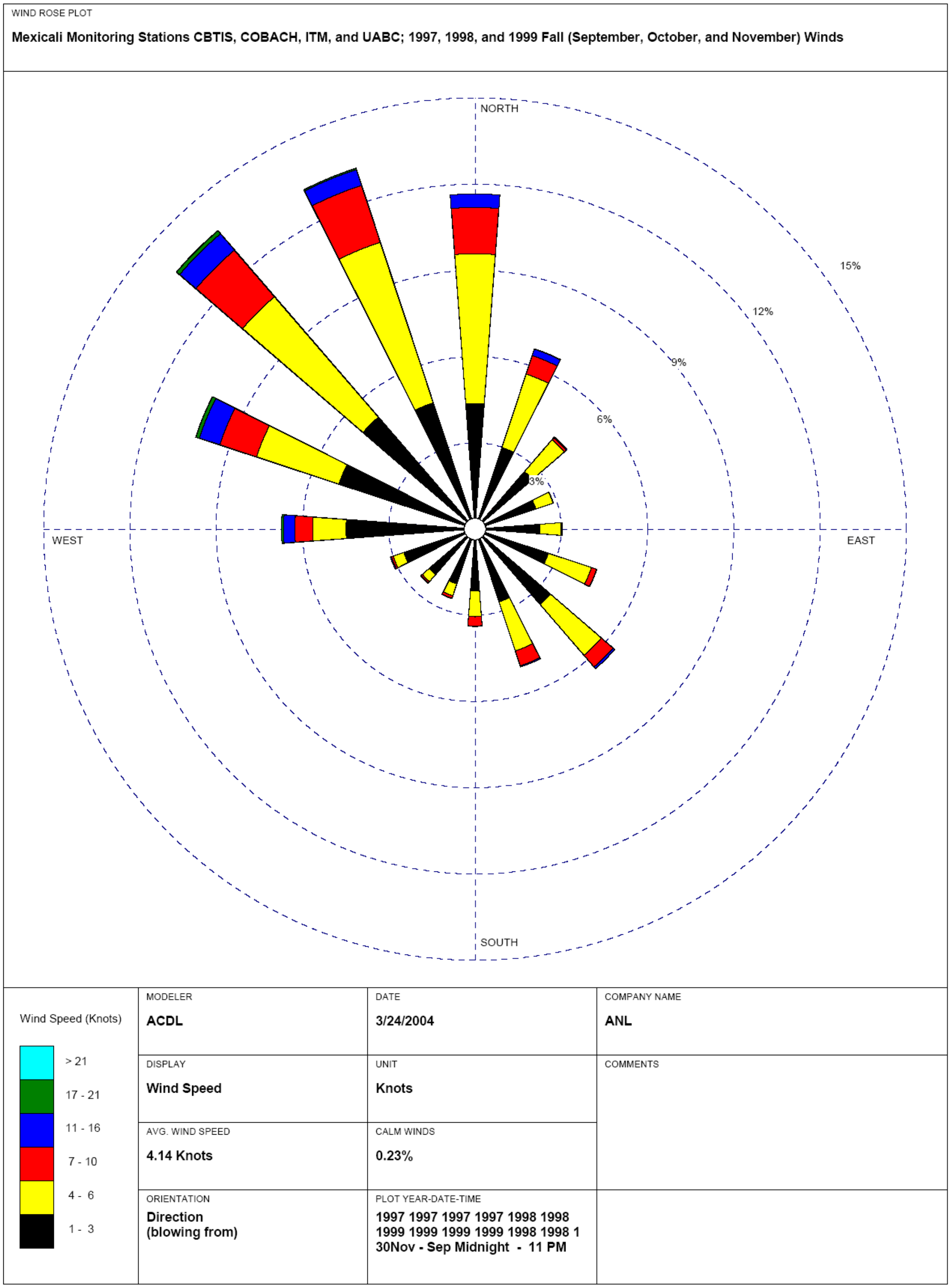


FIGURE 3.3-8 Mexicali Monitoring Stations CBTIS, COBACH, ITM, and UABC: Fall (September, October, November) Winds, 1997, 1998, and 1999

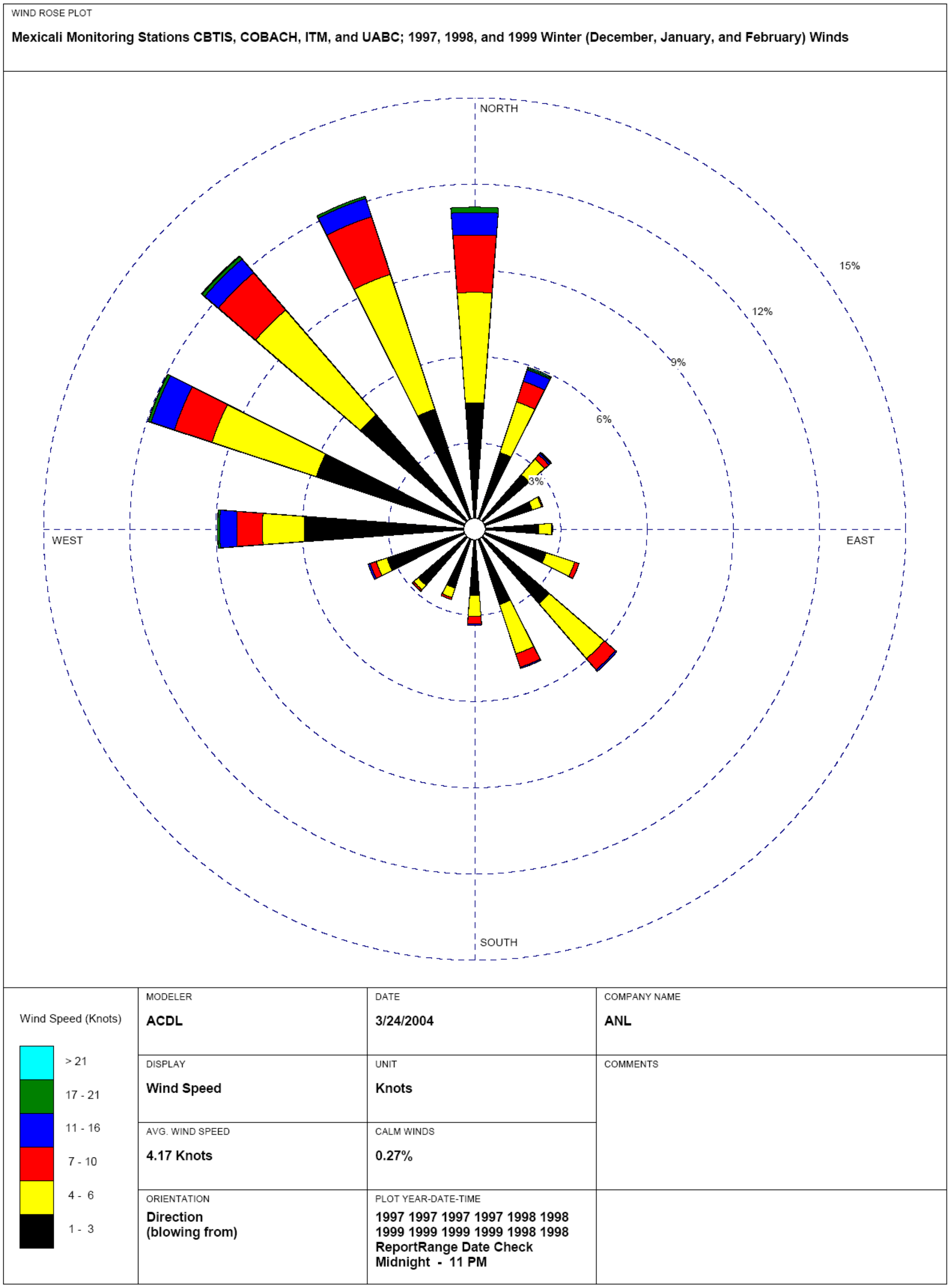


FIGURE 3.3-9 Mexicali Monitoring Stations CBTIS, COBACH, ITM, and UABC: Winter (December, January, and February) Winds, 1997, 1998, and 1999

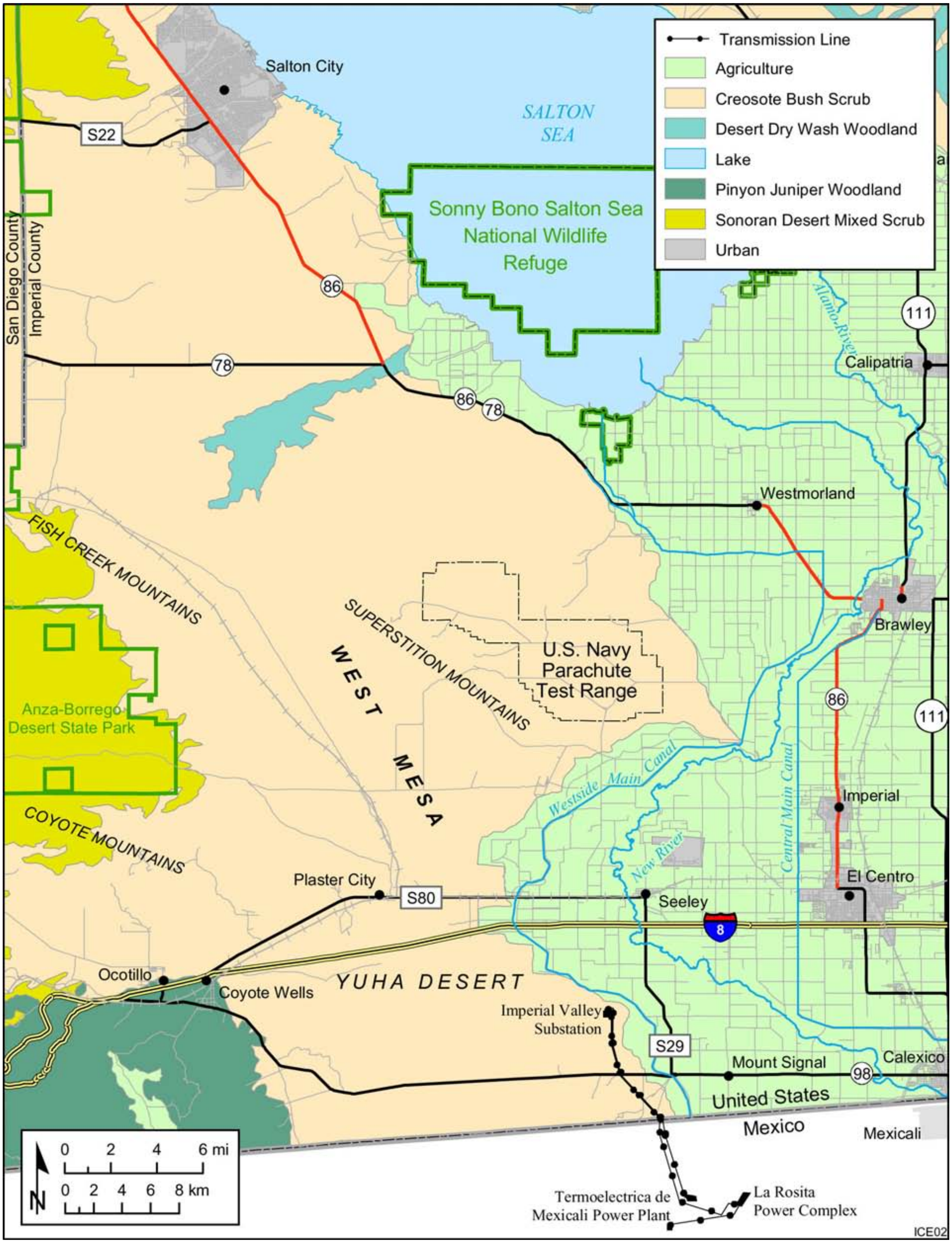


FIGURE 3.4-1 Biological Community Types in the Vicinity of the Proposed Transmission Line Routes (Source: adapted from Loeffler 2001)

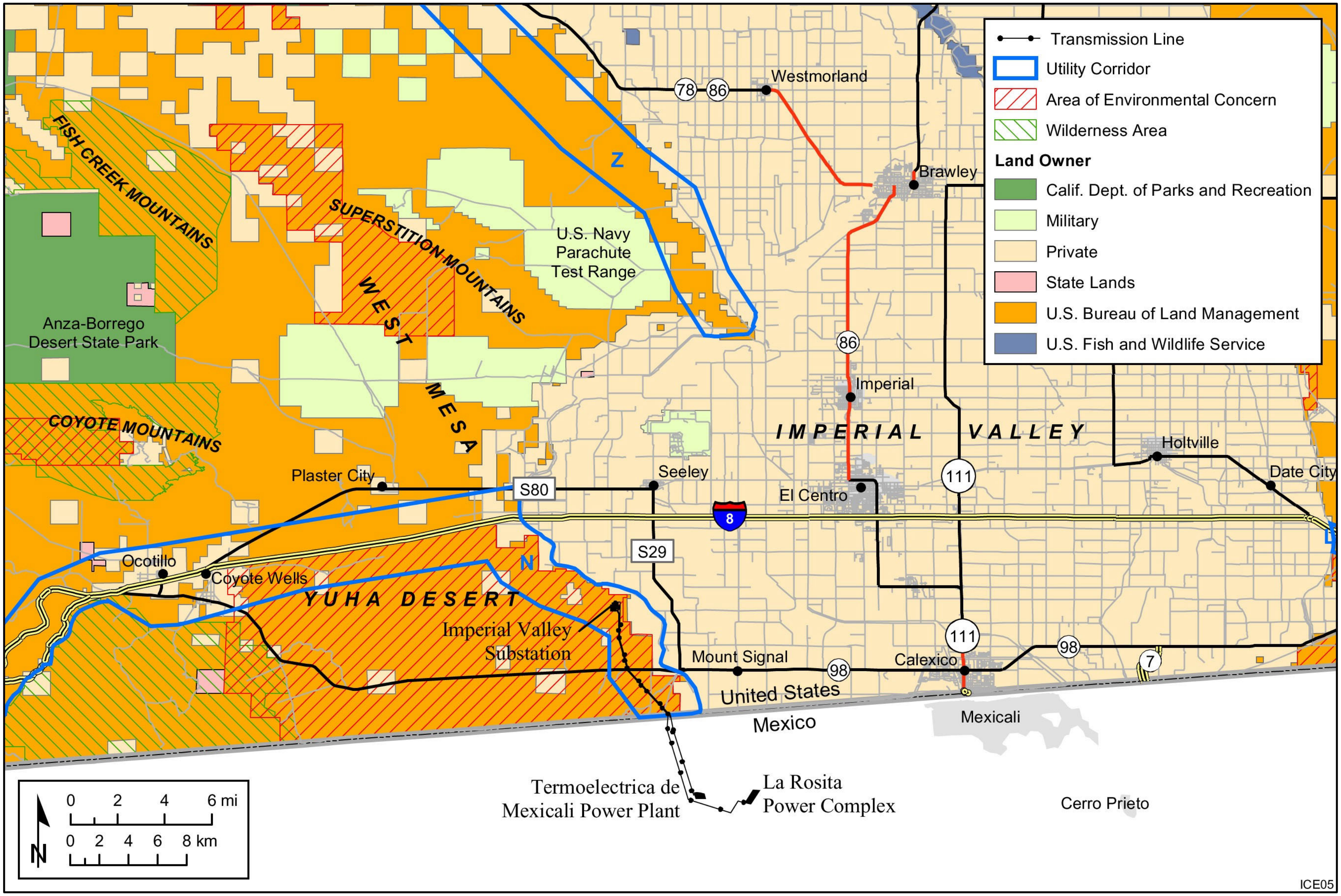


FIGURE 3.6-1 Land Use and Ownership Map (Note: Corridor 2 is a contingent corridor)

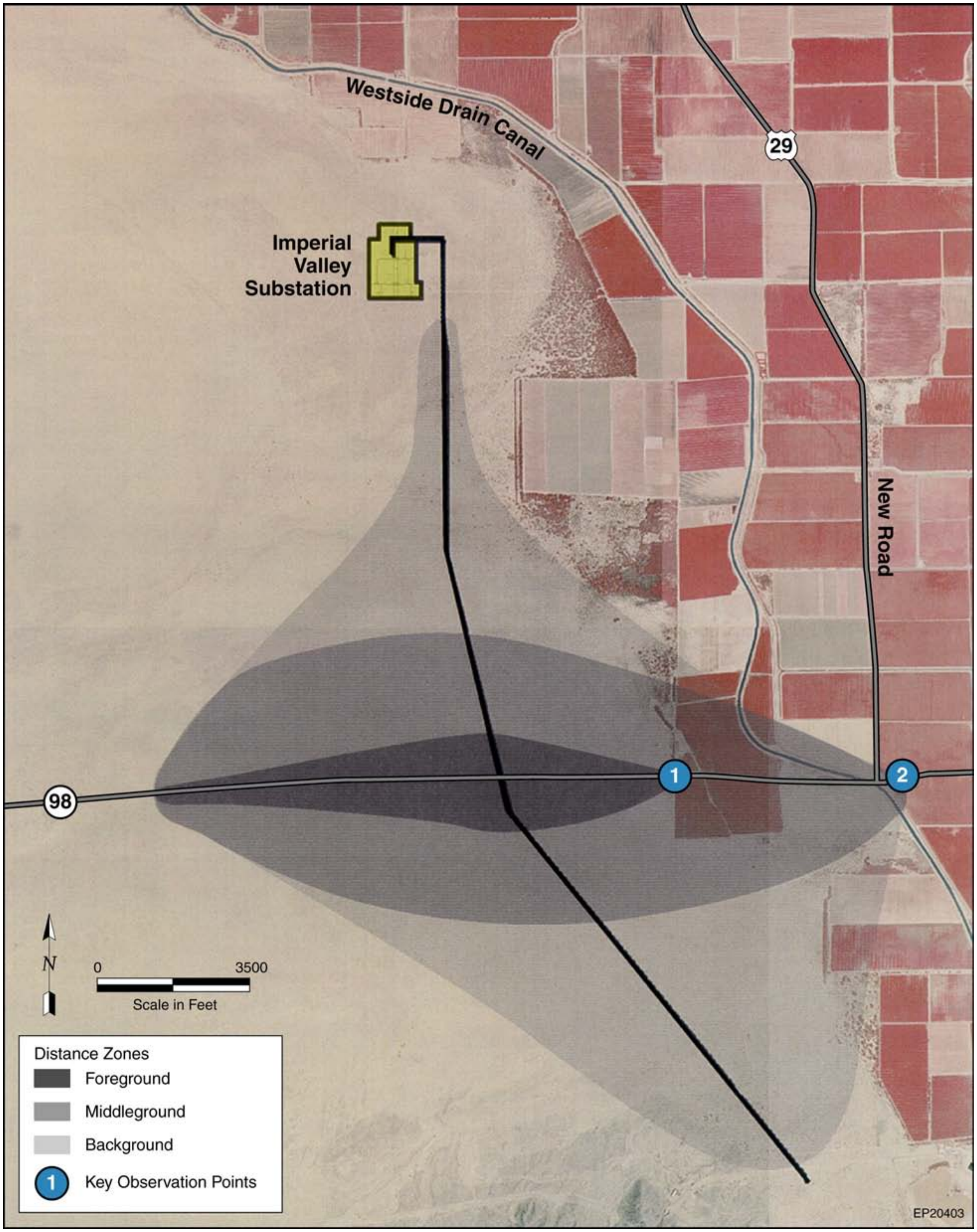


FIGURE 3.8-1 Distance Zone Map

TABLE 2.5-1 Summary of Impacts for Proposed Action and Other Alternatives by Resource Area[a]

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Geology, Soils, and Seismicity (4.1)	No additional impacts are anticipated to geological resources or soils. Normal erosional forces would continue. Because the transmission lines would not be built, seismicity hazards would not be relevant.	*Geology* Minor disturbance of surface material resulting from construction but with minimal potential for slope failure. *Seismicity* On the basis of the California Geological Survey's on-going evaluation of fault zones to date, surface fault rupture is not likely to occur along the proposed or alternative transmission line routes. *Soils* Potential for impacts would increase as a result of vegetation removal, and grading and excavation during construction that could lead to increased erosion. Temporary increase in soil compaction resulting from vehicle usage of access roads.	Impacts would be the same as those under the proposed action.	Impacts would be the same as those under the proposed action. In addition, with regard to soils, any paving of roads or construction activities could have short-term adverse impacts to soils due to soil disturbance. Overall, impact would be beneficial because dust emissions and soil erosion would be reduced over the long term.
Applicants' Proposed Routes:		Temporary impacts due to soil disturbance total about 15.8 acres (6.4 ha); permanent impacts would be less than 3.6 acres (1.5 ha) since no new access road would be built.		
Western Alternative Routes:		Temporary impacts would be about 18.0 acres (7.3 ha); permanent impacts about 13.1 acres (5.3 ha). The lower portion of the routes could cross prime farmland.		
Eastern Alternative Routes:		Temporary impacts would be about 16.3 acres (6.6 ha); permanent impacts about 10.5 acres (4.2 ha).		

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Water Resources (4.2)	*Transmission Lines* Under the no action alternative no transmission lines would be built and thus there would be no impacts. *Water Consumption* The LRPC unit would consume up to 4,940 ac-ft/yr of water taken from the Zaragoza Oxidation Lagoons in Mexicali. *Flow Reduction* The flow of the New River would be reduced by less than 4% (15.7% of the standard deviation for the flow at the Calexico gage). *New River* The TDS concentration would be increased by less than 3.7% (31% of the standard deviation). TSS, BOD, COD, and phosphorus loads in the New River would be reduced.	*Transmission Lines* Construction of two transmission lines along the proposed routes or alternative routes would have minimal impacts on surface waters. A maximum of two lattice towers for each line would be placed on the 100-yr floodplain for the Pinto Wash. This placement would have minimal impacts on floodplain function or values. Impacts to groundwater would be prevented during construction. *Water Consumption* The LRPC and TDM power plants would consume 10,667 ac-ft/yr of water for cooling purposes. The water would be taken from the Zaragoza Oxidation Lagoons in Mexicali. (The LRPC power plant alone would consume 7,170 ac-fr/yr. The TDM power plant alone would consume 3,497 ac-ft/yr.) *New River* Power plant operations would directly impact the New River by reducing the flow of water received from the Zaragoza Oxidation Lagoons and by modifying its quality. As a result, the average annual flow of the New River would be decreased by about 5.9% at the U.S.-Mexico border (Calexico gage). Decreases in flow would result in a decrease in average annual water depth of about 0.13 ft (3.9 cm) at the Calexico gage and 0.7 ft (2.1 cm) at the Westmorland gage near the Salton Sea. TDS concentrations would increase by 5.6%, or about 46% of its variability in the river at the Calexico gage, TDS, TSS, BOD, COD, phosphorus, and selenium loads would be reduced as a result of water treatment at the plants.	*Dry Cooling* The plants would use about 5% of the water needed for wet cooling under the proposed action. BOD, TSS, and phosphorus and selenium concentrations in the New River would be essentially unchanged. COD would slightly decrease. Indirect impacts to the Salton Sea would be minimal. *Wet-Dry Cooling* Impacts would be greater than those for dry cooling but less than those for wet cooling only, as described for the proposed action. Impacts to the New River, Salton Sea, Brawley Wetlands, and groundwater would be less than those for the no action and proposed action alternatives and would be proportional to the amount of wet-cooling used.	Impacts would be the same as for the proposed action. Measures to reduce air quality impacts could result in beneficial impacts to water resources over the long term, since surface runoff from unpaved surfaces would be reduced.

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Water Resources (4.2) (Cont.)	*Salton Sea* The Salton Sea inflow would be reduced by 0.4%, or 6.3% of the standard deviation of total inflow. Salinity would increase by less than 0.17 mg/L/yr. *Brawley Wetland* New River flow reductions would not interfere with withdrawal of water for wetland. Increases in TDS would not cause adverse impacts to the system. *Groundwater* The flow reduction of 4% at the Calexico gage would have minimal effect on groundwater recharge to the Imperial Valley Groundwater Basin, from the New River.	*Salton Sea* New River inflow to the Salton Sea would decrease, thus reducing its volume, lowering its elevation, and decreasing its surface area. The decrease in inflow of 10,667 ac-ft/yr would result in a elevation decrease of about 0.05 ft (0.6 cm), about 10% of the Sea's natural variability. Surface area would decrease by about 97 acres (39 ha), which is about 0.04% of its initial surface area and about 9% of its natural variability. Decreased water inflow would increase the TDS concentration (salinity) by 0.19 mg/L/yr. This rate of increase would cause the Salton Sea to reach a threshold of 60,000 mg/L only about 4 days earlier out of 36 years than it would with no plants operating. Phosphorus loads would be reduced by about 5.3%. Selenium loads would be reduced by about 38 lb/yr, or about 0.2% of the dissolved mass in the sea. *Brawley Wetland* New River flow reductions would not interfere with withdrawal of water for wetland. Increases in TDS would not cause adverse impacts to the system. Changes in other parameters (i.e., BOD, COD, and pathogens) could have beneficial impacts. All changes would fall within the range of the parameter's variability. *Groundwater* Indirect impacts to groundwater would occur as a result of decreasing flow in the New River since it is a recharge source for groundwater in the Imperial Valley Groundwater Basin. Impacts to the basin would be minimal because the New River is only one of many recharge sources, and the reduction in its flow is expected to be low.		

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Air Quality (4.3)	*Primary Emissions* Plant emissions would be somewhat greater for no action than for the proposed action for CO and NO_x because of the inclusion of the Mexico units at LRPC. However, emissions would still result in impacts in the United States below EPA SLs for all pollutants. Carbon dioxide (CO_2) emissions would be about 3.9 million tons/yr, or about 0.066% of total U.S. CO_2 emissions. *Secondary Air Pollutants* Increases or decreases of ambient ozone concentrations resulting from plant emissions of NO_x and volatile organic compounds (VOC) would be minor. Secondary PM_{10} (particulate matter with a mean aerodynamic diameter of 10 µm or less) production from plant emissions would also be minor and be similar to that under the proposed action. *Fugitive Dust* There would be no fugitive dust emissions from construction as transmission lines would not be built.	*Primary Emissions* The impacts from operation of export turbines at the TDM and LRPC power plants are considered as effects of the transmission line projects. Plant emissions of PM_{10}, nitrogen oxides (NO_x), carbon monoxide (CO), and ammonia (NH_3) all would result in increases in air concentrations that are below EPA SLs used here as thresholds of significant deterioration of air quality. CO_2 emissions would be about 5.1 million tons/yr, or about 0.088% of total U.S. CO_2 emissions. *Secondary Air Pollutants* Characterization of the air chemistry in the region suggests that plant emissions of NO_X and VOC could result in slight (less than 3 ppb) increases or decreases in the concentration of ambient ozone levels. Secondary production of PM_{10} in the atmosphere resulting from plant emissions of NH_3 and NO_x is expected to be no more than 1 µg/m^3. The SL for PM_{10} is not expected to be exceeded with the addition of secondary PM_{10}. *Fugitive Dust Emissions* Temporary emissions from transmission line construction would include those from fugitive dust, PM_{10} (construction, vehicular traffic, and helicopter operations), and fuel combustion. Construction-related PM_{10} emissions over the construction period would be about 11.4 tons (10.3 t) for the proposed routes, 14.4 tons (13.1 t) for the western alternative routes, and 12.3 tons (11.2 t) for the eastern alternative routes. The emission rate of fugitive dust (PM_{10}) from exposed shoreline resulting from the reduction in the surface area of the Salton Sea would be at most 100 tons/yr (91 t/yr).	*Emission Controls* CO emissions would be up to 80% less than those under the proposed action. HAPs emissions are assumed to be reduced by 50%. Emissions of other pollutants would as for the proposed action. Secondary O_3 and PM_{10} impacts would be the same as those for the proposed action. *Dry cooling or wet-dry cooling* Plant emissions of PM_{10} would be reduced without wet-cooling tower use. Other emissions would increase 10–15% as a result of reductions in plant efficiency. *Fugitive Dust Emissions* Emissions from transmission line construction would be the same as for the proposed action.	*Primary Emissions* Plant emissions would be the same as for the proposed action. Impacts of plant emissions on air quality would be offset by reductions in emissions of the same pollutants from other sources in the air basin. *Secondary Air Pollutants* Secondary O_3 and PM_{10} impacts from plant emissions could be reduced as compared to those for the proposed action with the use of emission offsets. *Fugitive Dust Emissions* In addition to emissions from transmission line construction, mitigation activities such as road paving could produce temporary fugitive dust emissions but long term improvement.

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Biological Resources (4.4)	*Transmission Lines* No additional impacts to desert habitat or wildlife are expected since no transmission lines would be built. *New River* Impacts to biological resources would occur from changes in water quality and volume in the New River, due to power plant operation. Impacts to aquatic organisms would be in proportion to the water resource impacts under the proposed alternative in accordance with relative water consumption. *Wetlands* No impacts would occur to wetlands because the transmission lines would not be built. The Brawley Wetland would not be adversely impacted by a decrease in New River water depth or an increase in salinity.	*Transmission Lines* Permanent impacts to Sonoran creosote bush scrub and desert wash habitat would occur during construction of the transmission lines. Construction may adversely impact small mammals and reptiles with low mobility during construction. No Federal-listed threatened or endangered species would be impacted by the proposed action; however, some sensitive plant species could be disturbed. Protective measures would be taken to minimize impacts to the flat-tailed horned lizard, the western burrowing owl, and other sensitive species. *New River* Water quality changes would have a minor adverse impact on fish and aquatic invertebrates. Riparian vegetation would not be impacted by a decrease in water depth or an increase in salinity. *Wetlands* No wetlands would be impacted by transmission line construction and operation. Desert wash areas [about 0.2 ac (0.08 ha)] could be adversely impacted. Brawley Wetland would not be adversely impacted by a decrease in New River water depth or an increase in salinity.	*Transmission Lines* The effects on desert habitat would be the same as those for the proposed action. *New River* The use of alternative cooling technologies at the power plants would reduce the adverse impacts associated with slight water depth and water quality changes to the New River and Salton Sea (though all these impacts would be small). *Wetlands* Impacts would be less to the Brawley wetland than under the proposed action for dry cooling or wet-dry cooling systems.	*Transmission Lines* Impacts would be the same as under proposed action. *New River* Impacts would be the same as for proposed action. *Wetlands* Impacts would be the same as for proposed action. *Salton Sea* Impacts would be the same as for proposed action. *Mitigation Measures Impacts* Prior to implementation an evaluation of potential impacts to special status species would be conducted.

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Biological Resources (4.4) (Cont.)	*Salton Sea* No additional impacts to aquatic invertebrates and fish.	*Salton Sea* Reduction in New River inflow would increase salinity (e.g., increase of 0.19 mg/L/yr) and could cause small adverse impacts to biological resources. A decrease in phosphorus load could reduce eutrophication, resulting in fewer episodic fish kills and improving the food base for some bird species. Impacts to habitat for waterfowl and wading birds would be small.	*Salton Sea* The use of alternative cooling technologies at the power plants would reduce the adverse impacts associated with slight water depth and water quality changes to the New River and Salton Sea (though all these impacts would be small).	
Applicants' Proposed Routes:		Permanent impact to 3.1 acre (1.3 ha) of Sonoran creosote bush scrub and 0.3 acre (0.1 ha) of desert wash habitat.		
Western Alternative Routes:		Permanent impacts would be about 30% greater due to greater length relative to the proposed routes.		
Eastern Alternative Routes:		Permanent impacts would be about 8% greater due to greater length relative to the proposed routes.		
Cultural Resources (4.5)	No additional impacts expected.	Cultural resources would be impacted by the construction and operation of the transmissions lines. Impacts to cultural resources would be mitigated.	Impacts would be the same as those identified for the proposed action.	Any measures involving road paving or construction may require evaluation for NRHP eligibility status and protection in consultation with California SHPO to mitigate impacts.
Applicants' Proposed Routes:		Construction of the transmission lines in the proposed routes would impact four archaeological sites. Adverse impacts from transmission line construction to these archaeological sites would be mitigated in consultation with the California SHPO.		

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Cultural Resources (4.5) (Cont.) *Western Alternative Routes:*		Portions of the western alternative routes have not been surveyed for cultural resources. While these routes would avoid the larger concentrations of archaeological sites found along the proposed routes, the routes would likely impact cultural resources. Any adverse effects would be mitigated prior to construction.		
Eastern Alternative Routes:		Portions of the eastern alternative routes have not been surveyed for cultural resources. While these routes would avoid the larger concentrations of archaeological sites found along the proposed routes, the routes would likely impact cultural resources. Any adverse effects would be mitigated prior to construction.		
Land Use (4.6)	No additional impacts expected.	Land use in the projects area is limited due to its status as an Area of Critical Environmental Concern. Vehicle use is confined to roads, and camping is limited to designated areas only. No farming or mining is currently allowed in the area.	Impacts would be the same as those under the proposed action.	Impacts would depend on mitigation measure (e.g., paving roads could result in adverse impacts if access to remote areas is increased).
Applicants' Proposed Routes:		Permanent impacts would be less than 3.6 acres (1.5 ha) since no new access roads would be built. No alteration of current land use plans is required.		
Western Alternative Routes:		Permanent impacts would be greater than those of the proposed and eastern routes: about 13.1 acres (5.3 ha). Routes would partially run outside of the utility corridor and would require alteration of land use designation.		
Eastern Alternative Routes:		Permanent impacts would be greater than those of the proposed routes: about 10.5 acres (4.2 ha). No alteration of current land use plans would be required.		

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Transportation (4.7)	No additional impacts expected.	Traffic in the projects area would increase during the transmission line construction period. Given the current levels of service on State Route 98 and low traffic volumes associated with projects, no impacts on existing levels of service are expected for the proposed or alternative routes.	Impacts would be same as those under the proposed action.	Impacts would depend on mitigation measures. In the short-term, adverse impacts could result from increased local traffic.
Visual Resources (4.8)	No additional impacts expected.	Construction and operation of the transmission lines would not alter the Class III Visual Resource Management rating for the project area. Transmission lines would not be a prominent addition to the existing landscape. Location of the lines in the Eastern routes would be closer to the nearest residence and a larger aspect of the landscape than in the other routes.	Impacts would be the same as those under the proposed action.	Impacts would depend on mitigation measure used (e.g., a compressed natural gas station would not cause a visual contrast, since its height would be similar to that of a gasoline service station).
Noise Impacts (4.9)	No additional impacts expected.	No adverse impacts are expected during transmission line construction or operation. Noise levels would be below EPA guideline values for the proposed and western alternative routes. For the eastern alternative routes, construction noise would be above EPA guidelines, but only for a short period of time (8-hr daytime shift, less than 1 week).	Impacts would be the same as those under the proposed action.	Impacts would depend on mitigation measures (e.g., paving roads would cause short-term adverse noise impacts due to equipment use near residential areas, but retiring old automobiles would have a beneficial impact).
Socioeconomics (4.10)	No additional impacts expected.	Temporary, small beneficial impacts on the local economy would occur during construction of the transmission lines as a result of wage expenditures and material procurement. Local tax revenues and lease payments to the Federal government from the proposed action are expected be minimal.	Impacts would be the same as those under the proposed action.	Impacts would depend on the mitigation measure (e.g., wage and salary spending and material procurement to implement a measure would have a beneficial impact to the local economy).

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Human Health Impacts (4.11)	No additional impacts from EMF would occur since the transmission lines would not be constructed. Impacts due to plant emissions would be minimal since they would be below EPA SLs. Secondary production of ozone and PM_{10} from plant emissions of precursors (NO_x, NH_3, and VOCs) would pose minimal health impacts.	No health impacts to residents, workers, or recreationalists due to EMF exposure would be expected from the proposed action. Emissions of NO_x, CO, and PM_{10} would result in air concentration increases to levels that would be below EPA SLs and therefore unlikely to adversely impact the health of residents in the air basin. Secondary production of ozone and PM_{10} from plant emissions of precursors (NO_x, NH_3, and VOCs) would pose minimal health impacts. Estimated incremental (above no action) cancer risks from exposure to HAPs are below the one per million significance threshold. Noncancer risks for HAPs and NH_3 are below the significance threshold for both acute and chronic exposure.	EMF impacts would be as for the proposed action. Emission controls (oxidizing catalysts) would reduce CO and HAPs emissions relative to the proposed action. Only minimal benefits to residents of the air basin would be expected. The use of alternative cooling technologies at the power plants would increase air emissions up to 15%, but health impacts would be minimal.	EMF impacts would be as for the proposed action. Mitigation measures would result in beneficial impacts by improving the air quality in the region. Road paving would produce long-term reductions in PM_{10} emissions. Fuel conversions would produce short- and long-term reductions in NO_x, CO, and VOC emissions.

TABLE 2.5-1 (Cont.)

For the proposed action, that is, the granting of one or both of the Presidential permits and ROWs, for most resource areas, the analysis was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. Impacts to air, water, and human health attributable to permitting each transmission line separately are contained in Sections 4.2, 4.3, and 4.11, respectively.

Resource	No Action	Proposed Action	Alternative Technologies	Mitigation Measures
Environmental Justice	No additional impacts expected.	Temporary impacts from noise and dust emissions and the more long-term impacts from noise and EMF in the vicinity of the transmission lines would not contribute to high and adverse impacts on the general population or to disproportionately high and adverse impacts on minority and low-income populations in any block group. Increases in air pollution due to emissions of $PM_{2.5}$ and PM_{10} were found to be below new source significance levels used as a benchmark for negligible impacts; therefore, these emissions would not contribute to high and adverse impacts on the general population or to disproportionately high and adverse impacts on minority and low-income populations in any block group. Adverse impacts to biological resources as a result of increases in Salton Sea salinity could result in minor impacts on the general population that fishes recreationally at the Sea. These impacts attributable to the proposed action would not be disproportionately high and adverse for any populations that might rely on the Sea for subsistence fishing, because the same minor effects on biological resources are estimated as under no action.	Installation of dry cooling or wet-dry cooling systems at the power plants would not contribute to impacts.	Mitigation measures to compensate for power plant emissions would have a beneficial impact on low-income and minority populations by improving air quality in the region. (Because of uncertainties related to the location of mitigation measures, an impact assessment at the census-block level was not conducted.)

a Abbreviations: BOD = biochemical oxygen demand; CO = carbon monoxide; COD = chemical oxygen demand; EMF = electric and magnetic fields; EPA = U.S. Environmental Protection Agency; HAPs = hazardous air pollutants; LRPC = La Rosita Power Complex; metric ton = 2,206 lb; NH_3 = ammonia; NO_x = nitrogen oxides; NRHP = National Register of Historic Places; O_3 = ozone; $PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter; PM_{10} = particulate matter less than 10 micrometers in diameter; ROW = right-of-way; SHPO = State Historic Preservation Office; SL = significance level; TDS = total dissolved solids; TSS = total suspended solids; VOC = volatile organic compound(s).

TABLE 3.10-1 Minority and Low-Income Population Characteristics in Imperial County

Parameter	Imperial County
Total Population	142,361
White	28,768
Total minority	113,593
Hispanic or Latino	102,817
Not Hispanic or Latino	10,776
One race	9,502
Black or African American	5,148
American Indian and Alaska Native	1,736
Asian	2,446
Native Hawaiian and Other Pacific Islander	75
Some other race	97
Two or more races	1,274
Total low-income	29,681
Percent minority	79.8%
Percent low-income	22.6%

Source: U.S. Bureau of the Census 2001a.

TABLE 3.2-1 Annual Mean Flows for the New River, 1980–2001

	Year	Calexico Gage (ft^3/s)[a,b]	Westmorland Gage (ft^3/s)[a,b]	Calexico Gage (ac-ft/yr)[c,d]	Westmorland Gage (ac-ft/yr)[c,d]
New River	1980	215	626	155,653	453,203
	1981	223	598	161,445	432,932
	1982	226	569	163,617	411,937
	1983	326	659	236,013	477,094
	1984	364	706	263,524	511,121
	1985	340	676	246,149	489,402
	1986	365	708	264,248	512,569
	1987	350	687	253,388	497,365
	1988	300	685	217,190	495,917
	1989	219	617	158,549	446,688
	1990	188	594	136,106	430,036
	1991	185	578	133,934	418,453
	1992	198	575	143,345	416,281
	1993	263	678	190,403	490,850
	1994	199	642	144,069	464,787
	1995	197	639	142,621	462,615
	1996	163	614	118,007	444,516
	1997	217	667	157,101	482,886
	1998	249	676	180,268	489,402
	1999	254	675	183,888	488,678
	2000	225	634	162,893	458,995
	2001	201	633	145,517	458,271
Mean flow		249	643	179,906	465,182
Standard deviation[e]		63	42	45,813	30,757
Minimum		163	569	118,007	411,937
Maximum		365	708	264,248	512,569

[a] Data are from USGS gages near Calexico and Westmorland, California.

[b] To convert ft^3/s to m^3/s, multiply by 0.02832; to convert ft^3/s to acre-ft/yr, multiply by 723.967.

[c] These values are only accurate to three significant figures (e.g., 453,203 ac-ft/yr is only meaningfully represented as 453,000 ac-ft/yr).

[d] To convert acre-ft/yr to m^3/s, multiply by 0.0000391.

[e] Standard deviation represents the variability of flow rate.

Source: USGS (2003a,b).

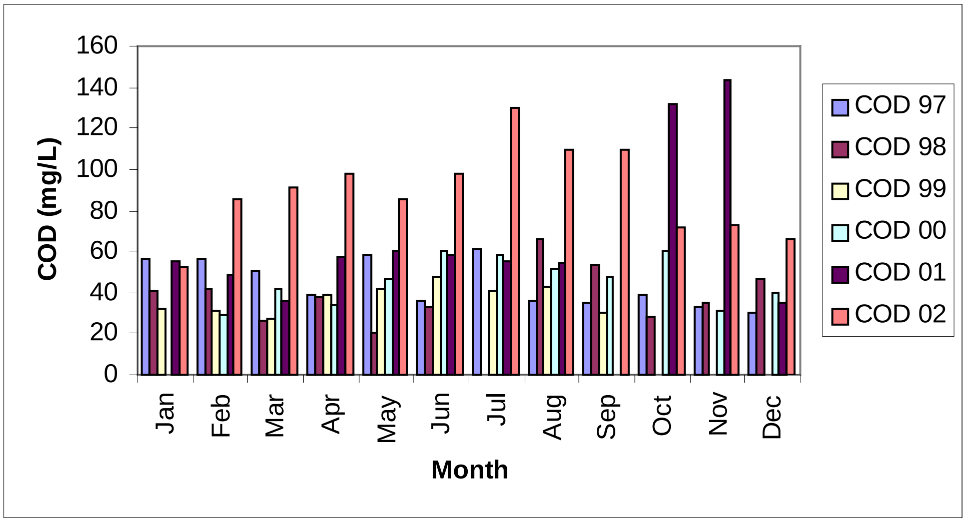


FIGURE 3.2-9 COD (mg/L) Measured at the Calexico Gage on the New River at the U.S.-Mexico Border (Source: CRBRWQCB 2003a)

TABLE 3.2-3 Average Values for TSS, BOD, COD, and Phosphorus

Year	TSS (mg/L)	BOD (mg/L)	COD (mg/L)	P (mg/L)	Flow (ft^3/s)	Load (tons) TSS	Load (tons) BOD	Load (tons) COD
1997	59.3	19.5	44.1	2.3	217	12,670	4,170	9,420
1998	60.4	17.9	39.0	1.8	249	14,810	4,390	9,560
1999	61.8	23.1	37.0	1.9	254	15,460	5,780	9,250
2000	44.0	48.5	45.4	1.6	225	9,750	10,750	10,060
2001	52.2	23.3	66.8	2.3	201	10,330	4,610	13,220
2002	38.6	32.5	89.2	1.3	–[a]	–	–	–
Mean	52.7	27.5	53.6	2.0				
Standard deviation	9.6	11.5	20.4	0.27				

[a] A dash indicates no data available.

Source: CRBRWQCB (2003a).

TABLE 3.4-2 Federal- and State-Listed Threatened and Endangered Species

Species	Federal Status[a]	State Status	Distribution and Habitat	Occurrence within Projects Area
Plants				
Peirson's milk-vetch *Astragalus magdalanae* var. *peirsonii*	FT, PCH	SE	Slopes and hollows of windblown sand dunes, known only from the Algodones Dunes (Imperial Sand Dunes), and in nearby Mexico from a limited area of dunes within the Gran Desierto, in the northwestern portion of the State of Sonora.	No suitable habitat; not expected to occur in the vicinity of the proposed transmission lines, the New River, or the Salton Sea.
Algodones Dunes sunflower *Helianthus niveus* ssp. *tephrodes*	–	SE	Unstabilized sand dunes in the Algodones Dunes of Imperial County.	No suitable habitat; not expected to occur in the vicinity of the proposed transmission lines, the New River, or the Salton Sea.
Fish				
Desert pupfish *Cyprinodon macularius*	FE	SE	Found in some agricultural drains that discharge directly into the Salton Sea, shoreline pools of the Salton Sea, and desert washes at San Felipe Wash and Salt Creek. Prefer shallow, slow-moving waters with some vegetation.	Not known or expected to occur in the New River because of the high sediment loads, excessive velocities, and presence of predators. May occur in some shallow areas of the Salton Sea near agricultural drainages and near the mouth of Salt Creek.
Reptiles				
Desert tortoise *Gopherus agassizii*	FT	ST	Mohave and Sonoran desert areas, especially areas of creosote bush scrub.	Out of known range for species not expected to occur in the vicinity of the proposed transmission lines, the New River, or the Salton Sea.
Barefoot gecko *Coleonyx switaki*	–[b]	ST	Rock outcrops on arid hillsides and canyons in desert scrub vegetation types.	No suitable habitat; not expected to occur in the vicinity of the proposed transmission lines, the New River, or the Salton Sea.
Flat-tailed horned lizard (*Phrynosoma mcallii*)	BLM-SS	–	Mohave and Sonoran desert areas in desert scrub vegetation types.	Suitable habitat exists along the proposed and alternative transmission line routes.

TABLE 3.4-2 (Cont.)

Species	Federal Status	State Status	Distribution and Habitat	Occurrence within Projects Area
Birds				
Bald eagle *Haliaeetus leucocephalus*	FT, PD	SE	Riparian areas containing large trees suitable for roosting. Occasionally visit the Salton Sea area during annual migrations.	Nonbreeding individuals occur in the Salton Sea area during the winter. Could occasionally roost on transmission towers within the transmission line or on large trees along the New River routes.
Swainson's hawk (nesting) *Buteo swainsoni*	–	ST	Plains, range, opens hills, sparse trees. Uncommon winter migrant.	Local breeding population now extirpated; not expected to occur in the vicinity of the proposed transmission lines, the New River, or the Salton Sea.
Brown pelican *Pelecanus occidentalis*	FE	SE	Primarily in estuarine, marine subtidal, and open waters; nesting colonies on the Channel Islands, the Coronado Islands, and on islands in the Gulf of California.	The Salton Sea currently supports a year-round population, sometimes reaching 5,000 individuals. Successfully nested at the Salton Sea in 1996. No suitable habitat and not expected to occur in the vicinity of the proposed transmission lines.
Yuma clapper rail *Rallus longirostris yumanensis*	FE	ST	Nests in emergent vegetation in freshwater and saltwater marshes and wetlands. Year-round resident at the Salton Sea and along the lower Colorado River into Mexico.	No suitable habitat and not expected to occur in the vicinity of the proposed transmission lines. Although nesting has not been reported, there is a potential for individuals to occur in wetlands along the New River. Occur at the south end of the Salton Sea near the New and Alamo River mouths, at the Sonny Bono Salton Sea National Wildlife Refuge, at the Wister Waterfowl Management Area, the Imperial Wildlife Area, and other locations.

TABLE 3.4-2 (Cont.)

Species	Federal Status	State Status	Distribution and Habitat	Occurrence within Projects Area
California least tern *Sterna antillarum browni*	PE	–	Nests on coastal beaches and estuaries near shallow waters. The terns prefer open areas where they have good visibility for long distances to see the approach of both ground and avian predators. The substrate is usually sand or fine gravel and can be mixed with shell fragments.	No suitable habitat and not expected to occur in the vicinity of the proposed transmission lines; not considered likely to occur within the New River; rare spring and summer visitors to the Salton Sea.
Southwestern willow flycatcher *Empidonax traillii extimus*	FE	SE	Summer breeding resident in riparian habitats in southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and northwestern Mexico. Nests in riparian habitat characterized by dense stands of intermediate-sized shrubs or trees.	Low potential for nesting in tamarisk-dominated riparian areas along the New River, although this is not the preferred riparian vegetation type.
Least Bell's vireo *Vireo bellii pusillus*	FE, CH	SE	Riparian areas along the lower Colorado River basin. Nests in well-developed overstories and understories, and low densities of aquatic and herbaceous cover.	Occurs accidentally in the Salton Sea and New River area during migration.
Yellow-billed cuckoo *Coccyzus americanus*	FC	ST	Riparian areas. Remnant populations breed along sections of seven rivers, including the Colorado River in the southern part of California.	Has not been seen recently in the Salton Sea area, but suitable habitat does exist in some of the upper reaches of streams draining into the Sea, such as Whitewater River.
Elf owl *Micrathene whitneyi*	–	SE	Desert trees. Very localized populations are present to the east of the Colorado River.	Out of range from known breeding locations; not expected to occur in the vicinity of the proposed transmission lines, the New River, or the Salton Sea.

TABLE 3.4-2 (Cont.)

Species	Federal Status	State Status	Distribution and Habitat	Occurrence within Projects Area
Western burrowing owl *Speotyto cunicularia hypugaea*	BLM-SS	–	Year-round resident and nests throughout most of California from March through August. Inhabits burrows in desert-scrub, grassland, and agricultural areas.	Single individual observed within the proposed transmission line routes, and there is appropriate habitat for nesting and overwintering; may occur in desert scrub and agricultural areas along the shorelines of the New River and the Salton Sea.
Gila woodpecker *Melanerpes uropygialis*	–	SE	Saguaro and willow-cottonwood desert habitats. Date palms, tamarisk. Known to occur in the vicinity of the Colorado River and near Brawley.	Not expected to occur within the vicinity of the proposed transmission line routes due to lack of suitable habitat. Could occur in riparian areas of the New River near Brawley.
Bank swallow *Riparia riparia*	–	ST	Nests in northern California and overwinters in South America. Nests in bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam.	Not expected to occur within the vicinity of the proposed transmission line routes due to lack of suitable habitat. Migrating individuals may occur in some areas along the New River or Salton Sea during April and September.
Mammals				
Peninsular bighorn sheep *Ovis canadensis*	FE	ST	Inhabit dry, rocky, low-elevation desert slopes, canyons, and washes from the San Jacinto and Santa Rosa mountains near Palm Springs, California, south into Baja California, Mexico.	Out of typical range; not expected to occur in the vicinity of the proposed transmission line routes, the New River, or the southern portions of the Salton Sea.
Palm Springs Ground Squirrel *Spermophilus tereticaudus chlorus*	FC	–	Occurs from San Gorgonio Pass to the vicinity of the Salton Sea. It has not been reported to occur in areas surrounding the southern portion of the Salton Sea or the Yuha Desert, and suitable habitat does not occur along the New River. Typically associated with sand fields and dune formations.	Out of known range; not expected to occur in the vicinity of the proposed transmission line routes, the New River, or the southern portions of the Salton Sea.

TABLE 3.4-2 (Cont.)

[a] Status codes: BLM-SS = BLM-designated sensitive species; CH = designated critical habitat; FC = proposed for listing as threatened or endangered by the Federal government; FT = listed as threatened by the Federal government; FE = listed as endangered by the Federal government; PCH = proposed critical habitat; PD = proposed delisting; ST = listed as threatened by the State of California; and SE = listed as endangered by the State of California.

[b] A dash indicates not listed.