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Volume 1

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE IMPERIAL-MEXICALI 230-kV TRANSMISSION LINES

Volume 1: Main Text and Appendixes A–L

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U.S. Department of the Interior
Bureau of Land Management
El Centro, CA
Cooperating Agency

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COVER SHEET

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

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LOCATION: Imperial County, California

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ABSTRACT: A U.S. Department of Energy (DOE) Presidential permit is required to construct, operate, maintain, and connect an electric transmission line across the U.S.-Mexico border. On February 27, 2001, Baja California Power, Inc., InterGen Aztec Energy, V.B.V. (hereafter referred to as Intergen), filed an application with DOE, Office of Fossil Energy, for a Presidential permit for 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, for a 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.

Because these projects would be located in essentially the same place, DOE and BLM elected to consider both in the same EIS. DOE published its Notice of Intent on October 30, 2003 (68 FR 61797). DOE and BLM held public scoping meetings on November 20, 2003, in El Centro and Calexico, California. The Notice of Availability of the Draft EIS was issued on May 14, 2004 (69 FR 26817). DOE and BLM held public hearings on July 14, 2004, in El Centro and Calexico, California. DOE gave the public until July 30, 2004, to comment on the Draft EIS.

DOE and BLM have prepared this EIS to address the environmental impacts of the proposed actions and the range of reasonable alternatives, including the “No Action” alternative. DOE and BLM will use the EIS to ensure that they have the environmental information needed for informed decision making. The decisions will be issued in the form of Records of Decision by DOE and BLM no sooner than 30 days after publication of the Notice of Availability of this Final EIS.

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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
AEP	American Electric Power
AERMAP	AERMOD Terrain Preprocessor
AERMET	AERMOD Meteorological 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 Resources Board
ASFMRA	American Society of Farm Managers and Rural Appraisers
ATSDR	Agency for Toxic Substances and Disease Registry
BECC	Border Environment Cooperation Commission
BLM	Bureau of Land Management
BOD	biochemical oxygen demand
BOR	U.S. Bureau of Reclamation
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 Commission
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
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
EKMA	Empirical Kinetic Modeling Approach
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
GMA	Geosynthetic Materials Association
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
IBWC	International Boundary Water Commission, United States and Mexico
ICAPCD	Imperial County Air Pollution Control District
IID	Imperial Irrigation District
INE	Instituto Nacional de Ecología
ISCST3	Industrial Source Complex Short Term Dispersion Model 3
ITM	Instituto Tecnológico de Mexicali
IV	Imperial Valley

LGEEPA	Ley General de Equilibrio Ecológico y la Protección al Ambiente
LRPC	La Rosita Power Complex
MACT	maximum achievable control technology
MCL	maximum contaminant level
MIA	Manifestaciónes de Impacto Ambiental
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
NOM	Normas Oficiales Mexicanas
NESHAPs	National Emission Standards for 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 Program Revised
PAH	polycyclic aromatic hydrocarbons
P.L.	Public Law
PM	particulate matter
$PM_{2.5}$	particulate matter with a mean aerodynamic diameter of 2.5 μm or less
PM_{10}	particulate matter with a mean aerodynamic diameter of 10 μm or less
PROFEPA	Procuraduria Federal de Protección al Ambiente
PSD	Prevention of Significant Deterioration
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 (system)
SDCWA	San Diego County Water Authority
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	significant impact levels
SMCL	secondary maximum contaminant level
SWRCB	State Water Resources Control Board
TDM	Termoeléctrica de Mexicali
TDS	total dissolved solids
TMDL	total maximum daily load
TOG	total organic gas
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(s)
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)
min	minute(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
s	second(s)
t	metric ton(s)
yd	yard(s)
yr	year(s)
V	volt(s)
W	watt(s)
μg	microgram(s)
μm	micrometer(s)
μT	microtesla(s)

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)

SUMMARY[1]

S.1 BACKGROUND

S.1.1 Previous NEPA Review and Litigation

Baja California Power, Inc. (hereafter referred to as Intergen), applied to the U.S. Department of Energy (DOE) for a Presidential permit on February 27, 2001, to construct a double-circuit, 230,000-volt (230-kV) transmission line across the U.S.-Mexico border. In a separate but similar application, Sempra Energy Resources (hereafter referred to as Sempra) requested a Presidential permit on March 7, 2001, also proposing to construct a double-circuit, 230-kV transmission line across the U.S.-Mexico border. 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 DOE before electric transmission facilities may be constructed, operated, maintained, or connected at the U.S. international border. Because of the similarities of these proposals, DOE decided to consider them together in a single environmental review.

DOE and the U.S. Department of Interior (DOI), Bureau of Land Management (BLM), originally determined that the appropriate level of National Environmental Policy Act (NEPA), 42 USC §§ 4321–4347, 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 relied on the EA to issue a Finding of No Significant Impact (FONSI) and Presidential permits for both projects on December 5, 2001. BLM issued two FONSIs on December 19, 2001, and two Decision Records to grant the rights-of-way (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 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's and BLM's FONSIs, the Presidential permits, and the 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, after briefings and 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

[1] To the extent feasible, vertical lines in the right margin of this summary and the remainder of this EIS document indicate changes that have been added after the public comment period.

to enjoin operation of the transmission lines immediately; instead, it deferred the setting aside of the Presidential permits and the FONSIs until July 1, 2004, or until such time as superseding NEPA documents were issued, whichever was earlier. Thus, the transmission lines could operate while DOE and BLM conducted this 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 prepared this environmental impact statement (EIS). The court has twice extended a date for setting aside the permits; that date is now March 14, 2005.

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 interpreted this language as requiring that they conduct their NEPA review from a fresh slate, as if the transmission lines had not been built. Accordingly, DOE and BLM have based their EIS analysis on the same purpose and need as 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 is presented as if the lines did not yet exist.

While the Draft EIS (DEIS) analyzed the alternative technologies alternative in terms of hypothetical, "to-be-built" plants, DOE and BLM now believe that the court ruling to treat the transmission lines as having never been built does not extend to the connected power plants. Such an assumption would limit DOE's and BLM's ability to perform an analysis of sufficient detail to fully support an effective evaluation of Alternative 3, which would be implemented in the context of a retrofit of alternative technologies to the existing plants.

S.1.2 Project Overview

In each of these projects, the applicants would use the proposed international transmission lines to connect separate, new 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 (Figure S-1). Within the United States, both transmission lines are proposed to be constructed on lands managed by the 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 ROW grants in order to be able to construct their respective projects across Federal land. Table S-1 is a time line for the projects that describes the milestones and sequences of events for construction and operation of the transmission lines and power plants. It also includes 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 EIS.

TABLE S-1 Time Line for Imperial-Mexicali 230-kV Transmission Lines

	Sempra (TDM)		Intergen (LRPC)	
Date	Permits and Contracts	Construction and Operations	Permits and Contracts	Construction and Operations
2000				
Jan.	Land Use and Zoning Permit			
June			Project bid for EAX awarded by CFE	
Aug.			MIA for EAX submitted for approval to SEMARNAT	
Nov.			• EPC contract for EAX signed • MIA for EAX receives approval from SEMARNAT	
2001				
Jan.	TDM receives approval of MIA from SEMARNAT			
Feb.	Sempra applies to BLM for ROWs		• Intergen applies to DOE for Presidential permit • Intergen applies to BLM for ROWs	
Mar.	Sempra applies to DOE for Presidential permit			• Construction of EAX and Sewage Treatment Plant at LRPC begins
Apr.	LNTP for power plant engineering		• MIA for EBC submitted for approval to SEMARNAT • EPC contract signed for EBC	
June	• CRE Import Permit • Power plant EPC contract executed and Full Notice to Proceed		EBC receives approval of MIA from SEMARNAT	
July				EBC construction begins
Aug.	• CRE Export Permit			
Sept.	Transmission line EPC contract executed	Groundbreaking for power plant		
Nov.		Groundbreaking for transmission lines on Mexico side		
Dec.	• DOE issues EA, FONSI, and Presidential permit to Sempra allowing interconnection of transmission lines at the U.S.-Mexico border • BLM issues FONSIs and Decision Records to grant ROWs		• DOE issues EA, FONSI, and Presidential permit to Intergen allowing interconnection of transmission lines at the U.S.-Mexico border • BLM issues FONSIs and Decision Records to grant ROWs	
2002				
Jan.	BLM transmission line ROW Notice to Proceed	• Groundbreaking for transmission lines on U.S. side		

TABLE S-1 (Cont.)

	Sempra (TDM)		Intergen (LRPC)	
Date	Permits and Contracts	Construction and Operations	Permits and Contracts	Construction and Operations
2002 (Cont.)				
Feb.	U.S. International Boundary & Water Commission authorization			
Mar.	Complaint on Presidential permit filed with court		Complaint on Presidential permit filed with court	
Apr.	CILA Permit			
Sept.				Intergen places transmission line in service
Nov.		Sempra places transmission line in service		
2003				
Feb.		• Transmission line energized • Power plant construction completed		
May	• Court issues an order that the EA and FONSI do not comply with NEPA • District court order grants and denies, in part, plaintiff's motion for summary judgment		• Court issues an order that the EA and FONSI do not comply with NEPA • District court order grants and denies, in part, plaintiff's motion for summary judgment	
July	• Court orders additional environmental analyses • District court order denies plaintiff's specific requests for injunctive relief (allows plants to run pending further NEPA review)	Sempra begins commercial operation of TDM	• Court orders additional environmental analyses • District court order denies plaintiff's specific requests for injunctive relief (allows plants to run pending further NEPA review)	• EAX begins commercial operation • Intergen begins commercial operation of LRPC
Oct.	DOE publishes NOI to prepare an EIS			EBC begins commercial operation
Nov.	Public scoping meetings held in El Centro and Calexico, California		Public scoping meetings held in El Centro and Calexico, California	
2004				
Mar.				Intergen completes installation of SCR on LR-1 export gas turbine
May	DOE issues Draft EIS		DOE issues Draft EIS	
July	Public comment period on Draft EIS closes		Public comment period on Draft EIS closes	
Dec.	DOE issues Final EIS		DOE issues Final EIS	

CFE = Federal Electricity Commission; CILA = Mexican Commission for Borders and Waters; CRE = Mexican Energy Regulatory Commission; EAX = Energiá Azteca X, S. de R.L. de C.V.; EBC = Energiá Baja California; EIS = environmental impact statement; EPC = engineering, procurement, and construction; INE = Instituto Nacional de Ecologia; LNTP = Limited Notice to Proceed; LRPC = La Rosita Power Complex; MIA = Manestifación de Ambientale; NOI = Notice of Intent; SCR = selective catalytic reduction; SEMARNAT = Secretaria De Medio Ambiente y Recursos Naturales; STP = sewage treatment plant; TDM = Termoeléctrica de Mexicali.

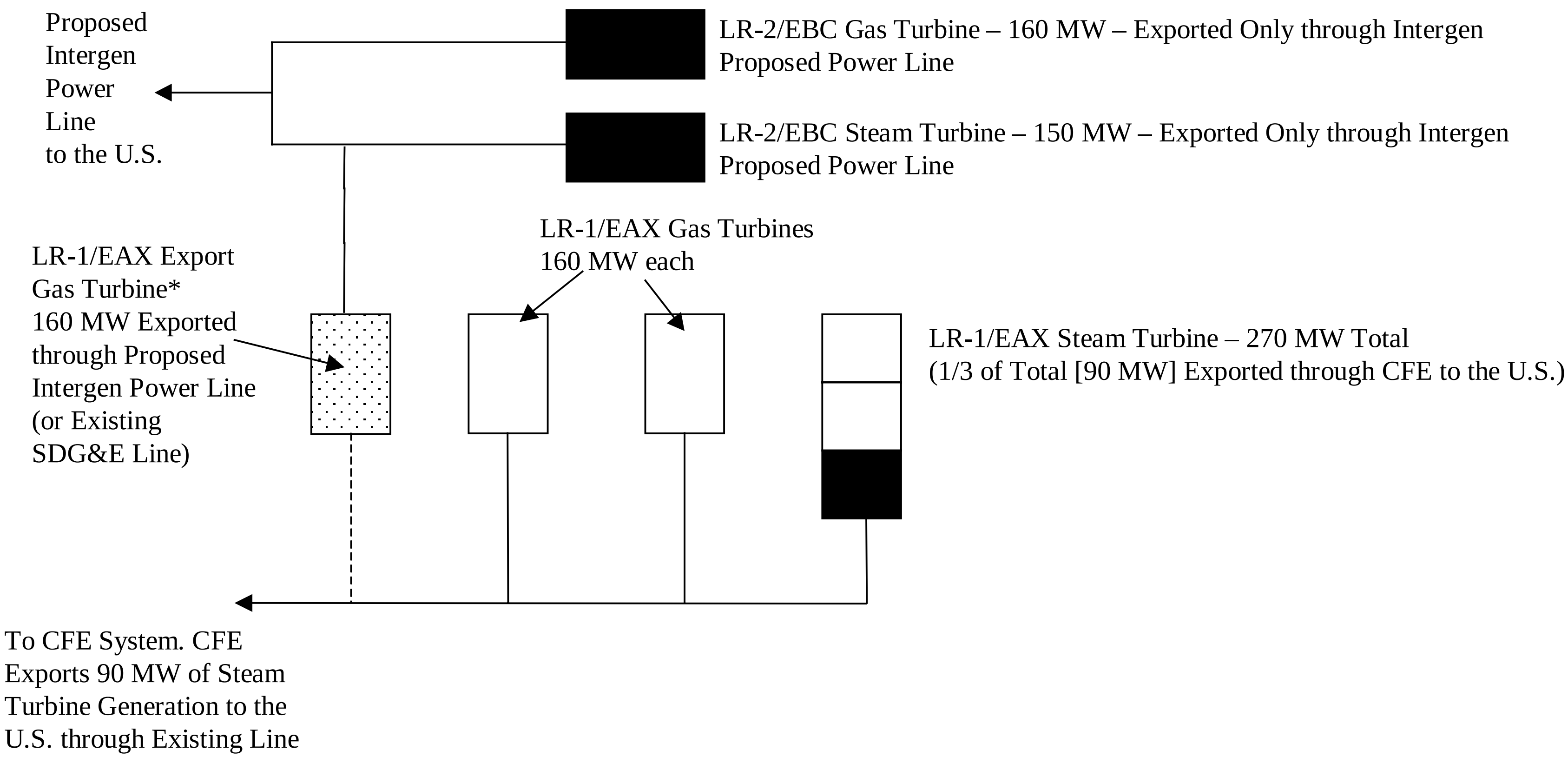
This EIS was prepared in accordance with Section 102(2)(c) of NEPA, Council of Environmental Quality (CEQ) regulations (40 *Code of Federal Regulations*, Title 40, Parts 1500–1508 [40 CFR Parts 1500–1508]), and DOE NEPA implementing procedures (10 CFR Part 1021). DOE is the lead Federal agency, as defined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

S.1.3 Overview of Transmission Line Projects

S.1.3.1 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 (Figure S-2), 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. One 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 (Figure S-3).

The electrical output of LR-2 is presently 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 (160 MW) at LR-1 and one-third (90 MW) of the electrical output of the LR-1 steam turbine (270 MW) are also designated for export to the U.S. market. However, the 160-MW electrical output of the LR-1 export gas turbine could now 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, there may be, at times, 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 Comisión Federal de Electricidad (CFE), the national electric utility of Mexico. Wastewater from the cooling towers would be discharged into the canal that flows into the New River at a point within 100 yd (91 m) of the border (see Figure S-8). The New River flows northward into the United States and terminates at the Sonny Bono Salton Sea National Wildlife Refuge.



Turbine (or Portion), Designated for Export

Turbine (or Portion), Designated for CFE/Mexico

Turbine, Designated for Export or Backup for Mexico

*The electrical output of this gas turbine is designated primarily for export to the U.S., but may be a backup for either of the two CFE gas turbines. Normally, the electrical output of this turbine would be exported to the U.S. over the proposed new international transmission line. Under certain circumstances, the electrical output of this turbine could be directed onto the CFE system, which would then wheel the power to the U.S. over the existing SDG&E transmission line.

FIGURE S-3 La Rosita Power Complex: Electrical Distribution

To reduce nitrogen oxides (NO_X) emissions, all gas turbines at the LRPC have been equipped with dry low-NO_X burners, and ultimately with selective catalytic reduction (SCR) systems. The EBC export gas turbine (310 MW) has been built with SCR. The EAX export turbine has also been equipped with SCR. Intergen has stated that the other two EAX gas turbines, those designed for the Mexico electricity market, will have SCR systems installed by March 2005. The combination of dry low-NO_X burners and SCR will reduce 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 power plant is obtained from the inlet of the Zaragoza Oxidation Lagoons and treated before use.

S.1.3.2 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 consists of one natural-gas-fired combined-cycle generating unit, with a nominal capacity of 650 MW. The unit consists of two 170-MW gas turbines and one 310-MW steam turbine. The power plant produces 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 is scheduled by Cal-ISO.

The power plant is 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 is obtained from the outlet of the Zaragoza Oxidation Lagoons and treated before use. Wastewater, which is discharged to the same canal as for the Intergen project, then flows into the New River, which flows northward into the United States.

S.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 this Final EIS (FEIS) 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 separate Records of Decision (RODs) by DOE and BLM.

S.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 start-up and restarting of 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 electric power supply within the United States and would not impede, or tend to impede, the coordinated use of the regional transmission system.

S.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 S-2) of BLM's California Desert Conservation Area (CDCA) Plan. Intergen filed its application for ROW approval with BLM on February 26, 2001, also for use of a ROW in Utility Corridor N. The Sempra and Intergen transmission line ROWs would each be 120 ft (36 m) wide, and both are 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* and DOI guidance.

These projects must be consistent with BLM's regional and local plans. The proposed projects fall within the CDCA. BLM administers a comprehensive land use management plan for this area, which is referred to 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 applications 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), as designated by the CDCA Plan. The Yuha Basin ACEC Management Plan 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-designated sensitive species. A major step toward that objective was the establishment of five flat-tailed horned lizard Management Areas. 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 the project should be timed to minimize mortality. The applicants have agreed to accept all applicable mitigation measures identified in the Strategy.

S.2.3 Applicants' Purpose and Need

The Sempra and Intergen Presidential permit applications each described a need for their 230-kV transmission lines to transport electric 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.

S.3 PUBLIC PARTICIPATION AND THE NEPA PROCESS

S.3.1 Public Scoping and Comment Period

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* (Volume 68, page 61796 [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. DOE and BLM held public scoping meetings 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.

S.3.1.1 Issues within the Scope of the EIS

The issues described below were raised by commentors during scoping and were addressed in the DEIS.

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 with an 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 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 the 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 and 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 stated that the new power plants could affect low-income populations. One commentor requested that the EIS address impacts of the project on cultural resources.

S.3.1.2 Issues outside the Scope of the EIS

The issues below were raised by commentors during scoping, and DOE has determined that they are outside the scope of the DEIS and the FEIS.

Several commentors asked DOE and BLM to evaluate the impacts associated with the power plants on the environment in Mexico, not just in the United States. The agencies do not agree that such an analysis is appropriate for the following reasons.

NEPA does not require an analysis of environmental impacts that occur within another sovereign nation that result from approved actions by that sovereign nation. E.O. 12114 (44 FR 1957; January 4, 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 Order does not require Federal agencies to evaluate impacts outside the United States when the foreign nation is participating with the United States or is otherwise involved in the action [Section 2-3(b)]. Here, the Mexico government has been involved in evaluating the environmental impacts associated with the power plants in Mexico and had issued permits authorizing the construction and operation of the two power plants and ancillary facilities. An overview of the permitting of the power plants and associated environmental impacts analysis that was performed by the Mexico government has been added to the EIS as Appendix J. In addition, the Federal action does not affect the global commons (e.g., outer space or Antarctica), and 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 electricity-generating facilities in Mexico, they are independent actions that serve distinct functions and that can proceed separately. Intergen and Sempra stated that if 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.

One commentor suggested that a 50-year comprehensive cumulative impact assessment be conducted as part of the EIS. This EIS does contain a cumulative impact analysis. CEQ guidance on conducting cumulative impact assessments states that projects be reasonably foreseeable. DOE and BLM believe that for purposes of estimating cumulative impacts, reasonably foreseeable projects are generally projects to be executed within the next 10 years. Projects predicted to occur beyond 10 years are generally presumed to be speculative and thus not 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.

S.3.2 Public Review of the DEIS

On May 14, 2004, the U.S. Environmental Protection Agency (EPA) published a Notice of Availability in the *Federal Register* (69 FR 26817) for the DEIS evaluating the impacts in the United States of constructing, connecting, and operating and maintaining two transmission lines from two power plants in Mexico. In accordance with CEQ and DOE NEPA regulations, the DEIS was distributed to interested agencies, organizations, and the general public to allow them to provide oral and written comments. It was also made available in its entirety on the project Web site (http://web.ead.anl.gov/bajatermoeis/index.cfm). E-mail notification was sent to those on the project Web site mailing list. The May 14, 2004, date marked the beginning of a 45-day comment period, which was to end on June 19, 2004. However, at the request of the plaintiff (Border Power), the comment period was extended to July 30, 2004. (A Notice of Comment Period Extension was published in the *Federal Register* on May 26, 2004 [69 FR 29934].) To facilitate public involvement, stakeholders could submit comments on the DEIS via telephone, letter, e-mail, or the project Web site.

DOE and BLM held two public hearings during the review period in the City Halls at El Centro, California (11:00 a.m. to 1:00 p.m.), and Calexico, California (6:00 p.m. to 8:00 p.m.), on July 14, 2004. The dates and times of the public hearings were announced on the project Web site and in local newspapers. The hearings on the DEIS were an important component in the agencies' continuing efforts to provide the public with opportunities to participate in the decision-making process. The hearings included a presentation by DOE, a question and answer period, and an oral comment session where reviewers were invited to formally enter their comments into the public record. In all, 26 individuals testified at the hearings. Transcripts of the public hearing proceedings were recorded by a court reporter and are available on the project Web site and in this EIS (Chapter 2 of Volume 2).

DOE received 4,804 comment submissions. These comments came from individuals, Federal and State agencies, local governments, and nongovernmental organizations such as environmental groups. All but 108 of these were campaign letters. An index of the commentors, copies of the actual letters or other documents containing public comments submitted to DOE (including comments identified in the transcripts), a summary of key issues in response to comments, and specific responses to each comment received are provided in Volume 2 of this EIS.

Comments on the DEIS were received by e-mail, fax, mail, or as oral statements at one of the public hearings from individuals, nongovernmental organizations, and government agencies. This resulted in 113 comment documents: 26 from the hearings, 5 representative campaign letters, and 82 from individuals or organizations. The vast majority (98%) of commentors submitted a campaign letter. DOE has responded to each of the oral and written comments, including the campaign letters.

While reviewing the comments, DOE identified 18 key issues that it believes reflect major concerns related to the EIS:

1. Extension of NEPA analysis into Mexico;
2. Use of significant impact levels (SLs) to evaluate impacts on air quality and human health;
3. The conditioning of permits, enforcement of emission levels;
4. Definition of the alternatives with regard to the three LRPC EAX gas turbines; and inclusion of the EAX-export unit in both the proposed action and no action alternatives;
5. Analysis of power plant impacts for all alternatives in terms of the existing plants rather than the hypothetical, "to-be-built" plants analyzed in the DEIS;
6. Analysis of dry and parallel wet-dry cooling;
7. Scope of the EIS with respect to the gas pipeline that supplies the power plants;
8. Characterization of air quality in terms of ambient air quality standards and exceedances;
9. Estimating additional violations of ambient air quality standards in Imperial County resulting from plant emissions;
10. Estimation of secondary PM_{10} from plant NH_3 and NO_x emissions;
11. Characterization of O_3 and PM_{10} episodes in Imperial County;
12. Discussion of the uncertainty and sensitivity of the DEIS ozone analysis using the EPA's O_3 Ozone Isopleth Plotting Program Revised (OZIPR) methodology; and description of the methodology;

13. Estimates of additional adverse health impacts;

14. Documentation of TDS removal in power plant water treatment systems;

15. Analysis of power plant impacts on the regional 4,000-mg/L TDS surface water objective;

16. The use of the second circuits on the respective transmission lines;

17. The applicability of conformity review to direct PM_{10} emissions from the Mexico power plants and to indirect PM_{10} emissions from dry lakebed at the Salton Sea exposed as a result of consumptive water use at these plants; and

18. Conservatism in the analysis and interpretation of impacts.

As noted above, many revisions were made to the DEIS on the basis of the comments received. Although a good portion of the changes were made to provide clarification and additional detail, the more substantial changes pertained to the impacts analyses for water resources and air quality. The changes made in response to public comments did not affect the overall significance of the environmental impacts presented in this DEIS.

S.4 ALTERNATIVES ANALYZED

The following alternatives are analyzed in this EIS:

1. No Action: 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.

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's and BLM's preferred alternative is to grant Presidential permits and ROWs to both Sempra and Intergen as their projects are presently designed.

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

S.4.1 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 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 operate 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 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.

S.4.2 Proposed Action: Grant One or Both Presidential Permits and Corresponding ROWs

Under the proposed action alternative, one or both of the 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 in the United States attributable to this 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 was 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.

S.4.2.1 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 (Figure S-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 BLM-designated Utility Corridor N, where each line would connect with a corresponding transmission line in Mexico. 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. 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 SDG&E's 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 centerline of the Sempra ROW would be east of and adjacent to the proposed Intergen transmission line ROW and would be 120 ft (37 m) wide. Thus, the centerline of the Sempra ROW would be 120 ft (37 m) east of the centerline of the proposed Intergen ROW and 240 ft (73 m) east of the centerline of the existing line.

For both the Intergen and Sempra transmission lines, steel lattice towers would be erected on the centerlines of the ROWs. The towers would be spaced approximately 900 to 1,100 ft (274 to 335 m) apart and would be roughly in line with the existing line's towers in an east-west direction. In this EIS, the towers, 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.

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 in sections by truck, 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. Deflection towers (or monopoles) are used where transmission lines turn at gradual angles, and dead-end lattice towers are used where transmission lines turn at large angles or where a transmission line is brought into an electric substation. Suspension, deflection, and dead-end 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 conductors would be 36 ft (11 m). The average 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 and 26.4 ft (6.5 and 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 2 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 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.

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 S-2.

TABLE S-2 Areas of Construction Impact

Impact Location	Size of Impact (acres)[a] 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.

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 of 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.

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 could 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 due to pull sites cannot be accurately estimated. In any event, such conductor replacement would be infrequent.

A typical steel lattice tower and monopole structure are shown in Figure S-4.

S.4.2.2 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 CDCA Plan, 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. A third alternative route located primarily on private land east of the existing line was considered but not evaluated for the reasons given below.

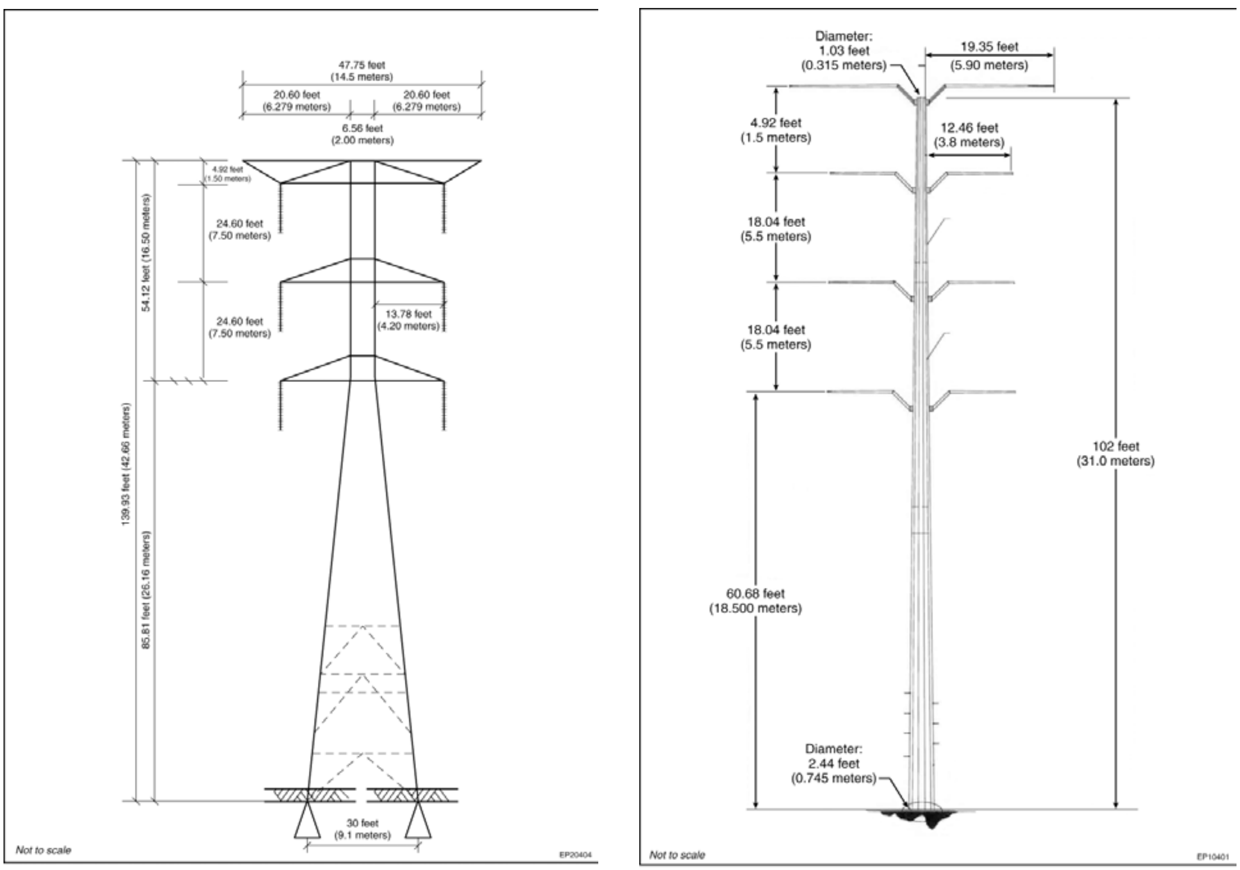


FIGURE S-4 Suspension Tower (left) and Suspension Monopole (right)

The end point and start point of each alternative route are 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 proposed routes represent a relatively direct path between these points.

The proposed and two alternative transmission line routes are shown in Figure S-5.

West of the Existing 230-kV Transmission Line. An alternative route west of the existing 230-kV IV-La Rosita transmission line 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 about 7.4 mi (11.9 km) more of ROW entirely on BLM land. The southern portion of this route would extend to the west, outside of BLM-designated Utility Corridor N.

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. The rationale for selecting the location of this route was to avoid concentrations of archaeological resources along the former shorelines 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 about 5.8 mi (9.3 km) more of ROW. This location, like the applicants' proposed routes, would remain entirely on BLM land within Utility Corridor N.

Outside Federal Lands. An additional alternative route was considered in which the transmission lines would be located primarily on private lands located east of BLM-designated 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 agricultural 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.

S.4.2.3 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.

S.4.2.4 Project-Related Power Plants

All generating units at both power plants operate in a combined-cycle mode and are fueled by natural gas supplied by a cross-border pipeline previously permitted by FERC. Figure S-6 is a schematic showing the general engineering features of the TDM and LRPC power plants. Electricity is 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, is recovered by the heat recovery steam generator to produce steam, which in turn is used by the steam turbine to generate additional electricity.

La Rosita Power Complex

EAX:

- 3 Siemens-Westinghouse Model W501F combustion turbines
- Alstrom steam turbine
- Doosan heat recovery steam generator

EBC:

- 1 Siemens-Westinghouse Model W501F combustion turbine
- Alstrom steam turbine
- Foster Wheeler heat recovery steam generator

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 are 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

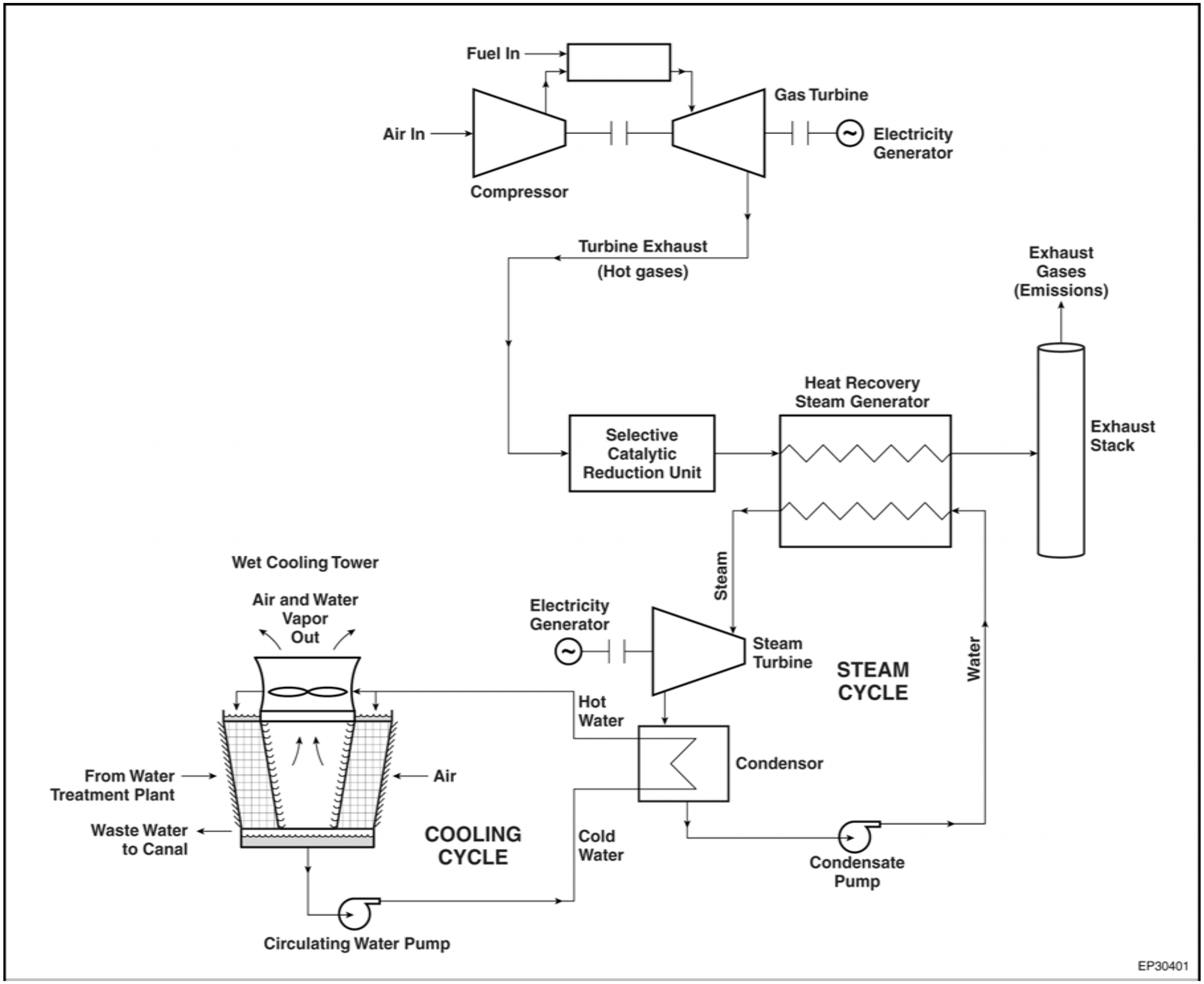


FIGURE S-6 General Engineering Features at the LRPC and TDM Power Plants

control NO_X emissions. SCR (Figure S-7) is a postcombustion cleaning technology that chemically reduces NO_X (nitrogen oxide [NO] and nitrogen dioxide [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%.

Both the LRPC and TDM power plants use wet cooling systems. The wet cooling system consists of a surface condenser and a cooling tower. 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 into the steam cycle to replenish water lost as heat recovery steam generator blowdown and miscellaneous water and steam losses. Water in the surface condenser is then cooled by air 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 currently installed at the Sempra and Intergen plants rely on power-driven fans to draw or force the air through the tower. Natural-draft cooling towers use the buoyancy of the exhaust air rising in a tall chimney to

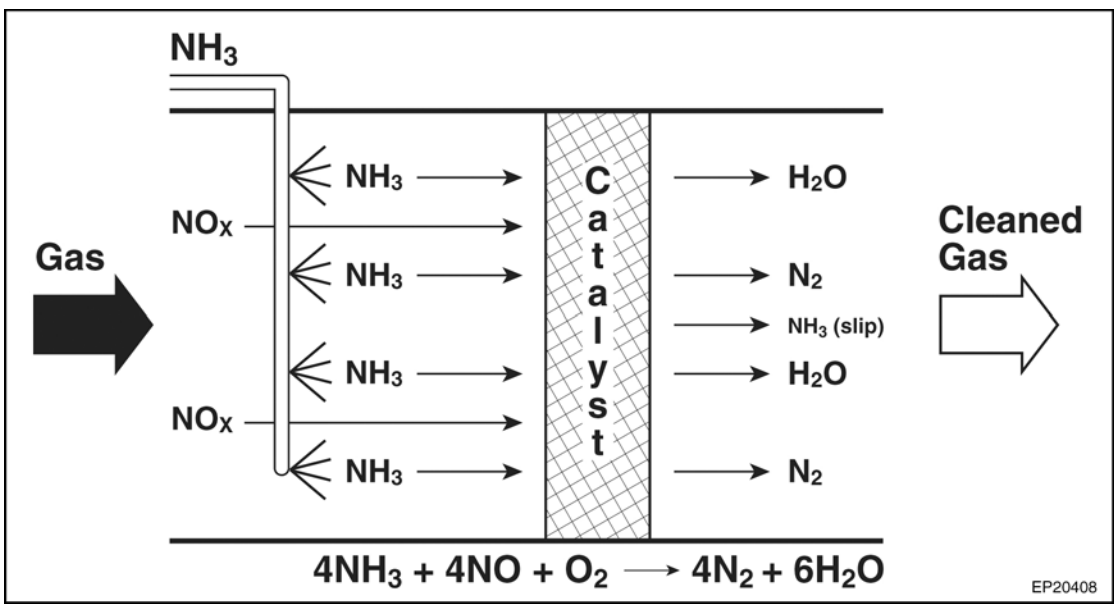


FIGURE S-7 Schematic of Typical SCR System

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, the power plants could be retrofitted with either a dry cooling system or a wet-dry cooling system; these are described in Section S.4.3.

Water (both cooling and steam cycle) for both power plants is obtained from the Zaragoza Oxidation Lagoons located west of Mexicali (Figure S-8). 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 water that covers 1 acre [43,560 ft^2] to a depth of 1 ft [0.30 m]). The sewage water is processed at the Zaragoza facility through 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 contracts with the local Mexican municipal water authority, Comisión Estatal de Servicios Públicos de Mexicali, to provide untreated, municipal wastewater. Raw sewage water is obtained at the inlet of the Zaragoza Oxidation Lagoons and piped to a sewage treatment plant adjacent to the lagoons that treats the water for use at the LRPC. Consequently, the water input to the sewage treatment plant has undergone little, if any, settling action from the lagoons. The adjacent sewage treatment plant treats 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 produced by the treatment plant is dewatered and disposed of as nonhazardous waste. The treated water is 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) is discharged to a channel adjacent to the sewage treatment plant. This stream eventually combines with the effluent of the Zaragoza Oxidation Lagoons.

Next to the LRPC, a tertiary treatment plant has been constructed to further treat the water to reduce phosphates, dissolved organic matter, and heavy metals. Part of the water treatment process includes passing through a lime softener and clarifier. This process removes dissolved salts (e.g., calcium, magnesium, and phosphate) from the water obtained from the Zaragoza Oxidation Lagoons. The addition of lime causes the precipitation of calcium and magnesium, thereby removing much of the water’s hardness, as well as substantial amounts of alkali metals, heavy metals, and phosphate. This process is the principal mechanism for reducing the quantity of TDS present in the water. The precipitated sludge is flocculated and separated from the water by sedimentation in the clarification process and sent to a press and filter house. Sludge from lime softening is dewatered and disposed of in an off-site landfill as nonhazardous waste.

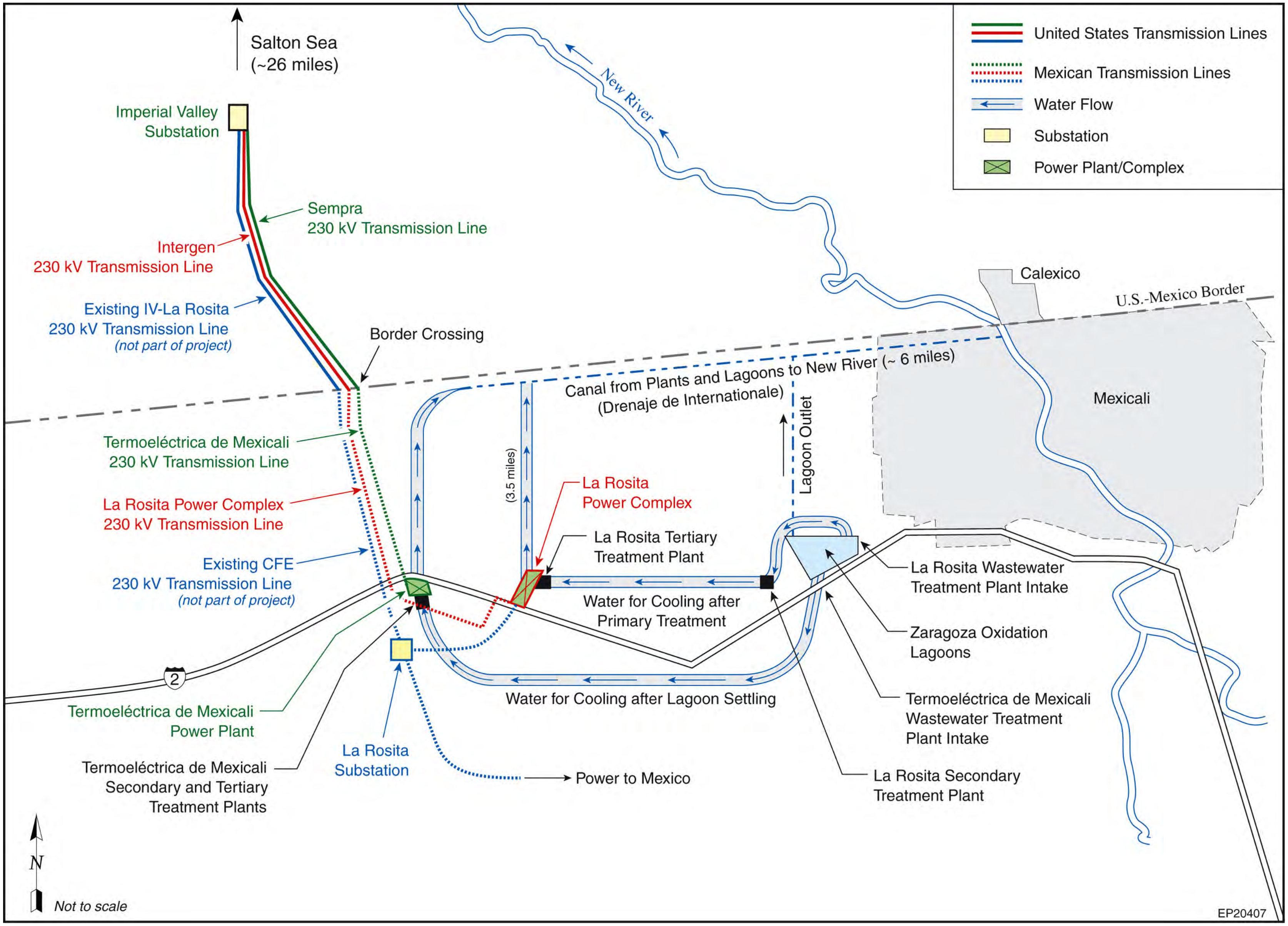


FIGURE S-8 Water Supply Cycle for LRPC and TDM Power Plants

Treated and untreated wastewater streams collected from power plant operations are discharged to the drainage channel that eventually connects to the Drenaje de Internationale, a major drainage channel flowing to the east, parallel to the U.S.-Mexico border (Figure S-8). The Drenaje de Internationale empties into the New River within 100 yd (91 m) of the border, about 6 mi (10 km) from the original discharge point. 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 obtains water from the Zaragoza Oxidation Lagoons after the water is treated in the primary settling ponds. The TDM sewage treatment plant uses 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 removes 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-denitrification. This treatment process eliminates biological contaminants and reduces other contaminants in the water. After biological treatment, water is clarified by the addition of lime to raise the pH to cause the precipitation of dissolved minerals, such as calcium and magnesium, and to reduce the concentrations of TDS present. The clarified water is then 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 is hauled to a landfill in Mexico. The water so treated is suitable for use as cooling water, the major use of water at the power plant. It replaces water lost to evaporation from the cooling towers.

Three main waste streams are piped into the waste sump during normal power plant operation. Waste streams mix before being discharged untreated into a drainage channel (the Drenaje de Internationale that eventually leads to the New River [Figure S-8]). The first stream is the wastewater from the cooling tower. The cooling tower bank consists of 12 units, and the water is used for up to six cycles before it is discharged. The second stream is wastewater from the demineralization process. The third stream is water discharged from the steam cycle.

S.4.3 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 alternative cooling technologies and more efficient emissions controls.

S.4.3.1 Alternative Technologies Considered But Not Evaluated

Dry-Only Cooling Technology. 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.

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, the dry cooling system discussed in the following paragraphs refers only to a direct dry cooling process.

Dry-only cooling technology is considered here mainly as a means of reducing the amount of water necessary for cooling at the power plants in Mexico (thereby reducing the impacts to the New River and Salton Sea caused by flow reductions under wet cooling). Under this scenario, the LRPC and TDM plants would be retrofitted with a dry cooling system.

A dry-only cooling system is usually used in situations when not enough water is available for wet cooling and the economics of the project can withstand the increased cost and loss of performance caused by its use (the use of dry cooling means less electricity will be produced with the steam produced, and thus more fuel per unit of electricity produced will be consumed). Loss of performance is especially pronounced when the daily mean maximum temperature exceeds 80°F (27°C), to the extent that dry cooling alone is considered impractical at temperatures above this threshold.

The dry-only cooling technology would be an insufficient cooling process for the Mexico power plants for the following reasons:

- In the region, maximum daily temperatures are less than 80°F (27°C) only 37% of the time. Temperatures exceed 80°F (27°C) about 63% of the time, and these high-temperature months tend to coincide with high-electricity-demand months. For plants in this climate condition, wet cooling is necessary for most of the year in order to maintain output and plant efficiency.

- Because the power plants have already been constructed, retrofitting for dry cooling would be extremely costly. For example, Sempra has estimated that it would cost approximately $150 million (43% of the original cost of the plants) to retrofit a dry cooling system. There would also be significant costs associated with shutting down the facilities for the 4 to 5 months needed for retrofit construction.

Dry-only cooling technology is considered infeasible as a retrofit to the existing plants on the basis of its low efficiency in the climate of the power plants and the high cost of redesigning the facilities, replacing equipment, and shutting down the facilities for the duration of retrofit construction. The dry-only cooling technology, therefore, is not evaluated further in this EIS as a reasonable alternative technology for Alternative 3.

Zero-Liquid Discharge Water Management Technology. Zero-liquid discharge water management systems are used at steam electricity-generating stations to minimize cooling system wastewater production by reusing as much wastewater as possible within the plant and employing evaporation to eliminate the remaining wastewater. The technology is considered here mainly as a means of reducing discharges of TDS from the power plants in Mexico. Under this scenario, the LRPC and TDM plants would be retrofitted with sidestream softening and reverse osmosis systems to reduce the required amount of cooling tower blowdown (the largest contributor to wastewater). Integrating a reverse osmosis system would also reduce the required capacity of the mechanical evaporator-crystallizer (or spray dryer) that would be needed to evaporate the cooling system wastewater.

The water quality impacts of installing zero-liquid discharge technology are mixed. Calculations show that this technology would decrease TDS and phosphorus concentrations in the New River at the U.S.-Mexico border by about 1%, but it would slightly increase concentrations of total suspended solids (TSS), biochemical oxygen demand (BOD), chemical oxygen demand (COD), and selenium compared with both plants operating without this technology (Appendix K). Flows to the New River would be slightly less than those under the proposed action, since wastewater discharge would be eliminated.

Because the retrofit of a zero-liquid discharge system to the power plants would present several technical challenges and incur significant capital and operating costs but yet yield only minimal water quality benefits, this technology is not evaluated further in this EIS as a reasonable alternative technology for Alternative 3.

S.4.3.2 Wet-Dry Cooling Retrofit

Because the power plants have been constructed with wet cooling systems, another possible alternative cooling technology is to retrofit the plants with a wet-dry cooling system, which combines both wet and dry cooling technologies (Figure S-9). This section discusses the feasibility of retrofitting the power plants with wet-dry cooling.

The most common dry cooling technology is direct dry cooling, also known as an air-cooled condenser system. In dry cooling, 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). Steam from the steam turbine exhausts directly to a manifold radiator system that releases heat to the atmosphere, thus condensing the steam inside the radiator (see the dry section illustrated in Figure S-9).

A wide range of wet-dry cooling designs is possible, covering the entire spectrum of wet versus dry cooling components depending on plant needs. A typical wet-dry cooling system utilizes both an air-cooled condenser and a wet evaporative cooling tower within the same cooling system. Wet-to-dry cooling ratios would depend on the prevailing 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.

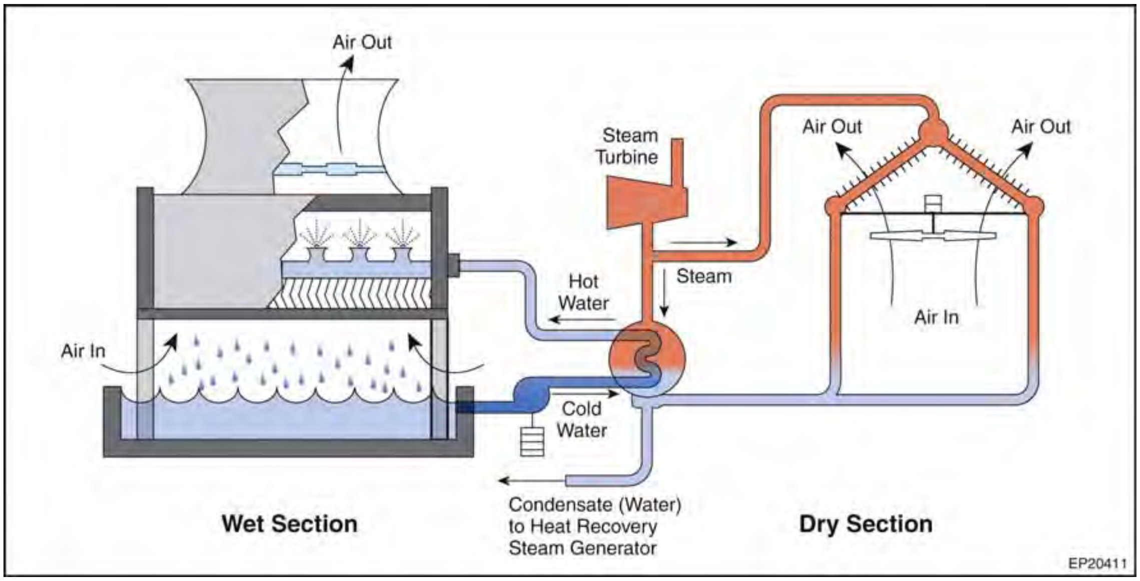


FIGURE S-9 Wet-Dry Cooling Technology

Dry cooling has both advantages and disadvantages compared with wet cooling; these would be realized to the degree that dry cooling would be used in a wet-dry cooling application. Advantages of dry cooling may include:

- 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 disadvantages of dry cooling may include:

- 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 reduction in power plant steam-cycle efficiency and output, depending on site conditions and seasonal variations in ambient conditions. The efficiency reduction ranges from about 2% when the ambient temperature is 68°F (20°C) to about 8% when the ambient temperature is 104°F (40°C). When factoring in the extra power needed to operate the cooling fans, efficiency could be reduced by a total of 10 to 15%. For a typical combined-cycle power plant where the steam cycle accounts for about one-third of the total capacity, overall plant efficiency would be reduced from 3 to 5%.

- Increased capital and operating and maintenance costs with a dry cooling system.

Application of a wet-dry cooling system allows tailoring the use of either the wet or dry system on the basis of climatic conditions. The issues in deciding whether to retrofit a wet-dry cooling system on both facilities would involve estimating the amount of time the plants would operate in the water-conserving dry cooling mode and the feasibility of adding the necessary equipment, in terms of both equipment cost and the difficulty of integrating the technology into the existing plant.

A potential wet-dry cooling system design would use dry cooling to handle the entire cooling load up to an ambient temperature of 80° to 90°F (27 to 32°C). Wet cooling would augment the dry system at temperatures above 80° to 90°F (27 to 32°C); 100% wet cooling could be used on days the temperature is above 90°F (32°C) to ensure maximum power output from the plants. The analysis of impacts to water resources assumes that dry cooling will be used at temperatures up to 90°F (32°C).

An analysis of data on maximum daily temperatures in Imperial, California, from 1993 to 1999 shows that 37% of the daily maximum temperatures are below 80°F (27°C); 19% are between 80° and 90°F (27° and 32°C); and 44% are more than 90°F (32°C). Therefore, dry cooling only would be expected to be used 37% of the time, while some combination of wet-dry or wet-only cooling would be used 63% of the time.

Retrofitting an existing plant to utilize wet-dry cooling would involve solving a number of possibly complex system integration issues, such as whether there is enough properly situated space to accommodate dry cooling equipment. Dry cooling towers are very large in both height and width; a retrofit at these plants would require an area of as much as 7 acres (3 ha). The cooling towers would also have to be located close to other large structures at the plants, like a turbine hall or heat recovery steam generator, which could negatively affect their performance due to wind effects caused by the interaction between structures; often the larger the tower, the greater the negative effects. Properly locating equipment is best performed during the plant's planning and design stage, not in a retrofit situation.

Costs associated with the retrofit would also have to be considered. They are estimated at $75 million and would include the capital cost of the new equipment, additional engineering and design costs, greater operation and maintenance costs, and the cost of lost power sales during installation. The outage due to installing the new equipment is estimated to be about 4 to 5 months.

A successful wet-dry cooling retrofit was performed in 1995 on a pulverized coal-fired power plant (Streeter Street Station Unit 7) owned by Cedar Falls Utilities in Cedar Falls, Iowa. However, this plant is very small (generating about 37 MW) and located in a cold climate. Extrapolating this experience for either the TDM or LRPC plants indicates a greater than 10-fold increase. For smaller stations, like Streeter, the size and complexity are less challenging. Such a large extrapolation would be unprecedented, especially in light of the demanding temperatures in Mexico.

S.4.3.3 Carbon Monoxide Emissions Control

This alternative includes operation of two power plants equipped with SCR systems to reduce NO_X emissions and using oxidizing catalysts on all gas turbines to reduce CO emissions. The analysis for this alternative assumes that the LRPC power plant would have emissions controls similar to those already described for the TDM plant.

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) (a greenhouse gas produced by human activity). 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.

S.4.4 Mitigation Measures

Under this alternative, DOE and BLM would grant one or both Presidential permits and corresponding ROWs to authorize transmission lines whose developers would employ off-site mitigation measures to minimize environmental impacts in the United States. For offsets of air emissions from power plant operations, DOE contacted the Imperial County Air Pollution Control District (ICAPCD) and Border Power to obtain suggestions for off-site mitigation measures that could be evaluated under this alternative. The Imperial Irrigation District (IID) and the Colorado River Basin Regional Water Quality Control Board have developed and published plans that would offset water reductions and improve water quality within the Salton Sea Watershed.

S.4.4.1 Water Resources

Mitigation for water resource impacts would focus on potential mitigation measures that could be implemented in the United States to offset increased TDS concentrations in the Salton Sea and/or New River resulting from reduced flow volumes in the New River due to power plant operations. The potential mitigation measures would be designed to offset the annual loss of 10,677 ac-ft (0.41 m^3/s) of water under the proposed action (i.e., both plants operating 100% of the time)[2] and could include the following:

- ***Lining canals:*** An estimated 167 mi (269 km) of canal in the Imperial Valley, if available to be lined, would need to be lined to offset the annual loss of water under the proposed action. Concrete liners installed along this length of canal would cost an estimated $18 million; the addition of synthetic liners to reduce water seepage as the system ages would raise the cost to $22 million.

- ***Reducing Evaporative Losses:*** Replacing most of the canal system with pipe could offset the annual water loss under the proposed action by reducing the volume of water lost from the drainage system due to evaporation (about 11,600 ac-ft [0.45 m^3/s]). This measure would require replacing the entire approximately 1,667 mi (2,683 km) of canals and laterals in the IID system with pipe.

- ***Fallowing Farmland:*** The area of land needed for fallowing to offset water reductions under the proposed action would depend on the particular crop being fallowed since irrigation needs vary by crop. For a crop like corn, which requires about 2 ac-ft (7×10^{-5} m^3/s) of water per year, 5,340 acres (2,161 ha) would need to be fallowed, with the annual cost of fallowing about $7 million.

- ***Groundwater Transfer:*** Groundwater wells could be installed to pump groundwater to the New River or Salton Sea directly. This potential measure would require pumping about 30 wells at a rate of 220 gal/min (830 L/min), possibly at Imperial East Mesa. Studies would be needed to determine whether this pumping rate could be achieved and sustained for the term of the project.

- ***Salton Sea Mitigation Strategies:*** Offsets could possibly be achieved by installing a dike in the Salton Sea to reduce the annual evaporation in the main body of the Sea. Another potential strategy would be to annually remove a

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[2] Because the plants would not operate 100% of the time, water reductions and hence mitigation for such reductions are overestimated.

volume of water from the Sea to compensate for losses from the New River. Both strategies could prevent the concentration of salt from increasing at a rate faster than that with no plants operating that would, without this action, occur if the Sea were to achieve a new water surface equilibrium. These measures would require additional feasibility studies and would also have to be coordinated with the Salton Sea Authority's restoration project activities.

A program to mitigate water consumption by the two power plants in Mexico could conceivably consist of one or more of the measures described above. Mitigation opportunities in Mexico may also be possible and could augment the benefits of these actions.

S.4.4.2 Air Quality

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 the 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 ICAPCD 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.

- ***Paving of Roads:*** The Imperial County Public Works Director provided the ICAPCD with a list of about 50 road segments totaling 23 mi (37 km) that could be paved to reduce fugitive dust emissions. Asphalt paving would cost about $430,000 per mile, assuming a two-lane road.

- ***Retrofitting of Emission Controls on IID Power Plants:*** The ICAPCD suggested that SCR installation on IID steam plant Unit 3 and the peaker plants would reduce NO_x emissions in the area of the projects. However, the IID already plans to repower this unit in 2007–2008 as a combined-cycle gas-fired unit to reduce NO_x emissions.

- ***Enhancing the 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 about $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 five smaller buses at a cost of about $4 million to $5 million. An overall reduction in particulates of approximately 0.1 ton/yr (0.1 t/yr) would result.

- ***Controlling Imperial County Airport Dust:*** Fugitive dust from natural windstorms and from aircraft (particularly from helicopter landings) occurs frequently at the airport. Estimated funding of $150,000 would be needed to either treat bare desert soils with dust retardants or to purchase crushed rock to cover the soil surface in the most sensitive areas. A reduction in particulates of 15 tons/yr (14 t/yr) could be achieved.

- ***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. Estimated funding of $250,000 would be needed for this effort. Depending on the retrofit program implemented, overall particulate engine emissions could be reduced by about 3.3 tons/yr (3 t/yr).

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 region 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.

S.5 COMPARISON OF POTENTIAL ENVIRONMENTAL IMPACTS AMONG ALTERNATIVES

The following discussion identifies the environmental implications of choosing among alternatives, organized by resource area. Both temporary impacts during construction and long-term impacts during operation of the projects are considered. This discussion is followed by Table S-3, which provides a summary of impacts for the four alternatives. For the proposed action (i.e., the granting of one or both of the Presidential permits and ROWs), the analysis for most resource areas 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.

S.5.1 Geology, Soils, and Seismicity

Under the no action alternative, there would be no potential impacts to geologic resources. Current geologic conditions would continue, and no prime farmland soils would be disturbed. Erosional processes would continue naturally in undisturbed areas. Potential seismic hazards associated with active fault systems in the area of the projects would not be a relevant concern.

Under the proposed action, 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 area of the projects, however, the potential for slope failure would be low. Soils along the proposed and alternative transmission line routes would be affected at the support structure sites, access road and spur areas, construction areas, and staging areas. No cultivated land would be disturbed. It is likely that the lower portion of the western alternative routes could cross prime farmland soils.

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 vegetation removal to prepare the site, soil disturbance associated with grading to construct access roads and spurs, and excavation associated with installing the tower support structures. Other areas of soil disturbance would include the work areas around each tower, pull sites, lay-down areas, and the trench for optical cables. Soil compaction would occur as a result of vehicles on the access roads and spurs and heavy equipment within the lay-down areas used for monopoles. (The steel lattice towers and A-frame support structures would be delivered by helicopter.)

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 ongoing evaluation of fault zones to date, surface fault rupture is not likely to occur along any of the proposed or alternative transmission line routes.

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

Under the mitigation measures alternative, any paving of roads would lead to some temporary, short-term impacts to soils along road ROWs (e.g., soil compaction or minor erosion from surface disturbance caused by equipment and 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 (i.e., 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 County Airport, would be beneficial.

S.5.2 Water Resources

S.5.2.1 Water Use

Under the no action alternative, only the LRPC EAX unit would be able to operate and would consume 4,940 ac-ft/yr (0.l9 m^3/s) of water for cooling taken from the Zaragoza Oxidation Lagoons in Mexicali that would otherwise flow to the New River and on to the Salton Sea. The proposed action, mitigation measures, and alternative technologies alternatives would include EAX operation plus operation of the EBC export unit at the LRPC plant and the TDM plant. The proposed action and mitigation measures alternatives would consume 10,667 ac-ft/yr (0.42 m^3/s) of water (the LRPC plant alone would consume 7,170 ac-ft/yr [0.28 m^3/s]; the TDM plant alone would consume 3,497 ac-ft/yr [0.14 m^3/s]). Under the alternative technologies alternative, the use of wet-dry cooling would consume about 56% less water than under the proposed action. Water treatment and consumption by the power plants would affect the quality and quantity of water in the New River and in the Salton Sea.

S.5.2.2 New River

Power plant operations under the proposed action alternative would reduce the average annual flow of the New River at the Calexico gage (near the U.S.-Mexico border) by about 5.9%. Since the New River gains in flow from agricultural runoff as it flows northward, decreases in the average annual flow at the Westmorland gage near the Salton Sea would be much less, about 2.3%. The combined annual water consumption for the power plants would represent about 23.3% and 34.7% of the natural variability in annual flow at the Calexico and Westmorland gages, respectively. These 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 0.07 ft (2.1 cm) at the Westmorland gage. These changes would maintain floodplains within the extent of historical values; therefore, impacts to New River floodplains would be minimal. Impacts on flow under an alternative cooling technology scenario (wet-dry cooling) would be less than the impacts on flow under the proposed action since wet cooling would be used only 44% of the time. Impacts on flow under the no action alternative would also be less, about 46% of those under the proposed action alternative.

Power plant operations would also affect the water quality of the New River. TDS concentrations (i.e., salinity) would increase due to the evaporation of water for cooling and return of TDS to the New River. However, the annual total TDS load to the river would be reduced somewhat due to the permanent removal of some TDS by the water treatment plants associated with the power plants.

Under the proposed action alternative, TDS concentrations at the Calexico gage near the U.S. border would increase 5.6%, or about 46% of TDS variability in the New River, and would remain less than the 4,000-mg/L water quality objective for the Colorado River Basin. Average TDS for the New River at its outlet to the Salton Sea would increase by about 2.1% for both plants operating (a smaller percent than at the Calexico gage, because flow and TDS concentrations in the New River tend to increase in the downstream direction from existing inputs along the river). The change in the temperature of the New River under the proposed action is estimated to be only about 0.5°F (0.3°C) because of the mixing of power plant discharge water with a much larger volume of water in the New River.

Under an alternative cooling technology scenario, TDS concentration increases would be less, depending on the extent to which dry versus wet cooling was used. The TDS concentration increase under the no action alternative would be less than 3.7% at the Calexico gage. The loads (total mass) of TSS, BOD, COD, selenium, and phosphorus, as well as of TDS, would also be reduced by plant operations.

Mitigation strategies adopted by the IID that focus on water conservation could offset water flow reductions in the New River and improve water quality within the Salton Sea Watershed.

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, thus increasing, at least temporarily, the sediment loads to nearby water bodies. 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.

S.5.2.3 Floodplains: Pinto Wash and New River

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 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.

New River. Along the New River, changes in water flow and depth produced by power plant operations would 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.

S.5.2.4 Salton Sea

Reductions in New River flow would result in a decrease in inflow to the Salton Sea, thus reducing its volume, lowering its elevation, and decreasing its surface area. Under the proposed action and mitigation measures alternatives, the decrease in water volume in the Sea would be about 10,667 ac-ft (1.32×10^7 m^3), less than 0.1% of the Sea's volume. The corresponding change in elevation would be about –0.05 ft (–0.6 cm), about 10% of the Sea's natural variability. Surface area would be decreased by about 97 acres (39 ha). This represents a decrease of about 0.04% of the Sea's initial surface area. Under the no action alternative, the reduction in the surface area of the Salton Sea would be only about 40 acres (16 ha).

Impacts to water quality in the Salton Sea would result from consumption of water from power plant operations. With no plants operating, the TDS concentration (salinity) in the Sea is about 44,000 mg/L. Assuming that the inflow of TDS (salt) to the Salton Sea is about 9,200 million lb/yr (4,172 kg/yr), the natural rate of increase in TDS concentration is about 443.6 mg/L/yr. After 1 year, this increase would yield a TDS concentration of about 44,444 mg/L.

With both plants operating, the TDS concentration resulting from the reduction in inflow volume to the Salton Sea would be about 44,063 mg/L (an increase of about 0.14% compared with no plants operating). Under this scenario, the natural rate of increase in TDS concentration, that is, with no plants operating, would be about 443.8 mg/L/yr. After 1 year of power plant operations, this increase would yield a TDS concentration of about 44,507 mg/L. 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.

After 1 year, the Salton Sea would adjust its elevation to the reduced inflow caused by the annual operation of the power plants and establish a new equilibrium (i.e, the rate of evaporation would be equal to the rate of water inflow from all sources). Thereafter, there would be almost no difference between the no action and the three action alternatives in their effect on TDS concentrations. The TDS value predicted for both plants operating for 1 year (44,507 mg/L) is much less than the 60,000-mg/L value considered by the DOI's Bureau of Reclamation and others as a value that would be detrimental to fishery resources. Without the power plants operating, the Salton Sea would reach a salinity of 60,000 mg/L in approximately 36.07 years. With both plants operating, a salinity of 60,000 mg/L would be reached in 36.06 years, or 4 days sooner than without the plants operating.

Operations of the water treatment plants associated with the power plants would reduce the load of phosphorus that the New River discharges to the Sea by about 150,000 lb (68,030 kg), which is about a 5.8% reduction in the total phosphorus load to the Salton Sea (the New River delivers about 50% of the phosphorus load to the Sea). Selenium loads would be reduced by about 38 lb/yr (17 kg/yr), which represents only a very small fraction of the total selenium load to the Sea.

Under the mitigation measures alternative, conservation measures such as lining canals, reducing evaporative losses, and fallowing farmland would yield water savings; however, it is not reasonable to assume that the IID would be interested in undertaking such a project at this time given the extensive water conservation measures it is currently undertaking for the Quantification Settlement Agreement and the significant financial, legal, environmental, and policy issues involved. Given these considerations, along with the limitations of the groundwater transfer (due to the declining status of groundwater in the area and its potentially high TDS concentrations) and the administrative complexities associated with removing water from the Salton Sea or building a dike within it, it is possible that none of the mitigation measures described can be readily implemented. In addition, impacts from other projects that are not being mitigated (e.g., the Mexicali II Wastewater Treatment Plant) and the reductions in Colorado River flow into Mexico, resulting in less water ultimately flowing back into the United States via the New and Alamo Rivers, would overwhelm the beneficial impacts of any mitigation efforts associated with this proposed project.

S.5.2.5 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 118,000, 180,000, and 264,000 ac-ft/yr (4.62, 7.04, and 10.33 m^3/s), 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. 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). Increases in TDS and selenium concentrations should not exceed the tolerance of wetland plants, whereas the changes in other water quality parameters could be beneficial. In all cases, the changes would be within the range of the parameters' variability.

S.5.2.6 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 transmission line construction would be limited to temporary and localized lowering of the water table if it was necessary to dewater an excavation to install a footing.

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, the impacts to groundwater resources resulting from all alternatives are expected to be minimal.

S.5.3 Air Quality

Air quality impacts resulting from transmission line construction include those from fugitive dust emissions, PM_{10} emissions, and fuel combustion emissions. Fugitive dust would be generated by construction vehicles used for excavation, by helicopter movement and landings for delivery of support structures, and by entrainment of soil on vehicle wheels. Impacts due to fugitive dust emissions are expected to be small and localized and would end once the construction activities are completed. Dust generation could be controlled by spraying water on access roads and work areas and tower sites.

Fugitive dust emissions would not affect ambient PM_{10} levels in the area of the projects. Fugitive PM_{10} emissions associated with tower pad construction are estimated to be about 26.4 lb (11.9 kg) of PM_{10} per acre per day over the construction period. Vehicular traffic to and from the construction areas and helicopter operations would generate a total of about 5.4 tons and 0.67 ton (4.9 t and 0.61 t) of PM_{10}, respectively, over the construction period. 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. Periodic maintenance activities would generate a maximum of 0.08 ton/yr (0.07 t/yr) (and slightly more for the longer alternative routes). Fuel combustion emissions associated with construction vehicle traffic are expected to be minimal and temporary in nature.

Air quality impacts from power plant operations would result from emissions of NO_x, CO, CO_2, and PM_{10} from the combustion of natural gas (stack emissions); PM_{10} from cooling towers; and NH_3 (known as NH_3 slip) from the SCR system used to reduce NO_x emissions.

Total volatile organic compound (VOC) emissions during the transmission line construction phase of the proposed route would be a maximum of about 0.361 ton (0.327 t); total NO_x emissions would be about 1.86 tons (1.69 t). VOC and NO_x emission estimates for the alternative routes are virtually the same. VOC and NO_x emissions during transmission line operation and maintenance are expected to be negligible.

Under the no action alternative, the three gas turbines of the LRPC EAX unit would operate, but the EBC unit at the LRPC and the TDM plant would not operate. Total emissions of CO and total PM_{10} emitted would be 2,181 tons/yr and 714 tons/yr (1,979 t/yr and 648 t/yr), respectively. Total NO_2 and NH_3 slip emitted through March 2005 would be 2,005 tons/yr and 74 tons/yr (1,819 t/yr and 67 t/yr), respectively. After the SCRs are installed on the two LRPC EAX Mexico turbines, NO_2 emissions would be reduced to 285 tons/yr (258 t/yr), while NH_3 slip would increase to 222 tons/yr (201 t/yr).

Under the proposed action, the EBC unit plus EAX export turbine at the LRPC and the TDM plant would operate. Emissions of CO and total PM_{10} caused only by these units would be 1,635 tons/yr and 732 tons/yr (1,483 t/yr and 664 t/yr), respectively. The NO_2 and NH_3 slip emitted by these units would be 418 tons/yr and 498 tons/yr (379 t/yr and 452 t/yr), respectively.

Projected increases in concentrations of NO_2, CO, and PM_{10} under both the no action and proposed action alternatives all fall below the EPA SL for each pollutant (a benchmark used in this EIS of the threshold of significant impacts to air quality).

The potential for O_3 formation related to plant emissions is also evaluated. O_3 is a secondary air pollutant formed in the presence of sunlight from a variety of precursors that include NO_x, VOC, and CO. Analysis in this EIS indicates that operation of power plants under all alternatives would result in minimal (< 1 ppm) increases in O_3 levels compared to background levels as a result of NO_x and VOC emissions under typical meteorological conditions.

Under the proposed action alternative (the EBC unit and the EAX export turbine at the LRPC and the TDM plant operating), CO_2 emissions would be about 5,100,000 tons/yr (4,600,000 t/yr), a value that is 0.088% of the total U.S. emissions from fossil fuel combustion. Under the no action alternative, CO_2 emissions would be about 3,900,000 tons/yr (3,500,000 t/yr) or about 0.066% of total U.S. emissions. There are currently no Federal guidelines on CO_2 emissions in the United States.

Estimated exposures in the United States to NH_3 and hazardous air pollutants (HAPs) emitted from the plants and associated health risk estimates are discussed in Section S.5.11.2.

Indirect air quality impacts in the United States from operation of power plants in Mexico relate to consumption of cooling water and projected exposure of the Salton Sea lakebed, resulting in additional PM_{10} emissions from wind erosion. Under the proposed action, reductions in annual inflow to the Salton Sea from the New River would expose an estimated 97 acres (39 ha) of shoreline that is currently under water. Emission rate estimates for PM_{10}, based on a comparison with the emissions from Owens Lake, a dried lakebed in Inyo County, California, would be less than 10 tons/yr (9 t/yr).

Under the alternative technologies alternative, the TDM plant would use SCR and oxidizing catalysts to reduce CO emissions. The LRPC would also incorporate SCR systems on all turbines by March 2005; however, it would not use CO emission controls. The increase in ambient CO concentrations in Imperial County associated with emissions from export turbines equipped with CO oxidizers would be slightly lower than under the proposed action. All values, including those under the proposed actions, are well below SLs established by the EPA. An alternative cooling technology (wet-dry cooling) would be used at power plants that connect to the transmission lines. The dry cooling phase of a wet-dry system tends to reduce plant efficiency on the order of 10 to 15%, especially when outdoor temperatures exceed 90°F (32°C). This would reduce electrical output for a given fuel input and would necessitate additional fuel consumption, thus increasing most plant emissions. Total PM_{10} emissions, by stack and wet cooling towers (that operate for wet cooling systems only) would be reduced.

Measures to improve air quality under the mitigation measures alternative generally focus on ways to compensate for air quality impacts in the United States due to power plant operations. Measures identified by the ICAPCD include paving roads, retrofitting emissions controls on IID power plants, enhancing the use of compressed natural gas to fuel motorized vehicles, controlling Imperial County Airport dust, and retrofitting diesel engines for off-road heavy-duty vehicles. PM_{10} and NO_x emissions could be reduced by paving roads, retrofitting emissions controls on IID power plants, and retrofitting diesel engines. Mitigation opportunities in Mexico could also prove to be beneficial and cost effective; these could focus on vehicle inspection and a vehicle retirement program for older vehicles.

S.5.4 Biological Resources

S.5.4.1 Transmission Corridors

Under the no action alternative, there would be no impacts to biological resources to desert habitat or wildlife since no transmission lines would be built.

Impacts to biological resources as a result of transmission line construction under the action alternatives would include temporary and permanent disturbance to desert habitat between the U.S.-Mexico border and the IV Substation. Under the proposed action, permanent impacts would involve about 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 transmission line routes from construction of tower bases and new access roads. Temporary impacts to these resources would also occur, involving approximately 15 acres (6.0 ha) of Sonoran creosote bush scrub and 0.5 acre (0.2 ha) of desert wash. Construction along the alternative routes would affect larger areas of desert habitat because both alternative routes would be longer than the proposed routes and new access roads would have to be constructed. Regardless of which transmission line is selected, there is a potential for construction activities to introduce noxious or invasive plant species to existing desert habitats.

General impacts to wildlife in the area of the projects may occur because of increased human activity and noise during construction activities.

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).

Bird species, such as neotropical migrants that are protected by the Migratory Bird Treaty Act, would not be adversely impacted by construction of the proposed transmission lines. 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 area of the projects).

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. These impacts could occur as a direct result of construction activities or as an indirect impact if invasive plants were accidentally introduced.

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 would be affected. This impact would result from placement of tower footings and access roads in the desert wash areas (the largest wash area is Pinto Wash). 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.

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 to the flat-tailed horned lizard, the western burrowing owl, and other species that BLM considers sensitive biological resources.

The flat-tailed horned lizard is active during most of the year, but is dormant and hibernates between approximately November 15 and February 15. The animal hibernates in burrows, usually within a couple of inches of the ground surface. 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. Construction would 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.

S.5.4.2 New River

Under the no action alternative, only the EAX unit at the LRPC would operate. 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 the proposed action.

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, COD, 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. 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 would be 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.

Indirect impacts to riparian communities associated with the New River could result from power plant operations, since the power plants would reduce the flow and depth of water in the New River and increase the concentrations of water quality parameters like salinity (measured as TDS). Decreases in water level, however, are not likely to result in impacts to riparian plant species since these changes would be on the scale of a few centimeters, and much of the dominant existing vegetation in the riparian zone is relatively drought-tolerant. Increases in New River TDS (from 2,620 mg/L under the no action alternative to 2,766 mg/L under the proposed action alternative) would remain below the 4,000-mg/L water quality objective for the Colorado River Basin and would have little or no effect on the growth of riparian vegetation (which generally also has a high tolerance for salinity).

Decreases in New River water depth would not affect the operation and maintenance of the Brawley wetland since the water intake for the pump used to supply water to the wetland is located deep enough to work under the slightly reduced flows. The predicted values for TDS and selenium concentrations should not exceed the tolerance of the wetland plants present and should have no effect on the viability of the wetland. The California bulrush is reportedly capable of tolerating salinities up to about 6,000 mg/L, and salinity tolerances for other freshwater wetland plants have been estimated at about 4,800 mg/L. Under the proposed action, average salinity at the Calexico gage at the U.S.-Mexico border would be about 2,766 mg/L, with less than a 0.01% chance that this concentration would exceed 4,000 mg/L.

Because implementation of the proposed action would have a very small to no effect on the riparian or wetland habitats along the New River, similarly there would 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 fish and aquatic invertebrate populations between the Calexico gage and the Salton Sea. Slight increases in average salinity concentrations would fall within the range of levels that have occurred historically and would not likely adversely 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.

The alternative technologies alternative using a wet-dry cooling system could impact biological resources in the New River. Potential impacts to the New River would be reduced if a wet-dry cooling system was employed. The use of wet-dry cooling technology would reduce water consumption compared with that identified for the proposed action alternative. While use of a wet-dry cooling system would result in less potential for adverse impacts compared with the proposed action, it should be noted that impacts to biological resources associated with the New River resulting from implementation of either the proposed action or the alternative technologies would be small.

Implementation of actions under the mitigation measures alternative would be the same as impacts under the proposed action since all plants would be assumed to be operating. Actions such as paving of roads in Imperial County or construction of compressed natural gas service stations in El Centro or Calexico would not affect water quality in the New River and thus not impact biological resources.

S.5.4.3 Salton Sea

Under the no action alternative, the increase in salinity levels in the Salton Sea would occur at essentially the same rate as with no plants 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 eutrophication[3] because phosphorus loading would be reduced by EAX unit operations.

Indirect impacts to biological resources in the Salton Sea would occur as a result of changes in flow volume, salinity, and nutrient levels of the New River under the proposed action alternative. Reduction in New River flow volumes would reduce the inflow to the Sea, slightly increasing its salinity. Under the proposed action and mitigation measures alternative, it is estimated that the salinity in the Salton Sea would reach a critical level (60,000 mg/L) in about 36.06 years, approximately the same as the estimated time under no action (i.e., 36.0 years). Salinity above a concentration of 60,000 mg/L would exceed tolerances for survival of most aquatic species in the Sea. Biological resources would be impacted by increasing salinity before this critical level would be reached.

In the nearer term (about 1 year), the proposed action would result in an annual phosphorus load to the Salton Sea of about 3.7% less than if no plants were operating. This decrease would likely reduce eutrophication in the area of inflow and could reduce the frequency (relative to the situation if no plants were operating) at which low DO events occur. (These events could cause mortality in fish and aquatic invertebrates in that part of the Sea.) Depending on the salinity levels (i.e., if they remain below the critical level of 60,000 mg/L), the reduction in phosphorus could increase the availability of food resources for birds and other wildlife that use the Salton Sea.

Impacts to habitat for waterfowl and wading birds that are summer residents or that migrate through the area are not expected to occur, since the maximum reduction in water elevation of the Salton Sea (as a result of decreases in inflow volume) under the proposed action would be small (about 0.05 ft or 0.6 cm).

The alternative technologies alternative using a wet-dry cooling system could impact biological resources in the Salton Sea. Potential indirect impacts to the Salton Sea would be reduced if a wet-dry cooling system was employed. The use of wet-dry cooling technology would reduce water consumption compared with that identified for the proposed action alternative. While use of a wet-dry cooling system would result in less potential for adverse impacts compared with the proposed action, it should be noted that impacts to biological resources associated with the New River resulting from implementation of either the proposed action or the alternative technologies would be small.

Implementation of actions under the mitigation measures alternative would be the same as impacts under the proposed action since all plants would be assumed to be operating. Measures that would offset reductions in flow volume in the New River could slightly improve water quality in the New River and Salton Sea and thus could have a small positive impact on

[3] Eutrophication is the process by which freshwater bodies are enriched by nutrients, such as phosphorus and nitrogen, which leads to excessive plant growth. This plant growth usually occurs as an extensive growth of algae, which eventually die and cause reduced oxygen levels because of their bacterial breakdown. The lower water oxygen levels can lead to fish kills.

biological resources. Actions such as paving of roads in Imperial County or construction of compressed natural gas service stations in El Centro or Calexico would not affect water quality in the New River and thus not impact biological resources.

S.5.4.4 Special Status Species

Special status species include Federal- and State-listed threatened and endangered species and those species considered sensitive by BLM. Impacts to special status species occurring in the riparian or aquatic habitats of the New River or the Salton Sea under the no action and action alternatives would not be expected since many of these species do not occur within the areas potentially affected by the proposed projects. Small changes in New River flow volumes and water quality are not expected to result in adverse impacts to the southwestern willow flycatcher, Gila woodpecker, or bank swallow that occur in the desert scrub riparian areas. Small changes in Salton Sea water elevation are expected to be too small to create adverse impacts for special status bird species (e.g., bald eagle, brown pelican, and Yuma clapper rail). Decreases in nutrient levels, however, may produce small beneficial impacts by reducing episodic fish kills from reduced oxygen levels, thus resulting in an improved food base for fish-eating birds. Because the desert pupfish is highly tolerant of elevated salinity, it is not likely to be affected by increases in salinity under either the no action or action alternatives.

There is a high potential for adverse impacts to the flat-tailed horned lizard and the western burrowing owl and their habitats as a result of transmission line construction activities. These impacts would be reduced by implementing protective measures as directed by BLM.

While there is a potential for bald eagles 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.

Under the alternative technologies alternative, implementation of the wet-dry cooling technology on power plants would reduce water consumption compared with the proposed wet cooling system. The impacts to the New River and Salton Sea from a wet-dry cooling system would change water levels and water quality only slightly in comparison with the no action and proposed action alternatives. Therefore, no impacts are expected 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. Impacts to terrestrial species along the transmission lines (flat-tailed horned lizard and the western burrowing owl) would be the same as those identified for the proposed action.

The impacts of implementing the mitigation measures alternative on protected species would depend on the nature and location of the actual measures employed. Measures that would offset reductions in flow volume in the New River would improve the overall water quality in the New River and ultimately the Salton Sea, and thus have a positive impact on biological resources.

For measures to offset air quality impacts, 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 U.S. Fish and Wildlife Service (USFWS) and California Game and Fish Department would be contacted before the start of paving or construction activities.

Site-specific information on the protected species at the location planned for the mitigation action would need to be obtained prior to implementing the measure in order to determine the appropriate way of minimizing or avoiding impacts. Impacts to special status species would be similar to or greater than those identified for the proposed action.

S.5.5 Cultural Resources

Under the no action alternative, the 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.

Under the proposed action, three alternative transmission line routes were evaluated. 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 and recorded 18 new sites and 34 isolated artifacts. All but one of the sites appear to be from the prehistoric period and are likely related to Lake Cahuilla, an ancient lake located along the applicants' proposed routes. The historic period site dates to the 1930s. Twenty-three of these sites have been recommended as eligible for *National Register of Historic Places* (NRHP) listing. Of the sites identified, four would be directly impacted under the proposed action using the applicants' proposed routes. There is also the potential for additional impacts from the creation of access roads and lay-down areas. A treatment plan for the four potentially eligible sites was developed and approved by the California State Historic Preservation Office (SHPO) to mitigate the adverse effects that would result from construction of the transmission lines.

BLM has partially surveyed the western alternative routes for the presence of cultural resources. The western routes were chosen to avoid cultural resources. This would be partially achieved by being west of the Lake Cahuilla shoreline. As a result, the potential for impacts to archeological resources would 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 SHPO and the appropriate Native American Tribes.

The eastern alternative routes have been partially surveyed for cultural resources. Use of the western or eastern alternative routes is expected to have a lower potential to impact cultural resources, since they are not located along the Lake Cahvilla shoreline. If these routes were selected, a cultural resources survey would be necessary as well as additional consultation with the SHPO and the appropriate Native American Tribes.

Use of more efficient control technologies (use of oxidation catalysts to reduce CO emissions) and alternative cooling technologies would not change the transmission line configurations; thus the impacts to cultural resources under the alternative technologies alternative would be the same as those for the three alternative routes under the proposed action.

In addition to activities described for the proposed action, activities under the mitigation measures alternative would require consultation with the SHPO before construction (e.g., paving of roads) commences. 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, protective measures for these sites would be developed in consultation with the SHPO and the appropriate Native American Tribes.

S.5.6 Land Use

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. Land use in the Yuha Basin ACEC would remain limited.

The environmental impacts to land use associated with granting the Presidential permits and corresponding ROWs would be similar for all of the proposed routes. Land use would be restricted along the access roads for the new transmission lines regardless of which routes were 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 roads. The total amount of permanent disturbance for the western and eastern alternative routes (13.1 and 10.4 acres [5.3 and 4.2 ha], respectively) would be higher than for the proposed routes (<3.6 acres [<1.4 ha]). The western alternative routes would run partially outside of BLM-designated Utility Corridor N and would require a plan amendment. 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 encompassing the applicants' proposed routes and the eastern and western alternative routes is designated 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. The nearest active mines are 2.5 mi (4 km) west of the proposed routes and would be unaffected by locating the transmission lines for the proposed or alternative routes.

Recreation activities in the Yuha Basin ACEC are somewhat limited. 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 permitted only in designated areas within the Yuha ACEC. There are no designated camping areas within 10 mi (16 km) east or west 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 soils.

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 it would require additional patrolling to ensure the integrity of the lines.

Use of more efficient control technologies and alternative cooling technologies would not change the transmission line configurations as described under the proposed action; thus land use impacts under the alternative technologies alternative would be the same as those for the proposed action.

The expected impacts to land use under the mitigation measures alternative would depend on the nature of the mitigation measures. For example, if the paving of roads was selected as a mitigation measure, increased access to certain remote areas that are currently difficult to access could result in adverse impacts to current land use.

S.5.7 Transportation

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.

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 per day in the first

2 months, falling to 8 in the third month and 5 in the last 2 months. Given the 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.

Use of more efficient control technologies and alternative cooling technologies would not change the traffic volumes associated with transmission line construction as described under the proposed action; thus transportation impacts under the alternative technologies alternative would be the same as those for the proposed action.

Impacts to local transportation networks under the mitigation measures alternative would depend on the nature of the mitigation measure. In the short term, any mitigation-related construction project would increase local traffic.

S.5.8 Visual Resources

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 (VRM) rating.

The area in the vicinity of each facility is classified as a Class III Visual Resource Inventory Area. 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.

The addition of transmission lines to the eastern alternative routes 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 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.

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. A number of measures might be used to mitigate the visual impacts of the lines on people traveling along State Route 98, including the reduction of the use of shiny metal surfaces on transmission towers or the treatment of these surfaces to allow blending with prominent desert background colors.

Use of more efficient control technologies and alternative cooling technologies would not change the transmission line configurations as described under the proposed action; thus impacts to visual resources under the alternative technologies alternative would be the same as those under the proposed action.

The impacts to visual resources under the mitigation measures alternative would depend on the nature of the mitigation measures. For example, the ICAPCD 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.

S.5.9 Noise

Under the no action alternative, the Presidential permits and the corresponding ROWs would be denied, and the transmission lines would not be built. Noise levels would continue at background levels of about 35 A-weighted decibels [dB(A)].

During construction of the proposed 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.

Noise levels decrease about 6 dB as the distance from the 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. 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.

Operation of transmission lines can result in noise impacts 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 the proposed transmission lines would generally be indistinguishable from background noise (35 dB(A) DNL or less) at locations beyond the edge of the ROW. During very infrequent rainfall events, the noise level at the edge of the ROW would be less than 39 dB(A). 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 transmission line 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.

Use of more efficient air emission control technologies and alternative cooling technologies would not change the noise levels associated with transmission line construction or operation as described under the proposed action; thus noise impacts under this alternative would be the same as those under the proposed action.

The noise impacts under the mitigation measures 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).

S.5.10 Socioeconomics

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 current levels.

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 in-migrating 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.

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. Construction along the proposed routes would create 69 direct jobs. There would be no increase in direct employment for the alternative routes. However, since the 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. 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) than 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.

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 routes, $27,300 for the eastern alternative routes, and $34,900 for the western alternative routes.

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 proposed routes, $7,300 for the eastern alternative routes, and $9,300 for the western alternative routes.

In addition to tax revenues generated by the projects for local and State governments, 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, $2,300 for the eastern alternative routes, and $1,934 for the western alternative routes.

Use of more efficient air emission control technologies and alternative cooling technologies 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 under the proposed action.

Socioeconomic impacts under the mitigation measures alternative would depend on the nature of the mitigation measures. However, in general, alternative 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.

S.5.11 Human Health

S.5.11.1 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 area of the projects 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 resulting air concentration increases from primary and secondary pollutants would be below SLs established by the EPA. Human health impacts from these emissions of would be minimal.

As discussed in Appendix H, the health risk assessment (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 SL of 1.0.

S.5.11.2 Proposed Action

Electric and Magnetic Fields. Data for 230-kV transmission lines similar to the proposed Intergen and Sempra lines suggest that magnetic field strengths at the centerline range from 34 to 48 mG; at 60 ft (18 m) from the centerline (corresponding to the edge of the ROW), they range from 5 to 8 mG; at 100 ft (30 m) from the centerline, they range from 1.3 to 2.3 mG; and at 200 ft (61 m) from the centerline, they range from 0.19 to 0.35 mG. 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. 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.

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).

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. 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 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. 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.

Criteria Air Pollutants. Power plant emissions would result in increases in ambient concentrations of NO_x, PM_{10}, and CO in Imperial County. 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.

Possible secondary formation of O_3 in the atmosphere would not contribute to an increase in O_3 concentrations in Imperial County of more than 1 part per billion (ppb), which is less than 1% of the National Ambient Air Quality Standard (NAAQS) of 120 ppb (1 hour). Health impacts from secondary O_3 formation would therefore be minimal.

The proportion of areawide PM_{10} attributable to direct emissions from the power plants would be low in comparison with the total ambient concentrations in Imperial County, as measured at the area air quality monitoring stations. 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 in Imperial County is a particular concern. In the years 1995–1997, Imperial County had the highest age-adjusted asthma hospitalization rate for 0- to 14-year olds of all California counties (556 hospitalizations per 100,000 person years). The rate for the entire Imperial County population was also high (207 hospitalizations per 100,000 person years). O_3 and PM in the region may be contributing factors. However, the operation of the TDM plant and the EBC and EAX export units at the LRPC plant would contribute only minor increases to the O_3 and PM levels in the region and thus would result in, at most, a small increase in the asthma problem (less than one additional hospitalization per year) or other air-quality related health problems. The estimated maximum increase in asthma hospitalizations in Imperial County is two to three cases per year out of a base of 323 cases per year. This result, however, is an overestimate because it uses the maximum PM_{10} increment in Imperial County from power plant emissions determined in the air dispersion modeling in Section 4.3.4.4.2 of the EIS as an exposure concentration. This value of 2.45 $\mu g/m^3$ taken from Table 4.3-4 represents a maximum increase for a 24-hour average for any location in the county over a representative 5-year period of meteorological conditions. Because the increase in the annual average concentration of PM_{10} in the county, which should be used in estimates of health impacts, is estimated to be 0.11 $\mu g/m^3$ (Table 4.3-4), the actual number of additional asthma cases is expected to be less than one per year.

Hazardous Air Pollutants and Ammonia. The HRA results of potential cancer risks due to HAP 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 incremental increase in cancer risk from exposure to HAPs (NH_3 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 NH_3 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 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 the TDM plant, compared with four at the LRPC. In addition, the TDM turbines are controlled with oxidation catalysts, while the LRPC turbines do not have HAP controls.

S.5.11.3 Alternative Technologies

Use of alternative technologies at the power plants in Mexico would not produce changes in the electric and magnetic field (EMF) strengths associated with the proposed transmission lines as described under the proposed action, thus human health impacts would be the same as those described for the proposed action.

The use of CO oxidizers on the TDM and/or LRPC turbines could decrease CO emissions by a factor of about 7 (see Tables 4.3-4 and 4.3-6). However, the estimated CO levels at the maximum modeled receptor points would be less than 2% of the significance level even without the CO oxidizers. At such low levels, the addition of CO oxidizers would not appreciably alter the potential for human health impacts.

In terms of air emissions, the dry cooling phase of a wet-dry cooling system would not generate PM emissions from cooling tower drift. 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 a dry cooling phase would result in a minor reduction of adverse impacts. However, because the dry cooling component of a wet-dry cooling system reduces power plant efficiency, power plant emissions would increase accordingly. Associated health impacts would be minimal.

S.5.11.4 Mitigation Measures

The impacts to human health under the mitigation measures alternative 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.

Air 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.

Water mitigation measures, if they can be implemented, would not be expected to produce any human health impacts.

S.5.12 Minority and Low-Income Populations

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. As a result, there would be no related impacts to minority and low-income populations in Imperial County.

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 with the spatial distribution of minority and low-income populations in Imperial County 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.

Impacts to minority and low-income populations 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 SLs used as a benchmark for negligible impacts. 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 the Sea's salinity and nutrient concentration. 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 from power plant operations under the proposed action would not result in high and adverse impacts to the general population who fish recreationally at the Sea; thus, these impacts would not be disproportionately high and adverse for any populations who might rely on the Sea for subsistence fishing. The time frame during which impacts would occur to fish species would be about 36 years, essentially the same with or without the power plants operating.

Use of more efficient control technologies and alternative cooling technologies at the 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 and thus also would generally have beneficial impacts to minority and low-income populations. The use of a wet-dry cooling system could potentially reduce adverse impacts to the Salton Sea due to the proposed action; however, impacts under either alternative would be minor.

The mitigation measures to compensate for power plant air emissions would likely have a beneficial impact on regional air quality. This would also be the case for measures taken to offset flow volume reductions in the New River. An assessment of impacts at the census-block level was not conducted for this EIS because of uncertainty as to where the mitigation measures would be implemented.

S.6 CUMULATIVE IMPACTS

Cumulative impacts that could occur as a result of the potential impacts of the proposed action when added to impacts from other past, present, and reasonably foreseeable future actions are evaluated both for the period of project construction and for the postconstruction (operation) period for as long as the impacts would last. The region of influence varies for each resource area and depends primarily on the distance a potential impact can reach.

The following actions are ongoing or have been evaluated as reasonably foreseeable and included in the analysis of cumulative impacts: IID water conservation and transfer project, Mexicali II wastewater treatment project, Salton Sea restoration project, Total Maximum Daily Load (TMDL) program, wetlands construction on the New River, and power plant development in the Imperial Valley-Mexicali region. Several general trends (e.g., precipitation, demographics, water use, and energy demand) for the Imperial Valley-Mexicali region were also identified that could contribute to cumulative impacts.

The most important cumulative impacts would be to water resources, air quality, and biological resources. Impacts to soils, noise, transportation, and socioeconomics due to the proposed action during the short term (for the construction period) would be localized and not likely to contribute to cumulative impacts.

The potential cumulative impacts to water resources relate mainly to the reduction in the volume of flow in the New River from the proposed action, which would, in turn, reduce inflow in the Salton Sea. Combined with ongoing and foreseeable projects, most notably the IID water conservation and transfer project, these reductions in New River flow would decrease the elevation of water in the Salton Sea and increase its salinity. The volume of water available to recharge groundwater in the Imperial Valley Groundwater Basin would also be reduced. Although other foreseeable projects like the TMDL program and construction of wetlands on the New River would have beneficial effects on water quality in the Salton Sea watershed, it is not clear whether the cumulative effects of all actions in the watershed on biological resources would be beneficial or adverse. Salinity concentrations in the Salton Sea are increasing and could reach a point such that adverse impacts to fish and aquatic species, and the birds that feed on them, would be unavoidable. Likewise, salinity increases in New River water could increase to a point that would adversely affect riparian and wetland plant species and fish and aquatic invertebrates in the river after a period of about 36 years. The proposed action would contribute to these changes, but it would have a relatively small contribution.

The cumulative effects of past, present, and future actions, including industrial and agricultural trends (increased acreage and use of irrigated lands) in the Imperial Valley-Mexicali region, would be to increase emissions of pollutants like NO_x, CO, PM_{10}, and NH_3 to the Salton Sea Air Basin. The proposed action would contribute to these ongoing changes, but it would have a relatively small contribution. In addition, actions taken under the mitigation measures alternatives would reduce these emissions, especially PM. For example, paving of 22 mi (37 km) of dirt roads in Imperial County would reduce PM_{10} emissions by about 650 tons/yr (589 t/yr).

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 application, Sempra Energy Resources (hereafter referred to as Sempra) requested a Presidential permit on March 7, 2001, also proposing to construct a double-circuit, 230-kV transmission line across the U.S.-Mexico border. Because of the similarities of these proposals, DOE decided to consider them together in a single environmental review.

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), 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's and BLM's FONSIs, the Presidential permits, and the 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, it deferred the setting aside of the Presidential permits and the FONSIs until July 1, 2004, or until such time as superseding NEPA documents and permits were issued, whichever was earlier. Thus, the transmission lines could operate while DOE and BLM conducted this 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 prepared this environmental impact statement (EIS). The court has twice extended a date for setting aside the permits; that date is now March 14, 2005.

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 interpreted this language as requiring that they conduct their NEPA review from a fresh slate, as if the transmission lines had not been built. Accordingly, DOE and BLM have based 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. At the same time, DOE considered the Mexico power plants as already constructed and operating.

While the DEIS analyzed the alternative technologies alternative in terms of hypothetical, "to-be-built" plants, DOE and BLM now believe that the court ruling to treat the transmission lines as having never been built does not extend to the connected power plants. Such an assumption would limit DOE's and BLM's ability to perform an analysis of sufficient detail to fully support an effective evaluation of Alternative 3, which would be implemented in the context of a retrofit of alternative technologies to the existing plants.

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

[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.

(10 CFR Part 1021). DOE is the lead Federal agency as defined by 40 CFR 1501.5. BLM is a cooperating agency.

1.1.2 Overview of the Transmission Line Projects

Table 1-1 is a time line for the projects that describes the milestones and sequence of events for construction and operation of the transmission lines and power plants. It also includes 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 EIS.

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).

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.

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 (160 MW) at LR-1 and one-third (90 MW) of the electrical output of the LR-1 steam turbine (270 MW) 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-La Rosita line. Delivery of the electrical output of the export turbines would be scheduled by the California Independent System

TABLE 1.1-1 Time Line for Imperial-Mexicali 230-kV Transmission Lines

	Sempra (TDM)		Intergen (LRPC)	
Date	Permits and Contracts	Construction and Operations	Permits and Contracts	Construction and Operations
2000				
Jan.	Land Use and Zoning Permit			
June			Project bid for EAX awarded by CFE	
Aug.			MIA for EAX submitted for approval to SEMARNAT	
Nov.			• EPC contract for EAX signed • MIA for EAX receives approval from SEMARNAT	
2001				
Jan.	TDM receives approval of MIA from SEMARNAT			
Feb.	Sempra applies to BLM for ROWs		• Intergen applies to DOE for Presidential permit • Intergen applies to BLM for ROWs	
Mar.	Sempra applies to DOE for Presidential permit			• Construction of EAX and Sewage Treatment Plant at LRPC begins
Apr.	LNTP for power plant engineering		• MIA for EBC submitted for approval to SEMARNAT • EPC contract signed for EBC	
June	• CRE Import Permit • Power plant EPC contract executed and Full Notice to Proceed		EBC receives approval of MIA from SEMARNAT	
July				EBC construction begins
Aug.	• CRE Export Permit			
Sept.	Transmission line EPC contract executed	Groundbreaking for power plant		
Nov.		Groundbreaking for transmission lines on Mexico side		
Dec.	• DOE issues EA, FONSI, and Presidential permit to Sempra allowing interconnection of transmission lines at the U.S.-Mexico border • BLM issues FONSIs and Decision Records to grant ROWs		• DOE issues EA, FONSI, and Presidential permit to Intergen allowing interconnection of transmission lines at the U.S.-Mexico border • BLM issues FONSIs and Decision Records to grant ROWs	
2002				
Jan.	BLM transmission line ROW Notice to Proceed	• Groundbreaking for transmission lines on U.S. side		

TABLE 1.1-1 (Cont.)

	Sempra (TDM)		Intergen (LRPC)	
Date	Permits and Contracts	Construction and Operations	Permits and Contracts	Construction and Operations
2002 (Cont.)				
Feb.	U.S. International Boundary & Water Commission authorization			
Mar.	Complaint on Presidential permit filed with court		Complaint on Presidential permit filed with court	
Apr.	CILA Permit			
Sept.				Intergen places transmission line in service
Nov.		Sempra places transmission line in service		
2003				
Feb.		• Transmission line energized • Power plant construction completed		
May	• Court issues an order that the EA and FONSI do not comply with NEPA • District court order grants and denies, in part, plaintiff's motion for summary judgment		• Court issues an order that the EA and FONSI do not comply with NEPA • District court order grants and denies, in part, plaintiff's motion for summary judgment	
July	• Court orders additional environmental analyses • District court order denies plaintiff's specific requests for injunctive relief (allows plants to run pending further NEPA review)	Sempra begins commercial operation of TDM	• Court orders additional environmental analyses • District court order denies plaintiff's specific requests for injunctive relief (allows plants to run pending further NEPA review)	• EAX begins commercial operation • Intergen begins commercial operation of LRPC
Oct.	DOE publishes NOI to prepare an EIS			EBC begins commercial operation
Nov.	Public scoping meetings held in El Centro and Calexico, California		Public scoping meetings held in El Centro and Calexico, California	
2004				
Mar.				Intergen completes installation of SCR on LR-1 export gas turbine
May	DOE issues Draft EIS		DOE issues Draft EIS	
July	Public comment period on Draft EIS closes		Public comment period on Draft EIS closes	
Dec.	DOE issues Final EIS		DOE issues Final EIS	

CFE = Federal Electricity Commission; CILA = Mexican Commission for Borders and Waters; CRE = Mexican Energy Regulatory Commission; EAX = Energiá Azteca X, S. de R.L. de C.V.; EBC = Energiá Baja California; EIS = environmental impact statement; EPC = engineering, procurement, and construction; INE = Instituto Nacional de Ecologia; LNTP = Limited Notice to Proceed; LRPC = La Rosita Power Complex; MIA = Manestifación de Ambientale; NOI = Notice of Intent; SCR = selective catalytic reduction; SEMARNAT = Secretaria De Medio Ambiente y Recursos Naturales; STP = sewage treatment plant; TDM = Termoeléctrica de Mexicali.

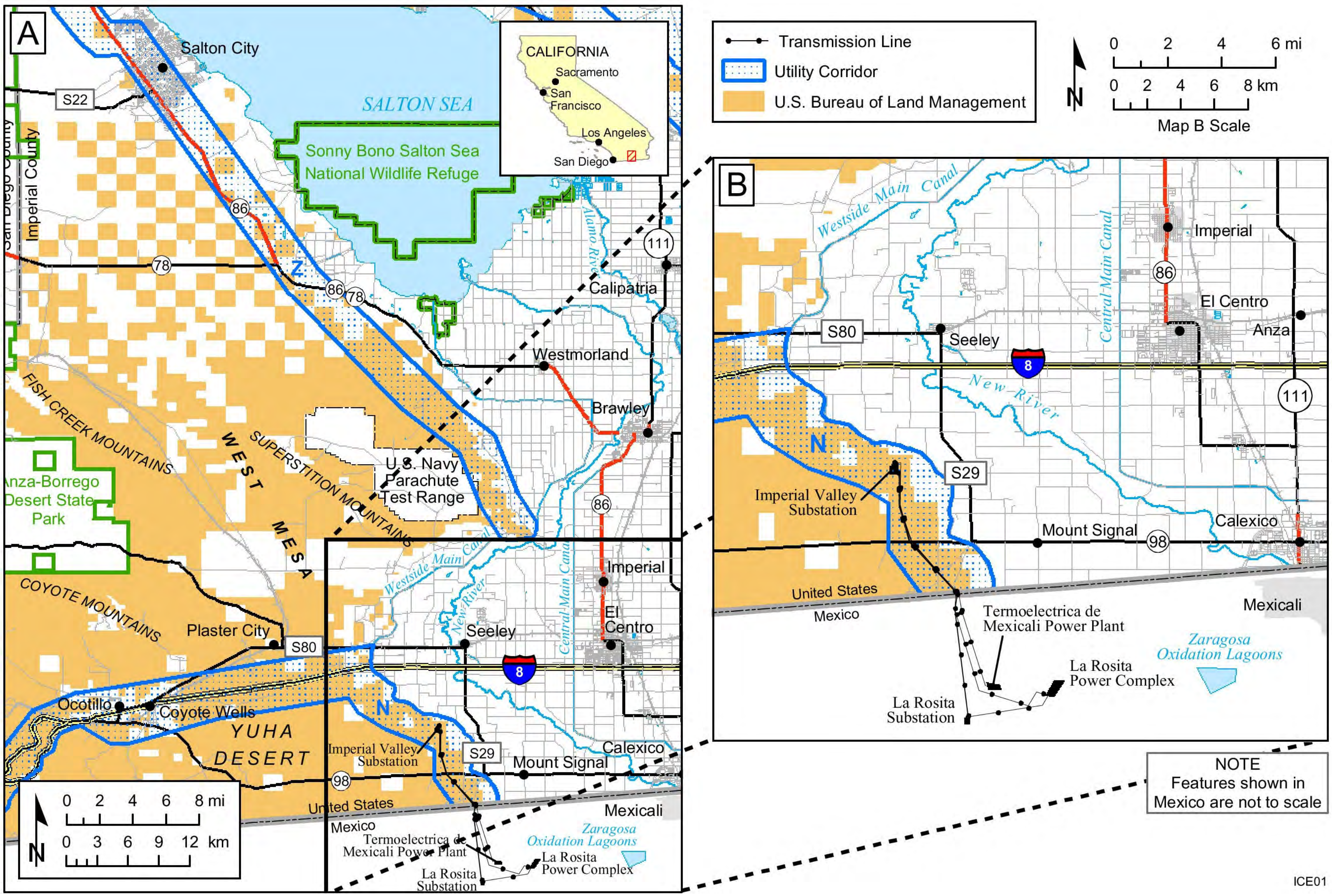

FIGURE 1.1-1 Regional Setting for Imperial-Mexicali 230-kV Transmission Lines

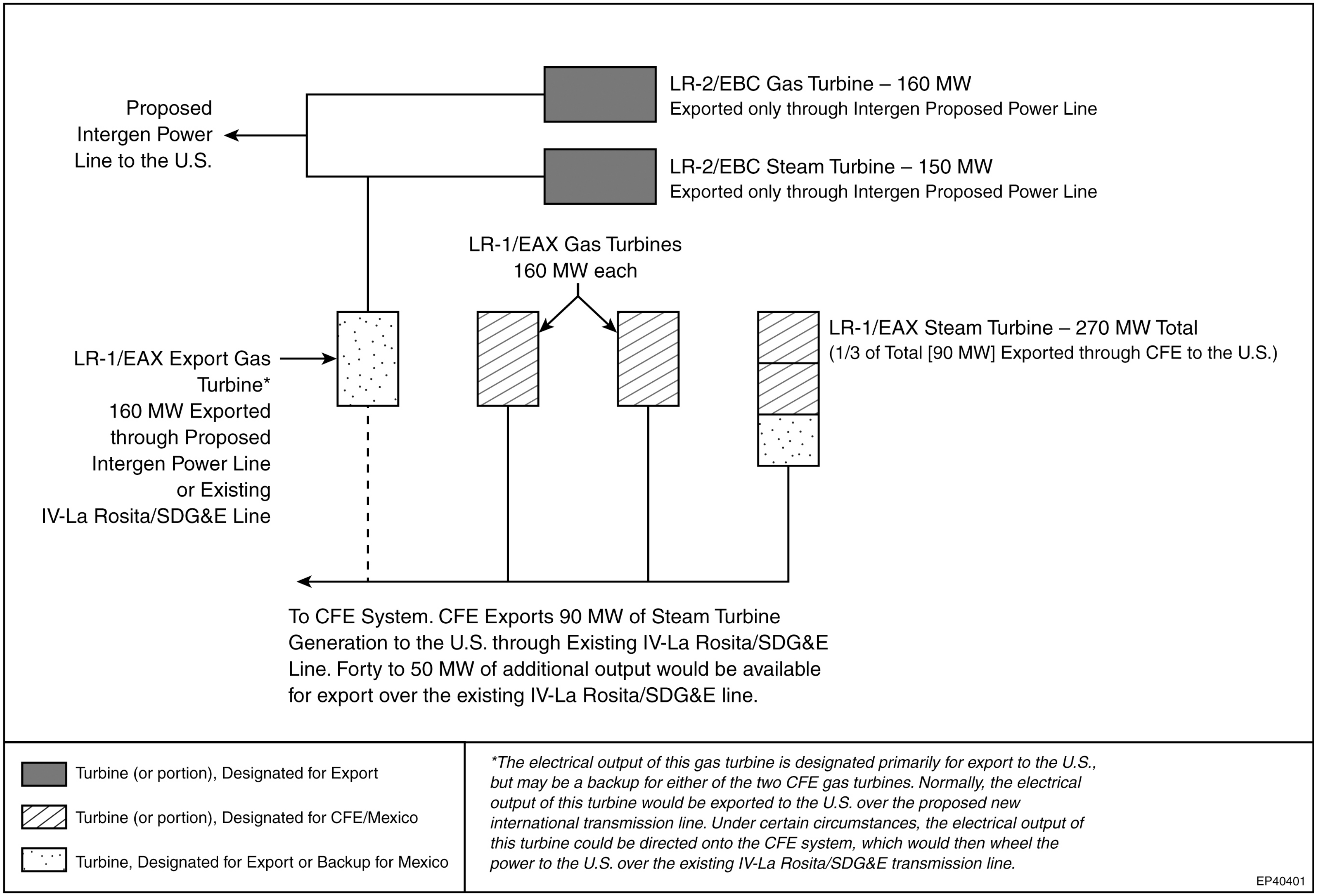

FIGURE 1.1-2 La Rosita Power Complex: Electrical Distribution

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 the Comisión Federal de Electricidad (CFE), the national electric utility of Mexico. Waste water from the cooling towers would be discharged into the canal that flows into the New River at a point in Mexico near the border (Figure 2.2-17). The New River flows northward into the United States and terminates at the Sonny Bono Salton Sea National Wildlife Refuge.

To reduce nitrogen oxides (NO_X) emissions, all gas turbines at the LRPC have been equipped with dry low-NO_X burners, and ultimately with selective catalytic reduction (SCR) systems. The EBC export gas turbine (310 MW) has been built with SCR. The EAX export turbine has also been equipped with SCR. Intergen has indicated that the other two EAX gas turbines, those designed for the Mexico electricity market, will have SCR systems installed by March 2005. The combination of dry low-NO_X burners and SCR will 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 is 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 consists of one natural-gas fired combined-cycle generating unit, with a nominal capacity of 650 MW. The unit consists of two 170-MW gas turbines and one 310-MW steam turbine. The power plant produces 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 is scheduled by Cal-ISO.

The power plant is 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 is obtained from the outlet of the Zaragoza Oxidation Lagoons and treated before use. Wastewater, which is discharged to the same canal as for the Intergen project, then flows into the New River, which flows northward into the United States.

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 this Final EIS (FEIS) 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 separate Records of Decision (RODs) by DOE and 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 start-up 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 (CDCA) Plan.

Intergen filed its application for ROW approval with BLM on February 26, 2001, also for use of a ROW in Utility Corridor N. 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 CDCA. BLM administers a comprehensive land use management plan for this area, which is referred to in this EIS as the CDCA Plan (BLM 1999). 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 applications that do not conform to the corridor system would require a plan amendment.

The area of the projects 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-designated sensitive species. A major step toward that objective was the establishment of five flat-tailed horned lizard Management Areas (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003). 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 the project should 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 their 230-kV transmission lines 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 AND THE NEPA PROCESS

1.3.1 Public Scoping and Comment Period

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* (Volume 68, page 61796 [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. DOE and BLM held public scoping meetings 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.

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 on 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 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 EIS are included in Appendix C.

1.3.1.1 Issues within the Scope of the EIS

The issues described below were raised by commentors during scoping and were addressed in the Draft EIS (DEIS).

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 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.

1.3.1.2 Issues outside the Scope of the EIS

The issues below were raised by commentors during scoping, and DOE has determined that they are outside the scope of the FEIS and the DEIS. Several commentors asked DOE and BLM to evaluate the impacts associated with the power plants on the environment in Mexico, not just in the United States. The agencies do not agree that such an analysis is appropriate for the following reasons.

NEPA does not require an analysis of environmental impacts that occur within another sovereign nation that result from approved actions by that sovereign nation. E.O. 12114 (January 4, 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 Order does not require Federal agencies to evaluate impacts outside the United States when the foreign nation is participating with the United States or is otherwise involved in the action [Section 2-3(b)]. Here, the Mexico government has been involved in evaluating the environmental impacts associated with the power plants in Mexico and had issued permits authorizing the construction and operation of the two power plants and ancillary facilities. An overview of the permitting of the power plants and associated environmental impacts analysis that was performed by the Mexico government has been added to the EIS as Appendix J. In addition, the Federal action does not affect the global commons (e.g., outer space or Antarctica), and 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.

The Federal action evaluated in the EIS is not to build the power plants, but only to permit the transmission lines to be built in the United States. The agencies' position in this regard (1) is consistent with applicable Federal laws, including the generally held legal presumption that Acts of Congress do not ordinarily apply outside U.S. borders; (2) avoids the appearance of the assertion of extraterritorial control over actions that were approved by and occur within the lands of another sovereign nation; and (3) prevents interference in the foreign relations of the United States. Application of this policy is particularly appropriate where, as here, the power plants are located in Mexico and the foreign sovereign itself has both reviewed the environmental impacts of the projects and approved the projects.

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 electricity-generating facilities in Mexico, they are independent actions that serve distinct functions and that can proceed separately. Intergen and Sempra stated that if 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. FERC issued a Final EIS for the pipeline in January 2002 and a Presidential permit and a certificate for the pipeline on January 16, 2002. The pipeline is currently in service.

One commentor suggested that a 50-year comprehensive cumulative impact assessment be conducted as part of the EIS. This EIS does contain a cumulative impact analysis (Chapter 5). CEQ guidance (CEQ 1997b) on conducting cumulative impact assessments states that projects be reasonably foreseeable. DOE and BLM believe that for purposes of estimating cumulative impacts, reasonably foreseeable projects are generally projects to be executed within the next 10 years. Projects predicted to occur beyond 10 years are generally presumed to be speculative and thus not 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.

1.3.2 Public Review of the Draft EIS

On May 14, 2004, the U.S. Environmental Protection Agency (EPA) published a Notice of Availability in the *Federal Register* (69 FR 26817) for the DEIS evaluating the impacts in the United States of constructing, connecting, and operating and maintaining two transmission lines from two power plants in Mexico. In accordance with CEQ and DOE NEPA regulations, the DEIS was distributed to interested agencies, organizations, and the general public to allow them to provide oral and written comments. It was also made available in its entirety on the project Web site (http://web.ead.anl.gov/bajatermoeis/index.cfm). E-mail notification was sent to those on the project Web site mailing list. The May 14, 2004, date marked the beginning of a 45-day comment period, which was to end on June 19, 2004. However, at the request of the plaintiff (Border Power Working Group), the comment period was extended to July 30, 2004. (A Notice of Comment Period Extension was published in the *Federal Register* on May 26, 2004 [69 FR 29934].) To facilitate public involvement, stakeholders could submit comments on the DEIS via telephone, letter, e-mail, or the project Web site.

DOE and BLM held two public hearings during the review period in the City Halls at El Centro, California (11:00 a.m. to 1:00 p.m.), and Calexico, California (6:00 p.m. to 8:00 p.m.), on July 14, 2004. The dates and times of the public hearings were announced on the project Web site and in local newspapers. The hearings on the DEIS were an important component in the agencies' continuing efforts to provide the public with opportunities to participate in the decision-making process. The hearings included a presentation by DOE, a question and answer period, and an oral comment session where reviewers were invited to formally enter their comments into the public record. Transcripts of the public hearing proceedings were recorded by a court reporter and are available on the project Web site and in this EIS (Chapter 2 of Volume 2).

DOE received 4,804 comment submissions. These comments came from individuals, Federal and State agencies, local governments, and nongovernmental organizations such as environmental groups. All but 108 of these were campaign letters. An index of the commentors, copies of the actual letters or other documents containing public comments submitted to DOE (including comments identified in the transcripts), a summary of key issues in response to comments, and specific responses to each comment received are provided in Volume 2 of this EIS.

Comments on the DEIS were received by e-mail, fax, mail, or as oral statements at one of the public hearings from individuals, nongovernmental organizations, and government agencies. This resulted in 113 comment documents: 26 from the hearings, 5 representative campaign letters, and 82 from individuals or organizations. The vast majority (98%) of commentors submitted what is referred to as a campaign letter. DOE has responded to each of the oral and written comments, including the campaign letters.

While reviewing the comments, DOE identified 18 key issues that it believes reflect major concerns related to the EIS:

1. Extension of NEPA analysis into Mexico;

2. Use of significant impact levels (SLs) to evaluate impacts on air quality and human health;

3. The conditioning of permits, enforcement of emission levels;

4. Definition of the alternatives with regard to the three LRPC Energía Azteca X, S. de R.L. de C.V. (EAX) gas turbines; and inclusion of the EAX-export unit in both the proposed action and no action alternatives;

5. Analysis of power plant impacts for all alternatives in terms of the existing plants rather than the hypothetical, "to-be-built" plants analyzed in the Draft EIS (DEIS);

6. Analysis of dry and parallel wet-dry cooling;

7. Scope of the EIS with respect to the gas pipeline that supplies the power plants;

8. Characterization of air quality in terms of ambient air quality standards and exceedances;

9. Estimating additional violations of ambient air quality standards in Imperial County resulting from plant emissions;

10. Estimation of secondary PM_{10} from plant ammonia and nitrogen oxides (NO_x) emissions;

11. Characterization of ozone and PM_{10} episodes in Imperial County;

12. Discussion of the uncertainty and sensitivity of the DEIS ozone analysis using the EPA's O_3 Ozone Isopleth Plotting Program Revised (OZIPR) methodology; and description of the methodology;

13. Estimates of additional adverse health impacts;

14. Documentation of total dissolved solids (TDS) removal in power plant water treatment systems;

15. Analysis of power plant impacts on the regional 4,000-mg/L TDS surface water objective;

16. The use of the second circuits on the respective transmission lines;

17. The applicability of conformity review to direct PM_{10} emissions from the Mexico power plants and to indirect PM_{10} emissions from dry lakebed at the Salton Sea exposed as a result of consumptive water use at these plants; and

18. Conservatism in the analysis and interpretation of impacts.

As noted above, many revisions were made to the DEIS on the basis of the comments received. Although a good portion of the changes were made to provide clarification and additional detail, the more substantial changes pertained to the impacts analyses for water resources and air quality. The changes made in response to public comments did not affect the overall significance of the environmental impacts presented in this EIS.

1.4 ORGANIZATION OF THIS ENVIRONMENTAL IMPACT STATEMENT

This Imperial-Mexicali 230-kV Transmission Lines EIS consists of two volumes. Volume 1 contains 14 chapters and 13 appendixes. Volume 2 contains the comment and response document for the review of the DEIS. Brief summaries of the main components of the EIS follow:

Volume 1 — Main Text and Appendixes:

- 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 area of the projects.
- 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.
- Appendix J contains an overview of the Mexico permits and approvals required for the LRPC and TDM power plants.
- Appendix K discusses the use of zero-liquid discharge technologies at the LRPC and TDM power plants.
- Appendix L contains photographs of the LRPC and TDM power plants.
- Appendix M contains the distribution list for this EIS.

Volume 2 — Responses to Public Comments:

- Chapter 1 provides an overview of the public participation and comment process.
- Chapter 2 provides copies of actual letters or documents that contain comments on the DEIS.
- Chapter 3 discusses key issues raised in the comments.

- Chapter 4 lists responses to all comments received.
- Chapter 5 is an alphabetical listing of all the references cited in the responses.

2 ALTERNATIVES

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

1. No Action: 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.

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 operate 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 prepared this EIS under the assumption that the proposed Intergen and Sempra transmission lines do not exist, the 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 the construction and operation of the proposed transmission lines, as well as those associated with operations of the TDM power plant and the EBC unit at the LRPC. 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, for purposes of this EIS, the impacts associated with this turbine are also included in the proposed action. This approach has been taken in the interest of conservatism and does not reflect a legal conclusion that the operation of the EAX export turbine is an effect of the approval of the Intergen transmission line.

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 BLM-designated 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

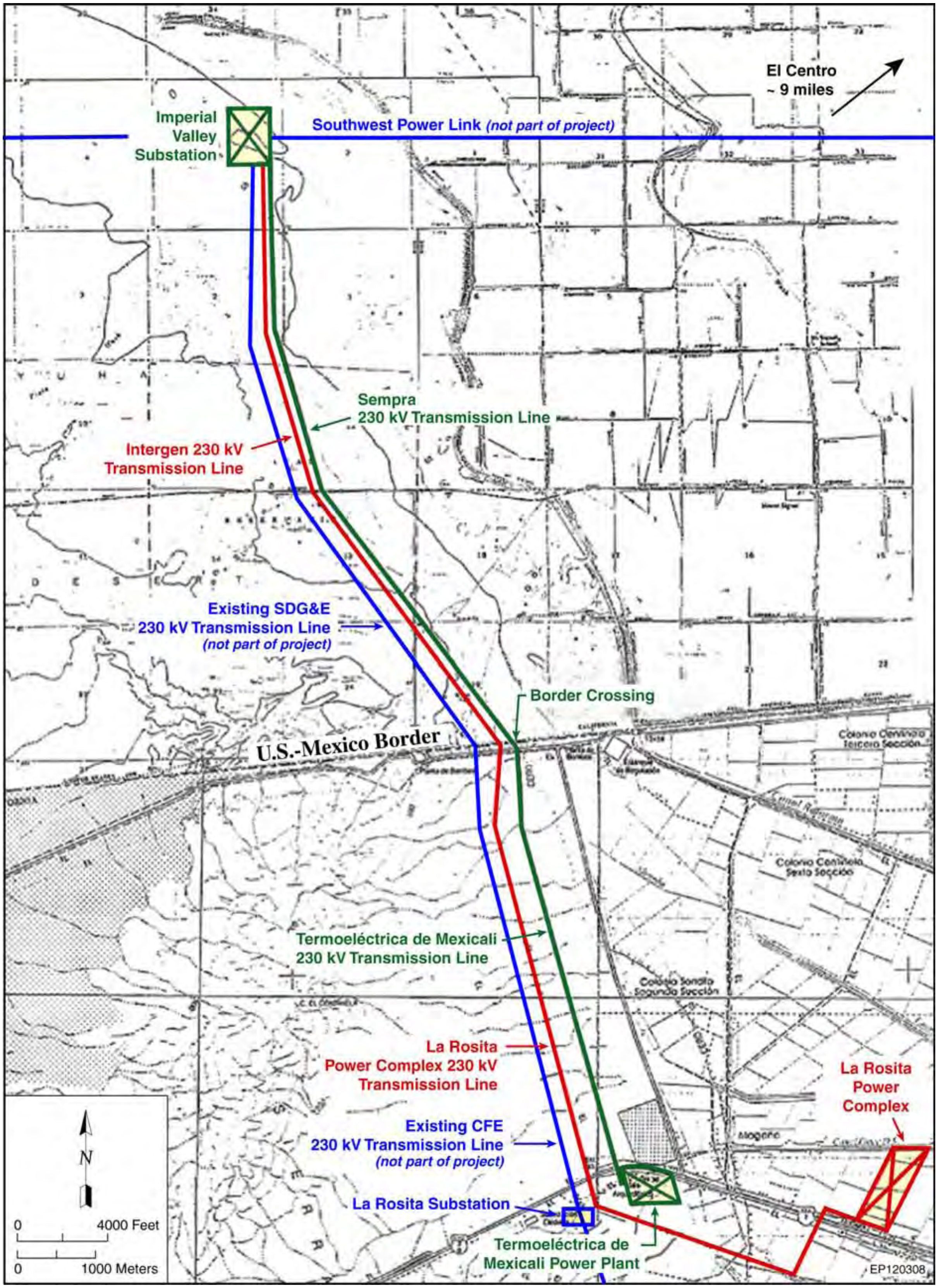

FIGURE 2.2-1 General Area Map Showing the Proposed Transmission Lines

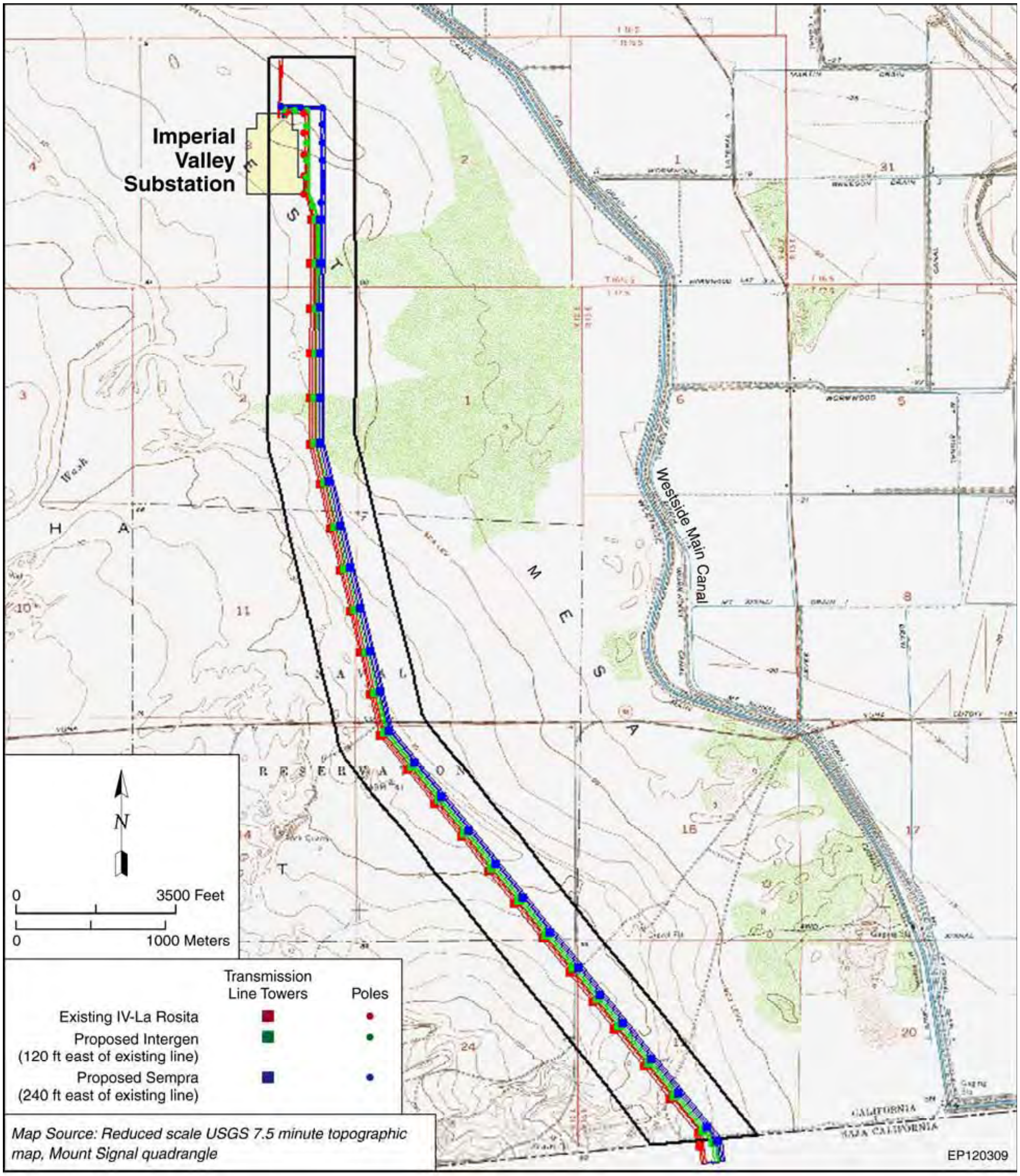

FIGURE 2.2-2 Location of Existing and Proposed Transmission Lines as Shown on U.S. Geological Survey Topographic Map

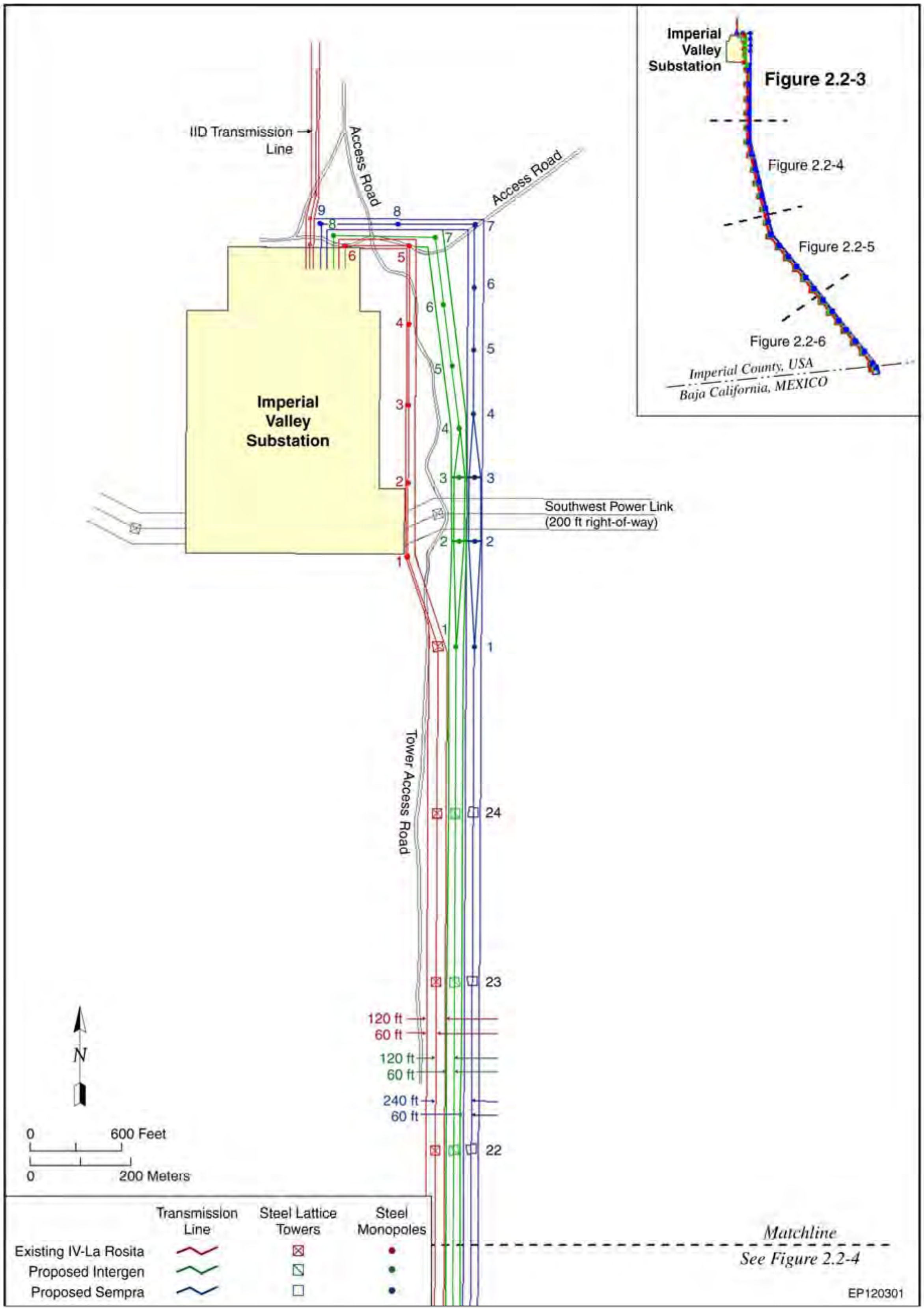

FIGURE 2.2-3 Projects' Plan — Segment A

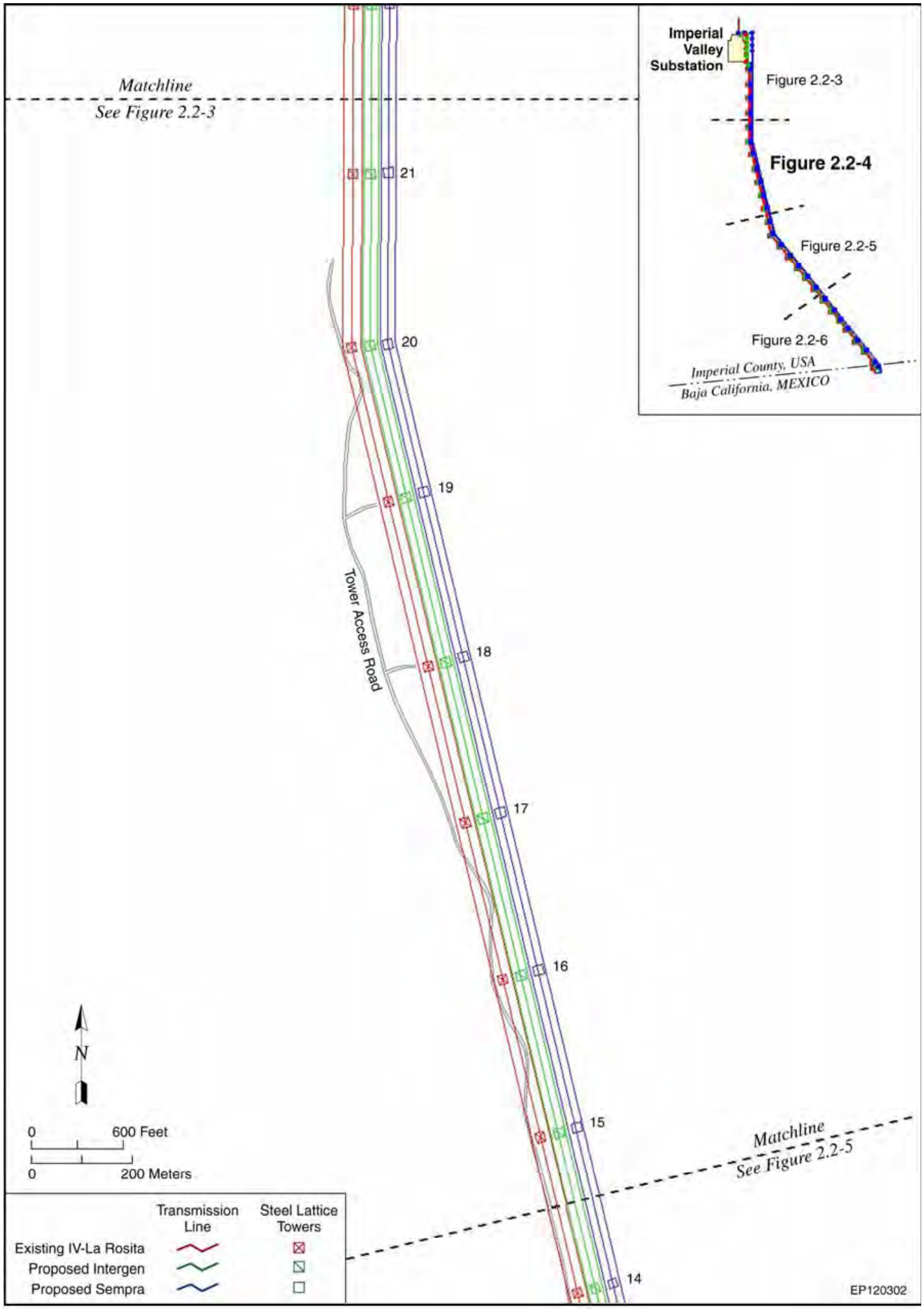

FIGURE 2.2-4 Projects' Plan — Segment B

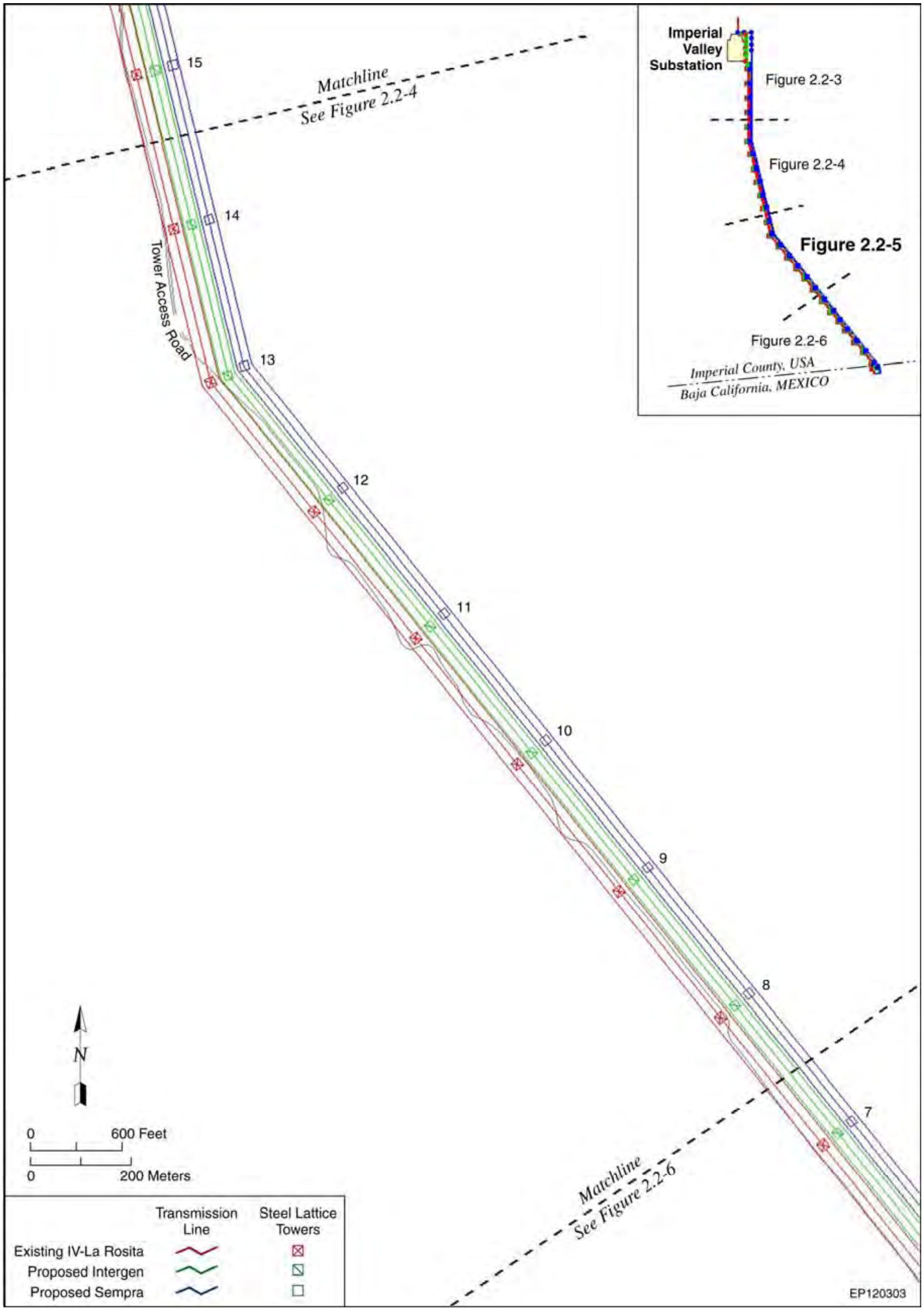

FIGURE 2.2-5 Projects' Plan — Segment C

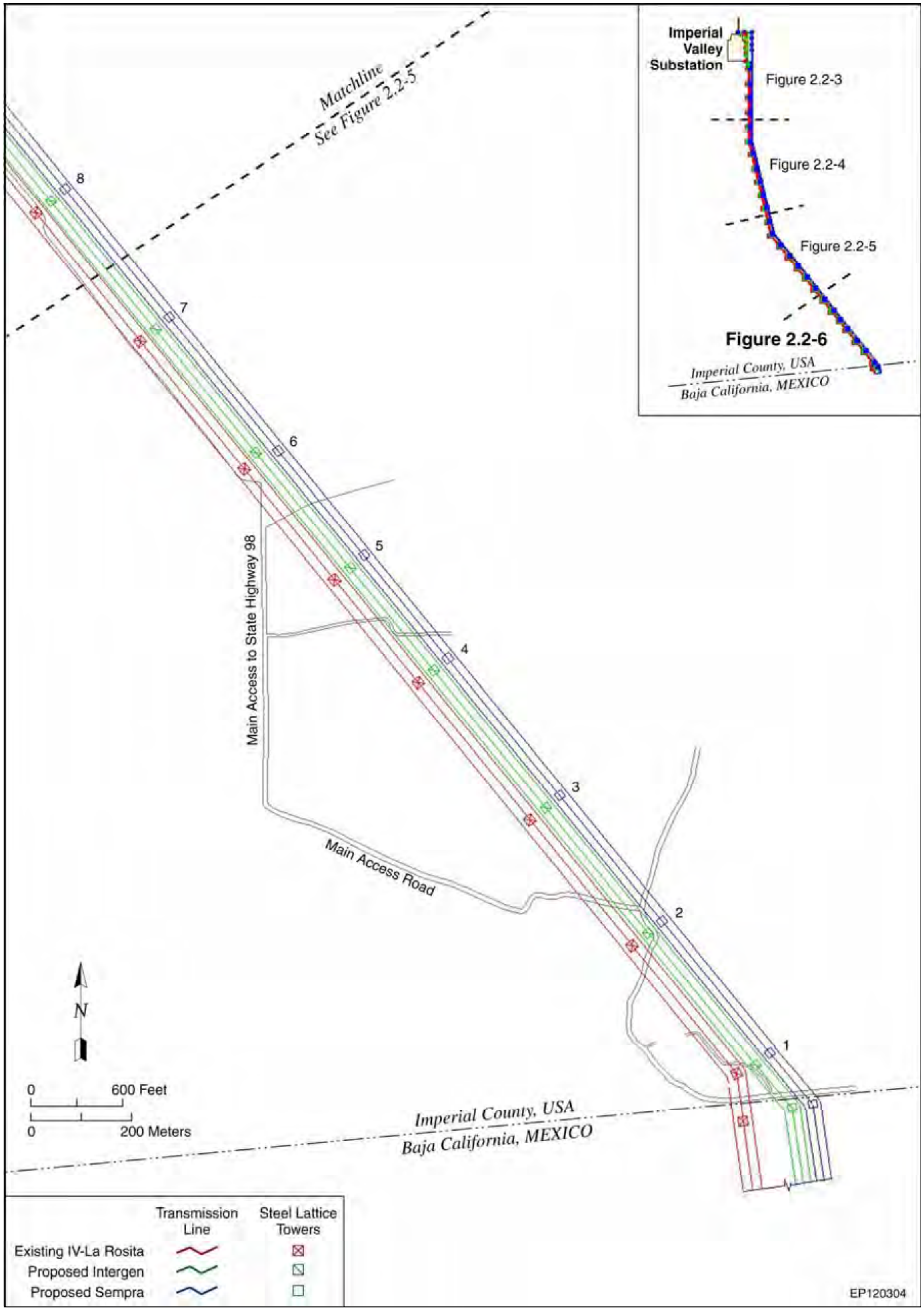

FIGURE 2.2-6 Projects' Plan — Segment D

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 centerline of the Sempra ROW would be east of and adjacent to the proposed Intergen transmission line ROW and would be 120 ft (37 m) wide. Thus, the centerline of the Sempra ROW would be 120 ft (37 m) east of the centerline of the proposed Intergen ROW and 240 ft (73 m) east of the centerline of the existing line.

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.

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[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.

Conductors (wires) on the dead-end and deflection towers or monopoles would be supported by double insulators. Conductors on suspension towers or monopoles would be supported by single insulators. The minimum ground clearance of the conductor would be 36 ft (11 m). The average 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 2 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 monopoles. 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 monopoles 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 projects 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, monopoles, and access roads by vehicle; (4) air or ground inspection as needed; (5) repair of tower or monopole components as needed; (6) repair

TABLE 2.2-1 Areas of Construction Impact

	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.

or replacement of lines as needed; (7) replacement of insulators as needed; (8) painting monopole or tower identification markings or corroded areas on towers or monopoles; and (9) response to emergency situations (e.g., outages) as needed to restore power.

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 sizes and locations 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-designated sensitive species, including the flat-tailed horned lizard and the western burrowing owl, the applicants would institute a number of protective measures for the proposed projects.

There is a potential for flat-tailed horned lizards to be encountered during transmission line construction activities. To protect this species, mitigation measures consistent with those identified in the *Flat-tailed Horned Lizard Rangewide Management Strategy* (hereafter referred to as the Strategy; Flat-tailed Horned Lizard Interagency Coordinating Committee 2003) would be conducted. These measures include the following:

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 by a biologist authorized by BLM to handle the lizards. 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. The area of vegetation and soil disturbance would be minimized to the greatest extent possible. When possible, the equipment and vehicles would use existing surfaces or previously disturbed areas. When excavation or grading was necessary, the topsoil would be stockpiled and restored following completion of the work.

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

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

11. 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.

12. 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 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.

13. 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 any monetary compensation to be paid by the applicants to BLM upon the completion of construction as identified in the 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 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 western 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 western burrowing owl, the following measures would be implemented as necessary:

1. Disturbance by construction of any occupied western 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 would 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 western burrowing owls.

2. If construction is to begin during the nonbreeding season, a preconstruction clearance survey would be conducted within the 30 days prior to construction to identify whether any western 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 would follow the protocols provided in the *Burrowing Owl Survey Protocol and Mitigation Guidelines* (California Burrowing Owl Consortium 2001).

3. Passive relocation of western burrowing owls from occupied burrows that would be otherwise impacted by construction would be required. Passive relocation would only be implemented in the nonbreeding season. This would include 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 would then be excavated and filled in to prevent their reuse. An artificial burrow would 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 would be implemented prior to February 1 to discourage the nesting of the western burrowing owls within the area of impact. As construction

continues, any area where owls are sighted would 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 would 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 would 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 would 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, the 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 the 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 the 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 CDCA 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) was 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 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 was 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 BLM-designated 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 monopoles 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.

All generating units at both power plants operate in a combined-cycle mode and are fueled by natural gas supplied by a cross-border pipeline previously permitted by FERC. Electricity is produced by both the gas turbines

La Rosita Power Complex

EAX:

- 3 Siemens-Westinghouse Model W501F combustion turbines
- Alstrom steam turbine
- Doosan heat recovery steam generator

EBC:

- 1 Siemens-Westinghouse Model W501F combustion turbine
- Alstrom steam turbine
- Foster Wheeler heat recovery steam generator

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, is recovered by the heat recovery steam generator to produce steam, which, in turn, is used by the steam turbine to generate additional electricity. Appendix L contains photographs of both power plants.

Termoeléctrica de Mexicali Power Plant

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

All turbines at both power plants are 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%.

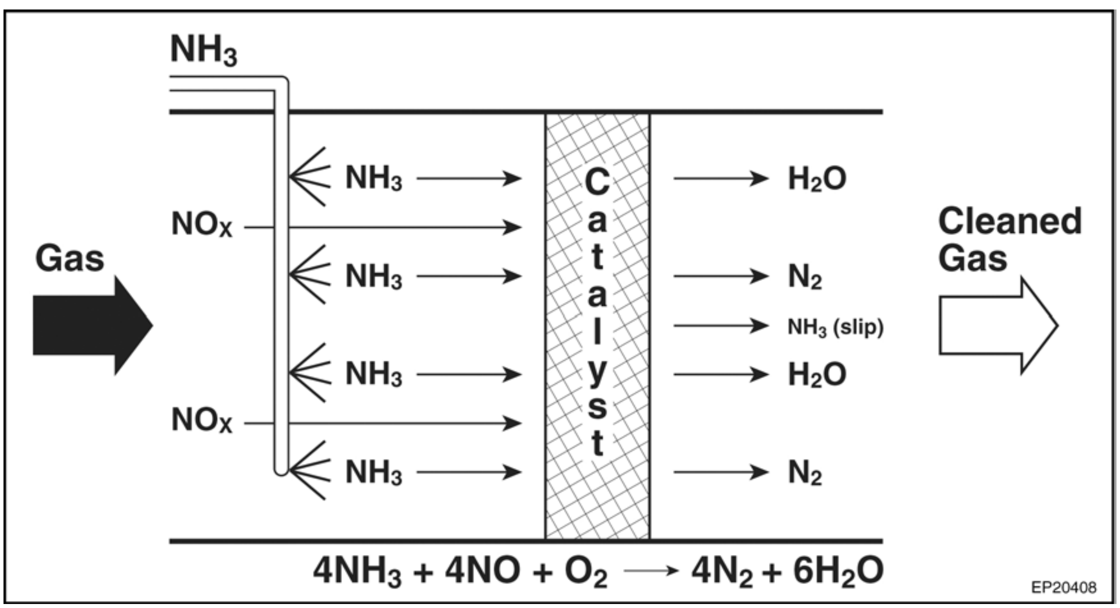

FIGURE 2.2-15 Schematic of Typical SCR System

Both the LRPC and TDM power plants use wet cooling systems. The wet cooling system consists 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 currently installed at 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, the power plants could be retrofitted with a wet-dry cooling system; such a system is described in Section 2.3.1.

The Importance of
Power Plant Cooling Systems

Effective cooling systems are critical to the operation and efficiency of gas-fired combined cycle power plants such as those at the LRPC and TDM. In this type of power plant, heat from the combustion process is recovered to generate steam that produces additional electricity. This process results in lower fuel use and lower air emissions for each megawatt hour of power generated. Figure 2.2-16 shows the power cycle for a typical combined-cycle power plant. Hot gases from the combustion of natural gas are used to drive a turbine that produces electricity. In a combined-cycle plant, exhaust gases from the combustion turbine are directed to a heat recovery steam generator in which waste heat from the exhaust gases is used to convert water to steam in a closed system. In addition, this process also cools the exhaust gases from the combustion turbine. The steam is used to drive a turbine to produce additional electricity. After passing through the steam turbine, the steam must be cooled (or condensed) back to a liquid state before being returned to the heat recovery steam generator to repeat the cycle. At the LRPC and TDM plants, the steam is cooled in a condenser using water as the medium for heat transfer. After heat is transferred from the steam side to the cooling side of the condenser, the cooling water passes through cooling towers that transfer the waste heat to the atmosphere (a process that results in evaporation of a portion of the water). The consumption of cooling water by evaporation is the single largest water loss at these power plants.

The processes and equipment at the TDM and LRPC power plants have been designed to operate within specified temperature ranges. If the cooling systems do not maintain the proper operating temperatures, the plant generating efficiency is reduced and the equipment may fail.

Water (both cooling and steam cycle) for both power plants is obtained 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 ac-ft/yr of sewage water (an acre-foot [ac-ft] of water is the volume of 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.

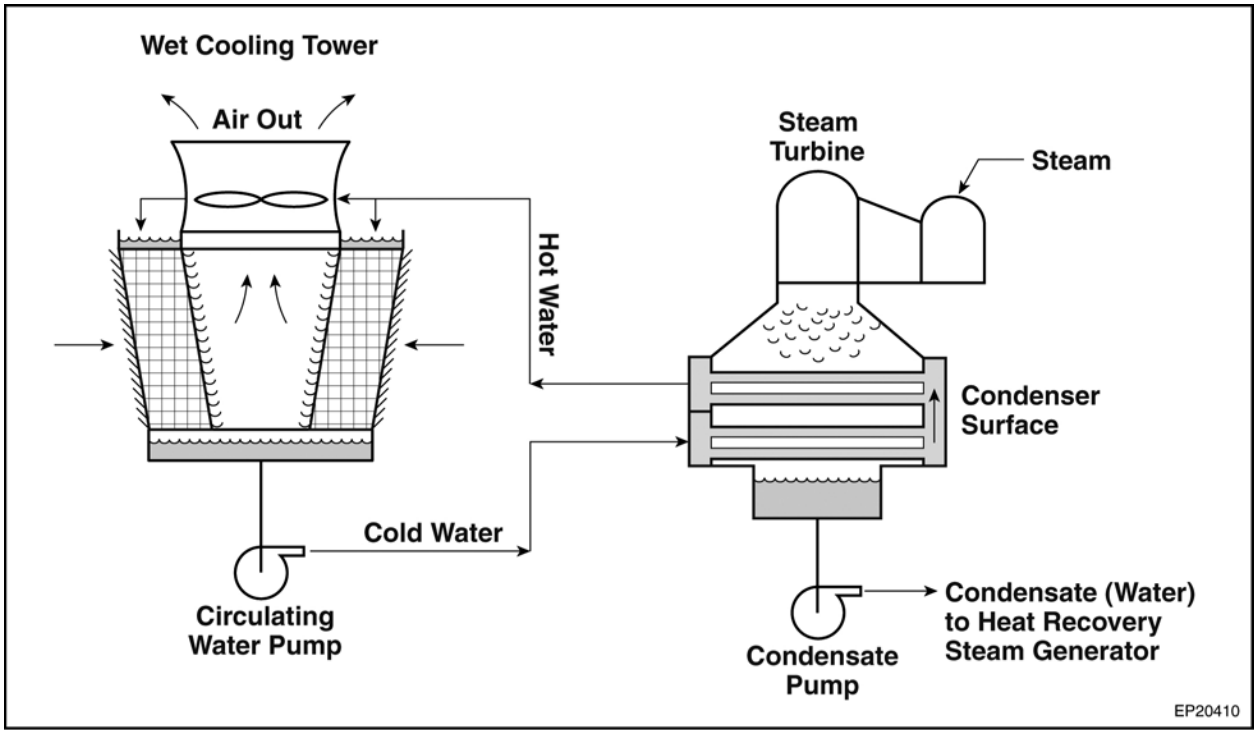

FIGURE 2.2-16 Wet Cooling Technology (Source: adapted from CEC 2001)

Water Treatment for LRPC. The LRPC contracts with the local Mexican municipal water authority, Comisión Estatal de Servicios Públicos de Mexicali (CESPM), to provide untreated, municipal wastewater. Raw sewage water is obtained at the inlet of the Zaragoza Oxidation Lagoons and piped to a sewage treatment plant adjacent to the lagoons that treats the water for use at the LRPC. Consequently, the water input to the sewage treatment plant has undergone little, if any, settling action from the lagoons. The adjacent sewage treatment plant treats 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 is dewatered and disposed of as nonhazardous waste. The treated water is 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) is discharged to a channel adjacent to the sewage treatment plant. This stream eventually combines with the effluent of the Zaragoza Oxidation Lagoons.

Next to the LRPC, a tertiary water treatment system has been constructed to further treat the water to reduce phosphates, dissolved organic matter, and heavy metals. Part of the water treatment process includes passing through a lime softener and clarifier. This process removes dissolved salts (e.g., calcium, magnesium, and phosphate) from the water obtained from the Zaragoza Oxidation Lagoons. The addition of lime causes the precipitation of calcium and magnesium, thereby removing much of the water's hardness, as well as substantial amounts of alkali metals, heavy metals, and phosphate. This process is the principal mechanism for reducing the quantity of TDS present in the water. The precipitated sludge is flocculated and separated from the water by sedimentation in the clarification process and sent to a press and filter house. Sludge from lime softening is dewatered and disposed of in an off-site landfill as nonhazardous waste.

Treated and untreated wastewater streams collected from power plant operations are discharged to the drainage channel that eventually connects to the Drenaje de Internationale, a major drainage channel flowing to the east, parallel to the U.S.-Mexico border (Figure 2.2-17). The Drenaje de Internationale empties into the New River within 100 yd (91 m) (Kiernan 2004) of the border, about 6 mi. (10 km) from the original discharge point. 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 obtains water from the Zaragoza Oxidation Lagoons after the water is treated in the primary settling ponds. The TDM sewage treatment plant uses 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 is clarified by the addition of lime to raise the pH to cause the precipitation of dissolved minerals, such as calcium and magnesium, and to reduce the concentrations of TDS that are present. The clarified water is then 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 is hauled to a landfill in Mexico. The water so treated is suitable for use as cooling water, the major use of water at the power plant. It replaces water lost to evaporation from the cooling towers.

A portion of this water is further treated to high purity for use in the closed steam cycle portion of the plant. This treatment is 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 is finally treated in a demineralizer to remove the remaining dissolved matter. This water provides makeup water in the steam cycle as well as potable water for the plant.

Three main waste streams are piped into the waste sump during normal power plant operation. Waste streams mix before being discharged untreated into a drainage channel (the Drenaje de Internationale) that eventually leads to the New River (Figure 2.2-17). The first stream is the wastewater from the cooling tower. The cooling tower bank consists of 12 units, and the water is used for up to six cycles before it is discharged. The second stream is wastewater from the demineralization process. The third stream is water discharged from the steam cycle.

At times when the TDM power plant is not producing energy under normal conditions, the sewage treatment plant operates in the bypass mode; that is, water from the Zaragoza Oxidation Lagoons is treated in the biological treatment portion of the sewage treatment plant and then discharged into the drainage channels. This is 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 an alternative cooling technology and more efficient emissions controls.

2.3.1 Alternative Technologies Considered But Not Evaluated

2.3.1.1 Dry-Only Cooling Technology

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 cooking 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.

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, the dry cooling system discussed in the following paragraphs refers only to a direct dry cooling process.

Dry-only cooling technology is considered here mainly as a means of reducing the amount of water necessary for cooling at the power plants in Mexico (thereby reducing the impacts to the New River and Salton Sea caused by flow reductions under wet cooling). Under this scenario, the LRPC and TDM plants would be retrofitted with a dry-only cooling system.

A dry-only cooling system is usually used in situations when not enough water is available for wet cooling and the economics of the project can withstand the increased cost and loss of performance caused by its use (the use of dry cooling means less electricity will be produced with the steam produced, and thus more fuel per unit of electricity produced will be consumed). Loss of performance is especially pronounced when the daily mean maximum temperature exceeds 80°F (27°C), to the extent that dry cooling alone is considered impractical at temperatures above this threshold (Simões 2004b).

Dry-only cooling technology would be an insufficient cooling process for the Mexico power plants for the following reasons:

- In the region, maximum daily temperatures are less than 80°F (27°C) only 37% of the time [NOAA 2003]). Temperatures exceed 80°F (27°C) about 63% of the time, and these high-temperature months tend to coincide with high-electricity-demand months. For plants in this climate condition, wet cooling is necessary for most of the year in order to maintain output and plant efficiency.

- Because the power plants have already been constructed, retrofitting for dry cooling would be extremely costly. For example, Sempra has estimated that it would cost approximately 150 million (43% of the original cost of the plants) to retrofit a dry cooling system. There would also be significant costs associated with shutting down the facilities for the 4 to 5 months needed for retrofit construction (Simões 2004b,c).

Dry-only cooling technology is considered infeasible as a retrofit to the existing plants on the basis of its low efficiency in the climate of the power plants and the high cost of redesigning the facilities, replacing equipment, and shutting down the facilities for the duration of retrofit construction. Therefore, it is not evaluated further in this EIS as a reasonable alternative technology for Alternative 3.

2.3.1.2 Zero-Liquid Discharge Water Management Technology

Zero-liquid discharge water management systems are used at steam electricity-generating stations to minimize cooling system wastewater production by reusing as much wastewater as possible within the plant and employing evaporation to eliminate the remaining wastewater. The technology is considered here mainly as a means of reducing discharges of TDS from the power plants in Mexico. Under this scenario, the LRPC and TDM plants would be retrofitted with sidestream softening and reverse osmosis systems to reduce the required amount of cooling tower blowdown (the largest contributor to wastewater). Cooling system wastewater would be discharged to solar evaporation ponds or mechanical-evaporator crystallizers located at each site. This would evaporate the water so that little, if any, wastewater would be discharged to the New River. Appendix K provides additional design (and retrofit) details on this type of system.

The water quality impacts of installing zero-liquid discharge technology are mixed. Calculations show that this technology would decrease TDS and phosphorus concentrations in the New River at the U.S.-Mexico border by about 1%, but it would slightly increase concentrations of total suspended solids (TSS), biochemical oxygen demand (BOD), chemical oxygen demand (COD), and selenium compared with both plants operating without this technology (Appendix K). Flows to the New River would be slightly less than those under the proposed action, since wastewater discharge would be eliminated.

Because the retrofit of a zero-liquid discharge system to the power plants would present several technical challenges and incur significant capital and operating costs yet yield only minimal water quality benefits, this technology is not evaluated further in this EIS as a reasonable alternative technology for Alternative 3.

2.3.2 Wet-Dry Cooling Retrofit

Because the power plants have been constructed with wet cooling systems, another possible alternative cooling technology is to retrofit the plants with a wet-dry cooling system, which combines both wet and dry cooling technologies (Figure 2.3-1). This section will discuss the feasibility of retrofitting the plants with wet-dry cooling.

The most common dry-cooling technology is direct dry cooling, also known as an air-cooled condenser system. In dry cooling, 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). Steam from the steam turbine exhausts directly to a manifold radiator system that releases heat to the atmosphere, thus condensing the steam inside the radiator (see the dry section illustrated in Figure 2.3-1).

A wide range of wet-dry cooling designs is possible, covering the entire spectrum of wet versus dry cooling components depending on plant needs. A typical wet-dry cooling system utilizes both an air-cooled condenser and a wet evaporative cooling tower within the same cooling system. Wet-to-dry cooling ratios would depend on the prevailing ambient air

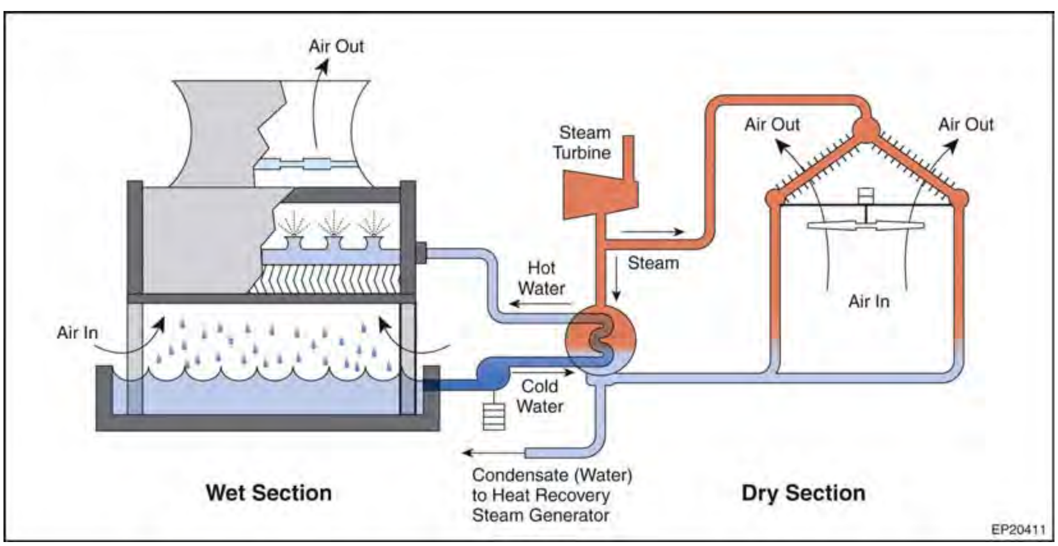

FIGURE 2.3-1 Wet-Dry Cooling Technology (Source: adapted from Institute of Clean Air Companies 1997)

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.

Dry cooling has both advantages and disadvantages compared to wet cooling. Advantages of dry cooling may include:

- 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 disadvantages of dry cooling may include:

- 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 reduction in power plant steam-cycle efficiency and output, depending on site conditions and seasonal variations in ambient conditions. The efficiency reduction ranges from about 2% when the ambient temperature is 68°F (20°C), to about 8% when the ambient temperature is 104°F (40°C). When factoring in the extra power needed to operate the cooling fans, efficiency could be reduced by a total of 10 to 15% (DOE, NREL, and ANL 2002). For a typical combined-cycle power plant where the steam cycle accounts for about one-third of the total capacity, overall plant efficiency would be reduced from between 3 to 5%.

- Increased capital and operating and maintenance costs with a dry cooling system.

Application of a wet-dry cooling system allows tailoring the use of either the wet or dry system on the basis of climatic conditions. The issues in deciding whether to retrofit a wet-dry cooling system on both facilities would involve estimating the amount of time the plants would operate in the water-conserving dry cooling mode and the feasibility of adding the necessary equipment, in terms of both equipment cost and the difficulty of integrating the technology into the existing plant.

A potential wet-dry cooling system design would use dry cooling to handle the entire cooling load up to an ambient temperature of 80 to 90°F (27 to 32°C). Wet cooling would augment the dry system at temperatures above 80 to 90°F (27 to 32°C); 100% wet cooling could be used on days the temperature is above 90°F (32°C) to ensure maximum power output from the plants (Powers 2004b). The analysis of impacts to water resources assumes that dry cooling will be used at temperatures up to 90°F (32°C).

An analysis of data on maximum daily temperatures in Imperial, California, from 1993 to 1999 shows that 37% of the daily maximum temperatures are below 80°F (27°C); 19% are between 80 and 90°F (27 and 32°C); and 44% are more than 90°F (32°C) (NOAA 2003). Therefore, dry cooling only would be expected to be used 37% of the time while some combination of wet-dry or wet-only cooling would be used 63% of the time.

Retrofitting an existing plant to utilize wet-dry cooling would involve solving a number of possibly complex system integration issues, such as whether there is enough properly situated space to accommodate dry cooling equipment. Dry cooling towers are very large in both height and width; a retrofit at these plants would require an area as much as about 7 acres (3 ha) (Simoes 2004b). The cooling towers would also have to be located close to other large structures at the plants, like a turbine hall or heat recovery steam generator, which could negatively affect their performance due to wind effects caused by the interaction between structures; often the larger the tower, the greater the negative effects. Properly locating equipment is best performed during the plant’s planning and design stage, not in a retrofit situation.

Costs associated with the retrofit would also have to be considered. They are estimated at $75 million (Simões 2004b) and include the capital cost of the new equipment, additional engineering and design costs, greater operation and maintenance costs, and the cost of lost power sales during installation. The outage due to installing the new equipment is estimated to be about 4 to 5 months.

A successful wet-dry cooling retrofit was performed in 1995 on a pulverized coal-fired power plant (Streeter Street Station Unit 7) owned by Cedar Falls Utilities in Cedar Falls, Iowa. However, this plant is very small, about 37 MW, and located in a cold climate. Extrapolating this experience for either the TDM or LRPC plants would be greater than a 10-fold increase. For smaller stations, like Streeter, the size and complexity are less challenging. Such a large extrapolation would be unprecedented, especially in light of the demanding temperatures in Mexico (Burns 2004).

2.3.3 Carbon Monoxide Emissions Control

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

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. For offsets of air emissions from power plant operations, DOE contacted the Imperial County Air Pollution Control District (ICAPCD) and the Border Power Plant Working Group to obtain suggestions for off-site mitigation measures that could be evaluated under this alternative (Russell 2004; Poiriez 2004a,b,c; Pentecost and Picel 2004; Powers 2004a).

2.4.1 Water Resources

Mitigation for water resource impacts would focus on potential mitigation measures that could be implemented in the United States to offset increased TDS concentrations in the Salton Sea and/or New River resulting from reduced flow volumes in the New River due to power plant operations. The potential mitigation measures would be designed to offset the annual loss of 10,677 ac-ft (0.41 m^3/s) of water under the proposed action (i.e., both plants operating 100% of the time)[2] and could include the following:

- ***Lining canals:*** An estimated 167 mi (269 km) of canal in the Imperial Valley, if available to be lined, would need to be lined to offset the annual loss of water under the proposed action. Concrete liners installed along this length of

[2] Because the plants would not operate 100% of the time, water reductions and hence mitigation for such reductions are overestimated.

canal would cost an estimated $18 million; the addition of synthetic liners to reduce water seepage as the system ages would raise the cost to $22 million.

- ***Reducing Evaporative Losses:*** Replacing most of the canal system with pipe could offset the annual water loss under the proposed action by reducing the volume of water lost from the drainage system due to evaporation (about 11,600 ac-ft [0.45 m^3/s]). This measure would require replacing the entire approximately 1,667 mi (2,683 km) of canals and laterals in the IID system with pipe.

- ***Fallowing Farmland:*** The area of land needed for fallowing to offset water reductions under the proposed action would depend on the particular crop being fallowed since irrigation needs vary by crop. For a crop like corn, which requires about 2 ac-ft (7×10^{-5} m^3/s) of water per year, 5,340 acres (2,161 ha) would need to be fallowed, with the annual cost of fallowing about $7 million.

- ***Groundwater Transfer:*** Groundwater wells could be installed to pump groundwater to the New River or Salton Sea directly. This potential measure would require pumping about 30 wells at a rate of 220 gal/min (830 L/min), possibly at Imperial East Mesa. Studies would be needed to determine whether this pumping rate could be achieved and sustained for the term of the project.

- ***Salton Sea Mitigation Strategies:*** Offsets could possibly be achieved by installing a dike in the Salton Sea to reduce the annual evaporation in the main body of the Sea. Another potential strategy would be to annually remove a volume of water from the Sea to compensate for losses from the New River. Both strategies could prevent the concentration of salt from increasing at a rate faster than that with no plants operating that would, without this action, occur if the Sea were to achieve a new water surface equilibrium. These measures would require additional feasibility studies and would also have to be coordinated with the Salton Sea Authority's restoration project activities.

A program to mitigate water consumption by the two power plants in Mexico could conceivably consist of one or more of the measures described above. Mitigation opportunities in Mexico may also be possible and could augment the benefits of these actions.

2.4.2 Air Quality

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

[3] The transfer project would reduce water delivery to the IID service area by up to 300,000 ac-ft/yr (4.73 m^3/s) (IID 2002).

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 ICAPCD 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 ICAPCD with a list of about 50 road segments totaling 23 mi (37 km) that could be paved to reduce fugitive dust emissions. Asphalt paving would cost about $430,000 per mile, assuming a two-lane road (Mercer 2004).

- ***Retrofitting of Emission Controls on Imperial Irrigation District (IID) Power Plants:*** The ICAPCD suggested that SCR installation on IID steam plant Unit 3 and the peaker plants would reduce NO_X emissions in the area of the projects. However, the IID already plans to repower this unit in 2007–2008 as a combined-cycle gas-fired unit to reduce NO_X emissions.

- ***Enhancing the 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 about $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 five smaller buses at a cost of about $4 million to $5 million. An overall reduction in particulates of approximately 0.1 ton/yr (0.1 t/yr) would result.

- ***Controlling Imperial County Airport Dust:*** Fugitive dust from natural windstorms and from aircraft (particularly from helicopter landings) occurs frequently at the airport. Estimated funding of $150,000 would be needed to either treat bare desert soils with dust retardants or to purchase crushed rock to cover the soil surface in the most sensitive areas. A reduction in particulates of 15 tons/yr (14 t/yr) could be achieved.

- ***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. Estimated funding of $250,000 would be needed for this effort. Depending on the retrofit program implemented, overall particulate engine emissions could be reduced by about 3.3 tons/yr (3 t/yr).

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.

3 AFFECTED ENVIRONMENT

This chapter describes the baseline condition of the area of the projects 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 lakebed 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 lakebed (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. [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 beach line 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 BLM-designated Utility Corridor N.

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).

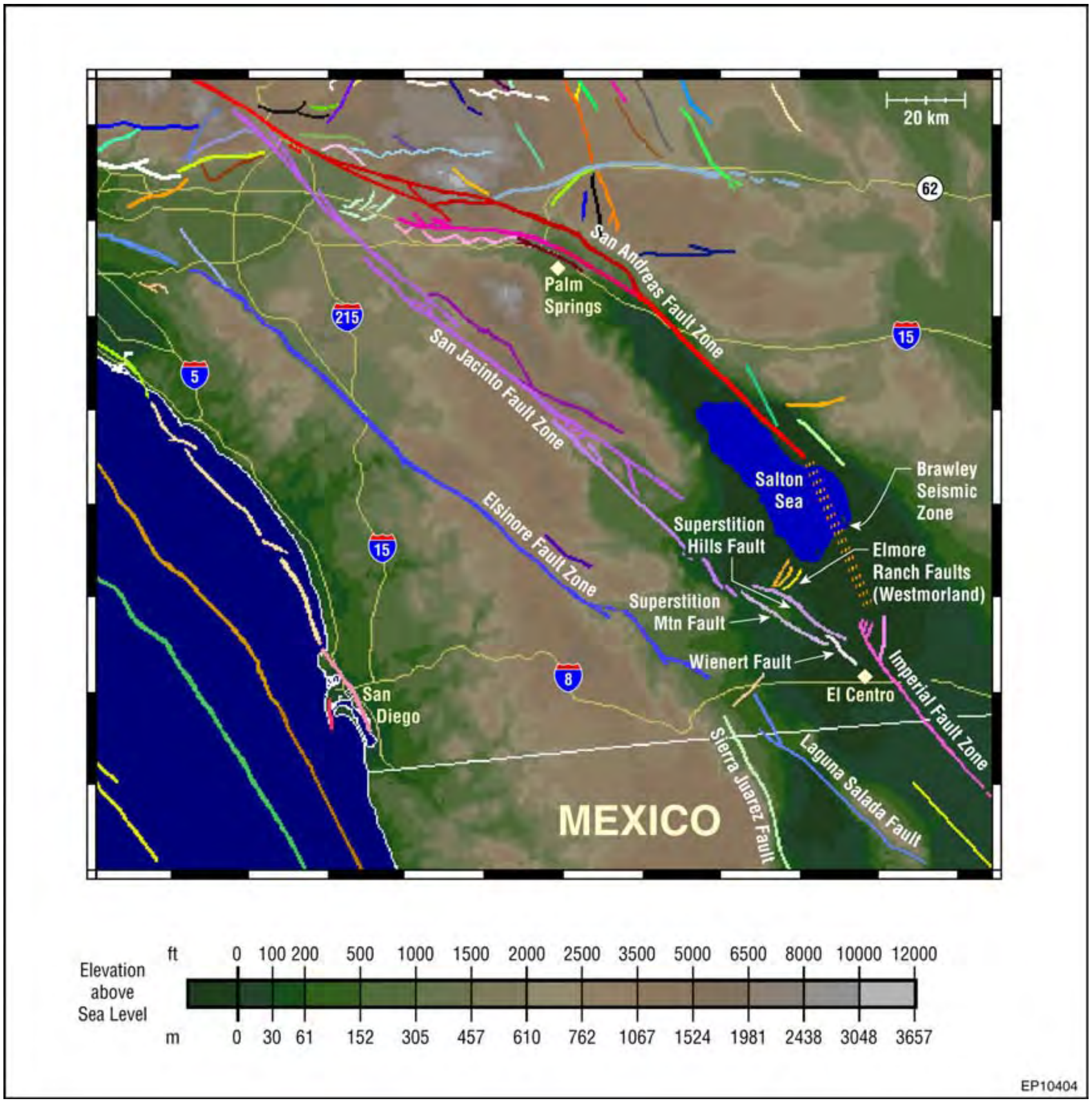

FIGURE 3.1-2 Major Fault Zones in the Salton Trough, Southern California (Source: SCEDC 2004)

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 (4.6 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 the 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 Imperial Canal (Setmire 2000; CRBRWQCB 1998a). 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 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 derived from 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; that is, 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.

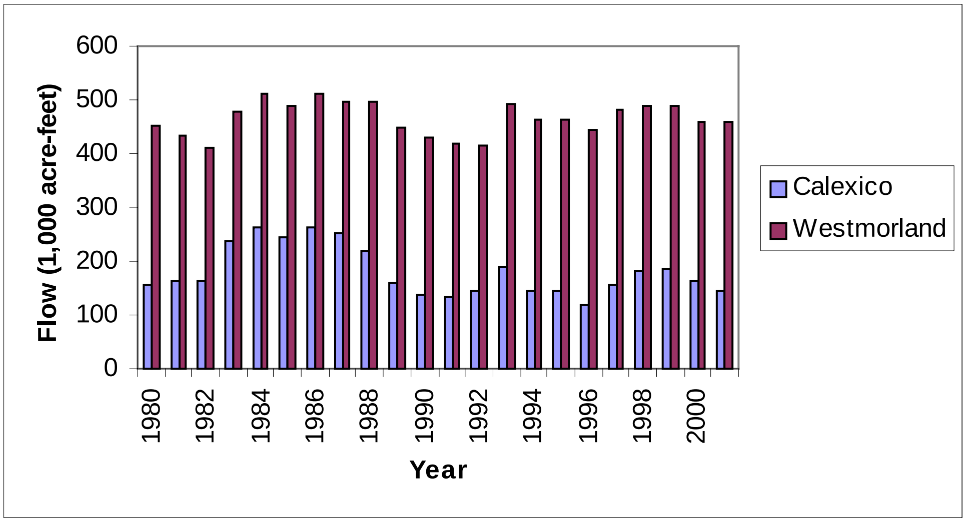

FIGURE 3.2-2 Annual Mean Flow in the New River at Calexico and Westmorland, California, 1980–2000 (Source: USGS 2003a,b)

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^3/s), the depth of the water calculated, using the linear regression model of the data, is about 6.0 ft (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.

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

> **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.

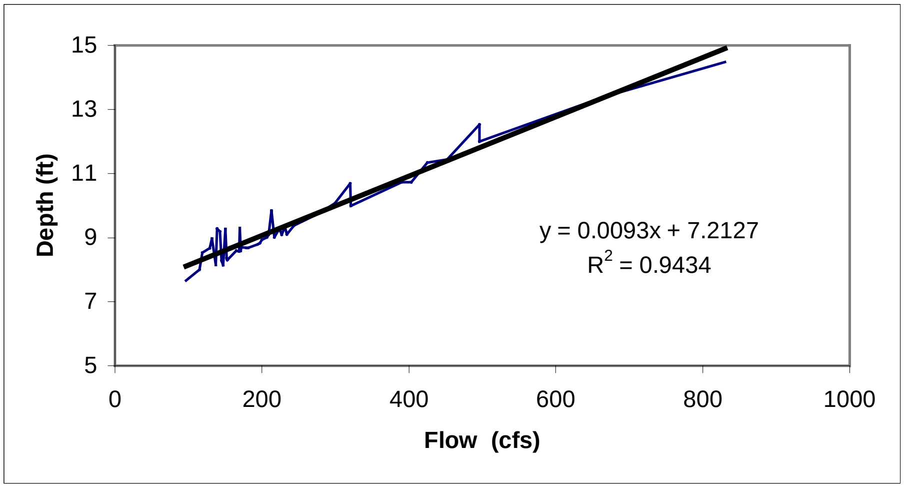

FIGURE 3.2-3 Depth/Flow Relationship for the Calexico Gage (to convert ft^3/s to m^3/s, multiply by 0.02832)

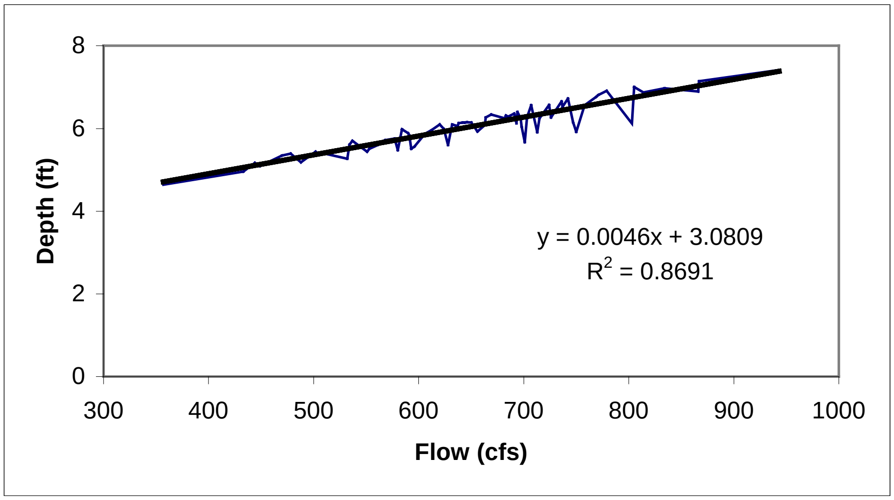

FIGURE 3.2-4 Depth/Flow Relationship for the Westmorland Gage on the New River (to convert ft^3/s to m^3/s, multiply by 0.02832)

(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).

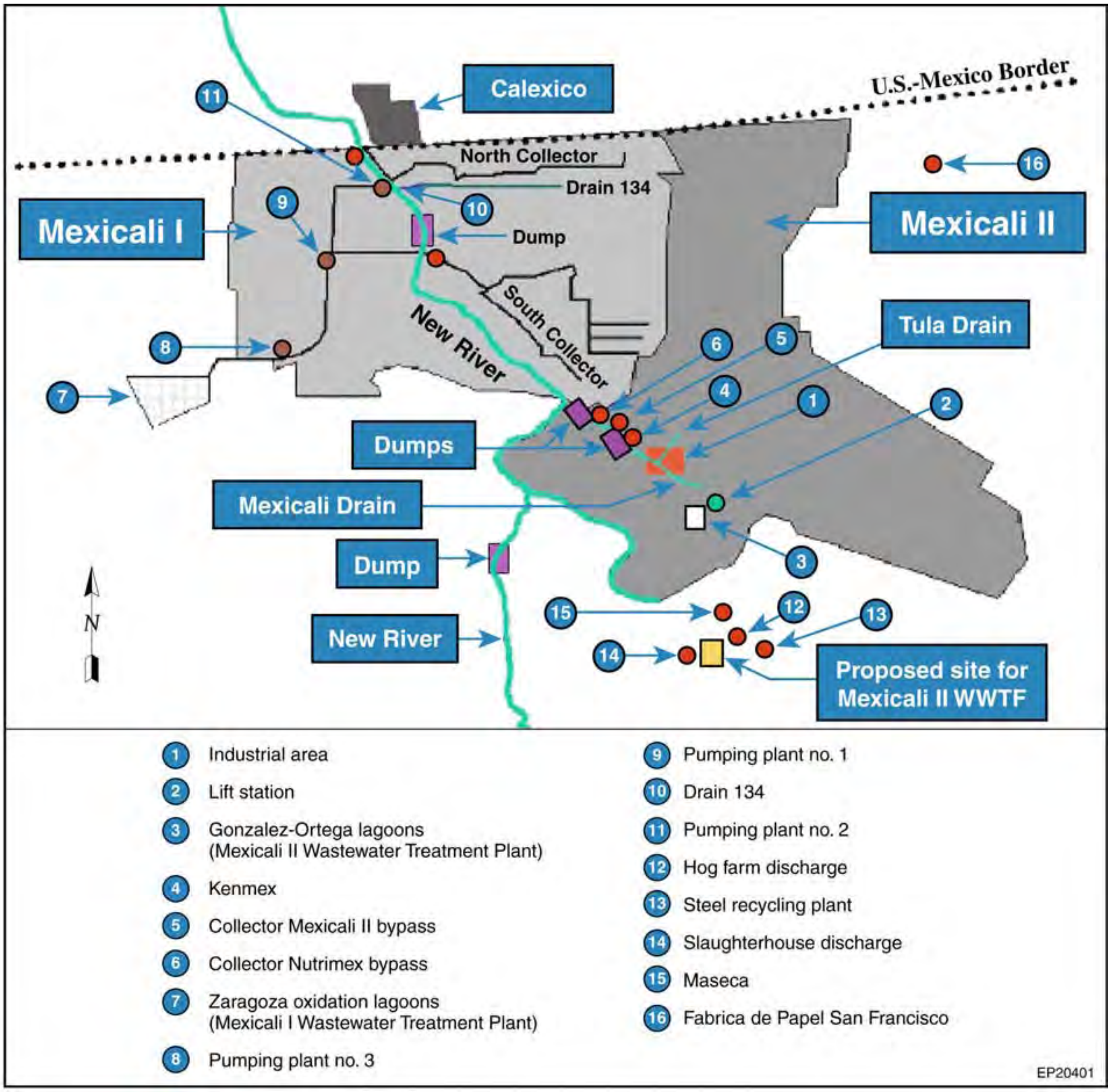

FIGURE 3.2-5 The New River in Mexicali, Mexico (Source: CRBRWQCB 2004c)

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 (CRBRWQCB 2003e).

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., tetrachloroethylene [TCE], methylene chloride, and *n*-nitrodiphenylamine) (DHHS 1996).

For the present study, water quality parameters of interest include salinity, selenium, total phosphorus, BOD, COD, and 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).[1] Because 1 L of water weighs 1,000 g, 1 mg/L is the same as 1 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, and sewage sludges and effluents (University of California 2003).

From January 1997 through April 2003, the Colorado River Basin Regional Water Control Board[2] 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 annual average established as a water quality objective for the Colorado River basin (see Section 3.2.1.1.3). 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).

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

2 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).

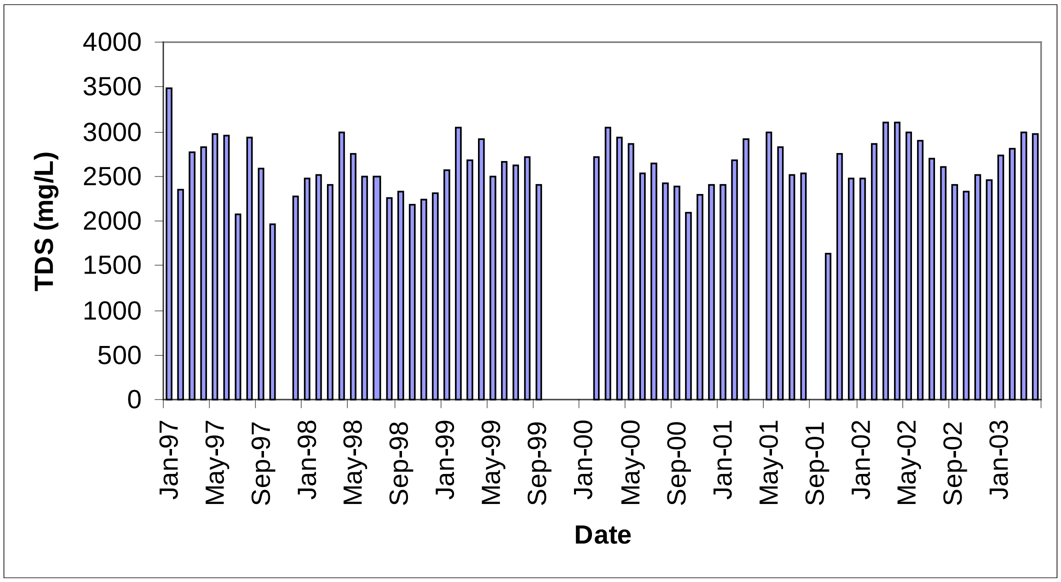

FIGURE 3.2-6 TDS (mg/L) Concentration at the Calexico Gage on the New River (Source: CRBRWQCB 2003a)

As with flow, TDS in the New River increases in the downstream direction. Twenty-seven TDS measurements were made at the New River outlet to the Salton Sea between January 1996 and March 1998 (IID 2002). TDS ranged from about 2,320 to 3,800 mg/L, with an average concentration of about 2,770 mg/L. This value is 150 mg/L greater than the average concentration at the Calexico gage. The variability of the TDS measurements were approximately 361 mg/L. All of these values are below the 4,000-mg/L annual average for the Colorado River Basin water quality objectives (see Section 3.2.1.1.3).

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.

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 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 based solely on detected values was about 0.021 mg/L. The standard deviation of sample concentrations was also about 0.021 mg/L, indicating variability in the dataset.

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).

The 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. Because the New River is not a source of drinking water, comparison with an MCL is very conservative.

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.

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 noncontact 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 (DO) 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 eutrophication.

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 (2 ppm). 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.

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).

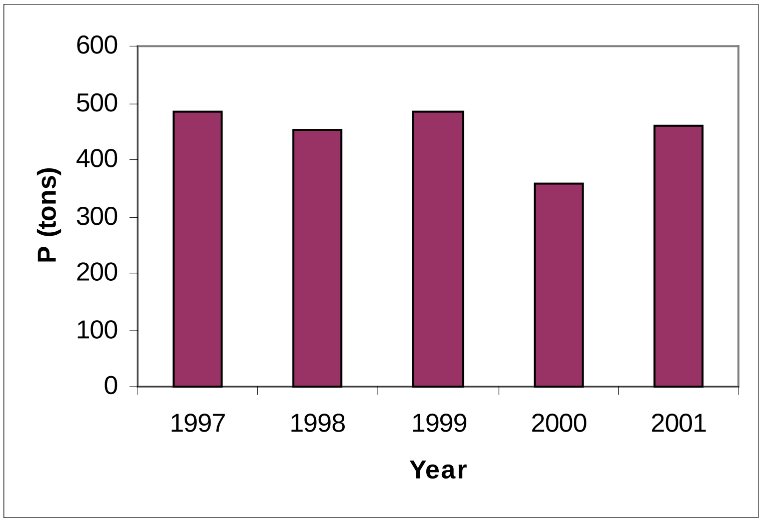

FIGURE 3.2-12 Annual Total Quantity of Phosphorus at the Calexico Gage on the New River at the U.S.-Mexico Border (Source: CRBRWQCB 2003a)

Temperature. 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). 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).

> **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 DO 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 postoperation 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

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 1 year). If the concentration of a material remains constant over a 1-year time period, its annual load is given as the product of its concentration, flow, and a time of 1 year.

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.

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 water bodies 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 2002b); 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 2002b; EPA 1996). Salton Sea objectives that apply to selenium for the New River, as a tributary to the

Salton Sea, include (1) a 4-day average value of selenium that shall not exceed 0.005 mg/L, and (2) a 1-hour average value of selenium that shall not exceed 0.02 mg/L (CRBRWQCB 2002c).

As with selenium, no TMDLs have been established for salinity or total phosphorus for the New River. However, an annual average salinity of 4,000 mg/L and an upper bound of 4,500 mg/L have been established as water quality objectives, excepting discharges from agricultural sources (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).

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.

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.

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 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).

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

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 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

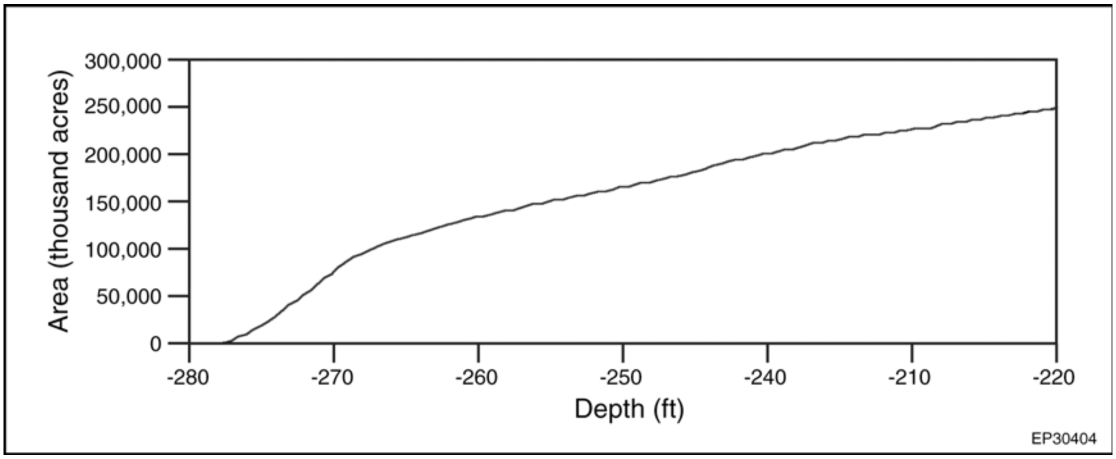

FIGURE 3.2-15 Depth/Area Relationship for the Salton Sea (Source: Weghorst 2001)

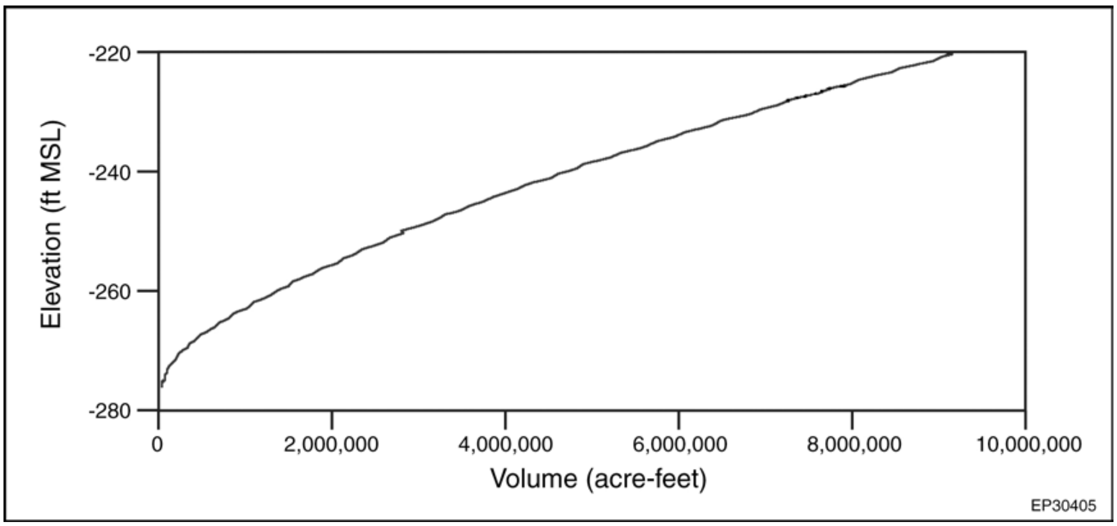

FIGURE 3.2-16 Volume/Depth Relationship for the Salton Sea (Source: Weghorst 2001)

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).

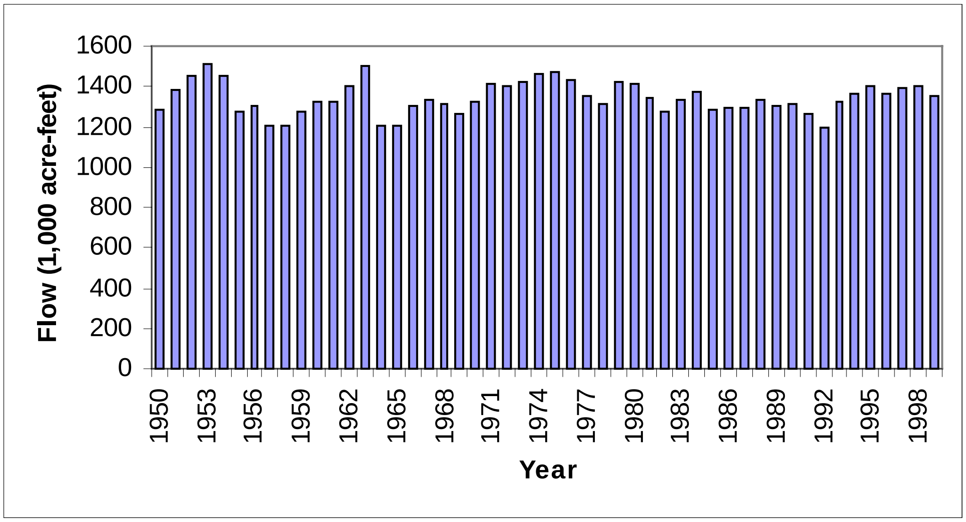

FIGURE 3.2-17 Inflow Volume to the Salton Sea (Source: Weghorst 2001)

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 water bodies 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

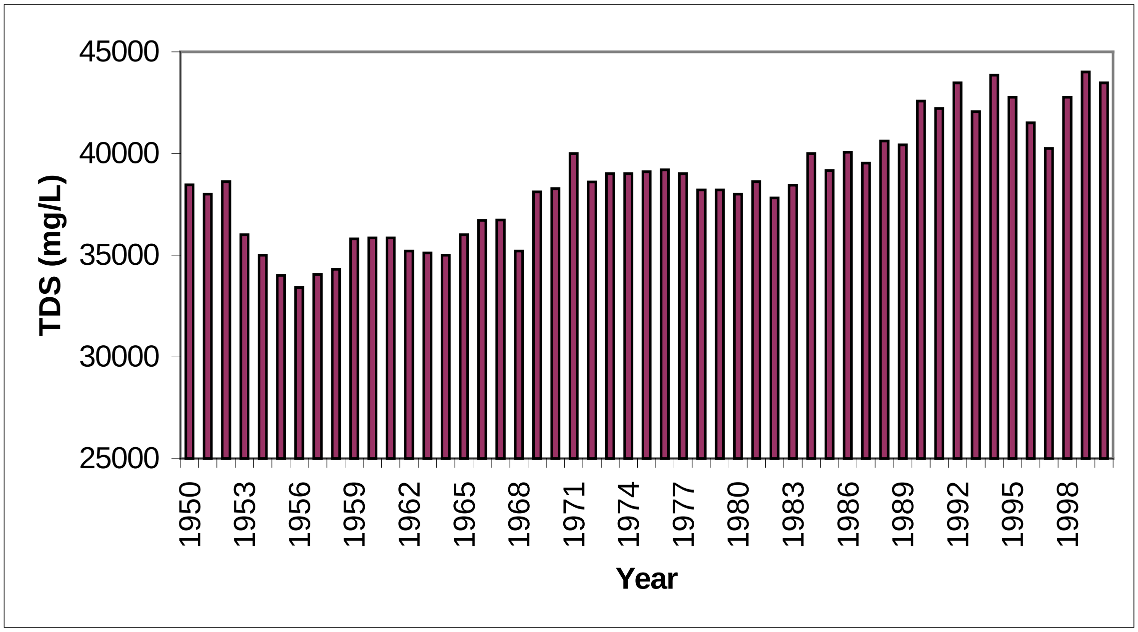

FIGURE 3.2-20 Salton Sea Total Dissolved Solids (Source: Weghorst 2001)

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 0.05 mg/L MCL for selenium in drinking water (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 ex officio 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. Under the supplemental review process, additional restoration alternatives, including the use of large-scale solar ponds, are being explored.

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 3.2-21). 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 2004a).

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 2004a).

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), including 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 2004a).

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 2004a).

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

[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.

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]

Parameter	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, 1999. 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 “12 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 is shown; northwesterly winds from the United States to Mexico and southeast winds from Mexico to the United States. It is apparent that the northwesterly 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, sulfur dioxide (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 these projects undertaken in the United States are in the ICAPD 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 O_3 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 CAA 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 signed by the Administrator of the EPA. This Final Rule was published in the *Federal Register* on April 30, 2004 (69 FR 23951), and a revision to the preamble was published on June 25, 2004 (69 FR 35526). 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 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 particulate matter 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 8-hour	0.09 ppm (180 μg/m^3) –[f]	0.12 ppm (235 μg/m^3) 0.08 ppm (157 μg/m^3)[g]	Same as primary standard
Respirable particulate matter (PM_{10})	24-hour Annual arithmetic mean	50 μg/m^3 20 μg/m^3	150 μg/m^3 50 μg/m^3	Same as primary standard
Fine particulate matter ($PM_{2.5}$)	24-hour Annual arithmetic mean	No separate state standard 12 μg/m^3	65 μg/m^3 [g] 15 μg/m^3 [g]	Same as primary standard
Carbon monoxide (CO)	8-hour 1-hour 8-hour (Lake Tahoe)	9.0 ppm (10 mg/m^3) 20 ppm (23 mg/m^3) 6 ppm (7 mg/m^3)	9.0 ppm (10 mg/m^3) 35 ppm (40 mg/m^3) –	None –
Nitrogen dioxide (NO_2)	Annual arithmetic mean 1-hour	– 0.25 ppm (470 μg/m^3)	0.053 ppm (100 μg/m^3) –	Same as primary standard –
Sulfur dioxide (SO_2)	Annual arithmetic mean 24-hour 3-hour 1-hour	– 0.04 ppm (105 μg/m^3) – 0.25 ppm (655 μg/m^3)	0.030 ppm (80 μg/m^3) 0.14 ppm (365 μg/m^3) – –	None 0.5 ppm (1,300 μg/m^3) –
Lead (Pb)[h]	30-day average Calendar quarter	1.5 μg/m^3 –	– 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 the 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. ARB (1993) has reported evidence of such transboundary migration in the influence of Mexicali sources on NAAQS exceedances in the Imperial Valley.

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.

Imperial County is classified by the State as a nonattainment area for $PM_{2.5}$ and has been recently[4] Federally classified by the EPA as a serious nonattainment area for PM_{10}. Particulate matter levels in Imperial County come from local and agricultural sources; the EPA does not consider 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.

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[4] Prior to September 2004, Imperial County was classified as a moderate nonattainment area for PM_{10}. On October 19, 2001, the EPA issued a final rule stating that but for the negative effects of transborder emissions from Mexico, Imperial County would have timely attained the PM_{10} NAAQS (66 FR 53106). However, on October 9, 2003, the U.S. Court of Appeals for the Ninth Circuit vacated this EPA rule following petition from the Sierra Club to that court. The court held that the EPA's "but for" conclusion ran counter to the evidence before it, and remanded with instructions that the EPA reclassify the county from moderate to a serious nonattainment area (*Sierra Club v. United States Environmental Protection Agency, et al.*, 352 F.3d 1186).

On December 18, 2003, the Ninth Circuit Court denied a petition for rehearing by the Imperial County Air Pollution Control District, an intervener in the case; slightly revised its October 9, 2003, opinion; and granted the District's motion to stay the mandate until March 17, 2004, to permit the District to file a petition for a writ of certiorari in the U.S. Supreme Court. Imperial County did so on March 17, 2004. On June 21, 2004, the Supreme Court declined to hear the case (*Imperial County Air Pollution Control District v. Sierra Club, et al.*, 72 U.S.L.W. 3757). Thereafter the stay was lifted and the mandate resumed.

Thus prompted by the Ninth Circuit Court Order, the EPA published a final rule on August 11, 2004, to reclassify the Imperial Valley from a moderate to a serious PM_{10} nonattainment area (69 FR 48792). This rule became effective on September 10, 2004. The EPA's summary of this final rule is:

> EPA is taking final action under the Clean Air Act (CAA) to find that the Imperial Valley Planning Area (Imperial Valley), a moderate nonattainment area for particulate matter of 10 microns or less (PM-10), failed to attain the National Ambient Air Quality Standards (NAAQS) by the statutory deadline of December 31, 1994, and to reclassify the area as a serious PM-10 nonattainment area. Today's action is in response to a recent decision by the U.S. Court of Appeals for the Ninth Circuit that vacated EPA's earlier approval of Imperial County's demonstration that the Imperial Valley would have attained the NAAQS by December 31, 1994, but for emissions emanating from outside the United States, i.e., Mexico. EPA's approval had the effect of allowing Imperial Valley to remain a moderate nonattainment area. In vacating that approval, the Court specifically directed EPA to reclassify Imperial Valley as a serious PM-10 nonattainment area.

The EPA simultaneously signed a proposed rule on August 11, 2004, to find under the CAA that the Imperial Valley Planning Area failed to attain the NAAQS for PM_{10} for a serious nonattainment area by the statutory deadline of December 31, 2001 (69 FR 48835).

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 ICAPCD. 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 area of the projects. 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 area of the projects, 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 area of the projects, respectively. These data are not reported here because the sites are less representative of the area of the projects due to their distance from the proposed transmission lines.

The Secretaría del Medio Ambiente y Recursos Naturales (SEMARNAT [the Mexico 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 area of the projects. 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 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 data 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).[5]

These tables (D-1 through D-8) 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

5 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.

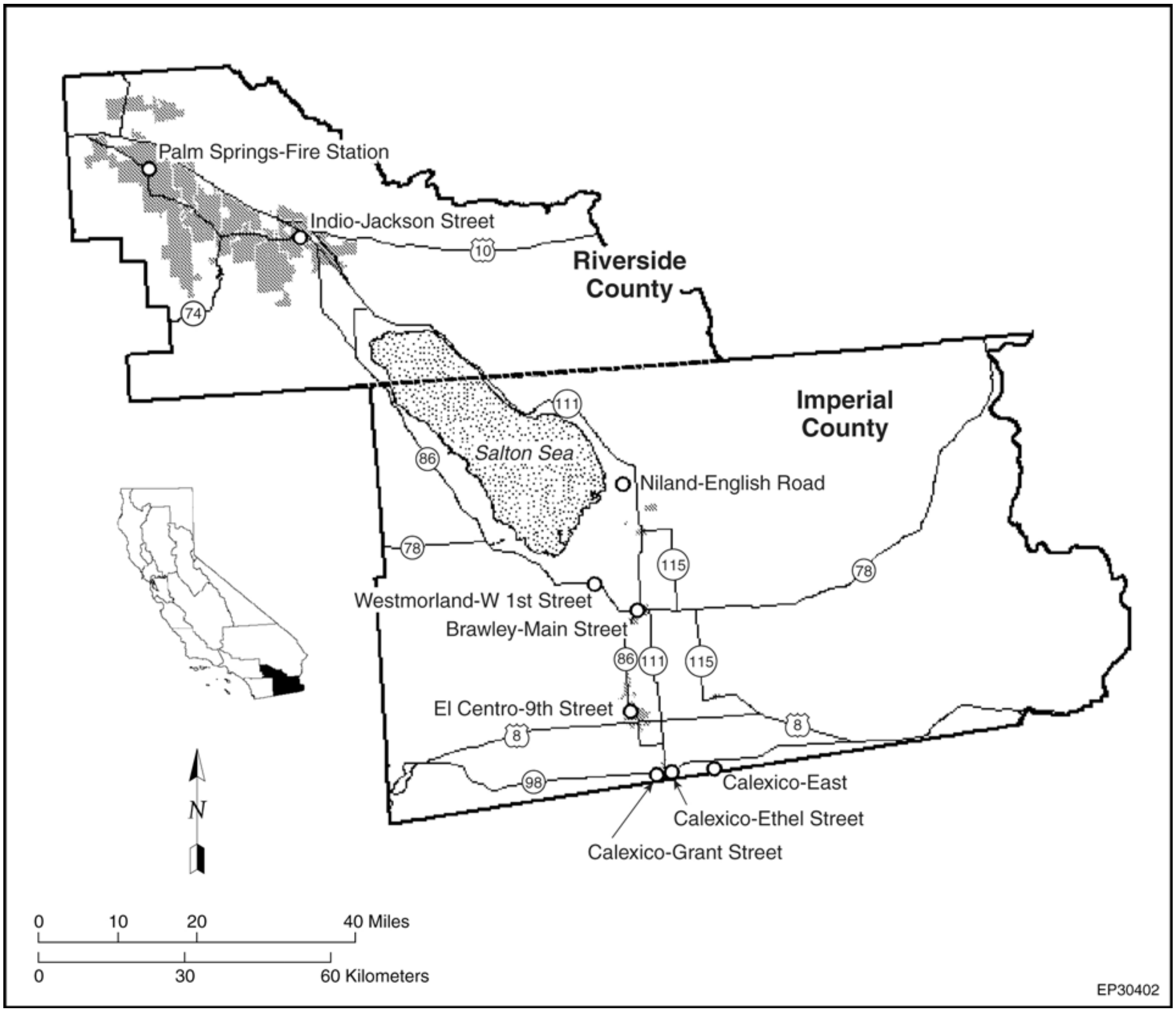

FIGURE 3.3-12 Salton Sea Air Basin Monitoring Stations ARB Map (Source: ARB 2003a)

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

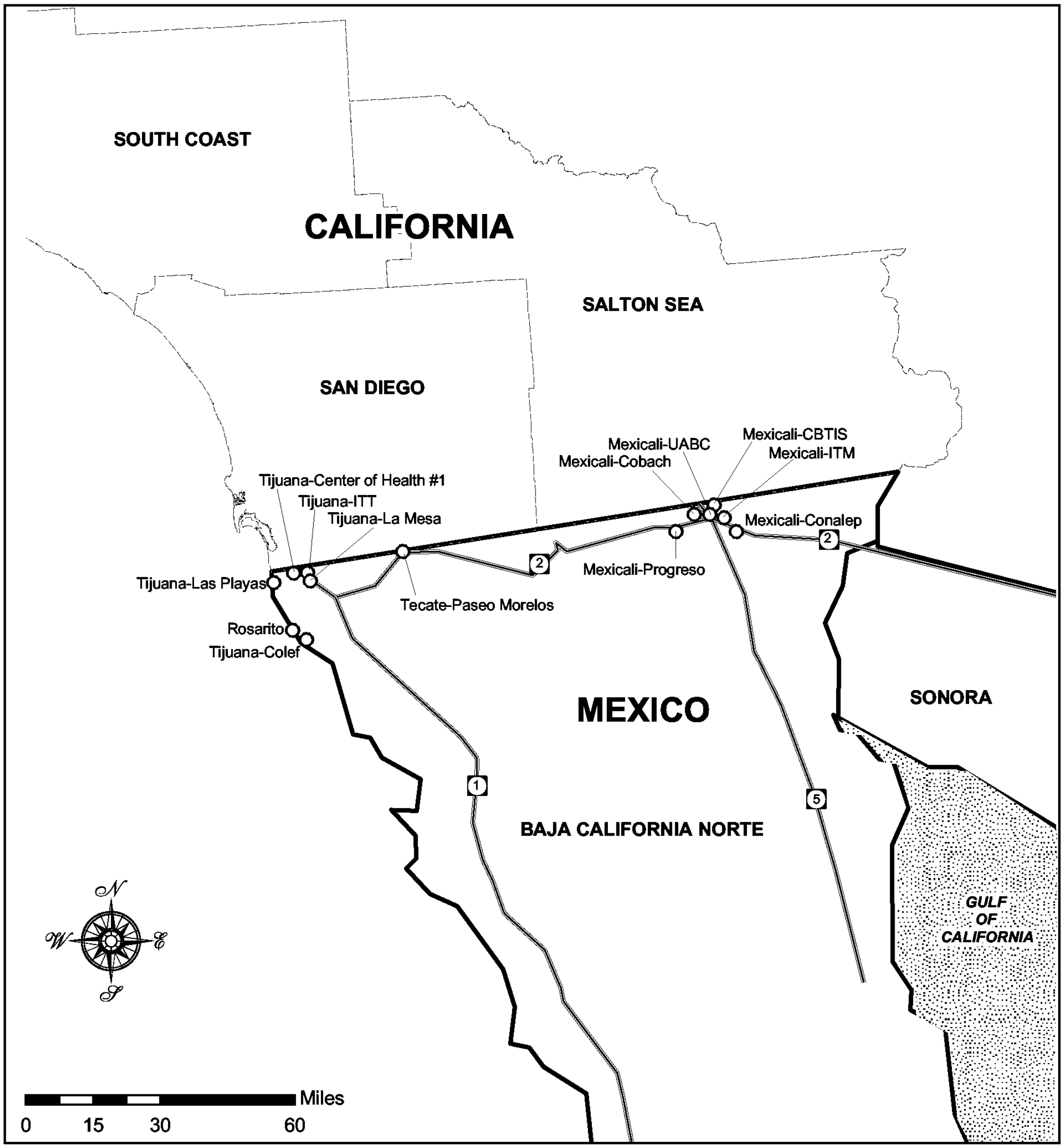

FIGURE 3.3-13 Mexico Monitoring Stations ARB Map (Source: ARB 2003a)

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.

As described earlier, the Salton Sea Air Basin is classified as a Section 185A nonattainment area for O_3 and currently as a serious (see footnote 3) nonattainment area for PM_{10}. The City of Calexico near the border is classified by the State of California as a state nonattainment area for CO. Table 3.3-3 shows NAAQS exceedances and maximum air pollutant concentration measurements in Imperial County for O_3, CO, and PM_{10} from 1987 through 2003.

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 ICAPCD. 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.

TABLE 3.3-3 Imperial County Air Quality Compared to NAAQS[a]

Compliance Measure/Year	Standard	1997	1998	1999	2000	2001	2002	2003
Ozone (concentrations in ppm)								
Maximum 1-hour concentration	.12	.160	.236	.171	.169	.167	.156	.144
Days over 1-hour standard		10	5	24	5	10	3	3
Maximum 8-hour concentration	.08	.120	.104	.110	.113	.112	.104	.097
Days over 8-hour standard		50	18	20	5	18	13	8
Carbon monoxide (concentrations in ppm)								
Maximum 8-hour concentration	9	17.8	14.4	17.9	15.5	12.3	11.6	8.8
Days over 8-hour standard		10	8	11	6	6	3	0
PM_{10} (concentrations in $\mu g/m^3$)								
Maximum 24-hour concentration	150	532	176	227	268	647	373	840
Monitored days over 24-hour standard		4	2	5	6	3	4	4
Calculated days over standard		12	12	32	38	18	21	25
Annual average	50	77.7	66.1	77.8	95.2	86.2	81.3	80.0

[a] Imperial County is not classified by the EPA as a Federal nonattainment area for CO. The City of Calexico near the border is classified by the State of California as a state nonattainment area for CO.

Source: Scheible (2004).

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 ICAPCD. 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, Imperial County, and State of Baja California Mexico are 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-designated 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-designated 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 vicinity of the applicants' proposed transmission line routes and the 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 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 eragrostis*), 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). Table 3.4-1 lists the fish species identified during these studies. 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.

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

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).

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 nigricans*), 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's (*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 DO 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 that 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 it does not represent 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 designated by BLM as 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-designated 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.

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, DO 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 area of the projects 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 projects 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-designated 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 recent 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*)

The 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-off 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, on average, 365 rails were 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 “loss of riparian breeding habitat, nest parasitism by the brown-headed cowbird (*Molothrus ater*), and a 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 area of the projects.

3.4.4.14 Bank Swallow (*Riparia riparia*)

The bank swallow, considered threatened by the State of California, historically was considered locally common in the lowland regions of California. The species has been 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, a candidate for listing by the Federal government and listed as threatened by the State of California, 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 observed 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-designated 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 area of the projects (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 are listed as endangered by the Federal government and threatened by the State of California. 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 area of the projects. 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, a candidate for listing by the Federal government, 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 the 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 area of the projects 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 rather than arrows. Sites from this time period are found near the margins of old watercourses and dry lakesides.

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 area of the projects 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 area of the projects 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 area of the projects 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 area of the projects 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 area of the projects include residential bases, field camps, lithic scatters, ceramic scatters, lithic and ceramic scatters, isolate ceramics, and isolate lithics. A single scatter of historic artifacts dating to the 1930s was also identified in the area of the projects, but it was determined that it 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 Plan issued in 1980 and amended in 1999 (BLM 1999). The area of the proposed projects is located on a portion of the public land discussed in this plan.

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 CDCA Plan designated 40,069 acres (16,215 ha) 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-designated sensitive species. The Yuha Basin ACEC Management Plan (BLM 1981) was developed to describe the management practices for the Yuha Basin ACEC. 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 area of the proposed transmission line projects 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 Basin ACEC.

3.6.4 Economic Development

No active sand or gravel mine sites are within the area of the projects. However, two inactive gravel quarries are within the area of the projects south of State Route 98. The closest active mining site is 2.5 mi (4 km) west of the area of the projects (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 ACEC. The IV Substation is located in this corridor. The area of the projects 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 Plan 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 area of the projects 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 Plan as Wilderness areas. The WSA located to the west of the area of the projects 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 routes 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. Designations 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 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

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.

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 would be 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 because the area lacks unique landscape features, the visual sensitivity of the area of the projects 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

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

- 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.

3.9 SOCIOECONOMICS

A region of influence (ROI) encompassing Imperial County was used to describe socioeconomic conditions for the area of the projects. 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.

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.

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).

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.

3.10 MINORITY AND LOW-INCOME POPULATIONS

E.O. 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 provided in Section 4.12.

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).

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 proposes 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

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).

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.

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 under 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 area of the projects, 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 the 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 area of the projects 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 as 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 BLM-designated Utility Corridor N, 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 area of the projects, however, the potential for slope failure would be low.

No active sand and gravel or fill mining occurs within BLM-designated 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 soils.

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 due to excavation associated with installing the tower support structures, 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 routes would be about 2 mi (3 km) 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 are 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 (0.06 acre [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 ongoing 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 emissions controls and/or an alternative cooling technology 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 County 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 (Barrett 2004) 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 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;
- Impacts of using a different cooling technology at the power plants;
- TDS removal in power plant water treatment systems; and
- Impacts on the region's 4,000-mg/L TDS surface water objective.

These topics are considered in the impacts analysis presented in the following sections.

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 were 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 were 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 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. Impacts to water quality are presented in Tables 4.2-2 through 4.2-7 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 EBC plant and the TDM plant. Although the

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	26,989	24,185	28,828	19,813
Net water delivered to New River	33,200	28,260	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	Only LRPC Operating	Only TDM Operating	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	4,800	4,430	4,680
Concentration load to New River from discharge water (million lb)[d]	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	5
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	10
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	15
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	Only LRPC Operating	Only TDM Operating	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	1.5
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[e] (mg/L)	NA	2.5×10^{-4}	2.5×10^{-4}	2.5×10^{-4}
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 "Only LRPC Operating" column. These values were 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. All values in the table represent plants operating at 100% capacity.

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

[e] 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 "Only LRPC Operating" column. These values were 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. All values in the table represent plants operating at 100% capacity.

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

[c] NA = not applicable.

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 also 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. The operation of the EAX export turbine requires the operation of the water cooling system at the EAX plant. However, the amount of water lost to evaporation during the cooling process as a result of the operation of the EAX export turbine is only about one-third of the water usage associated with operation of the entire EAX unit. Therefore, impacts to water quality parameters shown under the "Both Plants Operating" column in Tables 4.2-2 through 4.2-7 conservatively represent the impacts from the proposed action (as the proposed action has been defined for purposes of this EIS); that is, impacts shown under the "Both Plants Operating" column are higher than the impacts resulting from the operation of the TDM, the EBC plant, and the EAX export turbine.

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 were 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. All values in the table represent plants operating at 100% capacity.

[b] NA = not applicable.

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.

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.

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 “Only LRPC Operating” column. These values were 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. All values in the table represent plants operating at 100% capacity.

[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 “Only LRPC Operating” column. These values were 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. All values in the table represent plants operating at 100% capacity.

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 would 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.

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 4.2-7 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 “Only LRPC Operating” column. These values were 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. All values in the table represent plants operating at 100% capacity.

[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.

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 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 plant. 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).

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.

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 1-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 on 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.

If the low annual flow for the New River was used for the analysis, the percentage of flow lost to plant use would increase 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. The power plants obtain water from the Zaragoza Oxidation Lagoons (LRPC from the inlet and TDM from the outlet) and treat it by using five major components (Simões 2004b):

1. Biological treatment reactor and secondary clarifiers,
2. DensaDeg® reactor,
3. Demineralizer plant,
4. Press and filter house, and
5. Waste sump.

The first two processes — biological treatment and DensaDeg — treat the entire makeup stream for each of the power plants, which removes some TDS from the water, as discussed below. The water is introduced into the biological treatment reactor and clarifiers. At this point, biological treatment is used to oxidize organic matter and NH_3 and to remove nitrates that form as a result of the oxidation of NH_3. This step removes significant quantities of dissolved organics, NH_3, and phosphorous compounds, and agricultural and industrial chemicals. The clarifiers separate the activated sludge from the water and recirculate the sludge to the biological reactor. Water balance analyses performed for this component of the water treatment show that for an incoming stream with a TDS of 1,200 mg/L, the effluent displays a TDS concentration of 1,180 mg/L.

Additional and substantial TDS removal occurs in the next stage of the treatment process, the DensaDeg reactor. The DensaDeg reactor is a commercially available, proprietary, physical-chemical process that uses lime softening and clarification in two tanks. The majority of the TDS removal occurs in this step of the water treatment process (other processes include the above biological treatment reactor, moisture in the sludge removed, and cooling tower drift). In this step, lime (calcium hydroxide) is added to the water, which causes calcium and magnesium to precipitate, as well as substantial amounts of alkali metals, heavy metals, and phosphate. The precipitated sludge is flocculated and separated from the water by sedimentation in the clarifier and sent to the press and filter house. Effluent from this step has a TDS that ranges from about 900 to 1,000 mg/L.

The remaining water treatment components do little to further reduce the concentration of TDS in the water. In the waste sump, wastewater is collected from the cooling tower basin, demineralizer waste streams, and steam-cycle blowdown. The combined effluent that is discharged to receiving channels that ultimately discharge to the New River has a TDS of 4,430 mg/L at TDM and 4,800 mg/L at the LRPC (Table 4.2-2). Although the TDS concentration in the effluent is higher than that in the influent water from the lagoons, the annual load to the New River is reduced by approximately 3.7 million lb (1.7 million kg) by the water treatment process.

The water treatment process used at the LRPC is similar to that described above, and lime treatment reduces the annual TDS load to the New River by 5.3 million lb (2.4 million kg) (Table 4.2-2).

The above calculations were based on the assumption that the power plants operate 100% of the time. However, when the plants are in a bypass mode (i.e., not generating power due to maintenance or forced outages, such as those produced by equipment failures and market conditions), the water is only treated in the biological reactor and clarifiers before being returned to the discharge channel and ultimately the New River. For these conditions, the TDS in the effluent is about the same as that from the lagoons (1,180 versus 1,200 mg/L). However, the riverine system would still benefit from the biological treatment process that removes dissolved organics and other contaminants.

These removal rates are theoretical; however, conductivity measurements performed by Degremont de Mexico (the water treatment contractor for TDM) indicate that actual concentrations in plant effluent would be lower than the theoretical values (Simões 2004b). The numbers here, therefore, should be considered a conservative estimate (i.e., larger than those that actually occur).

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 (13 and 6.4 million kg), respectively, of dissolved solids. Approximately 24.1 million lb (11 million kg) from the LRPC plant and 10.5 million lb (4.8 million kg) from TDM plant discharge water would later be returned to the New River. This would result 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 at 100% capacity, the annual TDS load to the New River would be reduced by about 9 million lb (4.1 million kg) or about 8%. Actual TDS reductions would be less because the lime softeners are bypassed when the plants are not running. TDM estimates that the wastewater treatment plants would be run in bypass mode, that is, bypassing the lime softener, 25% of the time (Simões 2004b). Assuming a similar bypass rate for LRPC, TDS removal would be 25% less (2.25 million lb [1 million kg] less), since most TDS is removed by the lime softeners. Also, as noted above, the portion of TDS removal attributable to the proposed action would be about 30% less than the total for both plants operating, which accounts for the portion attributable to the EAX Mexico turbines.

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.

As discussed in Section 3.2.1.1.1, TDS in the New River increases in the downstream direction. On the basis of 1996 through 1998 measurements, the average TDS for the New River at its outlet to the Salton Sea is about 2,770 mL/g, with a standard deviation of 361 mg/L (IID 2002). Assuming that the flow of the New River is about the same as the flow at the Westmorland gage, which is located about 2 km (1.2 mi) upstream of the outlet, TDS at the New River outlet to the Salton Sea would be 2,828, 2,788, and 2,809 mg/L for both plants operating, only the TDM plant operating, and only the LRPC plant operating, respectively. These increases correspond to changes of 58 (2.1%), 18 (0.7%), and 39 mg/L (1.4%) over a condition in which no plants are operating, respectively. The changes would be well within the variability of the TDS measured at the New River outlet to the Sea, and the outlet flow TDS concentration would be well within the 4,000-mg/L upper bound for the Colorado River basin water quality objectives (SWRCB 2003). Calculations for other parameters (TSS, COD, phosphorous, and selenium) were not made; however, information on the removal processes indicates that impacts would be of the same magnitude as those for TDS and BOD.

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). Reductions attributable to the proposed action would be about 30% less than for both plants operating, which accounts for the portion attributable to the EAX Mexico turbines.

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 both 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 DO (dissolved oxygen) TMDLs for the New River and Colorado River water quality objectives for total phosphorus (Section 3.2.1.1). As noted in the previous paragraph, all changes would be about 30% less for the proposed action than the total for both plants operating.

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). This value was derived by using a simple mixing-model approach similar to that used for water quality parameters (Appendix F), the above average values, and the assumption 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 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 minimal permanent changes 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 would 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 acres [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 78,750 ac-ft [3.08 m^3/s] [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 annual operation of the power plants after 1 year. 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 would be 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 1 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 one part per billion (ppb) in Salton Sea water, the mass of selenium present would be 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 118,000, 180,000, and 264,000 ac-ft/yr (4.62, 7.04, and 10.33 m^3/s), 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 TDS and selenium concentrations should not exceed the tolerance of wetland plants (Section 4.4.4.2), whereas the changes in other water quality parameters could be beneficial (Section 4.4.4.3). 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 an alternative cooling technology (wet-dry cooling). Impacts from the use of more efficient emission controls would be the same as those for the proposed action and therefore are not discussed in this section.

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. For the sake of conservatism, wet cooling was assumed for days on which the temperature exceeded 90°F (32°C). In the area of Mexicali, Mexico, approximately 44% of the days (approximately 161 days annually) have temperatures that exceed 90°F (32°C). Calculations to estimate the impacts of a wet-dry cooling system on TDS for the New River at the Calexico gage at the U.S. Mexico border were made for the following assumptions: wet cooling would be used 44% of the time; annual water withdrawals for both plants operating would be the same as for the proposed action (Table 4.2-2); 20% of the water during the wet portion of the cycle would be returned to the New River via the drains (793 and 402 ac-ft/yr for the LRPC and TDM plants, respectively); the concentration of TDS in the plant discharge water would be the same as for the proposed action (4,800 and 4,430 mg/L for the LRPC and TDM plants, respectively); and the bioreactor would continue to operate during the dry portion of the cycle, but very little TDS would be removed (for simplicity, assumed to be equal to zero removal). For these conditions, the concentration of TDS in the New River at the Calexico gage would be about 2,683 mg/L. This value is about 83 mg/L less than the TDS predicted for the proposed action and would represent an increase of about 2% over the base case in which no plants would be operating. The proposed action would produce an increase of about three times more, that is, 6%. A similar calculation for BOD shows that the wet-dry system would produce a BOD in the New River at the Calexico gage of 25.4 mg/L, while the proposed action would produce a BOD of 25.9 mg/L. For this calculation, BOD removal is assumed to occur only within the bioreactor step of the water treatment process.

4.2.6 Mitigation Measures

4.2.6.1 Water Resources

Mitigation for water resources would focus on potential measures that could be implemented in the United States to offset increased TDS concentrations in the Salton Sea and/or New River resulting from reduced flow volumes in the New River due to power plant operations. Similar actions could also be potentially undertaken in Mexico. Potential measures could include, but are not limited to, lining irrigation canals to reduce seepage, reducing the amount of evaporation from irrigation canals, fallowing farm land, pumping groundwater from shallow aquifers to the New River or the Salton Sea, and annually removing a portion of the water in the Salton Sea or diking an area of the Sea to achieve evaporation losses equal to the loss of water from the New River due to power plant operations. The following discussion investigates the technical feasibility and cost of implementing these strategies.

Lining Canals: As part of a long-term program (costing at least $295 million) with other water agencies in California, the IID has developed a water conservation plan that includes land fallowing, improvements to on-farm irrigation systems and improved water delivery systems. Water delivery system improvements have focused on lining canals and laterals with concrete, constructing reservoirs and interceptor canals, and recovering canal seepage. These measures have resulted in a savings of approximately 106,000 ac ft/yr (4.1-m^3/s) of water (IID 2004a).

Between 1954 and 1989, 910 mi (1,465 km) of canal were lined, resulting in an annual water savings of 58,000 ac ft (71.5 million m^3) of water. The IID reports that there are 230 mi (370 km) of main canals; 1,438 mi (2,314 km) of canals and laterals, of which 1,109 mi (1,785 km) are concrete-lined or pipelined; and 1,406 mi (2,263 km) of drainage ditches in the Imperial Valley (IID 2004b). As discussed in Section 4.2.4, the annual loss of water under the proposed action (both power plants operating 100% of the time) would be 10,667 ac ft (0.41 m^3/s). This loss of water could be offset by installing concrete lining on approximately 167 mi (269 km) of canals, assuming a seepage rate from the canals of about 3.7 ac ft/mi (2,840 m^3/km).

Concrete liners are estimated to cost approximately \$2.00 ft^2 (GMA 2004). Lining 167 mi (269 km) of canal with a surface area of 10-ft^2/linear foot (3 m^2/m) would cost about \$18 million or about \$1,650 per ac ft (\$1.34/ m^3) of water conserved. With time, concrete liners crack and water losses increase. An aged system can lose as much as 30% of its water to seepage through cracks. This loss of efficiency can be reduced by adding a synthetic liner to the system. Such liners can increase construction costs by \$0.50/ft^2 (\$5.38/m^2). With a synthetic liner on top of the concrete, the cost for lining 167 mi (269 km) of canal with a surface area of 10 ft^2/linear foot (3.05 m^2/m) would be about \$22 million.

While the above analysis has identified potential measures to conserve water, water conservation through lining of canals and laterals would not necessarily reach the Salton Sea or provide mitigation for the proposed project. Water delivered to the IID from the Colorado River for irrigation purposes must be put to that use. Water saved may instead remain in storage on the Colorado River as it would not be needed for agricultural production within the IID. In addition, previous analyses of canal, lateral, and drainage ditch lining proposals on the IID have raised concerns regarding potential impacts to species, including the desert pupfish, protected by Federal and California Endangered Species Acts. This analysis does not include any costs associated with compliance with these and other applicable statutes, such as the California Environmental Quality Act, or potential impacts associated with possible temporary disruption of water service. Improvements in on-farm efficiencies also raise concerns as such actions often result in less wastewater runoff from farmland, thereby causing a reduction of inflow to the Salton Sea.

Reducing Evaporative Losses: As discussed in Appendix F, evaporative losses in the Salton Sea watershed are approximately 5.7 ft/yr (1.74 m/yr). Assuming that drainage canals have a width of about 10 ft (3 m) and that there are about 1,667 mi (2,683 km) of canals and laterals in the IID system, the average annual loss of water in the drainage canals due to evaporation is about 11,600 ac ft (0.41 m^3/s). To fully offset the 10,667 ac ft (0.41 m^3/s) of water annually due to the proposed action through a reduction of evaporative losses, most of the canal system would have to be replaced with pipe. These activities would be expected to have substantial environmental impacts, including land disturbance and endangered species issues, at significant cost. Because reducing the seepage from the canals would save much more water (by a factor of about 10), seepage control would be a more reasonable approach than reducing evaporation.

Fallowing Farmland: In 2001, about 521,850 acres (211,190 ha) of land in Imperial Valley were irrigated for agricultural purposes: 417,930 acres (169,130 ha) for field crops, 81,570 acres (33,010 ha) for garden crops, and 22,350 acres (9,045 ha) for permanent crops (IID 2004c). The area of land needed for fallowing to offset water reductions due to the proposed action would depend on the particular crop being grown since irrigation needs vary by crop. For example, alfalfa, a major crop produced in the Imperial Valley, requires about 6 ac ft of water per acre (18,290 m^3/ha) of irrigated land per year. Assuming that the fallowed land would be used to raise alfalfa, approximately 1,780 acres (720 ha) of land would need to be fallowed to offset water consumption by the two power plants. However, if the selected crop were corn, which requires about a third of the water required for alfalfa (about 2 ac ft/yr[7.7×10^{-5} m^3/s]), about 5,340 acres (2,160 ha) of land would need to be fallowed. In 2001, the total cash value for the top 10 crops in Imperial Valley was about $681 million (IID 2004b). With 521,850 irrigated acres (211,190 ha), the cash value per acre is about $1,305. If the actual cost for fallowing were equal to the cash value per acre, fallowing 1,780 to 5,340 acres (720 to 2,160 ha) would cost about $2.4 million to $7 million annually. This cost would be incurred for the lifetime of power plant operations. Fallowing of land within IID as a water conservation measure, however, has previously raised significant socioeconomic concerns and secondary impacts among the farming and nonfarming communities within the IID and the surrounding area.

Groundwater Transfer: Groundwater wells could be installed to pump groundwater to the New River or the Salton Sea directly. This could be accomplished by pumping 30 wells at 220 gal/min (830 L/min), possibly at Imperial East Mesa, southeast of the Sea (DOI 1974). Detailed studies would be required to determine whether this pumping rate could be achieved and sustained for the term of the project. In general, groundwater in the Imperial Valley basin occurs in two major aquifers (California Department of Water Resources 2004a). It should be noted that because this water has a relatively high TDS content, in the range of 498 to 7,280 mg/L, pumping groundwater to the Salton Sea could result in adverse impacts to its salinity concentrations. According to the results of a groundwater model that used data from 1970 to 1990 (California Department of Water Resources 2004a), the groundwater system beneath Imperial Valley is losing about 17,000 ac ft/yr (0.66 m^3/s). Because the groundwater system is already declining, it is unlikely that additional withdrawals would be an effective and feasible mitigation alternative.

Salton Sea Mitigation Strategies: Offsets could possibly be achieved by installing a dike in the Salton Sea or removing a volume of water at its current TDS level of 44,000 mg/L and allowing the New River to flow into the Sea with its lower TDS concentration. If the water were removed from the Sea to evaporation ponds (e.g., at Paden Dry Lakes, northeast of the Sea [DOI 1974]), the annual quantity of Salton Sea water that would have to be removed would have to equal the 10,677-ac ft/yr (0.41-m^3/s) reductions due to power plant operations. Removing an equivalent amount of Salton Sea water on an annual basis would prevent the concentration of salt in the Sea that would, without this mitigating action, occur if the Salton Sea were to achieve a new water surface equilibrium resulting from the 10,667-ac ft/yr (0.41-m^3/s) reduction in inflow. At the evaporation ponds, the high TDS water would be allowed to evaporate, leaving salt deposits that would need to be removed. This mitigation strategy would involve substantial annual costs in pumping water from the Sea to an evaporation pond and then removing the evaporated residuals. The permitting process for such a strategy is also expected to be complex.

If a dike were installed in the Salton Sea, the area to be diked off would have to reduce annual evaporation in the main body of the Sea by 10,677 ac ft/yr (0.41-m^3/s). This reduction in area would allow the main body of the Salton Sea to maintain an equilibrium in water surface elevation and would prevent the concentration of salt in the Sea that would, without this mitigating action, occur if the Sea were to achieve a new water surface equilibrium resulting from the 10,677-ac ft/yr (0.41-m^3/s) reduction in inflow. This diked-off area would be considerably less than the current North Lake Plan endorsed by the Salton Sea Authority that would involve constructing an 8.5-mi (13.7-km) long dam to divide the Salton Sea in half. Implementation of this strategy would be costly and complex and would have to be coordinated with the Salton Sea Authority's ongoing restoration project activities. Additional studies would be needed to evaluate the effectiveness of this mitigation measure to the Salton Sea.

Summary: It is important to note that while the conservation measures described above (lining canals, reducing evaporative losses, and fallowing farmland) would yield water savings, it is not reasonable to assume that the IID would be interested in undertaking such a project at this time given the extensive water conservation measures it is currently undertaking for the Quantification Settlement Agreement (QSA) and the significant financial, legal, environmental, and policy issues involved. Given these considerations, along with the limitations of the groundwater transfer (due to the declining status of groundwater in the area and its potentially high TDS concentrations) and the administrative complexities associated with removing water from the Salton Sea or building a dike within it, it is possible that none of the mitigation measures described can be readily implemented. In addition, impacts from other projects that are not being mitigated (e.g., the Mexicali II Wastewater Treatment Plant) and the reductions in Colorado River flow into Mexico, resulting in less water ultimately flowing back into the United States via the New and Alamo Rivers, would overwhelm the beneficial impacts of any mitigation efforts associated with this proposed project.

4.2.6.2 Air Quality

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, thus increasing, at least temporarily, the sediment loads to nearby water bodies. 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;
- Mitigation of impacts of emissions from the TDM and LRPC power plants by instituting offsets;
- Use of EPA significant impact levels (SLs), taken from the CAA as benchmarks of impacts of power plant emissions;
- Analysis of Alternative 3 emission control technology options in terms of a retrofit of the existing power plants;
- Analysis of the sensitivity of O_3 modeling to changes in input values; and
- Analysis of additional PM_{10} emissions from exposed Salton Sea lakebed resulting from water consumption by the power plants.

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, *AP-42: Compilation of Air Pollutant Emission Factors*, commonly referred to as "AP-42," published by the EPA (1998a). 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 Mexico 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 Dioxide, Carbon Monoxide, Ammonia, and Particulate Matter. DOE and BLM have used the EPA's AERMOD (the American Meteorological Society [AMS/EPA Regulatory MODel]) (EPA 1998b) 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 assessing 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 1 hour to 1 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, and limitations on vertical mixing in the stable boundary layer. It also includes a three-plume model for the convective boundary layer, and it fixes 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 data include 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 County 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 5 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, 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 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. The Ozone Isopleth Plotting Program Revised (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 the Empirical Kinetic Modeling Approach (EKMA) to estimate O_3 levels from different types and amounts of precursor emissions.

In general, a wide spectrum of air quality models, including the Gaussian plume model, Lagrangian puff model, and Eulerian model, are available for relatively inert pollutants, such as CO or SO_2. However, simulation of O_3 formation and transport is a highly complex and resource-intensive exercise. Control agencies are encouraged to use three-dimensional Eulerian photochemical grid models, such as the Models-3/Community Multi-scale Air Quality (CMAQ) model, to evaluate the relationship between precursor emissions and O_3. As a choice of models to complement photochemical grid models, EKMA, which is implemented by the OZIPR model, may be used to help in formulating strategies for simulation with a photochemical grid model and in corroborating results obtained with a grid model. Considering the magnitude of O_3 precursor emissions in the area, ambient O_3 impacts from the power plants are expected to be small. Accordingly, a screening type of model meets the needs of the objectives of this EIS; namely, to understand the nature and general magnitude of impacts of plant operations on O_3 production in the region. An analysis of the sensitivity of the results of the model to changes in inputs was performed, and the model performance has been determined to meet the needs of this analysis. The sensitivity analysis is discussed later in this section.

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 and the LRPC facilities were conservatively estimated by using an emission factor of 0.02 lb/MMBtu provided by the facilities, which is about four times higher than the emission factor for natural gas combustion from EPA AP-42 (EPA 1998a). 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 g of NH_4NO_3 from 1.0 g 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.

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 maximum achievable control technology (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).

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.

Notwithstanding, DOE and BLM have estimated HAP emissions for the LRPC and TDM as shown in Appendix H, which provides 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 NH_3 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 combined-cycle turbine units reduces many of the emission impacts that are associated with fuels such as coal, oil, or biomass. Forty tons/yr (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/yr (27 t/yr) from the no action alternative (i.e., the three EAX turbines at the LRPC), and 60 tons/yr (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 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/yr (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 (Pb). Lead is not known to be emitted from the burning of natural gas. There are no known emissions of the criteria air pollutant Pb 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 proposed action of 40 tons/yr (36 t/yr) of SO_2 (estimated) and 420 tons/yr (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/yr (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/yr (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

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

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 1998a) 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 2 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 site (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 2 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 area of the projects 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 acre (0.10 ha); 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 1998a) 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 2.2-13) were similarly estimated to be 14.4 tons (13.1 t) and 12.3 tons (11.2 t), respectively.

Estimates were derived for 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 2 months, 24 VMT for 1 month, and 15 VMT for 2 months, yielding a total of 5,022 VMT. Using EPA AP-42 emissions factors (EPA 2004b) 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 2004a) 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 0.088 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, would be 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 were undertaken in a Federally classified nonattainment or maintenance area, the provisions of the final rule for conformity would 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 ICAPCD.

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 70 tons (64 t) per year for PM_{10} in a serious[2] 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 would total less than 12 tons (11 t) in the year of construction, and much less (0.08 tons/yr [0.07 t/yr]) in subsequent years for maintenance thereafter — amounts that are considerably less than the specified levels of 70 tons/yr (64 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/yr (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/yr (22,000 t/yr) for PM_{10}, 15,000 tons/yr (14,000 t/yr) for VOC, and 17,000 tons/yr (15,000 t/yr) for NO_x (EPA 2004a). The maxima of 11.4 tons/yr (10.3 t/yr) of PM_{10}, 0.361 ton (0.327 t) of VOC, and 1.86 tons (1.69 t) of NO_x estimated to result from construction, and the 0.08 ton/yr (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

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[2] Prior to September 11, 2004, Imperial County was classified as a moderate nonattainment area for PM_{10} (see footnote 3 in Section 3.3.2).

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 70 tons/yr [64 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.

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	476
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/yr (1 t/yr) per turbine. For simplicity, these amounts are not displayed.

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)	Additional Emissions from the Proposed Action: TDM + EBC + EAX-Export[a] (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

[a] The EAX export turbine is included in the emissions for both the no action and proposed action alternative, since it could operate under either one.

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.

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 County 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 to 10,000 m) from the center, 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 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 the TDM and LRPC plants are shown in Tables 4.3-2 through 4.3-6. Ammonia gas emissions are discussed under health impacts in Section 4.11.

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 thus long-range transport of precursor gases to secondary PM_{10} can also play a role in determining PM_{10} concentrations.

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 NH_4NO_3 from NO_x 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 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.

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)	Significant Impact 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.

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:

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

where “(g)” denotes 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).

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).

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] ($\mu g/m^3$)	Significant Impact 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.

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;

- 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.

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 g of NH_4NO_3 from 1.0 g 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

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] ($\mu g/m^3$)	Significant Impact 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.

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 g NH_4NO_3 per 1.0 g 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 would be available from all regional sources and not just the small amount emitted from the power plants. (That is, in Imperial County, which is an ammonia-rich area [see the text box on page 4-48], 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.)

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] ($\mu g/m^3$)	Significant Impact 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.

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, less than 1 $\mu g/m^3$ NH_4NO_3 24-hour PM_{10} and 0.03 $\mu g/m^3$ NH_4NO_3 annual PM_{10}. These 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.

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] ($\mu g/m^3$)	Significant Impact 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.

In a study of PM_{10} in the Imperial Valley-Mexicali area, Chow and Watson (1995) concluded that secondary NH_4NO_3 contributions (from all sources) to regional PM_{10} are low, in the range of 2 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 (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 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 would be de minimis, and thus little associated impact can be ascribed.

Ozone formation. The potential influence of the TDM and LRPC plants on O_3 levels in the region that may result from their emissions was investigated. NO_X is one of the primary precursors in O_3 formation, along with VOC in the form of reactive organic gases. Both of these precursors are emitted from the power plants and are already present in the ambient atmosphere from numerous other sources. NO_X, VOC, and other precursors emitted to the atmosphere can participate in photochemical reactions that produce the secondary pollutant O_3.

Ozone modeling. The EPA's OZIPR model was used to estimate possible incremental O_3 formation. The model requires the initial ambient concentrations and hourly emission rates for the power plants and for the region for NO_X, VOC, and CO. It also requires VOC speciation (relative amounts of major constituents) and meteorological conditions for "typical" days.

Ambient concentrations of NO_X and CO were available from Imperial County. VOC ambient concentrations were not available for the Imperial County-Mexicali area. Thus, surrogate values from the Phoenix, Arizona, area were selected for OZIPR model runs as the best available.[3] Emissions inventory data for VOC, NO_X, and CO were available and were drawn upon for the combined Imperial County (ARB 2004a) and Mexicali area (ERG et al. 2003). Plant emission rates for VOC, NO_X, and CO were taken from Table G-1. In addition, VOC speciation profiles and "typical" meteorological conditions determined through a cluster analysis as required in the model were taken from Phoenix as included in the model database (EPA 1999c).

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 from 8 a.m. to 8 p.m., the time frame during which

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) in Imperial County. Area emissions of NH_3 for the state of Baja California, including agriculture, are listed as more than 9,000 tons/yr (8,165 t/yr) (which may be an underestimate). In summary, this Imperial Valley/Mexicali region can be regarded as an NH_3-rich area. NH_3 emissions from the power plants (maximum 646 tons/yr [586 t/yr]) are small compared with existing regional emissions.

3 Phoenix, Arizona, is one of the 10 cities that was already built into the OZIPR database (EPA 1999c) and is the most representative proximate city in terms of climate, latitude, and physiography. Phoenix is approximately 210 mi (338 km) east-northeast of the Imperial Valley/Mexicali area. It lies in the central part of the Salt River Valley, a broad, oval-shaped, nearly flat plain. Like the Imperial Valley/Mexicali area it has a desert climate with low annual rainfall and low relative humidity. Daytime temperatures are high throughout the summer months. As the physiographic and climatic descriptions of the Imperial Valley/Mexicali area in Sections 3.1.2 and 3.3.1 indicate, the Phoenix area is broadly similar. Phoenix has a population of approximately 1.3 million compared with the Imperial Valley/Mexicali area of approximately 0.9 million and, like Mexicali, is urban.

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. High NO_2 levels can form other products, such as HNO_3, 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).

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. The results of this sensitivity analysis are presented in Appendix G and are discussed further below.

OZIPR was used to predict peak O_3 concentrations[4] for the following scenarios:

1. Baseline regional conditions, that is, assuming no power plants existed or operated.

2. The less than 1-year period before March 2004 when 3 SCRs were operating at the Mexico power plants (on each of the two TDM turbines and on the LRPC EBC turbine).

3. The time period March 2004 through March 2005: two turbines at TDM each operate with an SCR installed for NO_x control, an EBC turbine with an SCR installed operates at LRPC, an EAX export turbine with an SCR installed operates at the LRPC, and the two Mexico EAX turbines at the LRPC operate with no SCRs installed. This corresponds to four SCRs operating at all the Mexico power plants.

4 The maximum modeled hourly value for the modeled period, 8 a.m. to 8 p.m.

4. The period from March 2005 onward: two turbines at TDM each operate with an SCR installed, an EBC turbine at the LRPC operates with an SCR installed, an EAX export turbine at the LRPC operates with an SCR installed, and two additional SCRs installed on the Mexico-dedicated EAX units at the LRPC operate. This corresponds to six SCRs operating at the Mexico power plants.

OZIPR model results are presented in Table 4.3-7 and Figure 4.3-1 and indicate that NO_x and VOC emissions from all the Mexico power plants would produce at most marginal increases in peak O_3 concentrations.

The two EAX turbines for Mexico at the LRPC would operate contemporaneously with the proposed action. Unlike in the analysis of criteria pollutants using the AERMOD model presented earlier, the emissions from these turbines are included in the analysis of all plant configurations in the current analysis, even though they are not included in the proposed action as defined above. These turbines are included so that the impacts of the sequential addition of SCRs on all three EAX turbines can be compared in the same analysis. While, with this configuration, it is not possible to compare alternatives in the same way as was done for the criteria pollutants, such results can be inferred from the trends exhibited in the current results. In any case, O_3 impacts are very small for all configurations analyzed, as discussed below:

TABLE 4.3-7 OZIPR Modeled Changes in O_3 Concentrations as a Result of Power Plant Operations

Power Plant Configurations	Peak Modeled O_3 Concentration	Change in O_3 Concentration as a Result of Power Plant Operations
Baseline:		
No power plants operating	0.1373 ppm, 269.4 μg/m^3	NA[a]
July 2003 – January 2004 (3 SCRs)		
TDM+EBC export with SCRs Plus: Three EAXs with no SCRs	0.1373 ppm 269.4 μg/m^3	0.0 ppm 0.0 μg/m^3
March 2004 –March 2005 (4 SCRs)		
TDM+EBC+EAX export with SCRs Plus: Two Mexico EAXs with no SCRs	0.1379 ppm, 270.6 μg/m^3	+ 0.0006 ppm + 1.2 μg/m^3
March 2005 Onward (6 SCRs)		
TDM+EBC+EAX export with SCRs Plus: Two Mexico EAXs with SCRs	0.1381 ppm 271.0 μg/m^3	+ 0.0008 ppm + 1.6 μg/m^3

[a] NA = not applicable.

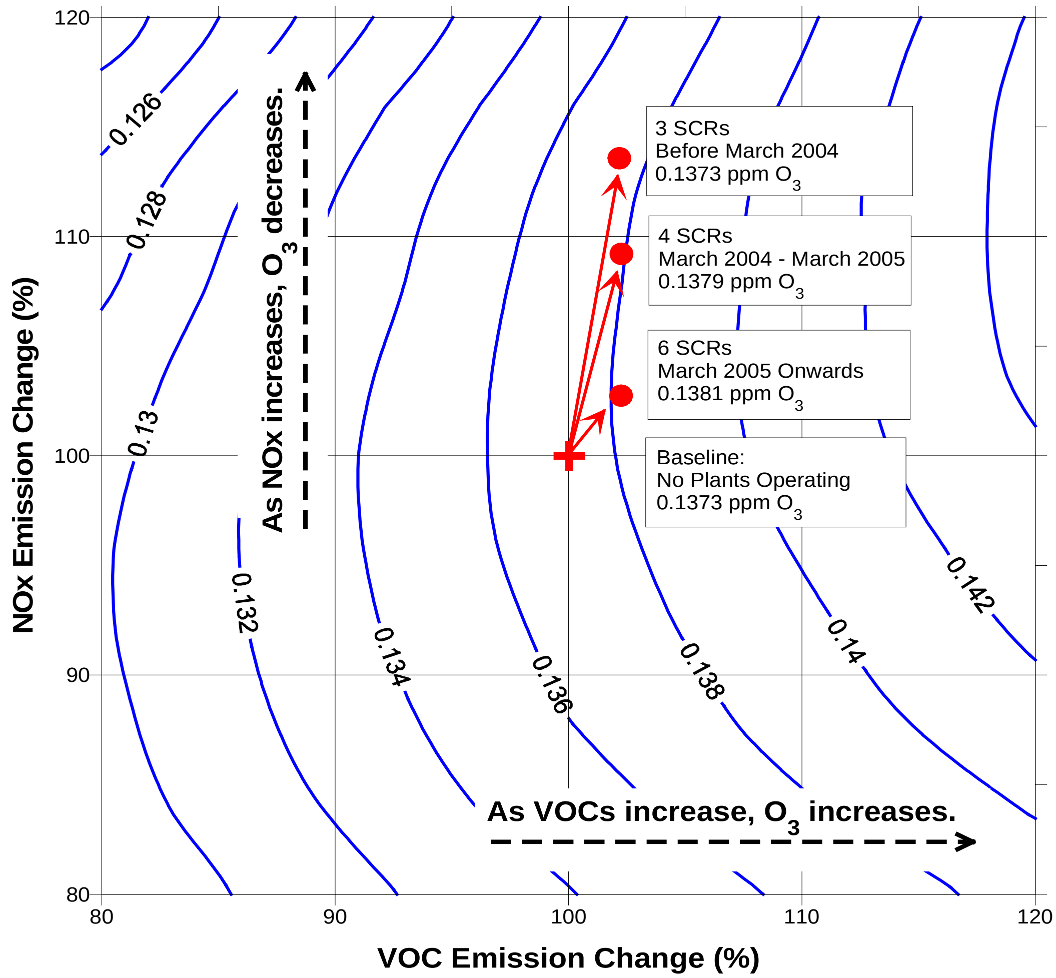

FIGURE 4.3-1 Relationships among NO_x, VOC, and O_3 in Modeled Changes in Peak O_3 Concentration (contour lines [isopleths] denote peak O_3 concentrations in ppm)

No power plants operating: For the baseline regional conditions that represent no power plants operating, OZIPR estimates a peak O_3 level of 0.1373 ppm.

Three SCRs operating: Overall NO_x emissions from the plants would be highest due to the absence of SCR on the EAX turbines. Modeling indicates, however, that O_3 levels would not change from regional baseline conditions as shown in Figure 4.3-1.

Four SCRs operating: The period March 2004 to March 2005 represents a time frame in which a total of four SCRs are operating at the Mexico power plants. As shown in Table 4.3-7 and Figure 4.3-1, O_3 peak levels were estimated to increase by 0.0006 ppm (1.2 µg/m^3), or 0.4%.

Six SCRs operating: The period March 2005 onward represents a time frame in which a total of six SCRs would operate at the Mexico power plants, and when two additional SCRs would be installed on the Mexico-dedicated EAX units to further reduce NO_X emissions, albeit their operation is outside of the proposed action. As Table 4.3-7 and Figure 4.3-1 indicate, a small increase in peak O_3 levels was estimated, namely 0.0008 ppm (1.6 μg/m^3), or 0.6%. That is, in this case adding more SCRs for NO_X control decreases NO_X emissions, but has the effect of slightly increasing modeled peak O_3 concentrations.

Figure 4.3-1 represents an OZIPR simulation based on annual total emissions and typical meteorological conditions. Details including regional emission data and the sensitivity results can be found in Appendix G in Tables G-4 and G-5. As Figure 4.3-1 shows, as NO_X increases above baseline levels, O_3 levels decrease; and as VOC increases, O_3 increases. This behavior explains the above results where an increase in NO_X emissions (three SCR case) does not contribute to an increase in modeled O_3. This result is consistent with an area that behaves as an urban-like region where O_3 tends to be VOC-limited, not NO_X-limited (VOC/NO_X ratios are in the VOC-limited region).

In general, O_3-NO_X-VOC modeling for individual locations and episodes has a relatively high uncertainty, driven by complex nonlinear photochemistry, temporal and spatial patterns of precursor emissions, and meteorological conditions. Generalizations about NO_X- versus VOC-limited conditions reflect average regional conditions. That is, these conditions can vary from episode to episode at one location and even during the evolution of the episode. In this context, the modeled area appears to behave on average like a VOC-limited urban-like area.

The parameters that were varied in the sensitivity analysis (Appendix G) included initial ambient concentrations (increased and decreased by a factor of two), regional emissions (increased and decreased by a factor of two), meteorological conditions (temperature from 100 to 111°F [38 to 44°C], a morning mixing height of 925 to 7,238 ft [282 to 2,206 m]) and an afternoon mixing height of 11,280 to 18,960 ft (3,438 to 5,779 m), and VOC speciation (using Los Angeles and Houston data). Results were obtained for this range of input for power plants equipped with SCRs on three, four, and six of the six turbines at both plants. The 3-SCR case represents SCRs on the two TDM turbines and on the EBC turbine at the LRPC as configured for a portion of 2003. The 4-SCR case represents the current configuration with the SCR added to the EAX export turbine. The 6-SCR case represents the period after March 2005 when SCRs will be added to the two Mexico EAX turbines.

The results of the sensitivity analysis (Table G-5) indicated that power plant emissions could result in either increases or decreases in peak O_3 concentrations for the 3-SCR and 4-SCR cases, depending on model input assumptions. Increases in O_3 as a result of plant emissions would occur when model inputs give rise to NO_X-limited conditions, while decreases would occur when input leads to VOC-limited conditions. Both the maximum predicted O_3 increase of 0.0036 ppm and maximum O_3 decrease of 0.0155 ppm occurred under the 3-SCR case when NO_X emissions from the power plants would be the greatest. Results for the 4-SCR case ranged from an increase of 0.0026 ppm to a decrease of 0.0086 ppm.

Under the 6-SCR case, however, only very small increases, ranging from 0 to 0.001 ppm, are predicted over the entire range of input conditions modeled. These results indicate that, even under NO_x-limited conditions, emissions from the power plants would not cause significant increases in maximum O_3 concentrations.

In conclusion, OZIPR modeling of O_3 formation in the Imperial Valley-Mexicali area does not indicate any meaningful change in O_3 levels as a result of the operation of the TDM or LRPC power plants.

Impacts compared to EPA significant impact 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, which 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 significant impact 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 between increased global temperatures and 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 short wavelength radiation (ultraviolet), intermediate wavelength radiation (visible light), and longer wavelength radiation (infrared). About 90% is intermediate wavelength (visible light or near infrared), and less than 10% is shorter 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 longer 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, which 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,

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).

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 with global emissions and 0.066% compared with U.S. 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 international commitments and with current U.S.-stated goals in helping address the balance between environmental concern and economic needs.

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 by a maximum of approximately 10,000 ac-ft/yr (0.39 m^3/s) because of reduced water flow in the New River arising from consumptive water losses by the TDM and LRPC power plants in Mexico. The reduced inflows would cause the volume of the Salton Sea to decrease and thus the surface area of the sea to shrink. Once the volume of the sea stabilizes in response to the reduced inflows, the surface area of the sea is estimated to shrink by approximately 97 acres (39 ha) or 0.041%. This figure is based on reduced inflows attributable to the operation of TDM and the entire LRPC at 100% capacity factor, and thus overstates the impact from the proposed action. The reduced inflows attributable to the operation of TDM, EBC, and the EAX export turbine are estimated to result in a reduction in the surface area of the Salton Sea of 65 acres (26 ha), or 0.028%. DOE and BLM conducted an investigation into the possible increase in fugitive emissions of PM_{10} by wind erosion of the Salton Sea lakebed that would be exposed as a result of the reduction in the volume of water in the sea.

In 2002, the EIR/EIS for the IID Water Conservation and Transfer Project was published (IID 2002). The proposed action would transfer up to 300,000 ac-ft/yr (11.73 m^3/s) of IID's Colorado River entitlements to water districts in southern California for urban use. Implementation would change the amount of drainage that would otherwise flow into the Salton Sea. The EIR/EIS predicts that by 2007, 15,100 acres (6,110 ha) of lakebed could be exposed and the surface level lowered by about 3 ft (1 m). The IID concluded that a reasonable quantitative estimate of PM_{10} emissions from exposed lakebed could not be made because of lack of data regarding sediment emissive characteristics, surface stability, spatial variations in sediment characteristics and soil erodibility, temporal variation in wind conditions, and variation in factors contributing to the formation of salt crusts and otherwise influencing the tendency of lakebed surfaces to emit PM_{10} in high winds. However, the EIR/EIS contains a qualitative comparison between the Salton Sea and Owens Lake with respect to the driving factors for PM_{10} emissions (primarily wind and sand conditions).

Owens Lake and the Salton Sea

Owens 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) in area and up to 30 ft (9 m) deep located at the terminus of the Owens River. The Salton Sea is a brine lake about 360 mi^2 (285 km^2) in area and up to 50 ft (15 m) deep. Owens 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. Owens Lake is recognized to be the highest single PM_{10} area source in the United States.

As the EIS/EIR describes, high winds at the Salton Sea are much less frequent than those at Owens Lake. Above a threshold velocity, surface sands “saltate” (skip along the surface) and with each impact may break coherent soil crust and eject PM_{10}. The correlation of sand motion with PM_{10} is so pronounced that sand motion is one of the primary tools for mapping PM_{10} emissions at Owens Lake. There is an almost continuous ring of sand dunes around the Owens Lake shoreline, as well as extensive areas of shifting sheets of sand on the lakebed, and extensive areas of deep sand deposits. In contrast, as the EIS/EIR describes, there is very little sand to blow and create PM_{10} emissions in the southeastern shore areas of the Salton Sea, where bathymetry suggests that the lakebed would be most extensively exposed. There are no sand dunes in this area as potential sand sources, and for those that do exist on the western shore, bathymetry suggests that the area of lakebed exposed in this area would be very limited. In addition, salt chemistry at Owens Lake is dissimilar to that at the Salton Sea and these differences favor increased emissions from Owens Lake. As the EIS/EIR describes, year-old crusts are generally damaged in the emissive areas at Owens Lake, whereas relatively older crusts (> 18 months) generally show little damage at the Salton Sea. Moreover, unlike Owens Lake, which is almost entirely dry, most of the Salton Sea lakebed that would be exposed because of the reduced flows would remain subject to periodic inundation due to seasonal and year-to-year variations in the level of the sea. This phenomenon further reduces the emissive potential of the exposed Salton Sea lakebed relative to Owens Lake. The EIR/EIS ultimately concludes that the conditions that promote PM_{10} emissions at Owens Lake appear to be largely absent in the Salton Sea, indicating that the rate of emissions from exposed Salton Sea lakebed would be significantly lower than from Owens Lake.

Notwithstanding these limitations and major qualifications in using Owens Lake emission data as a model, DOE and BLM extrapolated from measurements of fugitive dust emissions from Owens Lake (Gillette et al. 2004) to calculate an upper bound estimate of emissions from the Salton Sea lakebed before any adjustment to account for differences in emissive conditions between the areas in question. Gillette et al. (2004) 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 Owens Lake for a 12-month period between July 1, 2000, and June 30, 2001. DOE and BLM indexed this value to the total Owens

Lake lakebed area of 70,400 acres (28,490 ha) and proportioned it to the maximum 97-acre (39-ha) exposure of Salton Sea lakebed and to the 65 acres (26 ha) that would be attributable to the proposed action, to yield values of 99 tons/yr (90 t/yr) of fugitive PM_{10} emissions attributable to the operation of TDM and the entire LRPC, and 65 tons/yr (59 t/yr) of fugitive PM_{10} emissions attributable to the proposed action.

Given the lower emissive conditions at the Salton Sea compared with Owens Lake, the actual PM_{10} emissions from the Salton Sea lakebed that would be expected to result from the proposed action would be far lower than this 65-ton (59-t/yr) figure. The Salton Sea Authority has suggested that emissions from the sea lakebed may be on the order of only 1% of the emissions from Owens Lake (Kirk 2004). Likewise, Gillette et al. (2004) stated that the application of mitigation measures at Owens Lake, such as shallow flooding, managed vegetation, or gravel on identified dust source areas (measures that would make these areas more comparable to conditions at the Salton Sea) would be expected to reduce dust emissions by 99% (to 1%). Applying a 1% factor to the 65-ton/yr (59-t/yr) figure extrapolated from the Owens Lake data would yield an emission rate of less than 1 ton/yr (1 t/yr). If, however, a 10% factor was applied that was additionally conservative by being ten times greater, the estimated rate would be less than 10 tons/yr (9 t/yr). Given the significant differences in emissive conditions between Owens Lake and the Salton Sea, these estimated rates are likely to realistically bracket any actual emissions from any exposed Salton Sea lakebed attributable to the proposed action.

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/or an alternative cooling technology.

4.3.5.1 More Efficient Emissions Controls

Under the proposed action, the TDM plant would use SCR and oxidizing catalysts to reduce CO emissions. The LRPC plant also would incorporate SCR systems on all turbines by March 2005; however, it would not utilize CO emissions controls. This alternative analyzes the environmental impacts if oxidizing catalysts were utilized on all turbines, including those at the LRPC.

Additional CO emissions control technologies were analyzed for the LRPC plant 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 with the cumulative impacts of the LRPC and TDM plants from CO emissions as equipped under the proposed action; that is, no oxidizers on LRPC turbines, and 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 Technology

Environmental impacts from an alternative cooling technology are primarily of concern in the area of impacts to water resources. However, there are also some considerations for air quality. The dry cooling phase of a wet-dry system 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 could mean 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 (DOE, NREL, and ANL 2002).

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 power plants employing a wet-dry cooling system.

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 ICAPCD and Border Power to obtain suggestions for off-site mitigation measures that could be evaluated under this alternative (Russell 2004; Poiriez 2004a,b,c; Pentecost and Picel 2004; Powers 2004a).

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 ICAPCD 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. Asphalt paving would cost about $430,000 per mile, assuming a two-lane road.

The Imperial County Public Works Director provided the ICAPCD 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/yr (589 t/yr).

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 ICAPCD suggested that SCR installation on IID Unit 3 and the peaker units would reduce NO_x emissions in the area of the projects. However, the IID already plans to repower the gas-fired 44-MW Unit 3 in 2007–2008 as a combined-cycle gas-fired unit, at which time the best available control technology would apply and low NO_x emissions would result.

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 five smaller buses, at a cost of $4 million to $5 million.

The extent to which the portion of such funding toward projects 1, 2, and 3 would contribute to air quality benefits from the creation of a natural gas refueling infrastructure would depend on, among other factors, the unknown degree to which the use of natural gas as an alternative fuel was adopted countywide, and thus cannot be easily estimated. Project 4, however, does offer some guidance as to what air quality benefits could be achieved. The State of California has led a multiagency research effort to study emissions from in-use compressed natural gas and diesel transit buses (ARB 2004b). Particulate emission reduction from diesel buses was a primary goal of the use of compressed natural gas as an alternative fuel. ARB demonstrated an approximate 80-mg/mi particulate reduction (a two-third reduction). If it is conservatively assumed that the current fleet of buses has an aggregate annual mileage of 500,000 mi/yr (804,673 km/yr) and that a larger 100-mg/mi particulate reduction was achieved due to an older fleet base, then it would follow that an overall reduction of approximately 0.1 tons (0.1 t) per year of particulates would result.

Controlling Imperial County 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 ICAPCD 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).

Given that the land area for Imperial County extends to 4,175 mi^2 (10,813 km^2), from which approximately 124,000 tons/yr (112,000 t/yr) of fugitive dust is generated (ARB 2003b), the relative effectiveness of dust suppression on available land surface for treatment at the airport would likely be very small. That is, in the absence of information from the ICAPCD, if it is assumed that 0.5 mi^2 (1.3 km^2) of airport land was treated such that no fugitive emissions were emitted, and if a pro rata county land area/county emission rate was also assumed, then a reduction of up to 15 tons/yr (14 t/yr) of particulates could be considered to be a conservative estimate for this mitigation strategy.

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.

The funding estimate of $250,000 may allow conversion of approximately 50 to 100 heavy-duty diesel engines, depending on the chosen retrofit strategy. Flow-through oxidation catalysts reduce soluble organic fractions (80%), and particulates (25% to 50%) and/or diesel particulate trap oxidizers reduce particulates (25% reduction). For example, total overall particulate engine emissions could be reduced by approximately 3.3 tons/yr (3 t/yr); this value, however, would highly depend on the details of any actual retrofit program.

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 (BECC 2004b), 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, COD, 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 would be 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.

4.4.4 Proposed Action

4.4.4.1 Transmission Line Routes

Construction of the proposed transmission lines along the routes indicated 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. construction of tower bases and new access roads 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. 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 the area of potential effects for the transmission lines east and north of the IV Substation (9.5 acres [3.8 ha]). 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. Also, 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.

Regardless of which transmission line route is selected, there is a potential for construction activities to introduce noxious or invasive plant species to the existing desert habitats. Vehicles moved from one construction site to the next sometimes introduce nonnative or invasive plants by transporting seeds that may be clinging to vehicle structures or that have been incorporated into soil adhering to the vehicle. In addition, the potential for establishment of invasive plants can be increased when construction vehicles alter the structure of existing soils through compaction or excavation, which alter the ability of native plants to compete with introduced plant species. The risk of introducing invasive plants can be reduced by thoroughly cleaning construction vehicles (or maintenance) before moving them to a new site and by minimizing the area affected by vehicular traffic.

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.

General impacts to wildlife in the area of the projects 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 permanently 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 proposed transmission lines. No clearing would remove trees or shrubs used by migrating song birds 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 area of the projects).

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. These impacts could occur as a direct result of construction activities or as an indirect impact if invasive plants were accidentally introduced.

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 acre (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.

The area in which the transmission lines would be constructed is located within the Yuha Basin ACEC and 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* (hereafter referred to as the 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 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 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 would be completed as quickly 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. Section 2.2.1.4 provides a list of environmental protection measures.

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 power plants would result 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 the known salinity tolerances of 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, impacts to wetland vegetation were not evaluated. Since the total load of selenium to the New River would be 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 DO 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 only a very small reduction in the water level in the Salton Sea (i.e., –.05 ft [–0.15 m]; 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/or an alternative cooling technology. The following addresses impacts to transmission line routes, the New River, and the Salton Sea from the use of a wet-dry cooling system. Impacts to biological resources from the use of more efficient emissions control technologies would be essentially 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 and operation 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 in Section 4.4.4.1.

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 a wet-dry cooling technology was implemented due to lower water consumption. As described in Section 4.2.5, the use of a wet-dry cooling technology would result in water consumptions less than those identified for the proposed action (wet cooling) alternative. Wet-dry cooling would result in less potential for impacts compared with the wet cooling system under the proposed action. However, impacts to biological resources associated with the New River resulting from implementation of a wet-dry cooling system 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 a wet-dry cooling system was implemented. As described in Section 4.2.5, the use of a wet-dry cooling technology would result in water consumptions less than 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 wet-dry cooling technology alternative 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. Measures that would offset reductions in flow volume in the New River would improve the overall water quality in the New River and ultimately the Salton Sea, and thus have a positive impact on biological resources.

For measures to offset air quality impacts, 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 County Airport, or potential locations for compressed natural gas fast-fill facilities at the Calexico Unified School District and in Brawley. Also, the ICAPCD did not identify specific plans or specific locations of the compressed natural gas facilities, which 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 or the proposed action.

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. 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 those under 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 3.4.2 and 3.4.3. 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.

However, the conditions would be different if neither of the power plants were operating. As described in Section 4.4.3.2, 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

TABLE 4.4-1 Potential Impacts to Special Status Species

Species	Alternatives			
	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.	Same as no action.	Same as no action.	Same as no action.
Algodones Dunes sunflower *Helianthus niveus* ssp. *tephrodes*	No impacts; does not occur within potentially affected area.	Same as no action.	Same as no action.	Same as no action.
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 com-pared to current condition.	Same as proposed action.
Reptiles				
Desert tortoise *Gopherus agassizii*	No impacts; does not occur within potentially affected area.	Same as no action.	Same as no action.	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.	Same as no action.	Same as no action.	Potential for impacts if roads to be paved are within barefoot gecko habitat.
Flat-tailed horned lizard *Phyrnosoma 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 for 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.	Same as no action.	Same as no action.	Same as no action.
Southwestern willow flycatcher *Empidonax traillii extimus*	No impacts; riparian areas unaffected.	Same as no action.	Same as no action.	Same as no action.
Elf owl *Micrathene whitneyi*	No impacts; does not occur within potentially affected area.	Same as no action.	Same as no action.	Same as no action.
Gila woodpecker *Melanerpes uropygialis*	No impacts; riparian areas unaffected.	Same as no action.	Same as no action.	Same as no action.
Bank swallow *Riparia riparia*	No impacts; riparian areas unaffected.	Same as no action.	Same as no action.	Same as no action.

TABLE 4.4-1 (Cont.)

Species	Alternatives: 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 for 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.	Same as no action.	Same as no action.	Same as no action.
Palm Springs ground squirrel *Spermophilus tereticaudus chlorus*	No impacts; not expected to occur within potentially affected area.	Same as no action.	Same as no action.	Same as no action.

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 with 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) and no plants operating. 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. 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 can adapt to and survive in the 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 within the Yuha Basin ACEC and in the Yuha Desert Management Area for the flat-tailed horned lizard, a BLM-designated 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 Strategy (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003) to mitigate the effects of projects in the Yuha Desert Management Area. In addition to particular 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 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 would 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 also eats 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 western burrowing owl, a BLM-designated 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 lines has the potential to affect the burrows of any western burrowing owls in tower locations or in areas that would be traversed by construction vehicles. Mitigation to address this potential effect is identified in Section 2.2.1.4.1. Construction of the transmission lines would not impact western 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 western 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/or an alternative cooling technology. The following 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 and the western burrowing owl 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 with the proposed action.

The alternative cooling technology 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.

Measures that would offset reductions in flow volume in the New River could slightly improve water quality in the New River and Salton Sea and thus could have a small positive impact on biological resources.

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 archaeological 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 area of the projects. 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 area of the projects, 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 BLM-designated Utility Corridor N, 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[5] 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 (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

[5] 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 potential for impacts to archaeological resources would 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 eastern alternative routes have 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 an alternative cooling technology at the 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 or assess cultural resources would depend on the status of cultural resource surveys for the location, the location and NRHP status 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 cultural resources at the Imperial County Airport, or on potential locations for compressed natural gas fast-fill facilities at the Calexico Unified School District and in Brawley. Also, the ICAPCD did not identify specific plans or specific locations of the compressed natural gas facilities, which 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 area of the projects 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-designated 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 BLM-designated Utility Corridor N and would require a plan amendment. 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 active 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 somewhat limited. 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 Basin ACEC. There are no designated camping areas within 10 mi (16 km) east or west 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 soils (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 an alternative cooling technology at the 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 2 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 an alternative cooling technology at the 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 evaluated 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 included 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 shows the actual view of the existing IV-La Rosita lines from observation point 1. Figure 4.8-2 is a simulated 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 VRM 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).

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

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. A number of measures might be used to mitigate the visual impacts of the lines on people traveling along State Route 98, including the reduction of the use of shiny metal surfaces on transmission towers or the treatment of these surfaces to allow blending with prominent desert background colors.

4.8.5 Alternative Technologies

Use of more efficient control technologies and/or an alternative cooling technology at the 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 ICAPCD 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 were 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 was 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 (Lee et al. 1996). 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 the 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 the proposed transmission lines would be generally indistinguishable from background noise (35 dB(A) DNL or less) at locations beyond the edge of the ROW (Lee et al. 1996). During very infrequent rainfall events, the noise level at the edge of the ROW would be less than 39 dBA (Lee et al. 1996). 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 an alternative cooling technology at the 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 were 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 were simply scaled on the basis of the line length for each alternative. Construction workforce data for each alternative were 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 were 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 in-migrating 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). Construction along the proposed routes would create 69 direct jobs. There would be no increase in direct employment for the alternative routes. However, since the 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.

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.

In addition to tax revenues generated by the projects for local and State governments, 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 an alternative cooling technology at the 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; (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 (EMF). 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 were 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 is used exclusively in the impacts section of this EIS.) The field strength at the nearest residence (1.3 mi [2.1 km] to the east of the proposed routes) was estimated to assess the likelihood of adverse effects for residents at that location.

The health impacts analysis related to power plant emissions evaluated 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 SLs 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 HAP emissions were analyzed by preparing a health risk assessment (HRA). As described in Appendix H, the HRA was conducted based on current California Office of Environmental Health Hazard Assessment (OEHHA) risk assessment guidelines (OEHHA 2000), 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 EMF, 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, EMF 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 have 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 up to about 1,000 mG, 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 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; at 300 ft (91 m) from the centerline the magnetic field strength is about 0.8 mG (Lee et al. 1996), 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. In a study of 1,000 randomly selected individuals, only 14% had 24-hour average exposures of greater than 2 mG and less than 1% had 24-hour average exposures greater than 7.5 mG (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 (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; New York's limit for any power line is 200 mG. 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). A summary of studies conducted by Thurston and Ito (1999) documents an approximate 18% increase in the incidence of respiratory-related hospital admissions for each 100-ppb increase in the airborne O_3 concentration.

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 North Carolina Department of Natural Resources [2004]).

4.11.2.3 Particulate Matter

PM is particles found in the air of a certain size range and include liquid droplets. PM may be visible as smoke or haze, but individual particles are generally too small to be seen with the human eye. The composition of PM depends on its source and varies widely. It includes material of inorganic (e.g., dust, and chemical nitrates and sulfates) and organic (e.g., soot) nature. For regulatory purposes, PM is divided into PM_{10}, which is composed of particles nominally 10 µm in mean aerodynamic diameter or less, and $PM_{2.5}$, which is composed of particles nominally 2.5 µm in mean aerodynamic diameter or less. The two fractions have different sources and 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. 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.

PM is a health concern because inhalation of PM can cause respiratory tract irritation and lung disease. It can aggravate asthma and chronic bronchitis. A summary of studies conducted by Pope and Dockery (1999) documents an approximate 3% increase in the incidence of respiratory-related death, hospitalizations, lower respiratory symptoms, and asthma for each 10 $\mu g/m^3$ increase in airborne PM_{10}.

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 H, 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 strengths 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), they range from 5 to 8 mG; at 100 ft (30 m) from the centerline, they range from 1.3 to 2.3 mG; and at 200 ft (61 m) from the centerline, they range 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 proposed transmission routes and for the two alternative routes. For the 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.

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 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.

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 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 of NO_x, PM_{10}, and CO in Imperial County 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. SLs are based on corresponding NAAQS, which have a basis in human health (e.g., the SLs for NO_2, PM_{10}, and CO are 1%, 3%, and 5%, respectively, of the NAAQS). 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 power 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 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 in Imperial County is a particular concern, as noted in several studies (Collins et al. 2003; CDHS 2003). In the years 1995–1997, Imperial County had the highest age-adjusted asthma hospitalization rate for 0–14 year olds of all California counties (556 hospitalizations per 100,000 person years [CDHS 2003]). The rate for the entire Imperial County population was also high (207 hospitalizations per 100,000 person years). Ozone and PM in the region may be contributing factors. However, the operation of the TDM plant and the EBC and EAX export units at the LRPC plant would contribute only minor increases to the O_3 and PM levels in the region, and thus would result in at most a small increase in the asthma problem or other air-quality related health problems (Section 4.3.4.4.2).

On the basis of the results of many studies, it is estimated that for each 10-$\mu g/m^3$ increase in PM_{10}, there is an associated 3% increase in the incidence of respiratory-related death, hospitalizations, lower respiratory symptoms, and asthma (Pope and Dockery 1999). On the basis of this relationship, the maximum modeled increase of 2.45 $\mu g/m^3$ in ambient PM_{10} levels associated with the power plant turbines could be responsible for a 0.735% increase in the incidence of asthma.

To estimate the maximum annual increase in asthma hospitalizations in Imperial County, the overall age-adjusted hospitalization rate of 207 per 100,000 person-years, as reported by the California Department of Health Services (CDHS 2003), was multiplied by the estimated county population for 2003 of 156,600 (State of California 2003). This resulted in an estimate of 323 hospitalizations per year. To estimate the increase in asthma hospitalization incidence potentially due to power plant emissions, the number of cases (i.e., 323) would be increased by 0.735%. Thus, the estimated maximum increase in asthma hospitalizations in Imperial County would be about two to three cases. This is an overestimate, because the 2.45-$\mu g/m^3$ modeled increase is the maximum expected increase averaged over 24 hours at any location in the study area at any time. The annual average concentration increase from plant emissions in Imperial County that should be used in health impact estimates is 0.11 $\mu g/m^3$ (Table 4.3-4). Thus, the expected increase in asthma hospitalizations is less than one case per year.

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 is compared to the significance thresholds based on California risk assessment procedures.

The incremental increase in cancer risk from exposure to HAPs (NH_3 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 NH_3 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 the 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 the TDM plant compared with four at the 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 alternative technologies at the power plants in Mexico would not produce changes in the EMF 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.

The use of CO oxidizers on the TDM and/or LRPC turbines could decrease CO emissions by a factor of about 7 (see Tables 4.3-4 and 4.3-6). However, the estimated CO levels at the maximum modeled receptor points would be less than 2% of the significance level even without the CO oxidizers. At such low levels, the addition of CO oxidizers would not appreciably alter the potential for human health impacts.

In terms of air emissions, the dry cooling phase of a wet-dry cooling system 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 (i.e., they are below SLs), the decrease in PM emissions from the use of a dry cooling phase would result in a minor reduction of adverse impacts. However, 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 VOC) 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.

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 $PM_{2.5}$ and PM_{10} emissions were found to be below SLs 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 DO events that cause episodic fish kills (Section 4.4).

4.12.5 Alternative Technologies

Use of more efficient control technologies and/or an alternative cooling technology at the 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 a wet-dry cooling system could potentially reduce adverse impacts to the Salton Sea compared with the proposed action. However, impacts under either alternative would be minor.

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 area of the projects. This would also be the case for measures taken to offset flow volume reductions in the New River. An assessment of impacts at the census-block level could not be conducted for 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, 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 future 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 permits 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/or an alternative cooling technology); 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. 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 Future Actions.*** The list of past, present, and reasonably foreseeable future actions was 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 future 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 impacts analysis. Foreseeable actions considered are described in Section 5.3 and listed in Table 5.3-1. 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. Section 5.3.7 identifies general trends in the Imperial Valley-Mexicali region and considers their impacts in a qualitative way.

- ***Step 4: Develop the List of Receptors.*** The list of receptors (end points) for the cumulative impacts analysis was 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 were 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 Future Action or Activity.*** For each action identified in Step 3, a description of the potential impacting factors was 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 was conducted for each receptor or category of receptors.

The evaluation considered the impacting factors for the various resource areas and the incremental contribution of the proposed action to the cumulative impact.

The following factors were 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 incorporated 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

TABLE 5.2-1 Regions of Influence for the Cumulative Impacts Assessment

Resource Area	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 Basin ACEC within BLM lands
Land use	Yuha Basin 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

- Proposals that have been submitted to Federal and State regulators to begin the permitting process.

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 relevant general trends in the Imperial Valley-Mexicali region.

TABLE 5.3-1 Reasonably 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[a]	Under way	Water, wildlife, vegetation	New River, Salton Sea
Salton Sea Restoration Project[b]	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[c]	Approved	Air quality, human health	Salton Sea Air Basin

[a] Phase I funding through the Border Environmental Infrastructure Fund was approved by the EPA in June 2004 (BECC 2004a).

[b] This project is still in the planning phase; specific alternatives are still being developed and were not available for analysis.

[c] The Wellton-Mohawk Generating Facility is located 50 mi (80.5 km) east of the Salton Sea Air Basin.

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 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 2003). 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 2003; U.S. Water News 2004). It is expected that approximately 12.9 million ac-ft (1.6×10^{10} m^3) of water would 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 provide for delivery of non-Colorado River water, via exchange, 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) (i.e., to maintain salinity concentrations similar to baseline conditions). 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 (Weghorst 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 2002, 2003a).

As noted above, 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 (Weghorst 2004).

The EIR/EIS (IID 2002) 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 2002). 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 EPA has provided funding to the local utility in Mexicali, the Comisión Estatalde Servicios Publicos de Mexicali, 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). The planned 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 that 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. The EIR/EIS considered impacts under three inflow scenarios, including reductions of up to 560,000 ac-ft/yr (22 m^3/s) (Salton Sea Authority and BOR 2000).

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 on various proposals for restoration of the Salton Sea was delivered to Congress in 2003 (BOR 2003a). 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 (Salton Sea Authority 2003b; 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 the 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 was not possible to include this action as part of the cumulative impacts 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 water body 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 2000).

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 within California. The EPA and the U.S. Section of the International Boundary Water Commission (IBWC) are responsible for ensuring that discharges from Mexico do not violate TMDLs (CRBRWQCB 2002a,b).

TABLE 5.3-2 TMDL Pollutants and Time Lines for the New River and Salton Sea

Water Body	Pollutant/Stressor	Probable Source	Target Date for TMDL Development Start	Target Date for TMDL Development 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/DO	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 the 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 the 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 (CRBRWQCB 2004a). This value was also the standard for DO cited in Minute No. 264 (IBWC 1980).

[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).

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 (157,000 m^3) 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. The DO 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 electricity 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

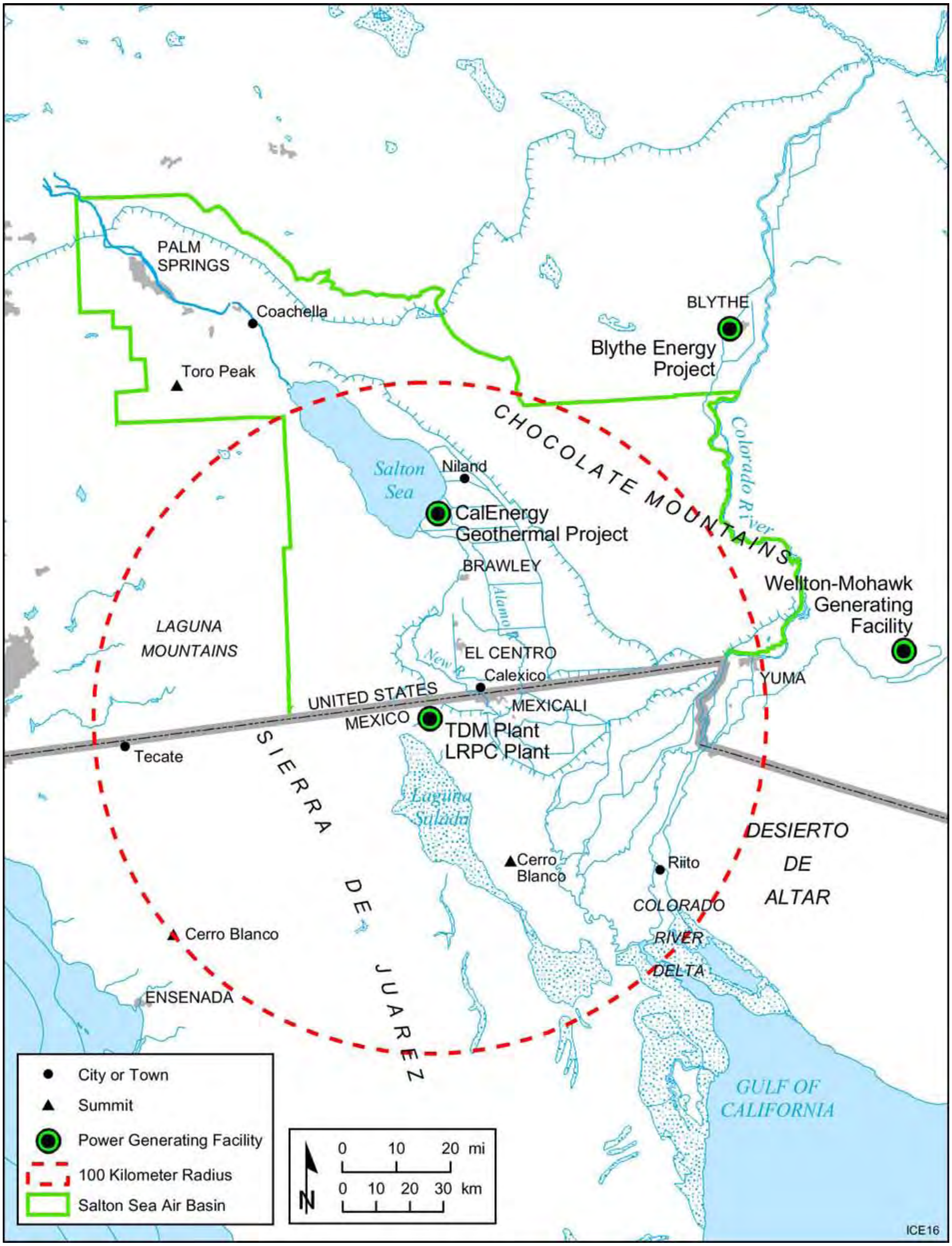

FIGURE 5.3-1 Locations of Reasonably Foreseeable Future Power Plant Projects Potentially Impacting the Salton Sea Air Basin

were conducted, Sempra has no foreseeable plans to add a second power plant to its TDM facility in Mexicali (Simões 2004a).

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 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 that 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 2002; 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 2002, 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 Climatic 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% (TeamNAFTA 2004).

5.3.7.2.2 Water Use Trends. Given the current annual rate of growth (4.9%), the population of Mexicali could reach 996,000 in 5 years; 1,265,000 in 10 years. Along with these population increases, water consumption would also be expected to increase. Discharges to the wastewater treatment facilities in Mexicali, some of which discharge to the New River, could reach as high as 24,000 ac-ft in 5 years; 54,000 ac-ft in 10 years (Tomasko 2004).

5.3.7.2.3 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 2 years due to slowdowns in the United States and world economies in 2002 (Mattson-Teig 2003; TeamNAFTA 2004).

5.3.7.2.4 Trends in Energy Demand. The DOE's Office of Fossil Energy reports that Mexico's energy policy over the next 10 years will focus on expanding the natural gas market and reducing the use of fuel oil (DOE 2003). Although Mexico has abundant petroleum and natural gas reserves, its ability to generate energy is not able to keep pace with the rapid increase in demand, primarily because of lack of funding for infrastructure projects (pipelines, transmission lines, and power plants). Energy consumption is estimated to increase at an annual rate of 2.8% per year through 2010 (DOE 2003); in the Mexicali region, energy consumption is expected to increase by 7.2% between 2002 and 2007 (Aboytes 2003).

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.

5.3.7.2.5 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).

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 postconstruction 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.

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 would 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 added 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 included 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

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
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

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; TDM = Termoeléctrica de Mexicali; TMDL = total maximum daily load.

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.

The cumulative effects of past, present, and future actions 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 (e.g., the Mexicali II Wastewater Treatment Plant, the wetlands construction projects, and the TMDL program) would have a beneficial contribution to cumulative impacts in that they would 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 are 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. However, it 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).

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% Salinity: +0.2–0.3%
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; IID = 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 (2002). 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.

5.4.3 Air Quality

5.4.3.1 Power Plant Emissions

The cumulative impacts 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 reasonably 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,

Power Plant Projects Not Evaluated

Power plant projects in the U.S.-Mexico border region mentioned in the press, on organization Web sites, in organization literature, or in correspondence to DOE and BLM as being proposed or planned were investigated along with avenues of official information such as 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 Comisión Reguladora de Energiá (CRE) has confirmed that neither the 940-MW Energiá Industrial Rio Colorado (San Luis) nor the 500-MW EnviroPower coal-fired plant, cited in the May 2, 2003, court order, will be developed in the border region (Gutierrez 2004).

would be a 185-MW geothermal steam-powered electricity-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 ICAPCD 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 biooxidizers 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 $\mu g/m^3$ of sulfur and maximum annual concentrations of 25.8 $\mu g/m^3$ of NH_3 would 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.

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)[b]	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[c]	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] To convert to metric tons, multiply by 0.9072.

[c] 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. Foreseeable projects like the IID's water conservation and transfer project (and general precipitation trends), 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 be about 20 ft (6 m) and would expose about 51,000 acres (21,000 ha). (This would correspond to about 73% of the lakebed area of Owens Lake, a dry salt lakebed in Inyo County, California, known to be the highest single PM_{10} area source in the United States.) The proposed project could contribute a 65-acre (26-ha) loss and would represent a relatively negligible fraction of other foreseeable projects. 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 the 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).

5.4.3.3 General Trends in Mexico

Over the next decade, the population of Mexicali is expected to increase (Section 5.3.7.2.1). Along with this trend, the numbers of vehicles and industrial activities are also expected to increase. These projected trends would have a negative cumulative effect on the air quality in the border region. Plans for air pollution abatement strategies and initiatives to promote regionally based air quality management programs (e.g., the EPA Border 2012 Program) should offset some of these negative effects.

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 La Rosita Power Complex (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 BOD5.

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 is expected to be minimal. However, combined with other past, present, and future actions, salinity is expected to increase to a point that would adversely impact these species.

5.4.5 Cultural Resources

The cumulative impacts to cultural resources within the Yuha Basin 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 Basin 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 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 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. Over time, these impacts could be disproportionately high and adverse to those populations that rely on the Sea for subsistence fishing. 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 DO 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, would 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 future actions 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; ground disturbance and 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 is expected to 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 Basin 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 Basin 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 could be disproportionately high and adverse to those populations that rely on the Sea for subsistence fishing. 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 DO 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, that would transmit power generated at two facilities in Mexico to the United States power grid. 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 are usual 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 effects 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 than construction of the proposed routes. 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 soils.

6.3 WATER RESOURCES

Using wet cooling during operation of the two power plants in Mexico 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 Termoeléctrica de Mexicali (TDM) and La Rosita Power Complex (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 region of the projects. There would also be exhaust emissions from construction vehicles. Given the small number of vehicles involved, the relatively 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. The amount of any O_3 that could be produced due to the operation of the two plants and 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. Some habitat for the flat-tailed horned lizard and burrows of the western burrowing owl (BLM-designated species of concern) could 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 either 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 destruction of portions of these sites. 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 are no residences and little recreational activity within the area of the projects. 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, the existing character of the landscape would be partially retained. Any visual impact from construction of the new lines along the proposed routes is expected to be moderate. Transmission lines along the alternative routes would diverge from the existing line the most 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, monopoles, 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 road extensions (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] Values include the area of permanent disturbance (201 ft^2) [18.7 m^2] for the footing excavation at each tower.

7.2 WATER

Limited amounts of water would be irretrievably consumed during construction of the transmission lines and in the operation of the power plants in Mexico that would 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). 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 here, 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, the disturbances of the desert soil surfaces 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-designated species of concern), would be lost. However, the implementation of mitigation procedures during construction would make it 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 (Table 7.1-1). The eastern routes would be shorter and would cross 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 destroy portions of these sites. 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 so that they would avoid most areas of 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 also 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 is most likely to occur.

The project area subject to short-term use would be limited to the 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 soils, not currently used for agriculture, could be affected if the proposed transmission lines were built along the western alternative routes. 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 in the short term. Land clearing and construction activities would disperse wildlife and temporarily eliminate some habitats, although mitigation measures should minimize 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 area of the projects, where disturbed biological communities are slow to recover.

The transmission lines and associated access roads and spurs would have only limited effects on the long-term productivity of the natural environment, because these limited effects can be attributed to the relatively small area that the projects would occupy and the 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 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.

If wet cooling is used at the power plants that supply electricity to the transmission lines, long-term use of water would result. 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 are 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	CAA	42 USC §§ 7401 et seq.	EPA	Requires sources to meet standards and obtain permits to satisfy NAAQS, SIPs, NSPS, NESHAPs, and 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 SO_2, NO_x, CO, O_3, Pb, and particulate matter, and emission limits/reduction measures as designated in each state's SIP. **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, 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 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., NRHP-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	65 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	29 USC §§ 651 et seq.	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 §§ 1241–1251	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 §§ 2601 et seq.	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 PCB-contaminated equipment. **Applicability:** Applicable primarily to the construction phase.
	Hazardous materials transportation law	49 USC §§ 5101-5127 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.
	Proposed Construction or Alteration of Objects That May Affect the Navigable Airspace	FAA 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.
	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.

TABLE 9-1 (Cont.)

Resource Category	Statute/ Regulation/Order	Citation	Administering Agency	Permits, Approvals, Consultations, and Notifications
Other (Cont.)	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 ROW 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*; CO = carbon monoxide; 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; NO_x = nitrogen oxides; NPDES = National Pollutant Discharge Elimination System; NRCS = Natural Resources Conservation Service; NRHP = *National Register of Historic Places*; NSPS = New Source Performance Standard(s); NSR = New Source Review; O_3 = ozone; OSHA = Occupational Safety and Health Administration; Pb = lead; PCB = polychlorinated biphenyl; ROW = right-of-way; SHPO = State Historic Preservation Officer; SIP = State Implementation Plan; SO_2 = sulfur dioxide; 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 line projects. The BLM maintains a Protocol Agreement with the California SHPO that outlines the process for consultation between the agencies. BLM's 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 projects between BLM and the California SHPO took place in 2001.

Table 10-1 presents a summary of DOE contacts made during preparation of this EIS. Federally recognized Native American groups were contacted previously by BLM to support analyses included in the EA. Chapter 6 of the EA (DOE 2001a) 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 Wildlife	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 Control 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).

Administrative Procedure Act: The Administrative Procedure Act of 1947 requires agencies to keep the public currently informed of their organization, procedures, and rules; provide for public participation in the rule-making process; prescribe uniform standards for the conduct of formal rule making and proceedings that are required by statute to be made on the record after opportunity for an agency hearing (i.e., adjudicatory proceedings); and restate the law of judicial review. The act applies (with certain exceptions) to every agency and authority of the government.

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.

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.

Alluvial fan: A gently sloping mass of unconsolidated material (e.g., clay, silt, sand, or gravel) deposited where a stream leaves a narrow canyon and enters a valley floor. Viewed from above, it has the shape of an open fan. An alluvial fan can be thought of as the land counterpart of a delta.

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.

Aquifer: A permeable underground formation that yields usable amounts of water to a well or spring. The formation could be sand, gravel, limestone, and/or sandstone.

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.

Area of Critical Environmental Concern (ACEC): An area managed by the Bureau of Land Management (BLM) and defined by the Federal Land Policy and Management Act of 1976 as having significant historical, cultural, and scenic values; habitat for fish and wildlife; and other public land resources, as identified through the BLM's land use planning 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 that 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.

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.

Blowdown: Water that must be removed from the cooling system on a regular basis in order to maintain chemical conditions and efficient operations.

Brackish water: Water that is saltier than freshwater but not as salty as seawater. It may result from mixing of seawater with freshwater, as in estuaries, or it may occur naturally.

Bureau of Land Management (BLM): An agency of the U.S. Department of the Interior that is responsible for managing public lands.

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).

Chemical oxygen demand (COD): COD is the amount of oxygen needed to degrade the organic compounds in a water system; it is typically determined by a standardized test procedure. The higher the COD, the poorer the water quality.

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 EPA must establish the criteria for setting these standards, the regulated pollutants are called criteria pollutants; (3) state implementation plan (SIP) 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 SIP) for achieving and maintaining the 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).

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 NAAQS. The 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 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: Archaeological sites, architectural structures or features, traditional use areas, and Native American sacred sites or special use areas that provide evidence of the prehistory and history of a community.

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.

Dewater: Remove or drain water from an area.

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).

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.

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 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 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 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 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 lake: A lake that becomes dry during the dry season or in particularly dry years.

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.

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 (DO) 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.

Fauna: Animals, especially those of a specific region, considered as a group.

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.

Federal Power Act: This act, as amended in 1935, created the Federal Power Commission and granted it the power to regulate the interstate electricity market as well as utility mergers and the licensing of hydropower projects. The Federal Energy Regulatory Commission is now charged with the administration of this law.

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.

Fugitive dust: The dust released from activities associated with construction, manufacturing, or transportation.

Generation: The act or process of producing electricity from other forms of energy.

Generator: A machine that converts mechanical energy into electrical energy.

Geology: The science that deals with the study of the materials, processes, environments, and history of the Earth, including the rocks and their formation and structure.

Geothermal: Of or connected with the heat inside the Earth.

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 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 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 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 EIS, as well as in the 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.

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.

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.

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 are determined by interacting ecosystems.

Lithic: A stone artifact that has been modified or altered by human hands.

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 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 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.

Maquiladora: A Mexican corporation that operates under a maquila (Mexican In-Bond) program approved by the Mexican Secretariate of Commerce and Industry Development.

Maximum contaminant level (MCL): The highest level of a contaminant that the EPA allows in drinking water.

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.

Migratory Bird Treaty Act: This act requires that the USFWS be consulted to determine the effects of a proposed activity on migratory birds and requires that opportunities to minimize the effects be considered.

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 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.

Mudflat: A flat sheet of mud between the high and low tide marks. Also, the flat bottoms of lakes, rivers, and ponds, largely filled with organic deposits, freshly exposed by a lowering of the water level.

National Ambient Air Quality Standards (NAAQS): Standards defining the highest allowable levels of certain pollutants in the ambient air. Because the 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 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 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 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 NHPA.

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.

Nitrogen oxides (NO_x): Also more correctly known as "oxides of nitrogen." Nitrogen oxides NO_x include the stable oxides of nitrous oxide N_2O, nitrogen dioxide (NO_2) and nitric oxide (NO). Typically NO_x is used to represent NO + NO_2. NO forms when fossil fuels are burned at high temperatures and rapidly undergo further oxidation to NO_2. NO_x reacts with volatile organic compounds (VOC) to form ozone, the main component of urban smog. NO_x also contributes to the formation of acid rain as nitric acid. NO_2 is one of the six criteria air pollutants specified under Title I of the CAA.

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.

Nonattainment area: An area that the EPA has designated as not meeting one or more of the NAAQS for criteria pollutants. An area may be in attainment for some pollutants but not others.

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.

Oxidation lagoon: A shallow pond where sunlight, algae, and oxygen interact to purify wastewater.

Ozone (O_3): The triatomic form of oxygen. In the upper atmosphere, O_3protects the earth from the sun's ultraviolet rays, but in the lower levels of the atmosphere, O_3 is considered an air pollutant. In the lower atmosphere, O_3 is formed primarily from a photochemical reaction between nitrogen oxides and volatile organic compounds. Small amounts of O_3 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.

Perched water table: A water table that is positioned above the normal water table for an area because of the presence of an impermeable rock layer.

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. The abbreviation "pH" stands for poten2 (German power) of hydrogen.

Phosphates: Chemical compounds that contain phosphorous. (See Section 3.2.1.1.2, Water Quality, for more information.)

Phreatophytic plants: Deep-rooted plants that obtain their water supply from groundwater

Physiography: The physical geography of an area or the description of its physical features.

$PM_{2.5}$: Airborne particulate matter with a mean aerodynamic diameter less than or equal to 2.5 μm; regulated under the NAAQS.

PM_{10}: Airborne particulate matter with a mean aerodynamic diameter less than or equal to 10 μm; regulated under the NAAQS.

Potable water: Water that can be used for human consumption.

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.

Prevention of Significant Deterioration (of air quality) (PSD): Regulations established to prevent significant deterioration of air quality in areas that already meet the NAAQS. Among other provisions, cumulative increases in sulfur dioxide, nitrogen dioxide, and PM_{10} 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.

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 EIS. The ROD is prepared in accordance with the requirements of the CEQ 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.

Recharge (of groundwater): The addition of water to an aquifer by natural infiltration (e.g., rainfall that seeps into the ground) or by artificial injection through wells.

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 (RCRA): 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.

Salininty: A measure of the number of grams of material (salts) dissolved in a number of grams of water. It is often referred to as total dissolved solids (TDS).

Scat: The excrement of an animal.

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.

Secondary MCL (SMCL): A secondary maximum contaminant level is a nonenforceable federal limit set for contaminants included in the Secondary Drinking Water Standards. It is set to protect the odor, taste, and appearance of drinking water.

Section 106 process: An 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: A plant or animal species listed by the State or Federal government as threatened, endangered, or as a species of special concern.

Silt: A sedimentary material consisting of fine mineral particles intermediate in size between sand and clay.

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.

Special status species: Special status species include proposed species, listed species, endangered species, and threatened species.

Species of special interest: A species that may have a declining population, limited occurrence, or low numbers for any of a variety of reasons.

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 NHPA.

State Implementation Plan (SIP): A plan developed at the State level and enforceable by the EPA, in which the State explains how it will comply with air quality standards.

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.

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.

Tectonic activity: Rock deforming processes and resulting structures that occur over large sections of the lithosphere (the outer solid part of the Earth, including the crust and the uppermost mantle).

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 USFWS or the National Marine Fisheries Service following the procedures set out in the ESA and its implementing regulations (50 CFR Part 424).

Tile water: Subsurface water that drains via tiles from an irrigated field.

Total dissolved solids (TDS): The concentration of dissolved inorganic chemical constituents (salts) in water.

Total maximum daily load (TMDL): The maximum amount of pollution that a water body can assimilate without violating state water quality standards

Total suspended solids (TSS): A measure of the suspended solids in wastewater, effluent, or water bodies, determined by tests for total suspended nonfilterable solids. Suspended solids are particles of soil, sediment, living material, or dead organisms suspended in water.

Traditional cultural properties: 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.

Turbine: A device in which a stream of water or gas turns a bladed wheel, converting the kinetic energy of the fluid flow into mechanical energy available from the turbine shaft. Turbines are considered the most economical means of turning large electrical generators. They are typically turned by steam, fuel vapor, water, or wind.

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.

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.

Wilderness Study Area (WSA): An area designated by a Federal land management agency as having wilderness characteristics, thus making it worthy of consideration by Congress for wilderness designation.

Wind rose: A circular diagram showing the percentage of time the wind is from each compass direction for a specific location.

Zero-liquid discharge (technology): A technology that minimizes wastewater production, maximizes reuse, and employs evaporation (solar ponds or mechanical evaporators) to eliminate the remaining wastewater produced.

APPENDIX A:

COURT ORDERS

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COURT ORDERS

This appendix contains the court orders issued on May 2, 2003, and July 8, 2003, by the United States District Court, Southern District of California (Case No. 02-CV-513-IEG (POR)), in the case of the Border Power Plant Working Group versus the U.S. Department of Energy and the Bureau of Land Management.

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FILED

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CLERK, U.S. DISTRICT COURT
SOUTHERN DISTRICT OF CALIFORNIA

BY: [signature] DEPUTY

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF CALIFORNIA

BORDER POWER PLANT WORKING GROUP, Plaintiff, vs. **DEPARTMENT OF ENERGY; SPENCER ABRAHAM, in his official capacity; CARL MICHAEL SMITH, in his official capacity; ANTHONY J. COMO, in his official capacity; BUREAU OF LAND MANAGEMENT,** Defendants.	CASE NO. 02-CV-513-IEG (POR) **ORDER (1) GRANTING IN PART AND DENYING IN PART PLAINTIFF'S MOTION FOR SUMMARY JUDGMENT; (2) GRANTING IN PART AND DENYING IN PART DEFENDANT'S MOTION FOR SUMMARY JUDGMENT; (3) DENYING DEFENDANTS' MOTION TO STRIKE PLAINTIFF'S DECLARATIONS; (4) DENYING DEFENDANTS' ORAL MOTION TO SUPPLEMENT THE ADMINISTRATIVE RECORD; (5) GRANTING PLAINTIFF'S MOTION TO STRIKE SUPPLEMENTAL DECLARATION AND REQUEST FOR JUDICIAL NOTICE; and (6) SETTING BRIEFING SCHEDULE FOR THE REMEDY PHASE OF THE MOTIONS FOR SUMMARY JUDGMENT** [Doc Nos. 44, 56, 59, 85]

Presently before the Court are cross-motions for summary judgement, federal defendants' motion to strike plaintiff's declarations, defendants' oral motion to supplement the record, and

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plaintiff Border Power Plant Working Group's motion to strike amicus Termoelectrica U.S.'s request for judicial notice and supplemental declaration. For the reasons discussed below, the Court denies in part and grants in part both motions for summary judgment, denies federal defendants' motions to strike and to supplement the record, and grants plaintiff's motion to strike.

BACKGROUND

I. Factual Background[1]

This case involves two applications for Presidential Permits and federal rights-of-way to build electricity transmission lines within the United States and across the United States-Mexico border to connect new power plants in Mexico with the power grid in Southern California.

1. <u>The BCP Permit and Right-of-Way</u>

In February 2001, Baja California Power ("BCP"), a wholly-owned subsidiary of Intergen Aztec Energy ("Intergen"), applied to defendant U.S. Department of Energy ("DOE") for a Presidential Permit to construct and operate an electric power transmission line across the international border between the United States and Mexico near El Centro, California. (<u>See</u> Pla's Statement of Undisputed Facts ("PSUF") at ¶ 1; Defs' Statement of Undipsuted Facts ("DSUF") at ¶ 2).[2] In particular, the BCP transmission line will connect the Imperial Valley electric substation in Imperial County, California to a new power plant called the La Rosita Power Complex ("LRPC") under construction just west of Mexicali, Mexico. <u>See</u> DOE-33, 202165-202167, DOE-101, 204344.[3] The connection will be made via another transmission line being constructed in Mexico by Energía de Baja California ("EBC"), a wholly-owned subsidiary of Intergen. <u>See</u> DOE-101 at 204320; DOE-33 at 202167; PSUF at ¶ 2. The LRPC is being built by EBC and another

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[1]The administrative record ("AR" or "record") is a compilation of documents relied upon by the agencies in making their challenged decisions and sets forth the material facts in this case.

[2]BCP also applied to the Bureau of Land Management ("BLM") for a right-of-way across federal land to build the transmission line. Although the Presidential Permits at issue were issued by the DOE and the rights-of-way were issued by the BLM, both agencies relied upon the same environmental analysis documents. Additionally, the parties focused their briefing almost entirely on the DOE's issuance of the Presidential Permits. For convenience, the Court will follow suit and refer primarily to the DOE permits, although the Court's analysis applies to both agencies' decisions.

[3]The Court will cite to the Administrative Record by referring to either the DOE or Bureau of Land Management ("BLM") document number and then to a bates number.

wholly-owned subsidiary of Intergen, Energia Azteca X ("EAX"). DOE-33 at 202167; PSUF at ¶ 2. The LRPC will house four gas-fired combustion turbines. DOE-101 at 204320. EBC will own one of these turbines and EAX will own the remaining three. Id. Two of the EAX turbines, with a combined output of approximately 500 megawatts ("MW"), will provide power to Mexico, while the third EAX turbine and the single EBC turbine will export a combined, nominal[4] 560 MW of power to the United States. DOE-101 at 204320, 204402, 204404. However, the BCP transmission line will be able to transport power generated by any of the turbines at the LRPC. DOE-101 at 204320 n.2 (noting that while exported power may in limited circumstances from one of the two turbines designated for Mexican energy production, the total amount of power exported would not rise above a nominal 560 MW). Each of the double circuit lines proposed by BCP would have a capacity of 600 MW. DOE-033 at 202168. The lines are to be constructed in two phases, with the second circuit only strung when business or economic circumstances make possible the expansion of the EBC facility, or to meet the additional transmission needs of the EAX turbines. Id. at 202167-212168.

The EBC turbine and the EAX export turbine utilize dry low-NOx (oxides of nitrogen) combustor technology and selective catalytic reduction ("SCR") technology that reduce NOx emissions to 4 parts per million ("ppm"). DOE-101 at 204402, 204404. Carbon Monoxide (CO) emissions from the EBC turbine and the EAX export turbine would be not be controlled and would emit at 30 ppm. DOE-101, 204404, 204321, 204344. Annual emissions from the EBC turbine and the EAX export turbine would be 282 tons of NO_2 (nitrogen dioxide), 924 tons of CO, and 410 tons of PM-10 (particulate matter less than 10 microns in size). DOE-101 at 204401.

The administrative record does not suggest that the remaining two EAX turbines at the LRPC will be built with emissions control technology for NOx or CO. DOE-101 at 204321,

[4]The parties explained at oral argument that "nominal" power output refers to the output of a plant when just the primary cycle of the plant is operating. Because these turbines are combined-cycle, they apparently achieve a "maximum" power output by using their secondary cycle.

204344.[5] Accordingly, these turbines will emit at 25 ppm for Nox and 30 ppm for CO. DOE-101, 204321. Annual emissions from these two EAX turbines would be 1,502 tons of NO_2, 957 tons of CO, and 314 tons of PM-10. DOE-101 at 204401.

2. The Termoelectrica-US ("T-US") Permit and Right-of-Way

On March 1, 2001, Sempra Energy Resources (SER) filed an application for a Presidential permit to construct and operate a separate transmission line that would facilitate the transmission of electricity across the U.S.-Mexico border. See DOE-35 at 202186-202187. In particular, the SER application sought permission to build a line that would connect the Imperial Valley electric substation to the Termoelectrica de Mexicali ("TDM") power plant under construction near Mexicali, Mexico. DOE-35 at 202186-202187. The connection will be made via another transmission line being constructed in Mexico by TDM. DOE-35 at 202187. TDM is a wholly-owned subsidiary of Sempra Energy. DOE-35 at 202188. The TDM plant would export 100 percent of its net generating capacity to the United States. DOE-101 at 204344. The TDM facility consists of two gas-fired combustion turbines. DOE-101 at 204320. Although the TDM facility is only permitted by Mexican authorities to generate a nominal 500 MW, DOE-35 at 202188,[6] SER indicated that it intended the possible second circuit of the transmission line to have the potential to export up to another nominal 500 MW. DOE-36 at 202196; DOE-35 at 202188.

The TDM facility would be equipped with emission control technology, including dry low-NOx combustor technology, SCR, and oxidizing catalyst systems, to reduce Nox and CO emissions. DOE-101 at 204402. The TDM facility would thus emit 2.5 ppm for NOx and 4.0 ppm for CO. DOE-101 at 204402, 204321. Based on 600 MW of energy output, the TDM facility would annually emit 170 tons of NOx, 165 tons of CO, and 216 tons of PM-10. DOE-101 at 204401.

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[5]Defendants argue that Intergen has announced since the issuance of the Presidential Permits that all of the Intergen turbines will use emissions control technology for NOx. (See DSUF at ¶ 23). However, based on defendants own arguments in their motion to strike, the Court will focus on the information available in the record as it stood at the time that defendants made the finding of no significant impact.

[6]The AR also indicates, however, that TDM is intended to export 600 MW to the U.S. DOE-101, 204321.

Concentrations of pollutants at the U.S. Mexico border due to emissions from the TDM facility are predicted to increase as follows: NOx (annual) 0.09 μg/m³; CO (8-hour) 2.16 μg/m³; PM-10 (hourly) 1.12 μg/m³; PM-10 (annual) 0.11 μg/m³. DOE-101 at 204403. When combined with total emissions predicted from the entire LRPC, the concentrations of pollutants at the U.S./Mexico border are expected to rise as follows: NO2 (annual) 0.8 μg/m³; CO (1-hour) 70.0 μg/m³; CO (8-hour) 30.8 μg/m³; PM-10 (24-hour) 4.5 μg/m³; PM-10 (annual) 0.3 μg/m³. DOE-101 at 204439.

II. Procedural Background

After undertaking an environmental assessment of the applications for the Presidential Permits and the BLM rights-of-way, DOE and BLM each issued a Finding of No Significant Impact ("FONSI") in December 2001. DOE-103; BLM-182 (FONSI for BCP right-of-way); BLM-183 (FONSI for SER right-of-way). DOE issued Presidential Permits to BCP and SER on December 5, 2001. DOE-104 at 204612; DOE-105 at 204618. BLM granted a right-of-way to BCP that became effective on December 28, 2001, and another right-of-way to SER that became effective on December 31, 2001. BLM-189 at 102333; BLM-186 at 102290. The Presidential Permit and the right-of-way issued to SER were subsequently transferred to T-US, a subsidiary of Sempra Energy. DOE-125S at S24897; BLM-207S at S102612.

Plaintiff filed a motion for summary judgment, alleging various violations of the National Environmental ~~Protection~~ Policy Act ("NEPA") and the Administrative Procedure Act ("APA") on January 31, 2003. The federal defendants filed a cross-motion for summary judgment and an opposition to plaintiff's motion on March 13, 2003. Amicus curiae briefs were filed by BCP, T-US, and Imperial County and City of El Centro. Plaintiff responded to the BCP and T-US briefs on April 4, 2003, and both plaintiff and the federal defendants replied to the other's opposition brief. The federal defendants have also moved separately to strike extra-record materials. Finally, plaintiff's moved to strike T-US's request for judicial notice and supplemental declaration.

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DISCUSSION

III. Preliminary Issues

Before reaching the merits of the case, the Court must first determine whether it has jurisdiction and what evidence it can consider. First, the Court will briefly consider whether it has proper jurisdiction.

A. Standing

Although defendants do not challenge plaintiff's standing, the Court has an independent duty to assure itself that it has jurisdiction over the case. Plaintiff has submitted several declarations to demonstrate its standing.

1. Legal Standards

a. Traditional Standing

Because standing is "an essential and unchanging part of the case-or-controversy requirement of Article III," the Court does not have jurisdiction in its absence. Lujan v. Defenders of Wildlife, 504 U.S. 555, 560 (1992). The "irreducible constitutional minimum" of standing contains three elements. Id. First, the plaintiff must have suffered an "injury in fact." Id. The Supreme Court's opinions have defined such an injury as "an invasion of a legally protected interest which is (a) concrete and particularized. . .and (b) actual or imminent, not conjectural or hypothetical." Id. (internal quotations omitted). Second, the injury must be fairly traceable to the challenged action of the defendants. See id. Third, it must be "likely, as opposed to merely speculative, that the injury will be redressed by a favorable decision." Id. at 561 (internal quotations omitted). Each of these elements must be supported by the plaintiff with the same manner and degree of evidence required to show any other matter at the present stage of the litigation. Id.

With regard to the "imminence" of the injury in fact, the plaintiff must show that the injury is "*certainly* impending." Id. at 564, n.2 (emphasis in original). The goal is to avoid conferring standing on a party on which no injury would have occurred at all in the absence of judicial action. Id. In the end analysis, the Court warns that standing "is not 'an ingenious academic exercise in the conceivable.'" Id. at 566 (citing United States v. Students Challenging Regulatory Agency

Procedures, 412 U.S. 669, 688 (1973)).

The requirement that the injury is particularized means that "[t]he plaintiff must have a personal stake in the outcome." Id. at 583. To be concrete, the injury must be more than "abstract." Id. Rather, plaintiff must demonstrate that it has "sustained or is immediately in danger of sustaining some direct injury as the result of the challenged statute or official conduct." Id. (internal quotation omitted).

b. Procedural Standing

In Lujan v. Defenders of Wildlife, the Court recognized that its analysis would differ if it was faced with a case in which "plaintiffs are seeking to enforce a procedural requirement the disregard of which could impair a separate concrete interest of theirs (*e.g.*,. . .the procedural requirement for an environmental impact statement before a federal facility is constructed next door to them)." Id. at 572. Although the Court rejected the argument that the injury-in-fact requirement is satisfied by "congressional conferral upon *all* persons of an abstract, self-contained, noninstrumental 'right' to have the Executive observe the procedures required by law," id. (emphasis in original), it also recognized that "procedural rights" are special and should be accorded different treatment under the standing analysis:

> The person who has been accorded a procedural right to protect his concrete interests can assert that right without meeting all the normal standards for redressability and immediacy. Thus, under our case law, one living adjacent to the site for proposed construction of a federally licensed dam has standing to challenge the licensing agency's failure to prepare an environmental impact statement, even though he cannot establish with any certainty that the statement will cause the license to be withheld or altered, and even though the dam will not be completed for many years.

Id. at 572, n.7. The Lujan Court explained that the case before it differed from its hypothetical case because the Lujan plaintiffs sought procedural standing for persons who had no concrete interests affected. Id. In terms of the Court's hypothetical, these would be people who live on the other side of the country from where the proposed dam would be built. Id.. In sum, the Court held that an individual can enforce procedural rights "so long as the procedures in question are designed to protect some threatened concrete interest of his that is the ultimate basis of his standing." Id. at 573.

The Ninth Circuit has determined that the Lujan case requires a plaintiff to show two essential elements for procedural standing: "(1) that he or she is a person who has been accorded a procedural right to protect [his or her] concrete interests. . . and (2) that the plaintiff has some threatened concrete interest ... that is the ultimate basis of [his or her] standing." Douglas County v. Babbitt, 48 F.3d 1495, 1500 (9th Cir. 1995) (internal citations omitted). Additionally, "plaintiffs must show that their interest falls within the 'zone of interests' that the challenged statute is designed to protect." Id. at 1500-01.

The Ninth Circuit has found in several cases that a procedural injury can form the basis for standing. See, e.g. Pacific Northwest Generating Coop. v. Brown, 25 F.3d 1443, 1450 (9th Cir.1994) (plaintiffs with an economic interest in preserving salmon have procedural interest in ensuring that the ESA is followed); Friends of the Earth v. United States Navy, 841 F.2d 927, 931-32 (9th Cir.1988) (residents who live near site of proposed port have procedural standing to sue for Navy's alleged failure to follow permitting regulations); State of California v. Block, 690 F.2d 753, 776 (9th Cir.1982) (state of California has procedural standing to challenge the adequacy of an EIS for forest service's land allocation); City of Davis v. Coleman, 521 F.2d 661, 671 (9th Cir.1975) (city located near proposed freeway interchange has procedural standing to challenge agency's failure to prepare an EIS).

c. Organizational Standing

An association has standing to bring suit on behalf of its members when "(a) its members would otherwise have standing to sue in their own right; (b) the interests it seeks to protect are germane to the organization's purpose; and (c) neither the claim asserted nor the relief requested requires the participation of individual members in the lawsuit." Hunt v. Washington State Apple Adver. Comm'n, 432 U.S. 333, 343 (1977).

2. Application to This Case

Plaintiff claims that five of the eight declarations it submitted in conjunction with its motion for summary judgment support plaintiff's standing. (See Declarations of Marie Barrett, Carlos Yruretagoyena Ugalde, Fernando Armando Medina-Robles, Kimberly Collins, and William Powers). All five are members of the plaintiff organization. Four of the five live either in Imperial County, U.S.A., or Mexicali, Mexico, near the transmission lines and power plants at issue. Based on their proximity to the project and the procedural requirement under NEPA to evaluate whether the project will have a significant impact on the environment, it seems clear that at least four of the members submitting declarations have procedural standing to sue in their own right. Furthermore the interest that the plaintiff seeks to protect - the public health and quality of the environment in that region - are germane to the plaintiff's purpose. (See Powers Decl. at 2 ("[Plaintiff organization's] membership is composed of United States and Mexican citizens who share a concern for the environmental health of the border region."). Finally, because the standing to sue is common to at least four of the members who submitted declaration, it is clear that no one member's participation is required in the lawsuit other than to supply the declaration that confers standing. Accordingly, it appears that plaintiff has satisfactorily demonstrated by a preponderance of the evidence that it has organizational standing to proceed in this suit.

B. Extra-Record Materials

As a second preliminary matter, the Court must determine what facts may properly form the basis of its decision. Plaintiff's cause of action arises under the Administrative Procedure Act ("APA"), 5 U.S.C. § 701 et seq. In general, actions under the APA are based on judicial review of the administrative record on which the agency relied in reaching the decision at issue. See 5 U.S.C. § 706. Defendants complain that plaintiff has filed eight extra-record declarations, each of which post-dates the final decision made by defendants in this case. (See generally Defs' Mem. in support of Motion to Strike). Accordingly, defendants move to strike these declarations. At the same time, Defendant-Intervenors T-US and BCP have submitted extra-record declarations in support of their respective amicus briefs. Finally, amici County of Imperial and City of El Centro have lodged several documents that they believe require judicial notice.[7]

The APA directs that "the court shall review the whole record or those parts of it cited by a party." 5 U.S.C. § 706. The Ninth Circuit has interpreted this command in the following way:

> Generally, judicial review of agency action is limited to review of the administrative record. *Friends of the Earth v. Hintz*, 800 F.2d 822, 828 (9th Cir.1986). In *Florida Power & Light Co. v. Lorion*, 470 U.S. 729, 105 S.Ct. 1598, 84 L.Ed.2d 643 (1985), the Supreme Court

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[7]The Court discusses T-US's supplemental declaration and request for judicial notice separately to provide a fuller context for that discussion. See Section VI(A), infra.

> emphasized that when reviewing administrative decisions:
> "[T]he focal point for judicial review should be the administrative record already in existence, not some new record made initially in the reviewing court." The task of the reviewing court is to apply the appropriate APA standard of review, 5 U.S.C. § 706, to the agency decision based on the record the agency presents to the reviewing court.
> *Id.* at 743-44, 105 S.Ct. at 1607 (quoting *Camp v. Pitts,* 411 U.S. 138, 142, 93 S.Ct. 1241, 1244, 36 L.Ed.2d 106 (1973)). This standard is applicable to review of agency action under NEPA. *Hintz,* 800 F.2d at 829.
>
> However, certain circumstances may justify expanding review beyond the record or permitting discovery. *See, e.g., Public Power Council v. Johnson,* 674 F.2d 791, 793 (9th Cir.1982). The district court may inquire outside the administrative record when necessary to explain the agency's action. *Id.* at 793-94. When such a failure to explain agency action effectively frustrates judicial review, the court may "obtain from the agency, either through affidavits or testimony, such additional explanation of the reasons for the agency decision as may prove necessary." *Camp v. Pitts,* 411 U.S. 138, 143, 93 S.Ct. 1241, 1244, 36 L.Ed.2d 106 (1973). The court's inquiry outside the record is limited to determining whether the agency has considered all relevant factors or has explained its course of conduct or grounds of decision. *Hintz,* 800 F.2d at 829.
>
> The district court may also inquire outside of the administrative record "when it appears the agency has relied on documents or materials not included in the record." *Public Power Council [v. Johnson],* 674 F.2d [791] at 794 [9th Cir. 1982]. In addition, discovery may be permitted if supplementation of the record is necessary to explain technical terms or complex subject matter involved in the agency action. *Id.*

Animal Defense Council v. Hodel, 840 F.2d 1432, 1436 (9th Cir. 1988) as amended by Animal Defense Council v. Hodel, 867 F.2d 1244 (9th Cir. 1989); see also Hells Canyon Preservation Council v. Jacoby, 9 F. Supp. 2d 1216, 1223 (D. Ore. 1998).

Plaintiff argues that its three scientific declarations fall within these exceptions. (See Pla's Opp'n to Defs' Mot. to Strike at 3).[8] First, plaintiff argues that the declarations demonstrate relevant factors (including impacts on air, water, and human health) that DOE did not adequately consider. (Id.). Second, they argue that the declarations help to explain technical terms essential to the case. (Id. at 4). Because it is not the Court's job to "resolve disagreements among various scientists as to methodology," the Court will not consider the declarations to the extent they seek to simply advocate a better or different methodology for assessing environmental impacts already analyzed in a reasonable manner by defendants. See Friends of Endangered Species, Inc. v. Jantzen, 760 F.2d 976, 986 (9th Cir. 1985). Neither may post-decisional documents be used to

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[8]Plaintiff argues that the remaining five declarations are submitted only to preemptively demonstrate standing. The Court finds that this is a permissible use of these five declarations and will consider them only to the extent that they bear on plaintiff's standing.

object to or support the federal actions for the first time. See Havasupai Tribe v. Robertson, 943 F.2d 32, 34 (9th Cir. 1991); Association of Pacific Fisheries v. EPA, 615 F.2d 794, 811-812 (9th Cir. 1980). However, to the limited extent that these declarations provide information falling within one of the established exceptions to the general rule that the review will be confined to the record, the Court will consider them. See Sierra Club v. Babbitt, 69 F. Supp. 2d 1202, 1209 (E.D. Cal. 1999) (finding extra-record declarations permissible and helpful in understanding the factual complexities of the case). If the Court relies on any of these extra-record documents, it will provide a citation to that document and explain the exception under which it considers the document. The Court will treat the extra-record materials submitted by the amici in the same manner. Accordingly, the Court declines to adopt the bright line rule urged by defendants, and denies their motion to strike plaintiff's extra-record declarations.

IV. Threshold Question: Are the Power Plants Within the Scope of the NEPA Review?

As a threshold matter, the Court must first determine the scope of the environmental review required by NEPA to determine whether the construction of the power plants is within that scope. Plaintiff assumes in its arguments that the actions whose impacts must be analyzed include not only the construction and operation of the actual transmission lines, but also the operation of the power plants in Mexico to which the lines will be connected. In fact, all, or at least the vast majority, of the complaints of impacts to air quality, water quality, and human health set forth by plaintiff are actually caused by the power plants. (See generally Pla's Mem. at 1:21-28). Because of this, amicus BCP argues that if the "action" at issue here is narrowly limited to the construction and operation of the transmission lines, without regard to the generation of the power, and the emissions of the power plants are not "effects" of that action, then plaintiff's complaints are immaterial to the permits at issue.

NEPA requires a federal agency to prepare an environmental impact statement (EIS) for all "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(2)(C). The Council for Environmental Quality (CEQ), which is charged with implementing NEPA, has defined a "major federal action" as including "actions with effects that may be major and which are potentially subject to Federal control and responsibility." 40 C.F.R. § 1508.18. Similarly, defendant Department of Energy has defined "action" for NEPA purposes as "a project, plan, or policy . . . that is subject to DOE's control and responsibility." 10 C.F.R. § 1021.104(b). BCP argues that the latter definition necessarily excludes the Mexican power plants from the scope of the action because these plants are outside the regulatory jurisdiction of the United States. (See BCP Brf. at 6).

The first key question under the regulatory definitions is whether the plants will be "projects" that are "subject to [Federal] control and responsibility." 10 C.F.R. § 1021.104(b). Clearly, they are not because they are outside the jurisdiction of the United States. Accordingly, defendants correctly did not include the power plants themselves when defining the scope of the proposed action. DOE-101 at 204328.

Nonetheless, the environmental analysis of the actions might still require consideration of the operation of the power plants if such operation constitutes an "adverse environmental effect" of the granting of the permit to construct and operate the transmission lines. 42 U.S.C. § 4332(C)(ii). NEPA's implementing regulations define "effects" and categorize them as "direct" or "indirect." 40 C.F.R. § 1508.8(a). "Direct effects" are those "which are caused by the action and occur at the same time and place." Id. "Indirect effects" are those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." Id. Thus, as BCP notes, the question is one of causation. (BCP Brf. at 6).

The question of whether the power plants are effects of the proposed action is central to assessing both the legality of the FONSI and to assessing the adequacy of the environmental assessment (EA). First, in deciding whether to prepare an EIS, an agency must consider "significant indirect effects." Sylvester v. U.S. Army Corps of Engineers, 884 F.2d 394, 400 (9th Cir. 1989). Second, the question of the adequacy of the EA's analysis of the air impacts, water impacts, and alternatives of the proposed actions, depend on whether the plants' adverse environmental impacts are effects of the proposed transmission lines.

The Sylvester court created the following analogy to address the scope of "effects" of a

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proposed action that must be discussed in environmental analyses:

> Environmental impacts are in some respects like ripples following the casting of a stone in a pool. The simile is beguiling but useless as a standard. So employed it suggests that the entire pool must be considered each time a substance heavier than a hair lands upon its surface. This is not a practical guide. A better image is that of scattered bits of a broken chain, some segments of which contain numerous links, while others have only one or two. Each segment stands alone, but each link within each segment does not.

Id. at 400. Employing this analogy, the Sylvester court held that in order for an agency to be required to consider secondary (indirect) and cumulative impacts (or effects) of an action other than the proposed action under NEPA, the proposed action and the second action must be "two links of a single chain." Id. In so holding, the Sylvester court collected and analyzed the prior cases discussing the question in the Ninth Circuit. Id. (citing Port of Astoria, Oregon v. Hodel, 595 F.2d 467, 480 (9th Cir.1979) (agency's EIS had to consider the supply of federal power and the construction of a private magnesium plant that used the power); Thomas v. Peterson, 753 F.2d 754, 761 (9th Cir.1985) (agency's EIS had to consider both a federal road and the federal timber sales that the road would facilitate); and Colorado River Indian Tribes v. Marsh, 605 F.Supp. 1425, 1433 (C.D.Cal.1985) (agency had to prepare an EIS that considered both the federal action of stabilizing a river bank and the private housing built as a result)); see also id. at 401 (citing Friends of the Earth v. Hintz, 800 F.2d 822, 832 (9th Cir.1986) (agency considered only filled wetlands and not other aspects of a harbor facility in deciding not to prepare an EIS); Enos v. Marsh, 769 F.2d 1363, 1371-72 (9th Cir.1985) (agency's EIS did not have to consider non-federal shore facilities for a new deep draft harbor); Friends of Earth, Inc. v. Coleman, 518 F.2d 323, 328 (9th Cir.1975) (agency did not have to prepare an EIS for state funded projects in a partially federally funded airport development)). The court concluded that these cases did not mandate a different result because "[t]he federal and private portions of the projects considered in these cases were joined to each other (links in the same bit of chain) in a way that the golf course [the proposed action under consideration in Sylvester] and the remainder of the resort complex (a separate segment of chain) are not." Id.

Importantly, the basis for the Sylvester court's determination of whether two related actions constituted links of a single chain involved determining whether "each [action] could exist without the other." Id. It was not enough that the actions might be related or that each "might benefit from the other's presence." Id. Accordingly, the question in the present case narrows to whether the transmission lines and the power plants at issue would exist in the absence of the other.

Somewhat confusingly, the Sylvester court cites two other Ninth Circuit cases in a footnote, dismissing them because they involved "the impact of federal action rather than the scope of federal action." Id. at 401 n.3 (citing Methow Valley Citizens Council v. Regional Forester, 833 F.2d 810, 816 (9th Cir.1987) and City of Davis v. Coleman, 521 F.2d 661, 671 (9th Cir.1975)). While it is clear, as the Sylvester court implies, that the scope of the proposed action and the impacts of that action are separate questions under NEPA, this appears confusing only because "scope" may also refer to the variety of impacts that a sufficient EA or EIS must address. It is helpful to differentiate then between the scope of the proposed action and scope of the NEPA review. Thus, in the present case, the proposed action does not include the operation of the Mexican power plants. The question remains, however, whether the operation and emissions of those plants must be included within the scope of the NEPA review because they are effects of the proposed federal action. It seems to the Court that many of the cases cited by Sylvester court involved both the impact (or effects) of a proposed federal action and the scope of the action. While those cases treated the two concepts as coextensive, this Court finds the cases relevant to the present inquiry only to the extent that they discuss the effects of the proposed action. Thus, the two additional cases cited by Sylvester dealing exclusively with the effects of federal action are central to the present analysis.

First, in Methow Valley Citizens Council v. Regional Forester, 833 F.2d 810, 816 -817 (9th Cir. 1987), rev'd on other grounds, Robertson v. Methow Valley Citizens Council, 490 U.S. 332 (1989), the court first emphasized that NEPA does not recognize any distinction between primary and secondary effects when requiring environmental review of the effects. Id. at 816. In discussing how proximate any effects must be to the proposed action to require their inclusion in the NEPA analysis, the Court held:

> This court would not require the government to speculate on impacts in order to "foresee the unforeseeable". *See City of Davis v. Coleman,* 521 F.2d 661, 676 (9th Cir.1975). However, [i]t must be remembered that the basic thrust of an agency's responsibilities under NEPA is to predict the environmental effects of proposed action before the action is taken and those effects fully known. Reasonable forecasting and speculation is thus implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as "crystal ball inquiry". *Id.* at 676 (quoting *Scientists' Institute for Public Information v. A.E.C.,* 481 F.2d 1079, 1092 (D.C.Cir.1973)). Thus we find it imperative that the [agency] evaluate the reasonably foreseeable significant effects which would be proximately caused by implementation of the proposed action.

Id. at 816-817. Similarly, though perhaps more narrowly, the court in City of Davis v. Coleman, found that effects must be included in the environmental review when the action is an "indispensible prerequisite" or an "essential catalyst" to the effects. 521 F.2d 661, 674 (9th Cir. 1975).

More recently, the Ninth Circuit reaffirmed that an agency may "limit the scope of its NEPA review to the activities specifically authorized by the federal action where the private and federal portions of the project could exist independently of each other." Wetlands Action Network v. U.S. Army Corps of Engineers (WAN), 222 F.3d 1105, 1116 (9th Cir. 2000). In general that Court instructed that "deciding whether federal and non-federal activity are sufficiently interrelated to constitute a single federal action for NEPA purposes will generally require a careful analysis of all facts and circumstances surrounding the relationship." Id. (internal quotations omitted).[9]

The WAN court faced a situation, like here, where the federal agency did not have independent jurisdiction over the non-federal action that was a potential effect of the proposed action. See id. at 1117.[10] Furthermore, the court found that the non-federal action "certainly *could*

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[9]Although the WAN court describes the federal and non-federal activity as a "single federal action for NEPA purposes," this Court's understanding of the holding is not that the private activity may fall within the scope of the proposed action, but rather that the private activity might constitute an effect of the proposed action and therefore fall within the scope of NEPA review.

[10]For this reason, cases involving whether the impact of "connected actions" have to be considered together under NEPA are inapposite to the case at bar. Cf. Save the Yaak Committee v. Block, 840 F.2d 714, 719 (9th Cir. 1988) (analyzing whether separate federal actions involving logging

proceed without the [federal action] and. . .is currently proceeding without the [federal action]." Id. The non-federal action at issue in WAN, as here, was not financed by federal funding, and federal regulations did not control the design of the non-federal action. Id. Finally, the WAN court derived comfort from the fact that the non-federal action had already been subjected to extensive state environmental review. Id.

In sum, Ninth Circuit precedent makes clear that effects must be causally linked to the proposed federal action in order for NEPA to require consideration of those effects in an EA or EIS. In the present case, only BCP puts much weight on the argument that the power plant emissions are not effects of the transmission line project. BCP's principle argument is that the power transmission lines are not a but-for cause of the LRPC emissions because the LRPC would generate some of its power for the Mexican market without regard to whether the transmission lines are completed, and it could send its export power through the Mexican power grid to the United States via an alternative transmission line. (See BCP Brf. at 9-10). Amicus T-US does not make the same argument, presumably because the TDM plant will only be producing power for export to the United States, and the only planned transmission line connecting that plant is the one requiring the permit under consideration. The federal defendants appear to concede, both in the EA itself and their briefs, that they were required to analyze to some extent the impacts of the power plants,[11] although they argue, correctly, that the power plants are not within the scope of the proposed action.

Plaintiff argues that the BCP and T-US permits should not be separately analyzed because

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operations must be considered cumulatively under NEPA regulations governing "connected actions"); Thomas v. Peterson, 753 F.2d 754, 758 (9th Cir.1985) (same). The EA concluded that a Federal Energy Regulatory Commission action involving a gas pipeline to fuel the plants under discussion was not a "connected action" pursuant to NEPA regulations. See DOE-101 at 204444-45. Plaintiff does not challenge that conclusion in the present action.

[11]See Defs' Reply at 1:15-17 ("DOE reasonably assessed the potential impacts of the actual proposed action and alternatives, and *also* reviewed impacts from the associated power plants."). This language suggests that federal defendants view the power plant impacts as secondary effects under NEPA. However, federal defendants also argue that NEPA does not require them to consider alternatives to the power plants, or to consider the cumulative impacts of the plants beyond that analysis contained in the EA. (Defs' Reply at 1:17-19).

the federal defendants opted to analyze the actions together. (See Pla's Reply at 10, n.10). Especially given the WAN court's instruction that the determination of effects is a fact-specific inquiry, the Court finds no reason why it should not consider the permits separately. This is even more important in this case because the record demonstrates that at least part of the LRPC plant is dedicated to providing power exclusively to the Mexican market, while all of the power of the TDM plant will be exported to the United States. Given these different factual circumstances, the Court finds it appropriate to consider the permits separately at the threshold level of analysis.

The LRPC plant is divided into three EAX turbines and one EBC turbine. Two of the EAX turbines are designed to produce power exclusively for sale to a Mexican utility, and it is reasonably foreseeable that very little of this power will flow through the BCP transmission line into the United States. DOE-101 at 204320. The EA does acknowledge the possibility that under limited circumstances, the domestic generation turbines may provide power to the BCP line. Id. at 204320, n.2. The record shows that the third EAX turbine is anticipated to produce power exclusively for export to the United States. Id. at 204320, n.1. However, the power produced by the EAX export turbine could be transmitted to the United States through an alternative interconnection site. Id. at 204328-29, 204395.[12] Finally, the EBC turbine is configured and licensed only to sell electricity over the BCP line. Id. at 204328-29, 204395, 204321; BCP Brf. at 9.

Although BCP cites to an extra-record declaration to support its claim that the two export turbines at the LRPC plant could be reconfigured to provide power for the Mexican market in the absence of the BCP transmission line, the Court finds that these extra-record materials were not before the agencies at the time that they made the challenged decisions and do not fall within any exceptions to the rule that the Court will limit its review to the record. Considering only the information that the federal defendants had before them at the time they made their final decisions, the Court finds that it was reasonably foreseeable that the two export turbines in the LRPC would

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[12]Presumably, the Presidential Permit governing the alternative interconnection site would need to be modified and an appropriate environmental review performed in the event that the EAX export turbine was forced to export its power through the alternative line.

use the BCP transmission line to export the entirety of their power. Furthermore, given that the BCP line is the only current means evidenced by the record through which the EBC turbine could transmit its power, the Court finds that the BCP line was a but-for cause of the generation of power at the EBC turbine. Because the EBC turbine and the BCP transmission line are two links in the same chain, the emissions resulting from the operation of the EBC turbine are "effects" of the BCP transmission line that must be analyzed under NEPA. For the same reasons, the Court finds that the operation of the TDM plant is an effect of the T-US transmission line. See DOE-101 at 204321 (indicating that the only current means of transmission from the TDM plants are through the T-US line).

Conversely, the Court finds that the two turbines in the LRPC dedicated almost exclusively to the generation of power for the Mexican market are not causally linked to the BCP line in a way that makes the BCP line a necessary prerequisite or essential catalyst to their operation. Because the line of causation is too attenuated between these turbines and the federal action permitting the BCP line, Ninth Circuit authority makes clear that the emissions of the non-export turbines were not effects of the BCP line and that the federal defendants were therefore under no NEPA obligation to analyze their emissions as effects of the action.[13] Additionally, because the record makes clear that the EAX export turbine has an alternative to the BCP line to export its power, the BCP line cannot be considered the but-for cause of the EAX export turbine's operation. Indeed, the EA concludes that the EAX export turbine would be built regardless of whether the BCP line is permitted. DOE-101 at 204328-29, 204395. For this reason, the EAX turbine is also not an effect of the action.

Although NEPA does not explicitly limit the federal defendants' review of impacts to only those required by NEPA (and, indeed, agencies might be commended for erring on the side of precaution and inclusiveness when considering major actions affecting the environment), the Court does not believe that even an inadequate analysis of isolated impacts that are not effects of the

[13]As discussed in more detail below, however, the EA must still analyze the cumulative impact of the proposed action when considered in conjunction with the impacts of other independent actions in the area.

proposed action can require the invalidation of an EA. Accordingly, the Court will not consider plaintiff's complaints regarding the EAX turbines at the LRPC except to the extent they relate to the cumulative impact analysis.

V. Did the Agencies Act Arbitrarily When They Issued a "Finding of No Significant Impact" (FONSI)?[14]

A. Standard of Review

Summary judgment is properly granted when "there is no genuine issue as to any material fact and that the moving party is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(c). In an administrative review case, like this one, the administrative record provides the relevant facts, and the legality of the agency's decision based on those facts is a question of law. Accordingly, summary judgment is an appropriate vehicle for resolving a case like the one at bar. See Northwest Motorcycle Assn. v. U.S. Dept. of Ag., 18 F.3d 1468, 1471-72 (9th Cir. 1994).

Under NEPA, an agency must prepare an EIS for any "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(2)(C). NEPA's regulations provide that an agency may prepare an EA to determine whether the proposed action is one that requires a full EIS. 40 C.F.R. § 1501.4(b). The EA must briefly describe the proposal, examine alternatives, consider environmental impacts, and provide a listing of individuals and agencies consulted. 40 C.F.R. § 1508.9. After preparation of the EA, an agency may decide to issue a "finding of no significant impact" (FONSI), which relieves the agency of its obligation to prepare a full EIS. If, however, the EA establishes that the agency's action may have significant environmental impacts, the agency must prepare an EIS. National Parks & Conservation Ass'n v. Babbitt, 241 F.3d 722, 730 (9th Cir. 2001) (internal quotations omitted).

An agency's decision not to prepare an EIS under NEPA is a final administrative decision reviewable under the Administrative Procedure Act (APA). See 5 U.S.C. § 701 et seq. Under the APA, the Court must decide whether the decision was arbitrary, capricious, an abuse of discretion,

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[14]Because the Court has requested the parties to brief only the issue of whether the EA and FONSI amount to violations of NEPA, the Court does not now address whether an EIS is required. The Court will address the appropriate remedies for any violations at a later hearing.

or otherwise not in accordance with law. See Native Ecosystems Council v. Dombeck, 304 F.3d 886, 891 (9th Cir. 2002). Under this standard, courts must "carefully review the record to ensure that agency decisions are founded on a reasoned evaluation of the relevant factors." Public Citizen v. Department of Transp., 316 F.3d 1002, 1020 (9th Cir. 2003) (internal quotations omitted). The Court must be satisfied that the agency took a "hard look" at the potential environmental impacts of the proposed action. Greenpeace Action v. Franklin, 14 F.3d 1324, 1332 (9th Cir. 1992). Part of this hard look is providing a convincing statement of reasons why potential effects are insignificant, and therefore do not necessitate the preparation of an EIS. See Save the Yaak Committee v. Block, 840 F.2d 714, 717 (9th Cir. 1988). If the decision of the agency is "well informed and well considered," the Court must defer to the agency's decision. LaFlamme v. FERC, 852 F.2d 389, 398 (9th Cir. 1988); see also WAN, 222 F.3d at 1114-1115 (an environmental review under NEPA will only be overturned if the agency committed a clear error in judgment).

B. Analysis

The parties do not dispute in their briefs that the issuance of the Presidential Permits and the rights-of-way in the present case represent "major federal actions" as defined by the NEPA regulations. Rather, the dispute centers on whether these actions will have "significant" impacts on the environment. NEPA regulations provide guidance on evaluating the significance of an action's impact. See 40 C.F.R. § 1508.27. Those regulations provide as follows:

> "Significantly" as used in NEPA requires considerations of both context and intensity:
> (a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.
> (b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:
> (1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
> (2) The degree to which the proposed action affects public health or safety.
> (3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
> (4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.

> (5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
> (6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
> (7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
> (8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
> (9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
> (10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

40 C.F.R. § 1508.27. If the agencies' actions are environmentally "'significant' according to *any* of these criteria," then they erred in failing to prepare an EIS. Public Citizen v. Department of Transp., 316 F.3d 1002, 1023 (9th Cir. 2003) (citing Nat'l Parks, 241 F.3d at 731) (emphasis in original).

1. Public Health

Plaintiff argues that despite public comments alerting the agencies to potential impacts on public health as a result of increased air pollution, the EA failed to evaluate these impacts. (See Pla's Mem. at 11-12). The Ninth Circuit has stated that even a "marginal degradation" of air quality "could easily be said" to be a significant impact on the environment for NEPA purposes. Public Citizen v. Department of Transp., 316 F.3d 1002, 1024 (9th Cir. 2003). In Public Citizen, the Court found that an agency's failure to even consider whether NOx and PM-10 emissions from diesel trucks would impact public health was a violation of NEPA. Id.

Defendants respond that they did in fact consider the health impacts of increased emissions. The reasoning upon which they rely is based on the following steps of logic: (1) Because they determined that emissions of NOx, CO, and PM-10 would fall below "significance levels" (SLs) established by the EPA, and (2) because these SLs are "based on protecting human health and welfare," then (3) the federal defendants at least implicitly analyzed whether the air emissions would harm public health. (See Def's Mem. & Opp'n at 11-12, 34). The EPA sets SLs for criteria pollutants in the context of carrying out its duties under the Clean Air Act. See DOE-101 at

204401-204402. These are the levels below which any particular major source is not deemed to be contributing to violations of the National Ambient Air Quality Standards ("NAAQS"). Id. The Appendix to the EA states that "[i]f measured or predicted concentrations of the criteria pollutants are below the ambient standard, no health effects are expected." DOE-102 at 204472. This statement contradicts plaintiff's claim that the EA contained no discussion of the health impacts of the actions whatsoever.[15] (See Pla's Reply & Opp'n at 7). Moreover, defendants argue that this link between NAAQS and public health impacts distinguishes the present case from Public Citizen. (See Defs' Mem. & Opp'n at 35, n. 18). Defendants argue that there exists no "marginal degradation" of air quality, as the term is used in Public Citizen, because the EA establishes that emissions would not exceed the SLs. (Id.). Finally, defendants argue that further discussion of the potential health impacts of the actions are discussed in the EA appendix, which they argue should be considered to be part of the EA. (Id. at 35). The EA Appendix specifies that T-US's application evaluated potential acute, chronic, and cancer health effects resulting from the TDM facility and found them to be "substantially below their relative thresholds of 10 in 1 million, 0.5 and 0.5, respectively." DOE-102 at 204486. Defendants also argue that modeling data for the LRPC export turbines were analyzed to ensure that they would result in no negative health impacts. Id. at 204469. Defendants argue that these analyses constitute the hard look they were required to take.

Although plaintiff argues that an analysis of whether air impacts will exceed EPA SLs cannot be equated with the public health analysis required by NEPA, the Court finds that plaintiff's argument is merely one involving methodology. The Court will not require that the agencies analyze the air impact on public health in a particular way, but rather will only ensure that the agencies' analysis is well-reasoned. The Court finds that the agencies have met their burden in this case. The logic of their argument is indeed well-reasoned: If ambient air quality standards are

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[15]Even if the Court excludes the Appendix to the EA from its review, the Court declines to adopt plaintiff's argument that an analysis of air quality impacts is not simultaneously an analysis of the public health impacts of impaired air quality. Air quality is regulated primarily because poor air quality has been linked to health impacts. Thus, an evaluation of whether the actions affect air quality necessarily involves an evaluation of the health impacts of the actions resulting from air pollution.

designed, as they are, to protect human health, then a finding that the projects do not violate those standards logically indicates that they will not significantly impact public health.[16]

2. Uncertainty

Plaintiff argues next that an EIS must be prepared because the effect of the Mexican power plants on the formation of ozone in Imperial County's airshed are uncertain. "Preparation of an EIS is mandated where uncertainty may be resolved by further collection of data, or where the collection of such data may prevent speculation on potential ... effects. The purpose of an EIS is to obviate the need for speculation by insuring that available data are gathered and analyzed prior to the implementation of the proposed action." Public Citizen, 316 F.3d at 1024 (internal quotations omitted) (omission in original).

In Public Citizen, the court held that an EIS was required to resolve uncertainties where an EA had made an arbitrary assumption about data supporting the agency's conclusion. See id. at 1026 (FONSI unsupportable because, among other reasons, it made an "an arbitrary assumption about the percentage of newer, 'cleaner' Mexican trucks on the roads"). Plaintiff in the present case argues that defendant's assumption that NOx emissions and ozone production would be linearly related is arbitrary and that therefore ozone modeling should have been conducted. (Pla's Reply & Opp'n at 14-15). In support of its argument, plaintiff points out that the EA itself states that the process of ozone formation is "complex and is also non-linear (i.e., output is not necessarily proportional to input."). DOE-101 at 204407. On the same page of the EA, the agencies state that ozone in Imperial County, like other rural areas, "does generally tend to be NOx-limited (i.e., adding more NOx increases [ozone])." Id.

[16]For the same reason, the Court declines to find that the agencies acted arbitrarily by not considering whether the emissions from the plants would violate the Clean Air Act's "prevention of significant deterioration" requirements (PSD) for attainment areas. First, this is yet another disagreement concerning the methodology of the agency's analysis, rather than an argument concerning the existence or adequacy of such analysis. Second, to the extent this argument attacks the reasonableness of the agencies' analysis, the Court finds that the agencies' decision was not arbitrary because the record shows that Imperial County is a nonattainment area for the emissions in question, and the PSD regulations are meant for areas in attainment or categorized as "unclassifiable." See 42 U.S.C. § 7471; DOE-101 at 204364 (Salton Sea Air Basin in nonattainment for PM-10, ozone, and in localized nonattainment for CO).

Defendants argue that they have acted conservatively in assuming that ozone production would be proportional to NOx emissions. (See Defs' Reply at 9). First, they argue that under some circumstances, increased NOx emissions can lead to a decrease in ozone. (Id.). Second, they argue that even if they took the counter-assumption that ozone was VOC-limited,[17] then additional NOx emissions would have little to no effect on ozone production. (Id.). Furthermore, defendant argues that to the extent plaintiff demands the use of ozone modeling to assess impacts, plaintiff merely disagrees with the method chosen by DOE. (See Defs' Mem. & Opp'n at 29).

The Court need not resolve disagreements among scientists as to methodology or to decide whether the method employed by an agency in its analysis is the best available. See Friends of Endangered Species, Inc. v. Jantzen, 760 F.2d 976, 986 (9th Cir. 1985). Instead, the Court's task "is simply to ensure that the procedure followed by the [agencies] resulted in a reasoned analysis of the evidence before it, and that the Service made the evidence available to all concerned." Id. Here, defendants present a reasoned analysis of the impacts on ozone. They provide a logical argument that the presence of NOx and ozone will be closely and positively correlated. DOE-101 at 204407. They then analyzed the contributions of all turbines at issue to the concentration of NOx at the U.S. border and reasonably extrapolated from this the impact on ozone. Id. at 204407-08. The criticism leveled by plaintiff is not at the amount of data collected to determine NOx levels at the border, but rather at the methodology employed to estimate ozone impacts. NEPA does not provide the Court with authority, however, to disagree with the agencies' specialized knowledge and determination that the particular methodology urged by plaintiffs would be infeasible and inaccurate. See DOE-101 at 204408 (describing the limited utility of ozone modeling when applied to the projects at issue). Accordingly, the Court does not find that the agencies acted arbitrarily in issuing the FONSIs because of uncertainty.

3. Impact on the Salton Sea, an Ecologically Critical Area

Although the draft EA contained no analysis of the impacts of the action on the Salton Sea,

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[17]VOCs are volatile organic compounds and are, along with sunlight and NOx, one of the main sources of "fuel" for the production of ozone. DOE-101 at 204407. The production of ozone tends to be limited either by the availability of VOCs or by NOx. Id.

in response to public comments the agencies analyzed the impacts in the final EA and the FONSI. See DOE-101 at 204446, 204431-204432; DOE-103 at 204605. The final EA determined that the combined impact of the LRPC and TDM facilities will reduce water flow into the Salton Sea by 0.79 percent and increase the salinity of the Salton Sea by 0.142 percent. DOE-101 at 204431-32. At the same time, the final EA implies that the operation of the plants will reduce the level of biological contaminants in the New River (which ultimately flows into the Salton Sea). Id. at 204432. The FONSI concludes that the negative impacts are "minimal and below the threshold of detection of most measuring instruments." DOE-103 at 204605.

Plaintiff argues that the agencies' conclusion is conclusory, not supported by data or analysis, and is due no deference. (See Pla's Mem. at 13). In support of its argument, plaintiff points to a document in the record stating that the Salton Sea is already a damaged resource because of too much salinity and that recovery efforts are underway to reduce the level of salinity. DOE-25 at 200943-949. The record also links efforts to control salinity in the Salton Sea to the survival of the region's biodiversity. See id. at 200959. Given this evidence of potential impact, plaintiff challenges the agencies' conclusion that an increase in the salinity of the Salton Sea would be insignificant merely because it might be too small to measure.

Defendants respond that they have provided adequate support for their conclusion that the impact will be insignificant because the estimated decrease to inflow and increase in salinity are within the natural range of variability of the Salton Sea and because the operation of the power plants will reduce biological and chemical contaminants in the water. See DOE-101 at 204432; (Defs' Mem. & Opp'n at 17 (citing DOE-25 at 201228)).[18] Furthermore, defendants point to the fact that the construction of evaporation ponds in the effort to restore the Salton Sea to a less degraded state will evaporate more water than the TDM and LRPC facilities will use on an annual basis. (See Defs' Mem. & Opp'n at 17 (citing DOE-25 at 200947, 200949)). Therefore, defendants argue that the proposed actions are consistent with the restoration effort. (Id.).

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[18]Water used in the power facilities and then returned to the New River will be treated to remove biological and chemical contaminants prior to the use of the water in the plants' cooling processes. See DOE-101 at 204431.

The Court agrees with plaintiff that the agencies' determination that the actions will not significantly impact the Salton Sea are arbitrary and capricious. First, while decreases in water flow and increases in salinity in the Sea may be "immeasurable," as the EA itself demonstrates, they are not incalculable. In fact, the record makes clear that the actions will increase the salinity of the Sea, that the Sea is under threat from increasing salinity already, and that extensive restoration efforts are underway to reduce the current salinity of the Sea.[19] Given this backdrop, the Court finds it unconvincing to say that merely because measuring instruments may not be able to detect an increase in salinity that is bound to occur makes that increase insignificant. The significance of an impact under NEPA has less to do with its measurability and everything to do with the context of the impact. Here, the impacts would affect an "ecologically critical area." See 40 C.F.R. § 1508.27(b)(3). It is clear from the record that this resource is currently threatened in a way that will only be exacerbated if the proposed actions are undertaken. To state simply, as the agencies have done, that these known impacts will be hard to measure, that they are within a range of natural variability,[20] or that an unrelated restoration effort will evaporate even more water in its effort to decrease salinity in the Sea,[21] is not enough to demonstrate that the impacts will be insignificant. Because the agencies' analysis is not well-reasoned or convincing, the Court finds

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[19]This analysis assumes that removing the impacts of the unconnected EAX turbines in the LRPC simply makes the increases in salinity and decreases in water flow proportionally smaller. In any case, the impacts from all the turbines, including those owned by EAX, on the Sea would have to be taken into account in the cumulative impact analysis.

[20]This reason in particular makes no sense. The natural variability of water flow and salinity in the Sea has no connection to the projects at issue here. If the projects increase salinity in the Sea, it appears as though this increase will be in addition to, and completely independent of, any natural increase in salinity. Thus, the impact of these projects might be thought of as simply moving the range of natural variability in the direction of increased threat. (See Pla's Reply & Opp'n at 12). Such a move does not argue against the significance of the impact, but rather argues strongly in favor of its significance.

[21]Defendants pointed out at oral argument that restoration efforts underway in the Salton Sea actually work in a cumulative sense to ameliorate the impact of increased salinity from the power plants. However, this argument overlooks another major factor in the cumulative impact analysis: the current base-line level of salinity, which is already threatening the area's biodiversity. When the base-line level of salinity is so high that it requires an extensive restoration effort, it is difficult to see how a new source of increased salinity, even a small one, can be insignificant cumulatively. Although the ultimate determination concerning significance is for the agencies and not the Court to make, as discussed in the cumulative impact discussion below, the EA is inadequate as a matter of law because it provides no analysis of the purportedly insignificant increases in salinity from the plants in the context of the high base-line level of salinity.

that they have failed to take the hard look at the impacts of the actions on the Salton Sea required of them under NEPA.[22]

4. Controversial Nature of the Impacts

Plaintiff next argues that the controversy surrounding the potential impacts mandated the preparation of an EIS. (See Pla's Mem. at 14-15). "'Controversy' sufficient to require preparation of an EIS occurs 'when substantial questions are raised as to whether a project ... may cause significant degradation of some human environmental factor, or there is a substantial dispute [about] the size, nature, or effect of the major Federal action.'" Public Citizen, 316 F.3d 1002, 1027 (citing Nat'l Parks, 241 F.3d at 736). The evidence establishing such a controversy must be brought to the agency's attention before it completes its deliberations on the proposed action. Id. The Public Citizen court set out a two-step test for determining the existence of a controversy. First, "[plaintiffs] must show that there was a 'substantial dispute' about [an agency's] actions and that this dispute raised 'substantial questions' about their validity." Id. If plaintiff makes this showing, "the burden then shifts to [the agency] to provide a 'convincing' explanation why no controversy exists." Id. (citing Nat'l Parks, 241 F.3d at 736).

Public Citizen held that an "outpouring of public protest" constituted a substantial dispute where 85 percent and 90 percent of public comments opposed the proposed action. See 316 F.3d at 1027. Where those comments had merit and the agency "failed to adequately account for its failure to act on them," the court held that the action was "controversial" and required preparation of an EIS. Id.

In the present case, DOE received twelve comment letters before the close of the public comment period, and an additional 400 comments by e-mail after the close of the period. DOE-103 at 204601-204602. Plaintiff cites to concerns raised in all but four of these comment letters

[22]Although it appears that the treatment of water to be used in the plants will remove contaminants in the water and improve the biological and chemical quality of the New River, these welcome benefits do not in some way negate the agencies' duty to separately analyze the negative impacts on water flow and salinity. See 40 C.F.R. 1508.27(b)(1) ("Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.").

concerning the water and air impacts of the power plants. See DOE-103 at 204602 (e-mail comment letters raised air and water impacts); DOE-101 at 204442-204443; DOE-72 at 203697, 203699 (air impacts); DOE-79 at 203713-714 (air impacts); DOE-80 at 203717-203719 (air and water impacts); DOE-85 at 203768-769 (water impacts); DOE-82 at 203724-765 (air and water impacts); DOE-86 at 203771 (air and water impacts); DOE-87 at 203773 (air impacts); DOE-71 at 203686 (air impacts). Thus, approximately 67 percent of pre-closure comments and approximately 99 percent of both pre- and post-closure comments raised air and water impact concerns. Plaintiff argues that these comments evidence a "substantial scientific controversy" over the significance of the actions. (Pla's Mem. at 15). Plaintiff additionally argues that the agencies failed to address in the EA or the FONSI whether the comments raise a controversy such that an EIS would be required. (Id.).

Defendants point out that public controversy sufficient to require the preparation of an EIS must raise "substantial" questions concerning the significance of any impacts of the proposed action or "substantial" dispute over the size, nature, or effect of the action. See National Parks, 241 F.3d at 736. If plaintiff raises such a substantial question or dispute before the preparation of a FONSI, then the burden shifts to the government to provide a "well-reasoned explanation" why the dispute over the EA does not create "a public controversy based on potential environmental consequences." Id. (internal quotations omitted).

In the present case, the agency received 412 comments on the proposed actions before the preparation of the FONSIs, although 400 of these comments were received after the close of the comment period. The agencies responded to all 412 comments in the final EA. Although post hoc arguments do not suffice to create public controversies and at least one court has found that comments creating a controversy must be made contemporaneously with the comment period, Nat'l Parks, 241 F.3d at 737 n.16, the agencies' consideration of the e-mail comments in the final decision document suggests that the Court should give them some weight. Nearly all of the comments disputed the effects of the action and the significance of those effects. In particular, the comments, considered as a whole, disputed the air and water impacts of the actions and asserted that the generation of the power to be transmitted over the lines were effects of the actions. In light of these comments, the Court finds that plaintiff has demonstrated the existence of a substantial dispute as to the effects and significance of those effects prior to the preparation of the FONSI.

Defendants argue that even if the comments raised a substantial dispute, the dispute was adequately addressed by responses to the comment letters. (See Defs' Mem. & Opp'n at 26). The applicable standard is whether defendants' responses provide a convincing explanation of why the comments do not suffice to constitute a public controversy. Nat'l Parks, 241 F.3d at 736; see also Northwest Environmental Defense Center v. Bonneville Power Admin., 117 F.3d 1520, 1536 (9th Cir. 1997) (holding that where agency cooperated with objecting parties, and alleviated most of those parties concerns, agency need not prepare EIS). Defendants addressed the comments in a separate section of the EA that compiles them by category. See DOE-101 at 204442-48. The Court has reviewed these responses and finds that they generally restate the substance of the comments and then reject those comments to the extent they assert significant air impacts, request mitigating conditions, or challenge the scope of the review. See id. The agency did address the comments asserting water impacts by adding a new section into the EA. Id. at 204446-47. Nowhere in the discussion of the comments, however, does the agency directly explain, much less "convincingly" explain, why the comments do not suffice to constitute a public controversy. See LaFlamme v. F.E.R.C., 852 F.2d at 401 ("While FERC disputes LaFlamme's contentions, nowhere does FERC explain why LaFlamme's points do not suffice to create a public controversy based on potential environmental consequences. NEPA requires such a well-reasoned explanation .") (brackets and internal quotation omitted). Because a controversy necessarily involves disagreement, it is not enough for defendants to simply point to their disagreement with the comments. Instead, the Court reads the applicable law to place on the agencies the burden of demonstrating the absence of a substantial public disagreement when they choose not to prepare an EIS.[23] Because defendants have failed to make such a showing in the EA or the FONSI, the Court finds that the EA inadequately considered whether the substantial questions raised by the 412 comment letters made

[23] As noted above, defendants did address the water-related comments by expanding the scope of the analysis. See DOE-101 at 204446. To the extent this may have eliminated the controversy over these impacts, however, substantial dispute over the scope of the analysis, the need for conditioning the permits on mitigating measures, and the significance of air impacts still existed.

the proposed actions controversial for purposes of determining the potential significance of the actions.

5. Local Air Laws

Finally, plaintiff argues that an EIS must be prepared because the proposed actions threaten to violate local air quality laws. (See Pla's Mem. at 17-18). "In its determination of whether its proposed action is significant, an agency must consider '[w]hether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.'" Public Citizen, 316 F.3d at 1026 (citing 40 C.F.R. § 1508.27(b)(10)). An agency has an obligation under NEPA to consider whether an action might violate state or local rules. Id.

Plaintiff's particular argument in the present case is that the proposed action threatens to violate Rule 207 of the Imperial County Air Pollution Control District (ICAPCD), which prohibits net increases from a new stationary source that has the potential to emit 137 pounds per day or more of any non-attainment pollutant. (Pla's Mem. at 17-18). The TDM plant alone is expected to emit 216 tons per year, or 1,184 pounds per day, of PM-10, a nonattainment pollutant in Imperial County. See DOE-101 at 204401.

Defendants respond that the plants cannot threaten to violate Imperial County's air laws because the plants are not part of the proposed action and because they are not subject to those laws. (See Defs' Mem. & Opp'n at 31-33). With regard to the first part of defendants' argument, the Court has already determined that the TDM and EBC turbines are effects of the proposed action and therefore fall within the scope of the analysis. However, the question of whether the plants are required to be included within an environmental analysis under NEPA differs substantially from the question of whether the plants must meet local air pollution laws. The ICAPCD rule cited by plaintiff applies to "new Stationary Sources . . . which are subject to Air Pollution Control District permit requirements." (Ex. 1 to Cty of Imperial's Request for Judicial Notice at Pg. 1).[24] Nothing in the record suggests that the TDM and EBC turbines are subject to the ICAPCD permitting requirements. In fact, defendants contend that these plants are not subject

[24] The Court considers this extra-record document only for the permissible reason of ascertaining whether the agencies considered all relevant factors in their EA.

to ICAPCD jurisdiction. See DOE-101 at 204328. Plaintiff does not specifically raise any other state or local law that they claim the plants threaten to violate. Accordingly, the Court declines to find that the potential impacts from the actions are significant because they threaten violations of any state or local air pollution laws.

VI. Is the EA adequate as a matter of law?

A. Analysis of Impacts

Plaintiff argues that the EA is deficient because it failed to consider, analyze, and disclose all of the potentially significant impacts of the proposed action. (See Pla's Mem. at 22-24). Plaintiff argues that this contravenes one of the fundamental purposes of NEPA, namely, to guarantee "that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision." See Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 349 (1989). In particular, plaintiff argues that the EA underestimates potential emissions from the TDM plant, fails to evaluate carbon dioxide and ammonia, and fails to evaluate health impacts of the emissions it does disclose. (See Pla's Mem. at 23-24).

First, plaintiff argues that the EA is inadequate because it assumes the TDM plant will produce only 600 megawatts (MW) of energy, even though T-US states in its permit application that it intends its transmission line to be able to carry a maximum potential load of 1400 MW. See DOE-36 at 202196; DOE-35 at 202188; DOE-101 at 204401. Furthermore, plaintiff argues that since the Presidential Permit carries no contrary condition on emissions, any expansion in the production capacity of the TDM plant could more than double the analyzed emissions from the plant without requiring any new permit for the transmission. (See Pla's Mem. at 23).

Defendants respond that they have simply used in their analysis the estimated amount of power to be generated submitted by TDM to the Mexican government in order to secure a license to operate the plant. (See Defs' Mem. & Opp'n at 13 (citing DOE-36 at 202201). Defendants argue that it is not "reasonably foreseeable" that the T-US line will carry more than the assumed 600 MW of power even though T-US stated in its permit application that the line would carry "a nominal 500 MW of power (approximately 700 MW maximum peak) into the U.S., with the potential for an ultimate nominal 1000 MW (with an approximate 1400 MW peak) of power using a possible future, second circuit." (Id.)[25] In general, defendants argue that TDM has not "indicated it has any plans to expand the TDM facility." (Id.); but see DOE-36 at 202201 (stating that a second circuit on the transmission line could "accommodate possible future expansion capability, generated by TDM" to the U.S.). The agencies determined that the "operating characteristics of the facilities" produced the estimate of generation capacity and that the higher assumptions urged by commenters were "undocumented." DOE-101 at 204446. To the extent that the higher emissions urged by plaintiff might be attributable to facilities other than TDM or LRPC, defendants argue that those other facilities are not within the scope of the analysis. (Id.). Therefore, defendants contend they are not required under NEPA to speculate about a future expansion of the TDM plant or the use of the lines to transmit power from other facilities. (Id. at 14).

The Court finds that the agencies provided adequate support for their conclusion that any future expansion of the TDM plant was not reasonably foreseeable. Plaintiff has pointed to nothing in the record suggesting that such an expansion is anything more than a speculative possibility, dependant on the market for electricity and other factors beyond the scope of this case. Additionally, defendants' counsel represented at oral argument that any future expansion of the facility to provide export power would require a supplement to the EA because the Presidential Permit currently approves of only the transmission of 600 MW of power. To the extent the potential carrying capacity of the T-US transmission line will be used to carry power from plants

[25] Amicus T-US filed a supplemental declaration of Octavio M.C. Simoes in support of a request for judicial notice of the Mexican environmental permits issued to TDM authorizing both the generation and export of power from the TDM plant. These are evidently the same permits that the agencies indirectly relied upon in making their assumption that the TDM plant would generate 600 MW of power. Plaintiff moved to strike the supplemental declaration and request for judicial notice. At oral argument, plaintiff notified that Court that plaintiff and defendants had stipulated to the authenticity of the Mexican permits submitted by T-U.S. Defendants then moved at oral argument to supplement the administrative record by adding the permits. Plaintiff objected on the basis that plaintiff would be prejudiced since it had not had a prior opportunity to examine the documents. The Court finds that although the permits would have been properly made a part of the administrative record in this case, the prejudice to plaintiff of making them a part of the record at this late date outweighs the interest in supplementing the record. Accordingly, the Court denies defendants' motion to supplement the record. For the same reasons, the Court grants plaintiff's motion to strike the supplemental declaration and request for judicial notice.

other than the TDM plant, the agencies have also demonstrated that the record provides nothing to show that the specific operating details of these plants are reasonably foreseeable, or that these plants would be "effects" for NEPA purposes of the T-US transmission line.[26] In short, the potential for future power generation is simply too remote and speculative to provide a basis for meaningful environmental analysis at the present time.

Second, plaintiff argues that the EA fails to consider emissions of carbon dioxide and ammonia. Because carbon dioxide contributes to global warming, and because ammonia is known to have health impacts, plaintiff contends that the failure to assess and disclose the impacts makes the EA inadequate. (See Pla's Mem. at 23-24). Defendants respond that nothing in the record provides a basis for the assertion that the agencies should have considered ammonia and carbon dioxide emissions. (See Defs' Mem. & Opp'n at 15). Additionally, defendants assert that neither ammonia nor carbon dioxide is a hazardous or toxic pollutant under federal or California law. (Id.). Accordingly, defendants argue that they were not arbitrary and capricious in not analyzing these effects. (Id.).

Although the federal defendants cite authority for the proposition that they need not evaluate "questionable effects" or "imaginary horribles," these cases are inapposite to the question posed by the emissions described here. (Id.). Defendants do not dispute that the TDM and EBC turbines will emit ammonia and carbon dioxide; these effects are neither questionable nor imaginary. Additionally, the record reflects that ammonia may cause acute and chronic health impacts. See DOE-23 at 200819. Although the agencies state that plaintiff has provided no authority for the proposition that it must consider the impacts of carbon dioxide and ammonia, neither do the agencies provide reasoning or legal authority for their proposition that they need not disclose and analyze these emissions merely because the EPA has not designated them as "criteria pollutants." (See Defs' Mem. & Opp'n at 14-15). In fact, one of defendants' consultants advised the agencies that "all criteria and non-criterion air pollutants relevant to the proposed action should

[26]For example, to conduct any legitimate analysis of the environmental impact of the additional generation of power to be carried by the T-US line, the agencies would have to be able to reasonably foresee the location of the additional power plants and their method of generation. The record does not suggest any of this information, nor does plaintiff in its brief.

be assessed." DOE-55 at 202850.

The record shows that carbon dioxide is one of the pollutants emitted by a natural gas turbine and that it is a greenhouse gas.[27] See DOE-17 at 200640; DOE-15 at 200386. Additionally, plaintiff argues that carbon dioxide emissions are the greatest by weight of all pollutants emitted by natural gas turbines, and charts from the record appear to support that argument. See DOE-17 at 200646-47. Similarly, the record discloses that ammonia is a by-product of the control technology used in the EBC and TDM turbines and that it causes acute and chronic health effects. See DOE-23 at 200818-19. Because these emissions have potential environmental impacts and were indicated by the record, the Court finds that the EA's failure to disclose and analyze their significance is counter to NEPA.

Finally, plaintiff argues that the EA is inadequate because it fails to evaluate health impacts related to the CO, NOx, and PM-10 emissions of the plants. The Court finds that the agencies' evaluation of health impacts was adequate based on the discussion in Section V.B.1, above.

B. Alternatives

Plaintiff argues next that the EA was inadequate because it failed to present reasonble and feasible alternatives. NEPA requires federal agencies to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E). Agencies must consider alternatives in an EA. See Bob Marshall Alliance v. Hodel, 852 F.2d 1223, 1228-29 (9th Cir. 1988); 40 C.F.R. § 1508.9(b). The alternatives analysis is central to an environmental analysis. 40 C.F.R. § 1502.14. It should "present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public." Id. "The rule of reason guides both the choice of alternatives as well as the extent to which the [NEPA analysis] must discuss

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[27] A "greenhouse" gas is one that is "of, relating to, contributing to, or caused by the greenhouse effect." See Merriam-Webster Dictionary, on-line edition (available at www.m-w.com) (last visited April 24, 2003). A "greenhouse effect" is the "warming of the surface and lower atmosphere of a planet . . . that is caused by conversion of solar radiation into heat in a process involving selective transmission of short wave solar radiation by the atmosphere, its absorption by the planet's surface, and reradiation as infrared which is absorbed and partly reradiated back to the surface by atmospheric gases." Id.

each alternative. Public Citizen, 316 F.3d at 1028 (internal citations and quotations omitted).

In the present case, plaintiff argues that the agencies were required under NEPA to do more than consider only a "no action" alternative and two alternative locations for the transmission lines. See DOE-101 at 204328, 204352-204354.[28] In particular, plaintiff argues that the agencies should have considered the proposal put forward by plaintiff in its comments; namely, that the granting of the rights-of-way and the Presidential Permits be conditioned on the commitment of the project proponents to implementation of state-of-the-art emissions control systems, mitigation through offsets in existing sources, and the use of dry cooling or parallel dry-wet cooling. DOE-82 at 203725-203727. Two other commentators suggested conditioning the issuance of the permits on certain controls for air and water emissions. See DOE-79 at 203714-203715 (comments of the American Lung Association) and DOE-80 at 203718-203719 (comments of Congressman Filner requesting a delay until mitigation measures could be adopted). Plaintiff argues that conditioning the permits in such a way was both within DOE's authority and feasible. (Pla's Mem. at 20-21). In sum, plaintiff argues that the agencies did not find that the alternatives proposed were unreasonable, but rather that the agencies simply never evaluated them. (Id. at 22).

In response, defendants argue that conditioning the Presidential Permits at issue would have been beyond the scope of the "purpose and need" of the proposed actions, since those actions dealt only with the construction and operation of the transmission lines and not with the operation of the power plants. (See Defs' Mem. & Opp'n at 18). In particular, defendants explained at argument their view that the alternatives analysis is co-extensive with the scope of the proposed action, and that it does not extend to the full scope of the review required under NEPA. Thus, defendants apparently contend that they only need consider alternatives to the direct effects of the construction of the power lines (e.g., the localized effects from construction of the towers).

The agencies need only consider alternatives that are feasible, and the analysis "cannot be found wanting simply because the agency failed to include every alternative device and thought conceivable by the mind of man . . . regardless of how uncommon or unknown that alternative may

[28] In fact, defendants also considered the alternative of granting only one permit and not the other. See DOE-101 at 204328-30.

have been at the time the project was approved," Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc., 435 U.S. 519, 551 (1978). Yet, plaintiff and others put forward the alternative of conditioning the permits in their comments responding to the draft EA. Plaintiff also argues that conditioning the permit was feasible since other conditions were placed on the permits. (See Pla's Mem. at 20). Additionally, plaintiff cites an Executive Order that grants DOE the authority to place conditions on Presidential Permits necessary to protect the public interest. See Executive Order 10485, § 1(a)(3), 18 Fed. Reg. 5397 (Sept. 3, 1953) as amended by Executive Order 12038 § 2(A), 43 Fed. Reg. 4957 (Feb. 3, 1978). Defendants argue that the "purpose and need" of the federal actions at issue did not include the generation of power at the Mexican plants. However, to the extent that this is simply a restatement of the threshold argument discussed above, the Court has already resolved that question by finding that the TDM facility and the EBC turbine are effects of the action. Said in another way, the purpose and need of the transmission lines is to deliver power from the TDM and EBC turbines.

Additionally, to the extent defendants argue that they need only consider alternatives narrowly related to the scope of the proposed action rather than considering indirect effects of the action, the Court holds otherwise. "[A]n agency must look at every reasonable alternative, with the range dictated by the nature and scope of the proposed action." Idaho Conservation League v. Mumma, 956 F.2d 1508, 1520 (9th Cir. 1992) (internal quotation omitted). Here, the scope of the action relates only to the transmission lines, but the nature of the action includes the full scope of the analysis, including the effects of the action. The nature of the action therefore includes the importation of power generated in Mexico. Indeed, to leave out the secondary impacts would be at odds with the purpose of the alternatives analysis, which is to provide a way for an agency to calculate and compare the various predicted effects of alternative courses of action. The analysis would be arbitrary in itself if it did not take into account all effects of a proposed action. Accordingly, defendants' argument that they need not consider alternatives related to the TDM and EBC facilities fails.

Given this nature, the agencies were obligated to set forth in the EA "the range of alternatives . . . sufficient to permit a reasoned choice." Methow Valley Citizens Council, 833

F.2d at 815. Although defendants argue that "international sensitivities" preclude conditioning the permits from being a reasonable and feasible alternative, such a discussion belongs in the EA's alternative analysis rather than a litigation brief. Furthermore, the Court is unconvinced that the federal government's conditioning of a permit to construct transmission lines within the government's jurisdiction to ameliorate negative environmental effects within the United States necessarily offends international principles of law.[29] The condition would not be a direct regulation of the Mexican power plants; those plants could still choose to sell their power to the Mexican market or transmit their power via an alternate route rather than meet the condition.

Plaintiff bears the burden of showing that the agency was alerted to the specific alternative at issue before it prepared the EA in question. See City of Angoon v. Hodel, 803 F.2d 1016, 1021-1022 (9th Cir. 1986). This requirement helps ensure that the alternative was not so remote and speculative as to have precluded the agencies from ascertaining the possibility. See Life of the Land v. Brinegar, 485 F.2d 460, 472 (9th Cir. 1990). In the present case, commenters, including plaintiff, clearly proposed withholding the permits until the federal defendants could be certain that the power generation met certain environmental standards. DOE-82 at 203725-203727; DOE-79 at 203714-203715; DOE-80 at 203718-203719. Accordingly, the Court is hard-pressed to find that the proposed alternative could not be reasonably ascertained by the agencies during their deliberations. Because the Court finds that the conditioning of the permits is a reasonable and feasible alternative within the nature of the proposed actions, the Court finds that the analysis of alternatives in the EA was inadequate in this regard.

C. Cumulative Impact Analysis

Finally, plaintiff argues that the EA is inadequate because it fails to adequately assess the

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[29]Defendants argue in the same breath that conditions are not necessary on the permits because of the voluntary measures undertaken by the power plants. Defendants seem to argue that if these voluntary measures were dropped in the future, defendants could then conduct a supplementary environmental analysis that would presumptively lead to a condition on the permit. (See Defs' Mem. & Opp'n at 22-23, n.14). The Court is at a loss to understand why such conditions might not raise international sensitivities in the future after voluntary agreements failed, when the same conditions are not even feasible enough to be considered in an EA today. In the same vein, the Court fails to see how denying one or both of the permits because of U.S. environmental impacts - alternatives considered by the EA (See Defs' Mem. & Opp'n at 24) - would have any less of an effect on international sensitivities than the conditioning of the permits.

cumulative impacts of the proposed actions. (See Pla's Mem. at 24-25). NEPA regulations explain that the cumulative impact of a project consists of the "incremental impact of the action when added to other past, present, and reasonably foreseeable future action regardless of what agency (Federal or non-Federal) or person undertakes such other actions." See Sylvester, 884 F.2d at 400 (citing 40 C.F.R. § 1508.7).

Although NEPA does not require the government to do the impractical, Inland Empire Public Lands Council v. United States Forest Service, 88 F.3d 754, 764 (9th Cir. 1996), the Ninth Circuit has held that "reasonably foreseeable" actions with potentially cumulative impacts must be analyzed under NEPA. Blue Mountains, 161 F.3d at 1215. Native Ecosystems Council v. Dombeck made clear the importance of the cumulative impact analysis:

> The importance of ensuring that EAs consider the additive effect of many incremental environmental encroachments is clear. "[I]n a typical year, 45,000 EAs are prepared compared to 450 EISs.... Given that so many more EAs are prepared than EISs, *adequate consideration of cumulative effects requires that EAs address them fully.*" *Kern [v. U.S. Bureau of Land Management]*, 284 F.3d [1062] at 1076 [9th Cir. 2002] (emphasis in original) (quoting Council on Environmental Quality, *Considering Cumulative Effects Under the National Environmental Policy Act* at 4, January 1997). As we have previously emphasized when considering the sufficiency of a timber sale EA, without a consideration of individually minor but cumulatively significant effects "it would be easy to underestimate the cumulative impacts of the timber sales ..., and of other reasonably foreseeable future actions, on the [environment]." *Id.* at 1078.

304 F.3d 886, 896 (9th Cir. 2002) (bracketed citation information added).

Plaintiff argues that the EA contains no cumulative impact analysis for effects on health, water quality or quantity, the Salton Sea, or ozone. (Pla's Mem. at 16). Additionally, plaintiff argues that the cumulative air impact analysis in the EA is inadequate to support the conclusion that the impact is insignificant. (Id.). In particular, plaintiff points to statements by DOE's consultant advising DOE that the air impacts of the power plants when considered in conjunction with the current non-attainment status of Imperial County's airshed might be cumulatively significant. See DOE-55 at 202850-202851. Additionally, plaintiff points to agency comments that the cumulative impacts section of the EA lacked discussion of potentially significant impacts. See P-52 at 102697 ("It would seem that the incremental addition of NOx to an ozone non-attainment area is exactly the kind of impact that discussions of cumulative impacts are intended to address.").

The cumulative impacts section of the EA analyzed the NOx, CO, and PM-10 impacts not only from the TDM and EBC turbines that are effects of the action, but also the remaining LRPC turbines. (See Def's Mem. & Opp'n at 34 (citing DOE-101 at 204438)). That analysis determined that the projected increases in ambient concentrations of those pollutants will be below the significance levels established by the EPA. (Id.). However, the cumulative impacts section of the EA fails to expressly disclose the past or present levels of air emissions in the Salton Sea Air Basin, nor does it consider the combined effects of the present actions when added to any unrelated, reasonably foreseeable future electricity generation projects in the air basin. See DOE-101 at 204436-40 (lacking discussion of these cumulative impacts). Although the federal defendants argue that no other emissions are foreseeable, plaintiffs point to information in the record suggesting plans for the construction of three additional power plants in the region. (See Pla's Reply & Opp'n at 18 (citing DOE-71 at 203687, DOE-79 at 203714)). Additionally, plaintiff argues that at least the potential expansion of the TDM plant to a maximum capacity of 1400 MW should have been considered. (Id.).

Defendants argue that additional power plant projects in the project area are "rumors" that the agencies do not consider to be concrete enough to be reasonably foreseeable. DOE-101 at 204438. Without more, the Court is unable to uphold its responsibility of determining whether the agencies took a hard look at potential cumulative impacts arising from other power plants in the area. The EA fails to list the plants expressly noted by the Imperial County Air Pollution Control District and the American Lung Association in their comment letters, and furthermore fails to support in any way the conclusion that the emissions from these plants are not reasonably foreseeable. See DOE-71 at 203687; DOE-79 at 203714. In contrast, and as discussed more in section VI(A) above, the agencies considered and provided support to reject the assertion that the future expansion of the TDM to produce a maximum 1400 MW was reasonably foreseeable.

Furthermore, defendants argue that since all impacts of the LRPC and the TDM plant were measured together and found not to rise above the SLs at the U.S. border, the combined impact of these turbines will not significantly impact the present background levels of the measured pollutants in Imperial County. Id. The Court agrees with the federal defendants that the cumulative impact analysis necessarily considers the impact of the cumulative LRPC and TDM emissions when combined with the current air quality of the Salton Sea Air Basin. Indeed, the agencies' finding that the emissions would not exceed the SLs means that the concentration of these air pollutants in Imperial County would not be significantly impacted by the operation of the plants. Accordingly, the Court finds that the EA adequately considered the cumulative impact of the TDM and LRPC emissions against the background of Imperial County's present air quality.

Finally, a review of the cumulative impact section of the EA and the entire FONSI fails to disclose any discussion of the actions' cumulative impact on water quality and quantity in the New River or the Salton Sea. The complete lack of an analysis of cumulative water impacts is inherently inadequate. In sum, the Court finds that the cumulative impact analysis in the EA is inadequate because the analysis fails to consider the combined impacts of future, specific power plants in the region and the cumulative impact on water resources.

VII. CONCLUSION

Based on the discussion above, the Court **GRANTS IN PART** plaintiff's motion for summary judgment to the extent it asserts violations of NEPA and the APA arising from the EA and FONSI's inadequate analysis of the following issues: **(1) the potential for controversy; (2) water impacts; (3) impacts from ammonia and carbon dioxide; (4) alternatives; and (5) cumulative impacts**. The Court **DENIES IN PART** defendants' motion for summary judgment as to the same issues. However, the Court **GRANTS IN PART** defendants' motion for summary judgment as to the remaining issues raised by plaintiffs, and **DENIES IN PART** plaintiff's motion as to those issues.

Additionally, the Court **DENIES** defendants' motion to strike plaintiff's extra-record declarations, **DENIES** defendants' motion to supplement the record, and **GRANTS** plaintiff's motion to strike T-US's supplemental declaration and request for judicial notice. Accordingly, the Court **STRIKES** T-US's supplemental declaration and request for judicial notice from the record.

Finally, the Court **INVITES** the parties, including defendant-intervenors T-US and BCP, to provide briefing on the question of an appropriate remedy or remedies for the violations found above. The parties shall provide briefing, if any, according to the following schedule and limitations:

BRIEF	**TO BE FILED AND SERVED ON OTHER PARTIES ON OR BEFORE:**	**PAGE LIMITATION**
Plaintiff's Memorandum on Remedies	May 19, 2003	10
Federal Defendants' Opposition	June 2, 2003	10
Defendant-Intervenor T-US's Opposition	June 2, 2003	10
Defendant-Intervenor BCP's Opposition	June 2, 2003	10
Plaintiff's Reply	June 9, 2003	10

The Court will hear argument concerning the appropriate remedy on June 16, 2003, at 10:30 a.m. in Courtroom 13, unless the Court notifies the parties otherwise.

IT IS SO ORDERED.

Dated: May 2, 2003

IRMA E. GONZALEZ
United States District Judge

cc: The Honorable Magistrate Judge Louisa S. Porter
all parties

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DEPUTY

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF CALIFORNIA

BORDER POWER PLANT WORKING GROUP, Plaintiff, vs. DEPARTMENT OF ENERGY; SPENCER ABRAHAM, in his official capacity; CARL MICHAEL SMITH, in his official capacity; ANTHONY J. COMO, in his official capacity; BUREAU OF LAND MANAGEMENT, Defendants.	CASE NO. 02-CV-513-IEG (POR) **ORDER (1) DENYING PLAINTIFF'S SPECIFIC REQUESTS FOR RELIEF; (2) GRANTING RELIEF IN MODIFIED FORM; (3) DEFERRING THE SETTING ASIDE OF THE PERMITS AND FONSI UNTIL JULY 1, 2004; (4) REMANDING THE MATTER TO THE FEDERAL DEFENDANTS FOR ADDITIONAL NEPA REVIEW AND A NEW DETERMINATION; (5) DENYING PLAINTIFF'S REQUEST FOR AN INJUNCTION PROHIBITING OPERATION OF THE TRANSMISSION LINES IN THE INTERIM; (6) DENYING WITHOUT PREJUDICE PLAINTIFF'S REQUEST FOR AN INJUNCTION TO REMOVE THE TRANSMISSION LINES AFTER 18 MONTHS; (7) RETAINING JURISDICTION PENDING NEPA COMPLIANCE; and (8) PROVIDING OTHER DIRECTION AND RELIEF AS STATED IN THE ORDER'S CONCLUSION** [Doc. Nos. 91, 93, 146]

Presently before the Court are plaintiff Border Power Plant Working Group's request for relief and motion for reconsideration of this Court's denial of plaintiff's oral motion to file supplemental declarations. Having heard argument on the request and having considered the parties' legal briefs and scientific declarations, the Court denies plaintiff's specific request for relief but grants relief in a modified form, as more fully described below. Additionally, the Court grants plaintiff's motion for reconsideration and, upon reconsideration, grants plaintiff's motion to file supplemental declarations.

I. Background

The Court refers the parties to the factual background provided in the Court's May 2, 2003 Order on the merits of this case. In sum, this case involves two applications for Presidential Permits and federal rights-of-way to build electricity transmission lines within the United States and across the United States-Mexico border to connect new power plants in Mexico with the power grid in Southern California. The U.S. Department of Energy (DOE) issued on Presidential Permit and the U.S. Bureau of Land Management (BLM) issued on right-of-way to defendant-intervenor Baja California Power (BCP). Those agencies issued another Presidential Permit and another right-of-way to defendant-intervenor Termoelectrica-U.S. (T-US). For ease of use, the Court will refer below to the Presidential Permits and the rights-of-way collectively as the "permits." The agencies collaborated to produce an environmental assessment (EA) pursuant to the National Environmental Policy Act (NEPA), upon which they subsequently relied to make a finding of no significant environmental impact (FONSI) from the issuance of the permits. Under NEPA's implementing regulations, this FONSI relieved them of the duty of undertaking a more comprehensive environmental impact statement (EIS).

Plaintiff filed a motion for summary judgement, alleging various violations of NEPA and the Administrative Procedure Act ("APA") on January 31, 2003. The federal defendants filed a cross-motion for summary judgment and an opposition to plaintiff's motion on March 13, 2003. Amicus curiae briefs were filed by BCP, T-US, and Imperial County and City of El Centro. Plaintiff responded to the BCP and T-US briefs on April 4, 2003, and both plaintiff and the federal defendants replied to the other's opposition brief.

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On May 2, the Court granted in part plaintiff's motion for summary judgement, holding that the federal defendants had violated NEPA and the APA by finding arbitrarily and capriciously that their actions would not lead to any significant environmental impacts. In particular, the Court held that the EA did not adequately address the water impacts on the Salton Sea, the potential for public controversy over the actions, the cumulative impacts of the actions, the impacts of carbon dioxide and ammonia emissions from the plants, and the alternative of conditioning the permits on certain emissions standards. Based on these deficiencies, the Court held that the FONSI was inadequately supported and therefore arbitrary. The Court set a remedy-phase hearing in the case for June 16, 2003.

Following the issuance of the Court's order on the merits, plaintiff moved for a temporary restraining order and a preliminary injunction pending the final decision on relief. The Court issued an order setting a hearing on June 3, 2003 to resolve the motion for a TRO. Following that hearing, the Court denied both the TRO and the PI motions, finding that plaintiff had failed to making a showing of irreparable injury in the interim and that the equities were against the issuance of temporary injunctive relief. The Court noted that its adjudication of the temporary relief motions was separate from its consideration of plaintiff's present request for permanent injunctive relief.

Plaintiff's motion for permanent relief in the case includes four requests: (1) that the Court set aside the permits and the FONSI; (2) that the Court order the DOE and the BLM to conduct an environmental impact statement (EIS) before issuing a new decision on whether to re-issue the permits; (3) that the Court enjoin operation of the transmission lines until the DOE and BLM issue permits pursuant to a legally adequate EIS and Record of Decision (ROD); and (4) that the Court enjoin the intervenors and DOE to remove the constructed transmission lines if DOE does not issue permits pursuant to a legally adequate NEPA review within 18 months of the Court's present Order. The Order will discuss each of these requests in turn.

III. DISCUSSION

A. WHETHER THE PERMITS AND THE FONSI SHOULD OR MUST BE SET ASIDE

1. Legal Standard

The Court has already determined in its Order of May 2, 2003 that the Administrative Procedure Act ("APA"), 5 U.S.C. § 701, et seq., establishes the standard of review for challenges to agency actions under NEPA. The APA also provides a specific remedy when a court, as here, has found agency action to be arbitrary and capricious: "The reviewing court shall . . . hold unlawful and set aside agency action, findings, and conclusions found to be . . . arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A).

2. Discussion

Plaintiff argues that the "shall" in the APA language cited above means that the Court must set aside the permits issued pursuant to an arbitrary and capricious FONSI. At least one district court in the Ninth Circuit has agreed with this analysis. See National Wildlife Federation v. Babbitt, 2001 WL 128425, *1 (E.D. Cal., Jan. 26, 2001) (holding that the court "must 'hold unlawful and set aside'" the agency's decision once it determined that the permit was issued in violation of the APA's standards). But see Westlands Water Dist. v. U.S. Dept. of Interior, 2002 WL 32101999, *56 (E.D. Cal., 2002) ("Despite the mandatory language, 'shall,' courts retain equitable discretion to fashion appropriate remedies when there has been a violation of NEPA.")). In interpreting the language of APA's § 706 to a violation of the Endangered Species Act, the Tenth Circuit held that the "shall" in § 706 restricts the courts' equitable discretion as to the remedy and mandates that the court issue the relief specified. See Forest Guardians v. Babbitt, 174 F.3d 1178, 1187-1189 (10th Cir. 1999) (citing Environmental Defense Ctr. v. Babbitt, 73 F.3d 867 (9th Cir.1995) for the proposition that the Ninth Circuit has implicitly recognized that "shall" in the APA § 706 means "shall").

The federal defendants argue, however, that the Court may exercise its traditional equitable discretion in deciding not to issue an injunction setting aside the permits in this case. Both sides agree that such equitable discretion "is displaced only by a 'clear and valid legislative command.'" United States v. Oakland Cannabis Buyers' Cooperative, 532 U.S. 483, 496 (2001) (quoting Porter v. Warner Holding Co., 328 U.S. 395, 398 (1946)). The federal defendants argue essentially that the "shall" in § 706 of the APA is qualified by § 702, which provides that "[n]othing herein . . . affects . . . the power or duty of the court to dismiss any action or deny relief on any other

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appropriate legal or equitable ground." 5 U.S.C. § 702.[1] The federal defendants argue that the legislative history of the 1976 amendment of the APA that resulted in this provision makes clear that the grounds for denying relief pursuant to § 702 include hardship to the defendant or to the public following a balancing of the equities. (See Fed. Defs' Opp'n at 2). Additionally, the federal defendants argue that § 706 itself qualifies its seemingly mandatory order for relief by adding the caveat that the court, in making determinations under § 706, must take "due account . . . of the rule of prejudicial error." 5 U.S.C. § 706. This provision, according to the federal defendants, means that the "shall" does not mean "shall" in cases where no prejudice has been shown. (See Fed. Defs' Opp'n at 3).

Plaintiff argues in reply that the term "shall" is unambiguous, and that the court must give meaning to the clearly expressed intent of Congress. (See Pla's Reply at 3). Indeed, the Supreme Court has stated that Congress could not choose a stronger word to express its intent than the use of the word "shall" as a legislative command to the courts. See U.S. v. Monsanto, 491 U.S. 600, 607 (1989). More recently, the Supreme Court warned that "[c]ourts of equity cannot, in their discretion, reject the balance that Congress has struck in a statute." Oakland Cannabis Buyers' Co-op., 532 U.S. 483, 497 (U.S. 2001).

Plaintiff replies to the federal defendants' argument that § 702 qualifies the "shall" in § 706 by arguing that the purpose of the 1976 amendment to the APA was only to remove the defense of

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[1] 5 U.S.C. § 702 provides, in its entirety:

> Right of review. A person suffering legal wrong because of agency action, or adversely affected or aggrieved by agency action within the meaning of a relevant statute, is entitled to judicial review thereof. An action in a court of the United States seeking relief other than money damages and stating a claim that an agency or an officer or employee thereof acted or failed to act in an official capacity or under color of legal authority shall not be dismissed nor relief therein be denied on the ground that it is against the United States or that the United States is an indispensable party. The United States may be named as a defendant in any such action, and a judgment or decree may be entered against the United States: *Provided*, That any mandatory or injunctive decree shall specify the Federal officer or officers (by name or by title), and their successors in office, personally responsible for compliance. Nothing herein (1) affects other limitations on judicial review or the power or duty of the court to dismiss any action or deny relief on any other appropriate legal or equitable ground; or (2) confers authority to grant relief if any other statute that grants consent to suit expressly or impliedly forbids the relief which is sought.

5 U.S.C. § 702.

sovereign immunity as a bar to judicial review of federal administrative action. (See Pla's Reply at 5). Plaintiff argues that the provision merely serves to make clear that extraordinary injunctive relief could still be denied on other appropriate equitable grounds. (Id.). In plaintiff's view, this general provision does nothing to affect the specific and mandatory remedy set forth in § 706, but rather that it applies to other types of injunctive relief that a party may seek beside the statutorily-prescribed remedy of setting aside the action. In support of its argument, plaintiff points persuasively to a report of the House of Representatives on the § 702 amendment, which concludes that the changes made by the amendment would not upset "congressional judgments that a particular remedy in a given situation should be the exclusive remedy." H.R. Rep. 94-1656, 1976 U.S.C.C.A.N. 6121, 6140.

Plaintiff's argument, however, appears to directly contradict the holding of the Ninth Circuit in National Wildlife Federation v. Espy, in which the court held:

> Although the district court has power to do so, it is not required to set aside every unlawful agency action. The court's decision to grant or deny injunctive or declaratory relief under APA is controlled by principles of equity. *Westlands Water Dist. v. Firebaugh Canal*, 10 F.3d 667, 673 (9th Cir.1993); *Sierra Pacific Industries v. Lyng*, 866 F.2d 1099, 1111 (9th Cir.1989). The district court must weigh "the competing claims of injury ... and the effect on each party of the granting or withholding of the requested relief." *Amoco Production Co. v. Village of Gambell*, 480 U.S. 531, 542, 107 S.Ct. 1396, 1402, 94 L.Ed.2d 542 (1987).

45 F.3d 1337, 1343 (9th Cir. 1995) (emphasis added). See also Natural Resources Defense Council v. Houston, 146 F.3d 1118, 1125 (9th Cir. 1998) ("A court may set aside an agency action if it was 'arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law'") (emphasis added) (citing 5 U.S.C. § 706(2)(A)); id. at 1129 (While the APA § 706 states that the agency shall set aside illegal agency action, the district court had the discretion to preserve contracts issued in violation of the APA) (citing Weinberger v. Romero-Barcelo, 456 U.S. 305, 320 (1982)). Unfortunately, the court in National Wildlife Federation did not provide an in-depth explanation for its conclusions regarding the statutory construction of the APA. It is clear, however, that the Ninth Circuit in that case specifically addressed the "shall" provisions of § 706 when it held that the courts retain equitable discretion not to set aside illegal agency action. 45 F.3d at 1340 (explaining that plaintiffs brought their claims under APA §§ 701-706); id. at 1342 ("Plaintiffs seek declaratory and injunctive relief under a federal statute which empowers a federal court to

'compel agency action unlawfully withheld,' and to 'hold unlawful and set aside agency action ... in excess of statutory jurisdiction, authority, or limitations, or short of statutory right....' 5 U.S.C. § 706(1), (2)(C)."). Accordingly, this Court is bound by the Ninth Circuit's interpretation of § 706 and accordingly must exercise its equitable discretion in deciding whether to set aside the permits at issue. Id. at 1343.[2]

In light of the Court's conclusion below to deny the request for an injunction against operation of the transmission lines pending further NEPA review, reached after a searching inquiry into the balance of harms to the parties and the public, the Court exercises its equitable discretion to defer the invalidation of the permits. See Sierra Club v. Penfold, 857 F.2d 1307, 1311 (9th Cir. 1988) (upholding district court's holding that BLM action was invalid for failure to include a sufficient EA but that injunction setting aside the action should be equitably deferred); id. at 1317 ("The district court molded its decree to meet the exigencies of the situation before it. The deferral of invalidity . . . was the best course available to remedy the interests and injuries involved."). Such a resolution avoids an outcome in which the Court has allowed the interim operation of the power lines, but those lines are without the proper legal permits. Accordingly, the Court defers the setting aside of the permits until July 1, 2004. The federal defendants may seek leave of the Court to continue that date, if necessary, as provided in the conclusion to this Order.

B. WHETHER THE COURT SHOULD ORDER THE PREPARATION OF AN EIS

1. Legal Standard

An agency is required to prepare an EIS if the EA establishes that the agency's action may have significant environmental impacts. National Parks & Conservation Ass'n v. Babbitt, 241 F.3d 722, 730 (9th Cir. 2001) (internal quotations omitted). An agency errs in failing to prepare an EIS if the agency's action is environmentally "significant" according to any of the criteria provided

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[2]The Court notes, however, that the cases cited by the Ninth Circuit in National Wildlife Federation do not appear to provide direct support for its conclusion. The citation to Westlands Water District appears inapposite, since the latter court merely held that "[t]he APA authorizes a court to either compel or set aside agency action (i.e. to award equitable relief) but does not authorize money damages." 10 F.3d at 673. Similarly, Sierra Pacific Industries does not appear to provide direct support for the proposition that the mandatory language of § 706 is subject to general principles of equity. In fact, that case does not discuss the APA, but rather describes the court's authority to issue an injunction under a different statute. See generally 866 F.2d 1099, 1111-1112.

by the Council on Environmental Quality for assessing the significance of environmental impacts. Public Citizen v. Department of Transp., 316 F.3d 1002, 1023 (9th Cir. 2003); 40 C.F.R. § 1508.27. "[T]o prevail on the claim that the federal agencies were required to prepare an EIS, the plaintiffs need not demonstrate that significant effects *will* occur. A showing that there are *substantial questions* whether a project may have a significant effect on the environment is sufficient." Anderson v. Evans, 314 F.3d 1006, 1017 (9th Cir. 2002) (internal quotations omitted). Thus, the Ninth Circuit has required preparation of an EIS where a "substantial controversy," one of the significance factors, existed regarding the effect of the action on the environment. National Parks & Conservation Ass'n v. Babbitt, 241 F.3d 722, 731 (9th Cir. 2001) ("[W]e conclude that the Parks Service clearly erred and that the high degree of uncertainty and the substantial controversy regarding the effects on the quality of the environment each necessitates preparation of an EIS." (emphasis added)).

On the other hand, the Ninth Circuit has also remanded a case in which it found a violation of NEPA to the federal agency without ordering an EIS. See Smith v. U.S. Forest Service, 33 F.3d 1072, 1079 (9th Cir. 1994). In Smith the Ninth Circuit concluded, unlike this Court in the present case, that the agency's decision was "environmentally significant." Id. Nonetheless, the Smith court found it more appropriate under the circumstances to "leave to the agency the decision of how best to comply with NEPA and its implementing regulations, and hold only that the NEPA documents before us are insufficient." Id.

Plaintiff suggests in a letter-brief submitted to the Court after oral argument that Smith can be distinguished because, in that case, the FONSI issued pursuant to the invalid EA had not itself been challenged. (Id. at 1078 ("the Forest Supervisor's finding [of] . . . no significant impact . . . has not, itself, been challenged by Smith")). However, the Court declines to adopt plaintiff's interpretation of Smith for three reasons. First, reading the passage cited by plaintiff in context, it appears that the court may have simply been characterizing the argument made by the defendant agency, rather than making its own finding of fact. Second, in the very next paragraph, the court states that "[n]evertheless, we must conclude that the agency's NEPA documents are inadequate." Id. The use of the plural "documents" suggests that the court found both the EA and the FONSI

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inadequate, whether or not it accepted the defendant agency's assertion that plaintiff had not challenged the FONSI itself. Finally, the Court finds it difficult to imagine how an inadequate EA could support a legally-adequate FONSI. It would be a strange outcome indeed for the Smith court to have decided that the EA illegally failed to consider related and cumulative impacts of the agency decision, but to have nonetheless found that the agency's finding of no impact was reasonably supported by the same document. Based on these considerations, the Court agrees with the federal defendants that Smith offers support for the proposition that a court need not require an EIS on remand, even where a Court has found the action to be environmentally significant.

2. Discussion

The federal defendants argue, correctly, that the Court did not find in its Order on the merits of this case that there would, in fact, be significant impacts to the environment. Instead, the Court found simply that the record did not adequately support a finding of no significant impact. In particular, the Court found that the agencies' analysis of impacts to the Salton Sea were not well-reasoned or convincing, that public comments had raised a substantial dispute as to the effects of the permits and as to the significance of those effects, that the NEPA analysis failed to assess the impacts of ammonia and carbon dioxide emissions, that the analysis failed to consider a reasonable and feasible alternative, and that the EA failed to adequately consider cumulative impacts. In fact, after an extensive review of scientific testimony, described more fully below, the Court concludes that it is unable to make a positive finding that the operation of the transmission lines will likely cause irreparable and substantial harm to the environment.

The federal defendants argue that the proper remedy for the Court's findings is to remand the matter to the agency for further explanation of its decision. (See Fed. Defs' Opp'n at 5 (citing Florida Power & Light Co. V. Lorion, 470 U.S. 729, 744 (1985) ("If the record before the agency does not support the agency action, if the agency has not considered all relevant factors, or if the reviewing court simply cannot evaluate the challenged agency action on the basis of the record before it, the proper course, except in rare circumstances, is to remand to the agency for additional investigation or explanation"). It does not appear, however, that any party disagrees that the matter must be remanded to the agency for additional explanation. Instead, the question presently before

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the Court is whether the agency should be ordered to conduct an EIS upon remand.

Plaintiff argues in response that while it is appropriate for the agency to have a first opportunity to explain why an EIS should not be prepared, when the agency fails to issue a legally-sufficient FONSI, the Court must remand for an EIS. The Anderson and National Parks & Conservation Association cases discussed above support this position by seemingly requiring an EIS if the Court finds that "substantial" questions or controversy surround the action. Plaintiff argues, convincingly, that if the federal defendant's interpretation of the Public Citizen court's two-step process for determining the existence of substantial controversy is taken to its extreme, the Court could never order an EIS to be prepared after having found that "substantial controversy" exists, since the agency would always have to be given a second (or third, etc.) chance to provide a convincing explanation for why the controversy does not, in fact, exist. See Public Citizen v. Department of Transp., 316 F.3d 1002, 1027 (9th Cir. 2003) (If a plaintiff shows substantial dispute about an agency action that raises substantial questions, then the burden shifts to the agency to provide a convincing explanation why no controversy exists).

The Court concluded in its May 2, 2003 Order on the merits of this case that "plaintiff has demonstrated the existence of a substantial dispute as to the effects and significance of those effects prior to the preparation of the FONSI." (Order at 29). The Court based its conclusion on the twelve timely comment letters received by the agencies and the additional 400 e-mail comment letters received by the agency after the closing of the comment period. In general, those letters, to the extent that they looked into the substance of the environmental impacts, provided little more than conclusions as to the significance of those impacts.

The record now before the Court includes a large number of scientific declarations, submitted by experts on both sides of the dispute, as to the significance of the impacts that the Court previously found inadequately assessed. These declarations provide a much broader and deeper scientific foundation upon which to judge the substance of plaintiff's allegations, especially when compared with the inadequate or nonexistent analysis in the EA and the public comment letters. The Court is even more convinced at this stage of the proceeding that a dispute exists concerning the significance of the impacts. However, the Court finds it appropriate to revisit the question of whether this dispute is "substantial," based on the record now before it. That inquiry, made in the following subsection below, leads the Court to the conclusion that plaintiff's allegations of environmental harm are, to a considerable degree, without substance. Because the Court finds that plaintiff has failed to make a likely showing of irreparable and substantial environmental harm, the Court also finds that it would be inconsistent to rely on its earlier finding of "substantial" dispute in ordering an EIS to be prepared. Rather, the Court finds for purposes of this remedial phase that plaintiff has failed to make a showing of substantial dispute or to raise substantial questions that would require such a remedial order.[3] Accordingly, the Court finds that this case can be distinguished from the Anderson and National Parks & Conservation Association cases, and that the Court is not bound by that precedent to require an EIS on remand.

Because plaintiff has not positively demonstrated to the Court the likelihood of a significant environmental impact from the proposed actions, the Court finds that it is not appropriate to constrain the agencies' decision-making by ordering an EIS on remand. The agencies are better suited to make that determination, after the completion of a fully adequate EA that rectifies and considers the deficiencies noted in the Court's May 2, 2003 Order on the merits. Accordingly, the Court remands the matter to the agencies to complete an environmental analysis of the proposed actions that complies with this Court's Order. In complying with this remand, the agencies may, according to their discretion, undertake either a supplemental EA, followed by an EIS if significant impacts are indicated, or an EIS in the first instance.[4]

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[3]In so holding, the Court does not mean to reconsider its holding on the merits that the agency failed to provide a convincing explanation for why the action had not raised a substantial dispute. The Court based its decision on the merits on the record, rather than on the extra-record materials presently before the Court. This was appropriate because the Court reviewed the reasonableness of the agency's decision based solely on that record.

The Court orders, below, that the agency may not rely on the Court's equitable analysis of environmental impacts on remand, given that the agency, and not the Court, has the superior expertise in these matters. Because the administrative record, absent the extra-record declarations prepared and submitted in this judicial proceeding and absent the Court's own analysis, fails to explain the absence of a substantial dispute, it is not inconsistent that the agency must still assess on remand whether a public controversy necessitates the creation of an EIS in this matter.

[4]Instructive in this regard is the Anderson court's analysis of the functional difference between an EIS and an EA:

> [A]n EIS serves different purposes from an EA. An EA simply assesses whether there will be

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C. WHETHER TO ENJOIN OPERATION OF THE TRANSMISSION LINES PENDING FURTHER ENVIRONMENTAL REVIEW AND DECISION-MAKING BY THE AGENCIES

1. Legal Standard

"The requirements for the issuance of a permanent injunction are 'the likelihood of substantial and immediate irreparable injury and the inadequacy of remedies at law.'" American-Arab Anti-Discrimination Committee v. Reno, 70 F.3d 1045, 1066 -1067 (9th Cir. 1995) (quoting LaDuke v. Nelson, 762 F.2d 1318, 1330 (9th Cir. 1985)).[5] "In each case, a court must balance the competing claims of injury and must consider the effect on each party of the granting or withholding of the requested relief." Amoco Production Co. v. Village of Gambell, 480 U.S. 531, 542 (1987). Additionally, "the public interest is a factor which courts must consider in any injunctive action in which the public interest is affected." American Motorcyclist Ass'n v. Watt, 714 F.2d 962, 967 (9th Cir. 1983) (citing Weinberger v. Romero-Barcelo, 456 U.S. 305, 312 (1982)). NEPA does not require the automatic issuance of injunctive relief upon establishing a violation, but instead the Court is obligated to conduct the traditional balancing of the equities when evaluating such a request. See Northern Cheyenne Tribe v. Hodel, 851 F.2d 1152, 1157-1158 (9th Cir. 1988).

2. Discussion

A. Irreparable Harm

The Court has already considered once, in conjunction with plaintiff's recent motions for a temporary restraining order and a preliminary injunction, whether plaintiff had met its burden of

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> a significant impact on the environment. An EIS weighs any significant negative impacts of the proposed action against the positive objectives of the project. Preparation of an EIS thus ensures that decision-makers know that there *is* a risk of significant environmental impact and take that impact into consideration. As such, an EIS is more likely to attract the time and attention of both policymakers and the public. In addition, there is generally a longer time period for the public to comment on an EIS as opposed to an EA, and public hearings are often held.

314 F.3d at 1023.

[5]No party suggests that plaintiff has an adequate legal remedy for any environmental harm it demonstrates. Accordingly, the analysis will focus on the whether plaintiff has succeeded in demonstrating a likelihood of substantial and immediate irreparable harm.

demonstrating irreparable harm. However, the Court made clear in its order denying plaintiff's motions that it was adjudicating the issue only based on the interim period of a few weeks and that such adjudication would not limit the Court in assessing the plaintiff's motion for a final remedy. The Court now has before it a much larger evidentiary record, based on the multiple declarations submitted by plaintiff and both intervenors.[6] The Court's first inquiry will be whether plaintiff has now met its burden of showing a likelihood of substantial and irreparable harm in the absence of the requested injunction. Plaintiff argues three distinct sources of such harm: (1) to the Salton Sea and the New River; (2) to the public from cumulative particulate emissions resulting from ammonia; and (3) from the lack of full public disclosure and the benefit of an informed agency decision prior to a change in the status quo.

1. The Salton Sea and the New River

Plaintiff submitted several declarations in support of its claim that irreparable injury will occur to the Salton Sea and the New River in the absence of an injunction. First, Jose Angel, a

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[6]Plaintiff filed a memorandum of points and authorities in support of its request for relief on May 19, 2003. That memorandum contained no supporting declarations. Plaintiff then filed a motion for a preliminary injunction and a temporary restraining order on June 2, 2003, *nunc pro tunc* May 28, 2003. Accompanying the TRO/PI motion was a declaration of William Powers assessing the impacts of the plants' operation on the environment. On June 2, 2003, in response to the Court's scheduling orders, the federal defendants and intervenors filed oppositions to both the plaintiff's May 19, 2003 request and May 28, 2003 motion for a TRO/PI. Defendant-intervenor TDM filed five declarations concerning the scientific impact of the plants' operation on the environment and human health. Defendant-intervenor BCP filed six declarations on the same subject. The Court denied plaintiff's motion for a TRO/PI on June 4, 2003.

Plaintiff then filed a reply to defendants' opposition to the request for relief on June 9, 2003. Attached to plaintiff's reply were five new scientific declarations and a second scientific declaration submitted by William Powers. At a telephonic status hearing on June 10, 2003, the Court granted defendant-intervenors' oral motion to file declarations in response to plaintiff's most recent declarations. On June 13, 2003, defendant-intervenors each submitted two additional rebuttal declarations. At oral argument on the request for relief, plaintiff appeared with five new rebuttal declarations that had not previously been served on defendants. Plaintiff made an oral motion to file the new declarations, which were made by the same declarants who had previously submitted declarations on behalf of plaintiff. After providing defendants with an opportunity to respond to the motion, the Court denied the motion. Plaintiff then filed on June 20, 2003 a motion for reconsideration of the Court's denial of the oral motion. Defendant-intervenors filed oppositions to the motion for reconsideration on June 25, 2003. Having considered the parties' arguments, and good cause appearing, the Court grants the motion for reconsideration and grants plaintiff's motion to file the additional declarations. To the extent that defendant-intervenors moved in their oppositions to file responses to the additional declarations, the Court denies those motions.

Division Chief with the California Regional Water Quality Control Board,[7] declares that the operation of the power plants and the affiliated sewage treatment plants will not decrease the total amount of total dissolved solids (TDS)[8] in the New River, as the intervenors claim, but rather will increase the salinity of the New River, decrease the flow, and leave unchanged the total amount of the TDS of the water flowing to the Salton Sea. (See Declaration of Jose Angel in support of Plaintiff's Request for Relief, at ¶ 18). Angel goes on to declare that because the "overwhelming body of evidence suggest [sic] that the current level [of salinity] is more than what is healthy for the Sea . . . any further salt degradation of the Salton Sea must be considered a significant impact." (Id. At ¶ 24). Angel explains in a supplemental declaration that he has referred to water quality standards established by the Regional Water Quality Control Board, and approved by the United States E.P.A., in evaluating the significance of the rise in salinity. (See Supp. Decl. of Jose Angel at ¶ 15). According to Angel, the current salinity of the Salton Sea fails to meet these standards, and therefore any further degradation must be significant. (Id.).

In another declaration, Thomas Kirk, the Executive Director of the Salton Sea Authority, states that "[*a*]*ny reduction* of inflow would cause the Sea to shrink and the salts in the Sea to become more concentrated." (Declaration of Thomas J. Kirk III in support of Plaintiff's Request for Relief, at ¶ 6). Kirk goes on to explain that the operation of the plants in Mexico "would result in reductions of inflow to the Sea that would exacerbate the rising salinity problem and further threaten the Salton Sea ecosystem." (Id.). Such rising salinity, according to Kirk, is already threatening the Salton Sea's fishery, which sustains "millions of birds that pass through the region annually as they migrate between the Pacific Ocean and the Gulf of California." (Id.). Based on this assessment, Kirk concludes that operation of the plants would have the "strong potential to cause irreparable harm to the Salton Sea." (Id.).

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[7]Counsel for plaintiff represented at oral argument that Angel had submitted his declaration with the full authority of, and on behalf of, the California Regional Water Quality Control Board. Angel states in his Supplemental Declaration at ¶ 25 that the Executive Director of the Board gave him the assignment to prepare the declaration.

[8]The scientific declarations submitted by the parties seem to use TDS and concentration of salts interchangeably. The Court will accordingly assume that they are at least close approximations of each other.

Finally, Marie Barrett, the Outreach Coordinator for the New River Wetlands Project, declares in support of plaintiff's motion that a 6 percent reduction in flow and a 6 percent increase in salinity of the New River could result in harm to the wetlands created by her organization along the New River. (Declaration of Marie Barrett in support of Plaintiff's Request for Relief, at ¶¶ 4,5). Barrett explains that these wetlands have been created as pilot projects to remove pollutants in the New River while providing increased habitat for birds in the area. (Id. at ¶ 3[a]). A three-year monitoring program is currently underway at the wetlands. (Id. at ¶ 3[b]).

Defendant-Intervenors submitted several declarations, however, that contest whether irreparable harm to the New River or to the Salton Sea is likely during the period in which the agencies are undertaking supplemental NEPA review.[9] T-US' expert, Dr. Theodore Hromadka, explains that the EA failed to take into account the effect of groundwater seepage on the flow of the New River, and that the analysis thus overstated the decrease in flow that might be expected. (See Declaration of Theodore Hromadka in support of T-US' Opp'n at ¶ 34). In essence, Dr. Hromadka explains that any decrease in the flow of the New River caused by operation of the plants will decrease the pressure on the banks of the river and allow a greater quantity of groundwater to seep into the river. (See id. at ¶¶ 18-20). Thus, Dr. Hromadka concludes that "all or almost all of the quantity of flow that is evaporated would be returned in quantity to the New River as a result of increased groundwater seepage." (Id. at ¶ 34). This equivalent or near equivalent flow would have less of a concentration of salts and TDS because the sewage treatment facilities connected to the plants would permanently remove much of the TDS.[10] (Id.). As a result of these processes, it is Dr. Hromadka's opinion that the operation of the plants and their treatment facilities "actually slows the degradation of the Salton Sea and would be a net benefit." (Id.). Plaintiff's expert, Angel, addresses this contention in his supplemental declaration. (See Supplemental Angel Decl. at ¶ 19). First, Angel states that groundwater seepage into the river is less than 13%. (Id.). The Court finds that this evidence fails to refute Dr. Hromdka's opinion

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[9]Intervenors argue, and plaintiff does not contradict, that such review would take no longer than 2 years, and would most likely take between 6 and 18 months. (See, e.g., T-US' Opp'n at 5, n.7).

[10]The Court notes that this assertion is directly disputed by plaintiff's expert, Jose Angel, as discussed above.

since it addresses current, not hypothetical seepage if flows from Mexico are decreased. Second, Angel argues that Dr. Hromdka has failed to point to any site-specific studies supporting his opinion and that the studies that Angel has conducted or directly supervised "fail to support the notion that groundwater is a significant source of inflow into the New River." (Id.). Finally, Angel notes that water accounting models used by the Salton Sea Authority and the U.S. Bureau of Reclamation are programmed to account for changes in groundwater flow, and that these models show a change in the elevation of the Salton Sea as a result of the power plants' operation. (See id. (citing id. at ¶ 11, but apparently meaning to cite to id. at ¶ 17)).

Finally, Dr. Hromadka also argues that even in the absence of increased groundwater seepage, the reduction in flow and corresponding increases in salinity would be well within the historic range of variability for the New River and the Salton Sea. (Id. at 35). However, the Court rejected this logic once already when it was put forth by the federal defendants in the EA, since it seems to ignore that an exogenous reduction in flow would merely move the historic range of variability to a lower flow range. Thus, historically low flow levels would apparently be even lower if the power plants remove water from the system.

T-US also submitted a supplemental declaration to respond to Jose Angel's first declaration. Among other factual challenges, Octávio Simoes refutes Angel's declaration that salts and TDS removed from sewage in the treatment process will simply be discharged again into the New River. (See Second Declaration of Octávio Simoes in Support of T-US' Opp'n at ¶ 3). Simoes explains that these wastes are processed at the plant into a solid waste that is then disposed of in a landfill. (Id. at ¶ 2). A supplemental declaration by BCP's expert Joel Kasper also declares that TDS removed during the treatment process at LRPC are not returned to the New River. (Second Declaration of Joel Kasper in support of BCP's Opp'n at ¶ 5). Angel responds to these contentions in his own supplemental declaration by suggesting that the water treatment process does not remove inorganic dissolved salts (e.g., sulfates) and that the intervenors' declarations have focused inappropriately on the removal of dissolved organics (e.g., organic phosphorous). (See Supp. Angel Decl. at ¶ 7). Additionally, Angel disputes Simoes' assertion that information regarding the removal of salts during the waste water treatment process can be found in the

Mexican environment impact evaluation. (Id. at ¶¶ 10-11).

BCP also offers Dr. Jean Nichols, an oceanographer and environmental consultant, who declares that even assuming that the operation of the plants increases salinity of the Salton Sea by as much as 0.14 percent after a year's time[11], such a change "would have no adverse effect on aquatic organisms in the Salton Sea." (Declaration of Jean A. Nichols in support of BCP's Opp'n at ¶ 4). Additionally, Joel Kasper, another of BCP's experts, explains that under a worst-case, continuous operation scenario, the salinity of the Salton Sea would rise about 63 mg/l, from about 44,000 mg/l to 44,063 mg/l, as a result of the operation of all the generation units in question for a year. (See First Declaration of Joel Kasper in support of BCP's Opp'n to Pla's Request for Relief at ¶ 12).[12] Kasper argues that the Bureau of Reclamation, in a report on the status of the Salton

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[11]This is a percentage increase in salinity that corresponds to BCP expert Kasper's estimate of the worse-case, continuous operation increase in salinity in the Salton Sea of 63 mg/l. (Nichols Decl. at ¶ 3).

[12]Plaintiff's expert Kirk directly disputes this calculation in his supplemental declaration. In that declaration, Kirk presents "simple mass balance calculations" to show that a flow reduction caused by the plants of 3,000 af/yr to 16,000 af/yr would lead to an increase in salinity in the Salton Sea of 408 mg/l to 1,963 mg/l. (See Supplemental Kirk Decl. at ¶ 3). Kirk goes on to argue that "[a] rapid increase of almost 2,000 mg/l could have a very serious effect on the fish with an increase in fish mortality or destroy the fishery completely." (Id. at ¶ 4 (emphasis added)). The 2,000 mg/l assumption translates into a percentage increase in salinity of about 4.5. Kasper, BCP's expert, calculates the maximum, worst-case reduction in flow to the Salton Sea resulting from the operation of the plants at 10,504 af/yr, closer to the higher range of Kirk's assumptions, but then concludes that such a reduction would only lead to a 63 mg/l increase in salinity after one year, assuming a new equilibrium is reached in one year. (See First Kasper Decl. at ¶ 12). Kasper's estimate is the basis for Nichols' assumption that the percentage increase in the salinity of the Sea will be about 0.14. While it is clear to the Court that either Kirk's or Kasper's calculation must be incorrect or that one of the two must have employed a faulty equation, the Court is ill-equipped to resolve such a dispute. However, the Court does note that Kirk's calculation appears to show, for example, that a 16,000 af/yr decrease in flow attributable to the plants leads to a total new equilibrium capacity in the Salton Sea of 7,299,184 af. (See Supp. Kirk Decl. at ¶ 3). This represents a total reduction of 325,659 af. (See id.) Perhaps this equilibrium would be reached over many, many years, but the Court is hard-pressed to understand how an inflow reduction of 38,000 af over a maximum two-year period, holding all other inflows constant, could result in such a large total reduction in the size of the Sea. This is especially true when viewed in light of Kasper's reasonable assertion that as the elevation of the Sea drops, evaporation will decrease, thereby mitigating at least some of the decrease in inflow. In any case, the Court assumes for purposes of this request for relief that Kirk's figures describe an equilibrium that would be reached far beyond the undisputed maximum two-year time-frame on remand contemplated by defendants. Finally, to the extent that Kirk's and Kasper's declarations are irreconcilable, the Court notes that Kirk's background and education are in the area of planning and public policy, while Kasper is an engineer with extensive experience working specifically in the area of water treatment for power plants. (Compare Supp. Kirk Decl. at ¶¶ 1-2 with Kasper Decl. in support of Opp'n to Request for Relief at ¶ 1-3). The Court finds that Kasper's relative professional expertise weighs in favor of giving greater credibility to his declaration. Similarly, the Court notes the potentially contradictory statements

Sea, has stated that 60,000 mg/l is the "critical salinity level for ecological reasons." (Id.). He submits that the worst-case potential increase in the salinity of the Sea is only 0.39 percent of the difference between the current and ecologically-critical levels. (Id.). Additionally, Kasper declares that any change in the salinity of the Salton Sea attributable to the operation of the plants would be entirely reversed if the flows into the New River are restored to their present levels. (Id. at ¶ 13).[13]

Finally, in a supplemental declaration, Kasper rebuts Barrett's assertions concerning the wetlands her organization has developed along the banks of the New River. First, he counters that the maximum possible reduction of flow at the wetlands would be no more than 2.5 percent, rather than the 6 percent alleged by Barrett. (Second Kasper Decl. at ¶ 15). Second, Kasper provides evidence that the wetlands are fed by pump, and not by gravity flow, so that the inflow to the wetlands could not be affected by a small reduction in the river's flow. (Id. at ¶ 16). Finally, Kasper states, based on evidence, that the dominant plant species in the wetlands would still be within its ideal salinity range even assuming Barrett's assertion that the salinity will increase by 6

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of Kirk, who declares that a 4.5 percent increase in salinity "could" have a very serious impact on the Sea's fishery, and Nichols, who declares that a 0.14 percent increase in salinity "would" have no adverse effect on aquatic organisms in the Sea. (Compare Supp. Kirk Decl. at ¶ 4 with Nichols Decl. at ¶ 4). The Court finds, based on the discussion above, that Nichols' estimate of the change in salinity is more credible. Additionally, the Court notes that Nichols is an oceanographer and environmental consultant who focused in her graduate work on bottom living organisms in regions of environmental stress. (Nichols Decl. at ¶ 1). The Court finds that her qualifications lend her conclusions relatively greater credibility when compared to the admittedly uncertain impacts asserted by Kirk.

[13]With regard to this argument, Angel responds in a supplemental declaration that he "cannot follow Mr. Kasper's line of reasoning because he does not explain how the lagoons are going to go back to their previous levels (presumably the levels before power plant operations) and how that reverses the projected environmental impacts – not just elevation." (Supp. Angel Decl. at ¶ 19). The Court does not find it so difficult to follow Kasper's line of reasoning. Presumably, if the power plants stopped operating, they would also stop diverting and using water from the New River system. Thus, holding all else constant, the quantity flowing into the lagoons and the sewage treatment plants, and therefore out of the lagoons and treatment plants, would be the same as before the plants had begun operation. Kasper argues that reinstating the previous levels of flow would enable the Salton Sea to reach a new equilibrium, one which would be the same as before operation of the plants if all else is held constant. Presumably, the total salinity in the Salton Sea at the new equilibrium would be about the same as before the operation of the plants, or possibly lower if the sewage treatment plants continued to operate after the power plants ceased operation and if the sewage treatment process does indeed remove salts as intervenors contend it would.

percent. (Id. at ¶ 17).[14]

Having considered the various scientific declarations submitted by the parties, the Court concludes that plaintiff has failed to show that substantial and irreparable harm to the Salton Sea would more likely than not result from a failure to issue the injunction. In particular, the Court is persuaded by intervenors' largely undisputed testimony that, even assuming a reduction in flow, the impacts from increased salinity resulting could be substantially reversed. The question of whether the fishery or other wildlife of the Salton Sea would be affected in the meantime, assuming an increase in salinity, is disputed among the experts. The Court does not find that plaintiff has prevailed in showing that such impacts would be likely or substantial. Finally, plaintiff's disputed claim that a wetlands creation program would be affected does not suggest that any effect on the wetlands would be irreparable, or that the loss of the wetlands would have other irreparable effects.

2. Ammonia Emissions

Next, plaintiff argues that it will suffer irreparable injury from the emission of ammonia that will create additional particulate pollution (PM_{10}). First, Dr. Paul English declares that "[b]ecause the EA did not disclose levels of ammonia emissions from the plants and thus, the corresponding increases of PM_{10}, which result as a byproduct from ammonia emissions, the EA's projected 24-hour average of 3 $\mu g/m^3$ underestimates the true cumulative impacts from this pollutant." (Declaration of Paul Brian English in support of Plaintiff's Motion on Remedies at ¶ 3). Another of plaintiff's experts, Dr. William Stockwell, concurs in this opinion, and declares that the worst-case, continuous operation ammonia emissions of 1,016 tons per year from the combined plants "poses a serious cumulative threat of irreparable environmental harm." (Declaration of William R. Stockwell in support of Plantiff's Motion on Remedies at ¶ 6). Dr. Stockwell also

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[14]Barrett acknowledges in a supplemental declaration that the USDA Plant Guide states that the ideal salinity range for the bulrush is 0 to 6,000 mg/l. (Supplemental Barrett Decl. at ¶ 3). However, she reasserts her argument that plants continuously exposed to the higher end of this range would face some degree of stress. (Id.). Additionally, Barrett argues that this marginal stress could be magnified by stresses from other sources, including other pollutants in the New River. (Id. at ¶ 5). The Court notes that Barrett does not address the undisputed fact that the sewage treatment plants would reduce other sources of pollution, which would presumably decrease the biological stress on the wetlands.

explains how ammonia emissions can form PM_{10} through a chemical reaction with nitric acid in the atmosphere. (Id. at 9). He goes on to argue that "[a]ny increases in ambient ammonia concentrations will increase the concentrations of secondary PM_{10}." (Id. at ¶ 11). In fact, Dr. Stockwell declares that due to the relative presence of NOx and ammonia in the atmosphere in the vicinity of the plants, a "substantial fraction" of the ammonia emitted could form PM_{10}. (Id. at 14). According to Dr. Stockwell, this additional PM_{10} was not discussed in the EA and has the potential to cause immediate and irreparable harm. (Id.).

T-US expert Dr. Steven Heisler explains that although ammonia is not regulated as a criteria pollutant or as a toxic air contaminant, exposure may have acute or chronic health effects. (First Declaration of Steven Heisler in support of T-US' Opp'n at ¶ 7). For that reason, the California Office of Environmental Health Hazard Assessment (OEHHA) has established acute and chronic reference exposure levels (RELs) for ammonia. (Id.). These RELs are commonly used significance levels for toxic air pollutants. (Id.). Dr. Heisler explains that RELs are established with margins of safety to ensure that no adverse health effects would be anticipated at levels below the respective REL. (Id.). The OEHHA RELs for ammonia are 3,200 $\mu g/m^3$ for the 1-hour (acute) period and 200 $\mu g/m^3$ for the annual (chronic period). (Id.). Dr. Heisler then calculated the anticipated ammonia slip emissions from all generation units at the LRPC and TDM facilities and, using a dispersion model, the resulting concentrations of ammonia at the border from these facilities. (Id. at ¶ 10). According to his calculations, the maximum 1-hour concentration would be 13.4 $\mu g/m^3$, and the annual average concentration would be 0.63 $\mu g/m^3$. Additionally, Dr. Heisler declares that since ammonia emissions from circulating water used in the facilities' cooling towers would be "much lower" than the ammonia slip emissions, no health impacts will result from the cumulative ammonia emissions of all the generating units. (Id. at 10, 12).

Dr. Heisler also opines on the ability of the ammonia emissions to cause particulate pollution. In his opinion, because Imperial County is relatively ammonia-rich, additional ammonia emissions from the plants would not lead to significant formation of particulate ammonium nitrate. (Id. at 13-16). He ultimately concludes based on this analysis that secondary particulate formed by ammonia emissions from the facilities would not be significant, or cause significant effects, over the next two years. (Id. at 16). In a supplemental declaration, Dr. Heisler responds to plaintiff's experts by calculating the estimated additional PM_{10} that will result from the facilities' ammonia emissions and finding that all PM_{10} emissions, both direct and secondary, attributable to the TDM and LRPC plants will not cause PM_{10} levels to exceed the EPA's significance levels at the border. (Second Declaration of Steven Heisler in support of T-US' Opp'n at ¶ 7, 15-17). Additionally, Dr. Heisler takes note of the diminishing performance of SCR technology over its lifetime, the fact that two of the LRPC plants will not immediately have SCR equipment (and will therefore have no ammonia slip emissions), and the actual ammonia content of the water to be used by the facilities. (Id. at ¶¶ 10-12). Based on these corrections and the expected actual operation of plants only 75 percent of the time, Dr. Heisler concludes that actual ammonia emissions from the facilities will be only nine percent of Dr. Stockwell's estimate over the next two years. (Id. at 13).

BCP's expert Perry Fontana, also conducted an analysis of the potential for impacts from the power plants' ammonia emissions. Fontana calculated a worst-case emission rate of ammonia and used a dispersion model to determine the maximum concentration increase of ammonia at receptors in Mexico, along the border, and into the United States. (Declaration of Perry Fontana in support of BCP's Opp'n at 3-5). Fontana compared the predicted concentrations with reference exposure levels (RELs) – based on the most sensitive effect reported in the medical literature – adopted by the California Air Pollution Control Officers Association (CAPCOA). (Id. at 6-7). The CAPCOA RELs are the same as the OEHHA RELs employed by Dr. Heisler. According to Fontana's analysis, the highest concentration of ammonia at any of the ground-level receptors is predicted to be less than 2 percent of the acute REL and even less of the chronic REL. (See id. at ¶ 7). While Fontana's calculations of emissions are somewhat higher than those of Dr. Heisler, they are still far below the RELs. Fontana also opines that the existing levels of background ammonia in the Salton Sea Air Basin are far below the RELs, and that therefore the small addition of ammonia from the plants would not cause significant adverse health impacts. (Id. at ¶ 9). Finally, Fontana, using a calculation provided by BCP's expert Joel Kasper, agrees with Dr. Heisler that ammonia emissions from the cooling towers would only be a fraction of the ammonia slip emissions, and that the additional cooling tower emissions would not change his opinion of no significant adverse health impacts. (Id. at ¶ 10; Kasper Decl. at ¶ 19).

In a supplemental declaration, plaintiff's expert Dr. English seeks to rebut the declarations of Heisler and Fontana by asserting again that it is "commonly accepted that there is a causal linear nonthreshold relationship between particulate matter with health outcomes such as hospital admissions, all-cause death, and death due to cardiorespiratory causes." (Supp. English Decl. at ¶ 3). Dr. English argues that looking just at the short-term increase in particulate matter at the border of 3 $\mu g/m^3$, which was the estimate presented in the EA and does not include any particulate that may be formed by ammonia emissions, the scientific literature suggests that the Court can assume there will be at least a 1% increase in deaths due to respiratory causes, a 0.8% increase in hospitalizations in COPD, and approximately 1% increase in upper respiratory symptoms and asthma. (Id. at ¶ 4).[15] It is beyond dispute that such impacts would be irreparable to those who suffered them. However, the Court must still determine whether such irreparable harm would be likely and substantial. Dr. English has not rebutted the EA's conclusion, as supplemented by intervenors' expert analysis to account for ammonia conversion, that such a increase in particulate is below the significance level set by the EPA for particulate emissions. While weighing the significance of health impacts is by no means a scientific or simple business, the Court finds it appropriate to defer to the expert agency's opinion on what increases in particulate are significant for purposes of protecting human health, and which are insignificant. Where the agency has determined that a particular increase is insignificant, the Court declines to find that the same increase is substantial for purposes of issuing injunctive relief.

Dr. English also argues in his supplemental declaration that the increases calculated by intevenors' experts would not, in fact, be below the EPA significance levels. (See id. at ¶ 5). While Dr. English apparently concedes that the 3 $\mu g/m^3$ estimated in the EA is below the 5 $\mu g/m^3$

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[15]In his first declaration, Dr. English cites to a 2002 study by Pope et al. and a 1999 paper by Pope and Dockery to support the assertion that a 10 $\mu g/m^3$ increase in chronic exposure to particulate is associated with specific health effects. (First English Decl. at ¶ 4). Fontana points out in a supplemental declaration that the 3 $\mu g/m^3$ increase reported in the EA is for short-term particulate increases, while the long-term average increase is only 0.2 $\mu g/m^3$. (Supp. Fontana Decl. at ¶ 6). In a rebuttal declaration, Dr. English again points to the 1999 Pope and Dockery article as support for his conclusion regarding acute health impacts of a 3 $\mu g/m^3$ increase, but he does not address the discrepancy pointed out by Fontana. (See Supp. English Decl. at ¶ 4).

significance level set by the E.P.A., he argues that such a conclusion is illogical in light of Fontana's own interpretation of the policy behind a significance level. (Id.). In particular, Dr. English quotes Fontana's statement that "significance levels represent the incremental increases in ambient concentrations attributable to an emissions source below which the source would not be considered to cause or contribute to a violation of the applicable National Ambient Air Quality Standards ("NAAQS") in areas where those standards already are not being met." (Supp. Fontana Decl. at ¶ 11) (citing 40 C.F.R. § 51.165(b)(2)). Dr. English argues that under this rationale, even a 3 $\mu g/m^3$ increase would be significant because it would have caused two particulate monitoring stations in Calexico to exceed the 150 $\mu g/m^3$ NAAQS eight times between 1994 and 2002. (See Supp. English Decl. at ¶ 5). While the Court notes the logic in Dr. English's argument, it does not agree with his conclusion. The significance levels regulations already assume that they are to be used in a "locality that does not or would not meet the applicable national standard." 40 C.F.R. § 51.165(b)(2). Thus, while it might be assumed that any incremental increase in the pollutant will contribute to or cause a violation of the NAAQS, the regulation creates a fiction in which incremental increases under certain thresholds will not be considered to have caused or contributed to the violation. Id. This does not amount to a purely mathematical conclusion, as Dr. English assumes, but rather to a conclusion based on policy and science that incremental increases below the significance levels will not unduly threaten human health and welfare, the basis for the NAAQS. See 40 C.F.R. § 50.2(b). As the Court stated above, where an expert agency has already determined that the emission of a certain level of a pollutant will not be significant, the Court will not lightly reject this conclusion. Rather, the Court finds that the agency's determination should weigh heavily in the Court's determination of whether the asserted particulate emissions would likely cause substantial irreparable harm for purposes of issuing injunctive relief.

Nonetheless, the Court finds persuasive Dr. English's assertion that even the particulate emissions disclosed in the EA - which likely understate the total particulate emissions because they fail to account for particulate caused by the ammonia emissions - would have caused the ambient concentration of particulate to exceed the NAAQS in Calexico multiple time during recent years. Notwithstanding the EPA's significance level fiction, these NAAQS were set at a level that preserves human health and welfare with a margin of safety. As a matter of common sense, it is clear that discharges of pollutants that actually, if not legally, cause violations of the NAAQS, or make existing violations worse, have the potential for adversely affecting health. The argument carries additional force when the Court considers that the short-term PM_{10} emissions from ammonia conversion are estimated to be 1.8 $\mu g/m^3$. (See Supp. Heisler Decl. at ¶ 15).[16] Thus, the combined 3 $\mu g/m^3$ provided by modeling in the EA and the 1.8 $\mu g/m^3$ or more contributed by ammonia conversion means that the NAAQS for particulate in the Imperial Valley will be exceeded even more frequently, or that the violations will be larger, than even Dr. English suggests, and the minimum total of 4.8 $\mu g/m^3$, while still below the E.P.A. significance level, would verge on significance even under that regulation.

According to the data provided by Dr. English, a 4.8 $\mu g/m^3$ increase in ambient particulate concentrations would have caused readings to exceed the NAAQS at the Grant Street monitor in Calexico five times in the eight years between 1994 and 2002. (See Exh. 1 to Supp. English Decl.). Similarly, such an increase would have caused the reading at the Ethel Street monitor to exceed the NAAQS four times over the same period. (Id.). Assuming these exceedances are roughly distributed over time, then over the undisputed maximum two year period for remand in this case, it might be expected that the plants' emissions would cause a reading in excess of the NAAQS about once at each station. While the Court does not view even one such exceedance of the NAAQS lightly, it will not find that these circumstances demonstrate the substantial and irreparable harm necessary to justify injunctive relief. The Court finds this conclusion to be particularly appropriate considering that the NAAQS are designed to incorporate an "adequate margin of safety," 40 C.F.R. § 50.2, and English's data suggests that any reading in the next two years that exceeds the NAAQS would likely exceed the standard by only a small margin.

In sum, the Court finds that plaintiff has failed to demonstrate that a likelihood of substantial and irreparable harm will result from the plants' ammonia emissions in the absence of

[16]Indeed, the contribution to particulate formation from ammonia may even be higher since it appears from Heisler's declaration that he has used estimates of actual ammonia emissions, rather than the more conservative "potential to emit" estimates normally required when reviewing new emissions sources. (See Supp. Stockwell Decl. at ¶ 3).

an injunction. The Court notes the dispute between the parties' experts concerning the formation of particulate, but declines to find that plaintiff's experts have shown that such particulate will be more likely than not to lead to substantial health effects. Additionally, the Court finds support for its conclusion from the declarations of two of intervenors' experts that ammonia emissions will not exceed the applicable reference exposure levels at the U.S. border.

3. Whether Irreparable Harm Results from the Lack of Full Disclosure and Informed Decision-Making Prior to a Change in the Status Quo

Plaintiff's third argument to show irreparable harm is that it will suffer a procedural injury from the lack of full disclosure and informed decision-making prior to the operation of the transmission lines. First, plaintiff argues that the agencies might be less likely to deny the permits after a new environmental review if the lines are allowed to operate in the interim. (Pla's Reply at 12). In support of this argument, plaintiff cites Metcalf v. Daley, 214 F.3d 1135, 1146 (9th Cir. 2000), in which the court suspended operation of an agreement between the federal government and the Makah Tribe pending the completion of a NEPA analysis. The Metcalf court was concerned that the government had already "committed in writing to support the Makah's whaling proposal," and that such a commitment might lead to a case of "first-the-verdict, then-the-trial." Id. This case is readily distinguishable, however, because plaintiff does not point to any similar written agreement, other than the clearly invalid permits, between the government and the intervenors. Furthermore, this Court can limit the influence of improper considerations by ordering the federal defendants not to consider the completion or interim operation of the transmission lines when making their NEPA determinations on remand.

A stronger argument is that NEPA provides a process through which major federal actions should be undertaken, that this process was inadequate in the instant case, and that it would be a subversion of the statute and the process to allow projects commenced under the authority of the invalid federal actions to proceed nonetheless. Support for this argument can be implied from the National Parks & Conservation Association court's holding that "[w]here an EIS is required, allowing a potentially environmentally damaging project to proceed prior to its preparation runs contrary to the very purpose of the statutory requirement." 241 F.3d at 737. However, it is important to note that the NPCA court had already found the project under consideration in that

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case to be "potentially environmentally damaging." Id. In the present, unusual NEPA case, the Court has considered the record along with the declarations of the parties and has not found likely environmental harm.

In fact, a focus on the procedural protections of NEPA as the basis for injunctive relief would be counter to the Supreme Court's holding in Amoco Production Co. v. Village of Gambell, 480 U.S. 531. In that case, the Court held that the Ninth Circuit, in granting injunctive relief, "erroneously focused on the statutory procedure rather than on the underlying substantive policy the process was designed to effect--preservation of subsistence resources." Id. at 544. The Court went on to hold that while a sufficient likely showing of environmental harm is generally enough to warrant injunctive relief, where injury to the underlying substantive policy is not at all probable and significant considerations weigh against issuing the injunction, a court abuses its discretion in doing so. Id. at 545.

Plaintiff's argument that the Court can find irreparable harm solely in a violation of statutory procedure, rather than in the environment that the procedure was designed to protect, runs counter to the holding in Gambell. In fact, the procedural error will be remedied through a remand to the agency for a new environmental analysis and a new determination under NEPA. The Court is not persuaded that the agency will not have the same, full range of alternatives available to it following a new analysis that it did when it made the decision the first time. In the meantime, as discussed above, plaintiff has failed to convince the Court that likely substantial and irreparable environmental harm will occur.

Accordingly, the Court finds that plaintiff's request for an injunction against operation of the transmission lines fails because plaintiff has failed to make the threshold showing of substantial and immediate irreparable harm. However, assuming arguendo that plaintiff has met its burden and has shown such harm, the Court is still required to balance the equities in deciding whether to issue the injunction.

B. Balancing of the Equities

As in Gambell, the parties opposed to the injunction in the present case claim that they stand to suffer considerable economic injury if the injunction issues. T-US asserts, and plaintiff does not dispute, that enjoining the use of the transmission lines for a period of two years would result in a direct financial impact to TDM, an affiliated company, of $121 million. (See T-US' Opp'n at 8; First Declaration of Octávio Simoes in support of T-US' Opp'n at ¶¶ 22-31). BCP argues, and plaintiff does not dispute, that enjoining the use of its transmission line would result in about $5.4 to $10.9 million in direct financial impacts to it and its affiliates in Mexico. (See Declaration of Vimal Chauhan in support of BCP's Opp'n at 4, 11, 12). Under the Gambell holding, the Court may consider these substantial economic harms in the absence of a sufficient showing of irreparable environmental harm. 480 U.S. at 545 (finding a loss of $70 million to weigh against enjoining the activity in the absence of demonstrated harm).

C. The Public Interest

The interests of the public must be taken into account when it is affected by the issuance or withholding of injunctive relief. Indeed, the failure to expressly consider the public interest on the record when the public interest is affected constitutes an abuse of discretion. Northern Cheyenne Tribe v. Hodel, 851 F.2d 1152, 1157 (9th Cir. 1988). In the present case, both sides lay claim to the public's interest. Plaintiff, appropriately, claims that the asserted environmental harms discussed above, if demonstrated, would harm the public. Additionally, plaintiff argues that the public has the right to an informed decision by the respective federal agency and full disclosure of environmental impacts of the action. The Court has already discussed both of these concerns above and has found them to be inadequate to require the issuance of an injunction.

On the other side of the equation, the federal defendants and intervenors argue the following public interest factors militate against issuing the injunction: (1) alleged benefits to the environment that accrue through operation of the sewage treatment plants associated with the power plants; (2) alleged benefits to the environment that accrue through the displacement of allegedly older, dirtier, and more costly power generation by the TDM and LRPC power plants; (3) the foreign policy implications from indirect impacts on Mexican plants, Mexican jobs, and Mexican taxes; and (4) the alleged threat of inadequate energy resources in California without the operation of the transmission lines.

First, BCP and T-US argue that because both the TDM and LRPC facilities have

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constructed sewage treatment plants to remove pollutants from partially treated or untreated sewage from Mexicali prior to use in the plants for cooling[17], the operation of the plants provides a significant benefit for the environment. T-US states that if the injunction issues, and the TDM plant is forced to cease operations, its associated sewage treatment plant will also stop operating. (First Simoes Decl. at ¶ 13). The sewage treatment plant at the LRPC would continue operating at least partially since the injunction of the BCP would only partially and temporarily cause that facility to cease operations. (See generally Chuahan Decl. (describing plans of the LRPC to continue operations through alternative means and through reconfiguration, if necessary)).

Intervenors argue, and plaintiff does not dispute, that operation of the sewage treatment plants removes pollutants from water that would ultimately otherwise be partially treated and discharged into the New River. Intervenors also argue, and plaintiff also does not dispute, that removal of these pollutants assists Mexico in meeting its obligations under the International Boundary and Water Commission Minute 264, a treaty between the U.S. and Mexico that governs the quality of water flowing into the U.S. through the New River. (See First Simoes Decl. at ¶ 11). Although Jose Angel argues on behalf of plaintiff that the discharges from the power plants will also violate the same treaty because they are "substances . . . in concentrations which are toxic or harmful to human, animal, or aquatic life, or which may significantly impair the beneficial uses of such waters," (Angel Decl. at ¶ 27), the Court found in its preceding analysis that plaintiff failed to demonstrate that the discharges would be significantly toxic or harmful.

Second, intervenors argue that if the Court enjoins operation of the transmission lines, older, more polluting, and costlier plants will have to make up the difference, all at a harm to the public. Intervenors first argue that the additional power to replace the power from these plants will have to come from other regional sources because of transmission considerations. (See, e.g. Declaration of Alberto Abreu in Support of T-US' Opp'n at ¶ 8). T-US' expert Alberto Abreu then systematically surveys the existing generation sources in each of the region's counties and Baja, Mexico to conclude that more NOx and carbon dioxide would be emitted if these other facilities

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[17]The water that is treated, less that which is evaporated in the cooling process, is discharged back into the New River after processing.

had to make up the difference from a ceasing of operations at the TDM plant. (Id. at ¶¶ 12-26). However, plaintiff's expert William Powers disputes that replacing the TDM and LRPC plants with other power plant capacity in the region will lead to anything more than "relatively little change" in NOx emissions. (Declaration of William Powers in Support of Pla's Motion on Relief at ¶ 13).[18] Additionally, Powers points out, and intervenors do not dispute, that emissions are not entirely fungible since Imperial Valley is in "nonattainment"[19] status for federal PM_{10} and ozone[20], while San Diego County is not. Thus, additional emissions in Imperial County, even if those emissions replace relatively more emissions in San Diego County, may ultimately be more harmful to the public as a whole. While acknowledging the merit of this argument, the Court also notes that it has considerable evidence before it in the intervenors' declarations and the EA that the estimated emissions of both particulate and NOx from the plants are below the significance levels established by the EPA for areas of nonattainment. The Court also notes that plaintiff has not disputed intervenors' contention that any power generated by other regional plants to replace power from TDM and the LRPC plants would be costlier and involve larger emissions of carbon dioxide.

Third, intervenors argue that the Court should be wary of issuing an injunction that would

[18]The supplemental declaration of Simoes challenges Powers' declaration, stating that Powers' own data shows that NOx emissions would be higher if regional plants replaced the power generated by the TDM and LRPC facilities. (See Second Simoes Decl. at ¶ 14). Simoes also challenges factual evidence presented by Powers concerning the retrofitting of regional power facilities with technology to reduce NOx emissions. (See id. at ¶¶ 16-17). Powers then submitted his own supplemental declaration to rebut these assertions. Powers argues that at least the Ventura County boilers, as a group, could provide power at a lower level of NOx emissions than the TDM and LRPC turbines as a group. (See Supp. Powers Decl. at ¶ 6). He also argues that Simoes' claim that power from Ventura County is unlikely to supply the San Diego service area because of distance and congestion is unsupported by facts. (Id.). Additionally, Powers provides with his supplemental declaration evidence tending to support his claim that the average NOx reduction achieved by retrofitting gas-fired utility boilers with SCR is approximately 90 percent. (Id. at ¶ 8, Exh. 1 to Supp. Powers Decl.). Nonetheless, implicit in Powers' rebuttal to the Simoes declaration is that only the Ventura County boilers have lower emissions than the TDM and LRPC plants, even if the 90 percent figure for reductions is accepted. (See id. at ¶ 6). Accordingly, unless all power to replace the power otherwise provided by the TDM and LRPC plants comes from Ventura County, it appears that total emissions would indeed be higher if the Court enjoined operation of the transmission lines.

[19]"Nonattainment" is a designation under the Federal Clean Air Act for airsheds that are significantly degraded by specific criteria air pollutants.

[20]NOx contributes to the formation of ozone.

have an effect on international relations between the United States and Mexico. In particular, Simoes, on behalf of T-US, estimates that an injunction that causes the TDM to cease operation in the interim would result in a loss of $9-13 million in wages in Mexico, a loss of $22 million in Mexican tax revenues, and the loss of 68-102 local jobs. (First Simoes Decl. at ¶¶ 32-25). Plaintiff, while not disputing these losses, argues instead that the case law relied upon by T-US does not support a finding that the losses of tax revenues and jobs are "foreign policy implications" of an action. (See Pla's Reply at 17). Assuming, arguendo, that nothing in the cases cited by intervenors restricts the Court from entering an appropriate injunction upon finding violations of NEPA in this case, nothing in plaintiff's argument suggests that the Court may not, in exercising its duty to weigh the public interest in issuing an injunction, consider impacts on foreign jurisdictions or foreign nationals, particularly when those impacts may affect foreign relations. Accordingly, the Court finds that these impacts are entitled to some weight in the determination of the public interest.

Finally, the intervenors argue that the public will be harmed by the unavailability of power from the TDM plant, and perhaps from the LRPC export turbines, that would result from an injunction against the operation of the power lines. In particular, intervenors warn of the possibility of power shortages should the TDM and LRPC not be able to contribute their generation to the electricity grid in Southern California. Plaintiff responds, through the declaration of William Powers, that the California Independent System Operator (CAISO) has issued a 2003 Summer Assessment in which it indicates that California will have over 3,000 MW of power reserves during the summer of 2003 even if the worst-case scenarios for demand are met. (See Powers Decl. at ¶ 3). Powers asserts that this assessment does not rely on the power from the TDM or LRPC plants. (Id.). More specifically, Powers argues that neither the San Diego service area nor the Imperial County service area are in danger of power shortages. (Id. at ¶¶ 5-6). In addition, Powers states that the power produced by the TDM and the LRPC would "not add significantly to the total power available to the state at times of peak demand due to existing transmission congestion issues." (Id. at ¶ 7).

T-US, through a supplemental declaration by Simoes, disputes Powers' contentions. First, Simoes argues that the 2003 Summer Assessment includes generation from the TDM and LRPC plants. (Second Simoes Decl. at ¶ 21). In support of his contention, Simoes attaches a copy of the Summer Assessment, which states that in the San Diego Gas & Electric Area, "about a 1000 MW of the summer peak load can only be met from the additional 1070 MW of new generation coming into ISO's Imperial Valley substation from Mexico,[21] 590 MW of new generation coming into CFE's LA Rosita substation from Mexico and over 3000 MW of new generation coming in Arizona at Hassayampa." CAISO 2003 Summer Assessment, Ex. 4 to Second Simoes Decl. at 38. The Court finds, however, that this language is ambiguous, since the sources listed total well above the 1000 MW required. It seems as though the assessment might mean to indicate that the required 1000 MW could be found in any combination of the three sources, including sources other than the TDM and LRPC plants. Second, Simoes argues that transmission congestion will not limit CAISO's ability to import power from the TDM and LRPC plants. (Second Simoes Decl. at ¶ 23). In support of this, Simoes declares that the plants have successfully sent their full generating capacity to the U.S. market without problems over the testing period. (Id. at ¶ 24). Plaintiff's expert, Powers, points out that the CAISO Summer Assessment also notes that "[a] new nomogram will limit the combined generation from Imperial Valley and imports from CFE to 800 MW." (Supp. Powers Decl. at ¶ 10 (citing CAISO 2003 Summer Assessment, Ex. 4 to Second Simoes Decl. at 38)). The implication is that, at most, 800 MW of the 1070 MW generated by the TDM and LRPC export turbines would be used to avoid power shortages in the San Diego service area. As a result, the Court agrees with plaintiff that the need for replacement power generated by potentially costlier and more polluting plants would likely be less than that estimated by intervenors. Nonetheless, this conclusion does not change the negative impact on the public interest from the issuance of an injunction, but rather changes only the relative magnitude of that impact.

Finally, and in further support of the intervenors' argument, Vimal Chauhan declares that the operation of the BCP transmission line would help alleviate transmission deficiencies and would enhance the reliability of the system by ensuring that the LRPC export generation could get

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[21] Simoes declares that this is a reference to the TDM and LRPC export plants. (Id. at ¶ 21).

to the California market if transmission along the alternative importation path is interrupted. (Chauhan Decl. at ¶ 13).

Having considered the declarations and argument of the parties, the Court finds sufficient evidence to believe that while the power that would flow over the transmission lines under consideration may not be required to avoid power shortages in the region or state in the interim period, the availability of the transmission lines and power would provide the system with a needed margin of forecasting error and safety, enhancing the reliability of the grid. Furthermore, given the high costs to the public that result from power shortages, even a relatively small probability carries with it a large risk. In sum, the Court finds that while plaintiff has not demonstrated a likelihood of substantial and irreparable environmental harm, intervenors have made a showing that they will suffer considerable economic harm and that the net interest of the public weighs against the issuance of the injunction. Accordingly, the Court declines to exercise its equitable power to enjoin operation of the transmission lines pending new NEPA determinations by the agencies.

D. WHETHER TO ENJOIN THE FEDERAL DEFENDANTS AND DOE TO REMOVE THE TRANSMISSION LINES IF LEGALLY ADEQUATE PERMITS ARE NOT ISSUED WITHIN 18 MONTHS

Finally, plaintiff moves the Court to compel intervenors to remove their transmission lines if they have not received permits issued pursuant to a valid NEPA review after 18 months. Because the Court will retain jurisdiction over the matter during that time, the Court finds no ground upon which to issue such an injunction, even if it was otherwise appropriate, at this time. Plaintiff may move the Court again for such relief after such time has elapsed if this matter has not been resolved.

IV. CONCLUSION

Based on the foregoing analysis, the Court **DENIES** Plaintiff's specific requests for relief but **GRANTS** relief in modified form. Specifically, the Court: (1) **GRANTS IN PART** plaintiff's request to set aside the Presidential Permits, the rights-of-way, and the FONSI issued in this case; (2) **DEFERS** the setting aside of the permits and the FONSI until July 1, 2004, or until such time as superceding NEPA documents and permits have issued, whichever is earlier; (3) **ORDERS** the federal defendants to seek a hearing date and file a brief showing cause on or before May 15, 2004, if necessary, why the Court should not set aside the permits and the FONSI on July 1, 2004; (4) **REMANDS** the matter to the respective agencies for the preparation of NEPA documents consistent with this Order and the May 2, 2003 Order on the merits; (5) **DENIES** plaintiff's request for an injunction against the operation of the transmission lines in the interim period; (6) **GRANTS** plaintiff's motion for reconsideration of the Court's order at argument denying plaintiff's motion to file supplemental declarations; and (7) **DENIES WITHOUT PREJUDICE** plaintiff's request for an injunction compelling the removal of the transmission lines after 18 months in the absence of legally adequate permits. Plaintiff may renew its motion for injunctive relief as to the removal of the transmission lines after 18 months from the date this Order is file-stamped if the matter has not been resolved by that time.

Additionally, the Court **RETAINS** jurisdiction over this matter pending full NEPA compliance. To aid in the exercise of this jurisdiction, the Court **ORDERS** the federal defendants to notify the Court when they have made new determinations concerning the proposed federal actions.

Finally, the Court **PROHIBITS** the federal defendants from considering the interim operation of the transmission lines, the completion of the construction, or this Court's equitable analysis of the environmental impacts of the proposed actions as part of the NEPA analysis and determination process on remand. Cf. Northern Cheyenne Tribe v. Hodel, 851 F.2d 1152, 1157 (9th Cir. 1988).

IT IS SO ORDERED.

Dated: July 8, 2003

Irma E. Gonzalez

IRMA E. GONZALEZ
United States District Judge

cc: The Honorable Magistrate Judge Louisa S. Porter
all parties

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APPENDIX B:

SCOPING SUMMARY REPORT
FOR
IMPERIAL-MEXICALI 230-kV TRANSMISSION LINES
ENVIRONMENTAL IMPACT STATEMENT

SCOPING SUMMARY REPORT

FOR

IMPERIAL-MEXICALI 230-kV TRANSMISSION LINES
ENVIRONMENTAL IMPACT STATEMENT

ENVIRONMENTAL IMPACT STATEMENT SCOPING PROCESS

Prepared by

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for

U.S. Department of Energy
and
Bureau of Land Management

March 2004

CONTENTS

NOTATION

The following is a list of acronyms, initialisms, and abbreviations (including units of measure) used in this document.

BACT	best available control technology
BLM	Bureau of Land Management
CEA	Comprehensive Cumulative Analysis
CO	carbon monoxide
DOE	U.S. Department of Energy
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FONSI	Finding of No Significant Impact
kV	kilovolt(s)
NEPA	National Environmental Policy Act
NH_3	ammonia
NOI	Notice of Intent
NO_x	nitrogen oxides
$PM_{2.5}$	particulate matter with a mean aerodynamic diameter of 2.5 μm or less
PM_{10}	particulate matter with a mean aerodynamic diameter of 10 μm or less
ppm	part(s) per million
SCR	selective catalytic reduction system
Sempra	Sempra Energy Resources
TDS	total dissolved solids

SCOPING SUMMARY REPORT
FOR
IMPERIAL-MEXICALI 230-kV TRANSMISSION LINES
ENVIRONMENTAL IMPACT STATEMENT

1 INTRODUCTION

On October 30, 2003, the U.S. Department of Energy (DOE) issued a Notice of Intent (NOI) in the *Federal Register* (*Federal Register*, Volume 68, page 61796 [68 FR 61796]) to prepare an environmental impact statement (EIS) concerning the issuance of Presidential permits and two separate right-of-way (ROW) grants to Baja California Power, Inc. (Intergen) and Sempra Energy Resources (Sempra). The permits are required to allow the transmission of electric power from two new power plants built by the respective companies in Mexico to the United States. The ROWs granted as part of the action would be for the construction of two 230-kV transmission line routes needed to transmit the power to the United States. The power lines would be constructed on Federal land managed by the U.S. Department of the Interior's Bureau of Land Management (BLM). The lines would be in Imperial County, California, and would be located west of Calexico and El Centro, California. The lines would run to the San Diego Gas & Electric Company's Imperial Valley Substation. The EIS will examine the impacts associated with construction and operation of the transmission lines, as well as the impacts in the United States from operation of the three natural-gas fired combined-cycle units built in Mexico for power export to the United States.

The public scoping period began with the publication of the NOI on October 30, 2003, and ended December 1, 2003. Two public scoping meetings, hosted by DOE and BLM, were held on November 20, 2003, one in El Centro, California, and the other in Calexico, California. About 30 people attended each meeting. Eleven people provided oral comments at the El Centro meeting, nine at the Calexico meeting, and 17 individuals and organizations provided written comments.

2 SCOPING COMMENT SUMMARY AND EIS ANALYSIS

2.1 INTRODUCTION

A summary of issues and concerns raised by commentors during the scoping period is presented in this section. Each subsection presents comments related to that topic area, along with a discussion (under the heading *EIS Analysis*) of what is or is not covered in the EIS. Briefly, issues to be analyzed in depth pertain to the impacts in the United States of construction and operation of the two transmission lines and of the operation of the three export units in Mexico.

2.2 SUMMARY OF COMMENTS

Several commentors expressed their pleasure that the DOE was conducting a full EIS for the proposed action. Many of the comments focused on the adverse impacts on human health, air quality, and water quality associated with the operation of the power plants and technologies (e.g., selective catalytic reduction [SCR] systems and dry cooling) that could be used to reduce those impacts.

2.2.1 National Environmental Policy Act (NEPA) Process/Decision Making

Connected Actions: Several commentors suggested that the Federal agency actions analyzed in the EIS (i.e., DOE's issuance of Presidential permits for the Sempra and Intergen transmission line projects to cross the U.S.-Mexico border and BLM's issuance of two ROW grants for the transmission lines to cross BLM-administered land) are connected actions within the meaning of NEPA, and therefore are required to be analyzed in a single NEPA document. In addition, commentors suggested that the Federal Energy Regulatory Commission's (FERC's) actions to issue a Certificate of Convenience and Necessity and a Presidential permit to cross the border to North Baja Pipeline, LLC, for the North Baja Natural Gas Pipeline Project, and the two power plants in Mexico are connected actions.

EIS Analysis: While the projects are complementary, they are independent actions that serve distinct functions and that can proceed separately. Under the Council of Environmental Quality's regulations implementing NEPA (Title 40, Part 1508.25 of the *Code of Federal Regulations* [40 CFR 1508.25]), actions are connected if they (1) automatically trigger other actions which may require EISs; (2) cannot proceed unless other actions are taken; or (3) are interdependent parts of a larger action. The DOE and BLM actions related to this EIS will not automatically trigger FERC's actions related to the gas pipeline, or vice versa. The pipeline project will proceed regardless of whether DOE and BLM actions are taken, and, conversely, Sempra and Intergen will proceed with the transmission line projects regardless of whether the gas pipeline is built. Although DOE and BLM have no regulatory jurisdiction over the power plants, the EIS will analyze the impacts in the United States that these facilities have on air and water quality, and their contribution to cumulative impacts.

Assessment of Impacts in Mexico: Several commentors stated that the link between the transmission lines and the power plants warrants an examination of the potential construction and operation impacts in both the United States and in Mexico. Several commentors stated that an international board should study the environmental effects of the project. The group would examine all environmental effects on both sides of the border and identify the impacts.

EIS Analysis: The proposed action in this case is the granting of the Presidential permits and the granting of ROWs for the transmission lines. DOE and BLM have no jurisdiction over power plants located in Mexico. The plants' impacts are considered only to the degree that they contribute to cumulative impacts. That is, the impacts are assessed for the same project region locations as those of the transmission line impacts, which are confined to the United States in this analysis. Therefore, the assessment of the power plants' impacts on Mexico is outside the scope of the analysis. Related to these issues are the requests for a binational assessment of impacts from the proposed project. DOE and BLM believe that NEPA is the appropriate vehicle for assessing the impacts from this project.

Consultation: One group suggested that additional consultations are needed with representatives of Imperial County to assess how the proposed projects would conform to local regulations. It was also suggested that regional military bases be consulted directly.

EIS Analysis: DOE and BLM consulted with the Imperial County Air Pollution Control District Office. Information provided by this office is used in the EIS. There will be no formal consultation with the military.

Conditioned Presidential Permits: Commentors suggested that certain mitigation and technology upgrades be added as conditional requirements of the Presidential permits.

EIS Analysis: Alternative technologies that could mitigate impacts are analyzed under one of the alternatives in the EIS. If DOE chooses that alternative, one or both permits would be conditioned on the use of the specific alternative technologies.

Siting of the Transmission Lines and the Gas Pipeline: A commentor suggested that an appropriate, safe distance between the transmission line and gas pipeline be determined to prevent accidental ignition of the pipeline from an electrical discharge.

EIS Analysis: The EIS is concerned with any potential impacts from the construction of the transmission lines on BLM land. The nearest pipeline is more than 50 miles away from the transmission line, which is far enough away to remove concern. Therefore, the EIS does not specifically discuss safe distances between gas pipelines and transmission lines.

2.2.2 Human Health Issues

Health Effects from Operation of Power Plants: Numerous commentors expressed concern over the health and safety effects from the operation of the two power plants in Mexicali on human health in Imperial County. Many commentors stated that the unusually high asthma rates (especially for children) for the county are the result of poor air quality in Imperial Valley and that the construction and operation of additional power plants could only make matters worse. The commentors requested full disclosure of the process by which the health effects from the plants are analyzed.

EIS Analysis: The EIS examines the human health effects in the United States resulting from construction and operation of the transmission lines. The analysis also examines the effects on the U.S. population of operating the power plants. Asthma is discussed in the EIS, but there is not a detailed study of childhood and teenage asthma.

Comprehensive Health Risk Assessment: Several commentors recommended that a comprehensive health risk assessment be conducted for Imperial Valley. This study would examine the links between the air pollution and the health issues (including cancer, birth defects, asthma) occurring in the valley. Most of the commentors requesting this study wanted it to include both Mexico and the United States.

EIS Analysis: A comprehensive health risk assessment of health issues is included in Appendix H of the EIS.

2.2.3 Water Quality and the Salton Sea

General Water Issues: Several commentors expressed concern over the effects that the proposed action would have on water availability and quality in the region. Specific issues raised include concerns over a reduction in the flow of the New River resulting from the cooling processes at the power plants; an increase in salinity of the Salton Sea from the decreased flow in the New River; and an increase in the temperature of the New River from the heated water being discharged from the plants to the river. Commentors also expressed concern about the quantity of total dissolved solids (TDS) in the water being discharged into the New River from the power plants.

Effects on the Salton Sea: Many commentors expressed concern over the effects of the power plants on the Salton Sea. The main concern was that the use of water from the New River (one of two rivers that feed the Salton Sea) for the wet cooling system at Mexicali would reduce the flow of water into the Salton Sea from the New River, causing the Sea to shrink and the salts to become more concentrated. It was noted that the Sea and its nearby wetlands provide habitat for numerous species of fish and birds (including migratory birds species), and that even a small increase in salinity could have an adverse effect on the recreational fishing industry and the general ecology of the region. Also, the cumulative effects of this and other actions could cause more severe effects.

EIS Analysis: The EIS addresses potential water quality impacts of the proposed actions in the United States, with particular attention to impacts on the New River and the Salton Sea. The impacts on water quantity and quality associated with wet cooling (evaporation) systems are examined and compared to impacts expected from dry cooling or wet-dry cooling.

2.2.4 Air Quality

General Air Issues: Many commentors expressed concern that the power plants would further degrade the air quality in a region with existing air quality problems. Specifically, commentors expressed concern over the amounts of nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter with a mean aerodynamic diameter of 2.5 µm or less and a diameter of 10 µm or less ($PM_{2.5}$ and PM_{10}, respectively) that would be emitted by the power plants. There was also concern over increases in ozone (O_3) resulting from operation of the power plants.

EIS Analysis: Potential air quality impacts of the proposed action are addressed, as will the changes in emissions associated with installing SCR systems. The EIS examines pollutants considered to be key indicators of air quality, including CO, NO_x, O_3, sulfur dioxide (SO_2), lead, PM_{10} and $PM_{2.5}$. The analysis also specifically examines the contribution of plant emissions to NH_3 and secondary O_3 production in the region.

Air Analysis Parameters: Several people commented on aspects of the air analysis. One suggestion stated that if Prevention of Significant Deterioration was the standard for determining air quality impacts, the amount of ammonia (NH_3) slip allowed for this analysis should be 3.5 parts per million (ppm). A second commentor suggested that Sempra cannot claim any air credits for the introduction of natural gas fuel to Mexicali because the claimed reduction of other fuels as a consequence is not verifiable or quantifiable. A commentor noted that the analysis previously conducted on the power plant air emissions assumed that the region was an attainment area, when neither Mexicali nor El Centro are attainment areas.

Another commentor stated that the air samples taken at the border do not accurately reflect maximum exposure concentrations. The commentor stated that impacts must be analyzed away from the border because of stack heights and their proximity to the border.

Another commentor indicated that the air analysis should consider the extreme temperatures the region experiences and the effect that these temperatures have on air quality.

The analysis is limited to impacts in the United States on air quality in compliance with NEPA requirements.

2.2.5 Biological Resources

Some commentors requested that the EIS consider the impacts of the project on protected, threatened, endangered, or sensitive animals and plants and their habitats. One commentor was concerned that a decrease in surface water area of the Salton Sea would concentrate birds in a smaller area and the resulting increased concentration of waste would accelerate “biological processes” in that habitat. Another commentor was concerned that an increase in salinity, decrease in flow, and/or increase in water temperature could negatively impact wetland projects. A few commentors suggested that adverse impacts to the Salton Sea from the proposed action could have cumulative effects on the bird populations that utilize the lake. The commentors indicated that this could constitute a violation of the Migratory Bird Treaty Act.

EIS Analysis: The EIS assesses the potential environmental impacts of the construction and operation of the transmission lines and the operation of the power plants on ecological resources, including wetlands, plant and animal species, and threatened and endangered species and critical habitat that may occur in the area. The EIS specifically assesses the impacts from the construction of the transmission lines on the flat-tailed horned lizard, and the effects of water use by the proposed actions on the New River habitat and on the fish and bird populations at the Salton Sea. The EIS includes a brief discussion of the Migratory Bird Treaty Act. Impacts to biological resources in Mexico are within the scope of the EIS.

2.2.6 Cultural Resources

A commentor requested that the impacts of the project on cultural or historic resources on both sides of the border be considered as part of the analysis in the EIS.

EIS Analysis: The EIS assesses the potential impacts of the proposed action on the cultural, historic, and archaeological resources in the United States. Potential mitigation measures for any impacts are also discussed. The analysis does not include impacts that occur in Mexico.

2.2.7 Minority and Low-Income Populations

Several commentors pointed out that Imperial County is a poor and largely minority population, which must be protected. It was also suggested that issues related to environmental justice be addressed for the Mexican population as well.

EIS Analysis: The EIS evaluates the potential for disproportionately high or adverse human health or environmental impacts on minority and low-income populations in the region. Environmental justice impacts in Mexico are not analyzed as part of the EIS.

2.2.8 Socioeconomics

Tourism: A commentor suggested that the effects of the proposed project on tourism be examined as part of the analysis.

EIS Analysis: The socioeconomic analysis in the EIS includes employment and economic effects resulting from construction of the transmissions lines on Imperial County. Impacts on tourism are included as part of the analysis of the services sector of the county economy.

2.2.9 Homeland Security

One commentor asked that a homeland security risk assessment be developed.

EIS Analysis: A discussion of homeland security issues is beyond the scope of the EIS.

2.2.10 Geology, Soils, and Seismicity

Soil: One commentor asked that impacts on soil be included in the EIS.

Earthquake Response Measures: The commentor expressed concern over the ability of the power companies to respond to a seismic event that could affect the transmission of power to the United States. The commentor also noted that construction of the transmission lines must meet or exceed seismic zone 4 requirements and wondered what construction standards were in Mexico.

EIS Analysis: The EIS describes the geologic, soil, and seismic characteristics of the area traversed by the transmission lines and assesses earthquake-related impacts. Structural requirements for buildings in Mexico are beyond DOE's authority and are not addressed in the EIS.

2.2.11 Visual Resources

Some commentors suggested that the visual impact of the two new transmission lines be examined as part of the EIS.

EIS Analysis: The visual impacts of the project on the landscape are assessed for the United States.

2.2.12 Land Use and Recreation

One commentor noted that rising salinity could affect recreational fishing in the Salton Sea.

EIS Analysis: The EIS includes an analysis of the impacts and alterations to existing land use, including recreation, from construction of the transmission lines.

2.2.13 Technology Issues

General: Numerous commentors expressed concern over technologies currently being used at the power plants for cooling and emissions control. The primary concern was that technologies other than those currently in use could potentially reduce the adverse effects of power production on the environment. Many commentors suggested the use of alternative technologies, such as dry cooling. There was a request for the construction standards and techniques utilized in Mexico to be reviewed and assessed as part of the EIS.

Dry Cooling: Several commentors mentioned dry cooling and suggested that using dry (air) cooling methods at the power plants would reduce adverse effects to air and water that have been associated with wet (evaporative) cooling. They believed that the EIS should investigate alternative cooling methods, including dry cooling and a combination wet-dry system.

Selective Catalytic Reduction System: Several commentors mentioned the SCR systems (also called selective catalytic converters) that were going to be installed at the plants to help reduce NO_X emissions. Commentors pointed out that even with this technology, there will be a significant increase in measurable pollutants in the Imperial Valley; it was also noted that SCR systems do not reduce CO emissions. Another commentor wanted DOE to require that the turbines be equipped with SCR technology before granting the permit. Commentors also requested that emissions at the plant be measured and made public prior to and after the installation of this technology. The cost of installing SCR technology should be examined.

Best Available Control Technology: Some commentors wanted Best Available Control Technology for pollutants to be installed on all power generating units at the two power facilities. It was also stated that the offset of all emission increases associated with the operation of the two projects be secured according to the Clean Air Act.

Air Monitors: Commentors requested that monitoring stations be placed around the power plants to record air emissions (including particulates and smog forming pollutants) from the plants. It was also requested that the monitoring information be made public.

Alternative Energy: A commentor suggested that geothermal energy would be more appropriate for the Imperial Valley region for the generation of electricity than gas-fired electrical generating plants. The commentor noted that currently there are five geothermal areas within Imperial County being used to generate electricity, and that there are generally fewer emissions from a geothermal plant than from a gas power plant.

EIS Analysis: The EIS includes a discussion of best available technology. Dry cooling and SCR systems are included in the discussion. The EIS does not address air monitoring stations. An analysis of alternative energy sources is beyond the scope of this EIS.

2.2.14 Mitigation

Mitigation of All Impacts: Several commentors suggested that all impacts from the construction and operation of the power plants and the transmission lines be fully mitigated as a condition of approving the transmission lines. Offsets to mitigate any impacts, such as paving roads to limit the amount of dust in the air or retiring older, more polluting automobiles, were specifically mentioned. Another suggestion was to establish a mitigation fund for use in establishing offsets. A final comment on the offsets was a request that they be established in the United States or if they were established in Mexico, that Imperial County officials be allowed to inspect the offsets.

Emergency Response Measures and Reliability Study: One commentor was concerned about the lack of coordinated emergency response measures in the event of an aircraft crashing into one of the towers, lines, substation, or other part of the power grid. Another commentor suggested that a group of independent, binational observers be established to monitor compliance with all emergency response measures; and that this should be established and agreed to by the companies and agencies involved, as an integrated part of the EIS. Several commentors requested that information pertaining to emergency outage plans and security from terrorist acts be examined as part of the EIS.

EIS Analysis: Appropriate mitigation measures and/or offsets are discussed for each technical area. Issues related to emergency outage plans are covered in a separate reliability analysis being conducted by DOE that is not part of the NEPA analysis. This anlaysis would consider outages from a variety of circumstances, such as an aircraft collision with the power lines.

2.2.15 Cumulative Impacts

Cumulative Air and Water Issues: Several commentors requested that the EIS examine the cumulative effects of the transmission lines and the power plants in the larger context of activities occurring in Imperial Valley. The cumulative effects of the project on the Salton Sea, the New River, fishing, and on farming were all mentioned specifically. The commentors suggested that the analysis examine the impacts from both construction and operation of the power plants. One commentor requested that impacts in Mexico be included.

Effect of Additional Power Availability in Imperial Valley and Mexico: Some commentors requested that the EIS analysis examine the potential impacts associated with the new power supplies available in the region as a result of the projects. The commentors stated that the additional power would lead to increased development of the area through housing and industry.

Construction of Additional Power Plants: Some commentors wanted the construction of a second power plant by each of the companies to be considered in the cumulative impact analysis. They believed this was reasonable since each transmission line would contain two circuits.

Construction of a New County Cargo Airport: A commentor stated that the area selected for the construction of the transmission lines is in the vicinity of a proposed location for a new county cargo airport. It was suggested that the EIS examine the cumulative effect of such an airport sited near the transmission line.

50-Year Comprehensive Cumulative Analysis: A commentor suggested that a 50-Year Comprehensive Cumulative Analysis (CEA) be conducted for this project. The CEA should consider things like U.S. and Mexican growth projections, environmental factors, major equipment maintenance and operational activities, and overall energy requirements. Rather than being a Washington-based project, it should use local binational governmental and nongovernmental organizations involved in long-term planning for the Mexicali and Imperial Valley areas.

EIS Analysis: The EIS analyzes the potential cumulative impacts in the United States of the proposed transmission lines and the power plants when added to other past, present, and reasonably foreseeable future actions. This includes potential cumulative impacts to air quality in the region and impacts to the Salton Sea. All reasonably foreseeable future power plants are included in the cumulative impacts analysis. A 50-year comprehensive cumulative impact analysis is outside the scope of the EIS. Also, the EIS does not address actions taken by nongovernmental agencies.

APPENDIX C:

ISSUES TRACKING MATRIX

APPENDIX C:

ISSUES TRACKING MATRIX

TABLE C-1 EIS Issues Tracking Guide[a]

Issue Emerging from the EA Court Challenge/EIS Scoping	Summary of Resolution of the Issue	Where Issue Is Addressed in the EIS
Challenge		
1. *Potential for Public Controversy:* Substantial questions were raised in comments submitted on the EA that raised a controversy over the potential impacts of the proposed action.	This EIS was prepared in large part to address the questions that gave rise to the controversy.	Throughout. See citations below to specific questions.
2. *Water Impacts – Salton Sea:* The conclusion in the EA that flow and salinity impacts to the Salton Sea would be too low to measure was insufficient. Such impacts must be computed.	Impacts of flow reductions and salinity increases have been analyzed in terms of calculated increases in these parameters as well as on the elevation of the Salton Sea, its area, volume, and the advancement of the time to reach a critical salinity level of 60,000 mg/L.	Impacts of plant operations on the Salton Sea are presented in Section 4.2.4.2.
3. *Impacts from NH_3 and CO_2:* Questions remain concerning contributions of NH_3 emissions to secondary PM_{10} formation and whether NH_3 concentrations exceed reference levels in the U.S. Also, plant emissions of CO_2 need to be evaluated under NEPA.	Impacts from plant NH_3 emissions were analyzed in terms of maximum increases in ambient air concentrations in Imperial County as compared to a safe reference concentration and in terms of contributions to secondary PM_{10} formation from chemical reactions of power plant NH_3 and NO_x in the atmosphere.	Production of secondary PM_{10} from NH_3 emissions is discussed in Section 4.3.4.4.2; an assessment of CO_2 emissions is presented in Section 4.3.4.4.3.
4. *Range of Alternatives:* The EA did not evaluate reasonable and feasible alternatives, namely (1) state-of-the-art emission controls on power plants, or dry cooling or wet-dry cooling; and (2) mitigation through offsets in existing sources.	The EIS analyzes alternatives encompassing the addition of further CO and NO_x controls on export turbines at the power plants and alternatives that consider dry or wet-dry cooling of the power plants.	The alternative technologies alternative is described in Section 2.3. Resource area impacts are generally discussed in the alternative technologies sections (e.g., 4.1.5, 4.2.5, etc.)

TABLE C-1 (Cont.)

Issue Emerging from the EA Court Challenge/EIS Scoping	Summary of Resolution of the Issue	Where Issue Is Addressed in the EIS
5. *Cumulative Impacts:* The EA did not adequately assess the cumulative impacts of power plant operations on the New River and Salton Sea, nor did it adequately consider the impacts of specific future power plants in the region mentioned by commentors.	Cumulative impacts on water resources and air quality in the border region are analyzed in the EIS. Impacts on the quantity and quality of water in the New River and Salton Sea from the projects were reviewed in the context of broader demands on the same resources, such as the water transfer project. Impacts to air quality from any verifiable future power plants or other industries with air impacts were analyzed after a careful review of planned or proposed projects in the region.	A cumulative impacts analysis is presented in Chapter 5. Cumulative impacts to water resources are discussed in Section 5.4.2. Cumulative impacts to air quality are discussed in Section 5.4.3. A summary of impacts is provided in Table 5.4-4.
EIS Scoping		
1. Adverse impacts to the New River and Salton Sea from increased TDS and reduced DO.	Impacts to the New River and Salton Sea are analyzed in terms of changes in calculated TDS loads and concentrations and measured DO concentrations.	Impacts to the New River are presented in Section 4.2.4.1 and to the Salton Sea in Section 4.2.4.2.
2. Adverse air quality impacts from plant emissions of NO_x, CO, PM_{10}, and NH_3.	Increases in ambient air concentrations in Imperial County are modeled using EPA's AERMOD model and compared to EPA SLs for adverse air quality impacts for NO_x, CO, PM_{10}, and NH_3. Impacts on the concentrations of the secondary air pollutants O_3 and PM_{10} are also analyzed.	Section 4.3.

TABLE C-1 (Cont.)

Issue Emerging from the EA Court Challenge/EIS Scoping	Summary of Resolution of the Issue	Where Issue Is Addressed in the EIS
3. Human health impacts, with particular concern for asthma sufferers.	Human health impacts are analyzed in terms of exposure to EMF from the transmission lines and from air pollutants emitted from the power plants. Exposure to EMF to nearby residents is computed from conservative application of standard field strengths for power lines. Exposure to plant-related air pollutants is analyzed in terms of EPA SLs and through a review of the types of health effects that are associated with the pollutants and the regional health status with respect to these health effects. In addition, a human health risk assessment was performed for exposure to hazardous air pollutants and NH_3.	Human health impacts from exposure to EMF and to plant-related air pollutants are discussed in Section 4.11 and Appendix H.
4. Consideration of mitigation measures to offset plant emissions.	A mitigation measures alternative is analyzed in the EIS. Mitigation measures analyzed are confined to those that affect air quality. Water resource offsets are not considered because all water in the region is accounted for, that is, taking water for one purpose would remove it from another established, purpose. Air quality offsets from road paving and engine and fuel conversions in vehicles are analyzed.	A mitigation measures alternative is analyzed under the various resource area analyses in Section 4. Specific discussions of air quality offsets are presented in Sections 2.4 and 4.3.6.
5. Consideration of alternative technologies, including dry cooling, wet-dry cooling, and CO and NO_x controls on power plants.	The EIS analyzes an alternative that encompasses power plants fitted with further air pollution controls and dry or wet-dry cooling. Air pollution modeling included cases with plants equipped with full NO_x and CO controls. In addition, impacts on water and air from the use of dry or wet-dry cooling are analyzed.	Impacts on water resources are discussed in Section 4.2.5. Impacts on air quality are discussed in Section 4.3.5, and impacts on biological resources are discussed in Section 4.4.5.

TABLE C-1 (Cont.)

Issue Emerging from the EA Court Challenge/EIS Scoping	Summary of Resolution of the Issue	Where Issue Is Addressed in the EIS
6. Ecological impacts from salinity increases in the New River and Salton Sea, including recreational fishing in the Sea.	Impacts to biological resources associated with the New River, Salton Sea, and experimental wetlands along the New River from water use at the power plants are analyzed in the EIS. Impacts on recreational fish populations in the Salton Sea are included in the analysis.	Ecological impacts from changes in water quality and volume are discussed in Section 4.4.
7. Visual impacts of the transmission lines.	Visual impacts from construction of the transmission lines along three possible alternative routes are analyzed in the EIS in terms of regional visual setting and from key viewing points using photo simulations.	Visual impacts of construction of transmission lines are discussed in Section 4.8.
8. Environmental justice and cultural resources impacts.	Environmental justice issues are evaluated in the EIS in terms of potential disproportionate impacts of the projects on low-income and minority populations. Impacts to cultural resources from construction of the transmission lines along three alternative routes are assessed in terms of known and expected resources along the respective routes.	Environmental justice issues are analyzed in Section 4.12. Cultural Resources impacts are analyzed in Section 4.5.

[a] Abbreviations: AERMOD = AMS/EPA Regulatory MODel; CO = carbon monoxide; CO_2 = carbon dioxide; DO = dissolved oxygen; EA = environmental assessment; EIS = environmental impact statement; EMF = electric and magnetic fields; EPA = U.S. Environmental Protection Agency; NEPA = National Environmental Policy Act; NH_3 = ammonia; NO_x = nitrogen oxides; O_3 = ozone; PM_{10} = particulate matter with a mean aerodynamic diameter of 10 μm or less; SL = significance level; TDS = total dissolved solids.

TABLE C-2 Summary of Declaration Issues and Resolutions[a]

Declaration Author and Affiliation	Summary of Issue and Resolution	Where Issue Is Addressed in the EIS
	Declarations Related to Water Impacts	
M. Barrett, plaintiff	*M. Barrett declares that flow in the New River would be reduced by about 6% as the result of the proposed action.*	
	In general, the calculations performed for this EIS are in agreement with this value. The actual reduction at Brawley would be somewhat less, however, because the wetlands are located downstream of the Calexico gage and the New River gains water as it flows northward.	Section 4.2.4.2
	M. Barrett further states that the proposed action would immediately decrease the amount of water flowing through the Brawley wetlands.	
	However, water for the Brawley wetlands is obtained from the New River by pumping; direct flow from the river is not used. The reduction in New River flow at the wetlands produced by the proposed action would not prevent pumping the same amount of water (about 7 ac-ft/yr) from the river even under low-flow conditions.	Section 4.2.4.2
	M. Barrett additionally states that the proposed action would increase the TDS at the location of the wetlands by about 6%.	
	The calculations performed for this EIS are in agreement with her stated value.	Section 4.2.4.2
	M. Barrett states that the proposed action would reduce flow to the New River and the Salton Sea.	
	The calculations performed for this EIS support her statement. Flow in the New River would be reduced by about 6%, and inflow to the Salton Sea would be reduced by about 0.8%. These reductions would be well within the normal variability of the systems.	Sections 4.2.4.2 and 4.2.4.2

TABLE C-2 (Cont.)

Declaration Author and Affiliation	Summary of Issue and Resolution	Where Issue Is Addressed in the EIS
	Declarations Related to Water Impacts	
K. Collins, plantiff	*In her declaration, K. Collins states that the proposed action would decrease water in the New River and increase its salinity.*	
	Calculations performed for this EIS are in agreement with her statement.	Section 4.2.4.1
	K. Collins further states that the proposed action would increase the concentration of industrial wastes if the power plants evaporate the treated water normally disposed of in the river. Water released from the Zaragoza Oxidation Lagoons undergo, at most, primary treatment (i.e., settling).	
	Calculations performed for this EIS indicate that, except for TDS and selenium, water quality parameters in the New River would be improved by the proposed action (e.g., decreased COD, BOD, TSS, phosphorus, etc.).	Section 4.2.4.1
DOI	*The DOI report summarizes the current status of alternatives for reducing salinity and of elevation control for the Salton Sea. Information from this report was used in characterizing the affected environment for the Salton Sea. Impacts to the Salton Sea from the proposed action were discussed as part of the EIS process.*	Sections 3.2.1.3 and 4.2.4.2
W. Powers, plaintiff	*W. Powers states that the proposed action would immediately reduce the flow of water in the New River and increase its salinity by as much as 10% at the U.S.-Mexico border.*	
	Calculations performed for this EIS indicate that similar changes would occur, but the magnitude would be less, approximately 6%.	Section 4.2.4.1
T.J. Kirk, plaintiff	*T.J. Kirk states in his declaration that the proposed action would reduce flow to the Salton Sea and increase its salinity.*	
	Calculations performed for this EIS are in agreement with this statement. With both plants operating, inflow to the Sea would be reduced by about 0.8%, and its TDS would increase by about 0.14%. The rate of TDS increase would also increase by about 0.19%. This increase in rate would result in a TDS value of 60,000 mg/L in about 36.06 years, rather than 36.07 years, a difference of about 4 days. This small change in time is beyond the accuracy of the model and the input parameter values used to predict the changes.	Section 4.2.4.2

TABLE C-2 (Cont.)

Declaration Author and Affiliation	Summary of Issue and Resolution	Where Issue Is Addressed in the EIS
	Declarations Related to Water Impacts	
J.A. Olson, plaintiff	*J.A. Olson declares that the proposed action would shrink the size of the Salton Sea and increase its salinity.*	
	Calculations performed for this EIS are in agreement with this statement. The volume of the Sea would decrease by about 0.14%, and its salinity would increase by the same amount. Its elevation would decrease by about 0.05 ft (0.02 m), and about 97 acres (39 ha) would be lost in surface area. Cumulatively, impacts of the proposed action would be a fraction of the impacts to the Sea resulting from decreased inflow to the system (approximately 32% in the short term, and 12% in 2022, when the San Diego water transfer projects ramp up to a value of up to 200,000 ac-ft/yr).	Sections 4.2.4.2 and 5.4.2
J. Angel, plaintiff	*J. Angel declares that the proposed action would increase TDS and reduce flow to the Salton Sea and New River.*	
	The calculations performed for this EIS are in agreement with this statement. The volume of the Sea would decrease by about 0.14% due to a reduction in flow from the New River, and the salinity of the Sea would increase by the same amount. Its elevation would decrease by about 0.05 ft (0.6 in.), and about 97 acres (39 ha) would be lost in surface area. Cumulatively, impacts of the proposed action are a fraction of the impacts to the Sea resulting from decreased inflow to the system (approximately 32% in the short term, and 12% in 2022, when the San Diego water transfer projects ramp up to a value of up to 200,000 ac-ft/yr).	Sections 4.2.4.2 and 5.4.2
	The proposed action would also decrease the flow in the New River, as declared by J. Angel. At the Calexico gage, flow would be reduced by about 5.9%; at the Westmorland gage, flow would be reduced by about 2.3%. Both of these reductions are well within the annual variability of flows measured by the USGS.	Section 4.2.4.1
	Because of a reduction in flow and discharge of power plant water that was initially treated from the Zaragoza Oxidation Lagoons prior to use, the annual TDS load to the New River would be decreased; however, the annual TDS concentration in the river would increase by about 6% because of reduced flow in the river and TDS values in the power plant effluent. At the same time, TSS, BOD, COD, and phosphorus loads in the New River would decrease by 2.3, 5.8, 17.0, and 7.5%, respectively. All of these parameter changes are well within the annual variability observed by measurement.	Section 4.2.4.1

TABLE C-2 (Cont.)

Declaration Author and Affiliation	Summary of Issue and Resolution	Where Issue Is Addressed in the EIS
	Declarations Related to Water Impacts	
T.J. Kirk, plaintiff	*T.J. Kirk, in this declaration, states that reductions in New River flow would increase the TDS in the Salton Sea, reduce its area, and decrease its elevation.*	
	The calculations performed for this EIS are in agreement with this statement. However, the changes calculated for this EIS were less than those described in the declaration. The volume of the Sea would decrease by about 0.14% due to a reduction in flow from the New River, and the salinity concentration of the Sea would increase by the same amount. Its elevation would decrease by about 0.05 ft (0.6 in.), and about 97 acres (39 ha) would be lost in surface area. In either case, the values calculated are well within the uncertainty of the Sea's actual TDS concentration.	Section 4.2.4.2
T. Hromadka, Intervenors	*T. Hromadka declared that water lost to power plant operations in the New River would be replaced by an increase in groundwater inflow.*	
	Calculations performed for this EIS indicate that the change in water depth at the Calexico gage caused by plant operations would be on the order of 0.13 ft (about 0.04 m). In a gaining stream (i.e., one in which the quantity of water flowing in the stream increases in the downstream direction), such as the New River, as the water level drops, water would be released from bank storage (e.g., groundwater seepage). The amount of water released to the river would be a function of many variables, including soil type, antecedent moisture conditions, precipitation patterns, irrigation practices, etc. Because the change in depth of the New River produced by plant operations would be very small, accurately determining potential inflow from bank storage is not necessary, and groundwater replenishment of the river was not included as an ameliorating effect in the EIS (thus leading to a more conservative water analysis).	Section 4.2.4.1
	T. Hromadka further declares that the reduction in flow and increase in TDS for the New River would be within the historic range of variability for the New River and Salton Sea.	
	The calculations performed for this EIS support this declaration. As stated in the court decision, this reduction would lead to an overall decrease in the average flow for the New River. This decrease would be very small relative to prepower plant flows and small compared to the overall variability.	Sections 4.2.4.1 and 4.2.4.2

TABLE C-2 (Cont.)

Declaration Author and Affiliation	Summary of Issue and Resolution	Where Issue Is Addressed in the EIS
	Declarations Related to Water Impacts	
O. Simoes, Intervenors	*O. Simoes declared that wastes from the power plant operations are processed at the plant into a solid waste that is then disposed of in a landfill.*	
	Calculations performed for this EIS indicate that operation of the power plants would reduce the annual loads of water quality parameters to the New River. For example, operation of both plants would reduce the annual TDS load to the New River by about 9 million lb (4 million kg). This reduction primarily occurs because less water would be delivered to the New River by the combined plants and the Zaragoza Oxidation Lagoons outfalls. Because of a decrease in flow in the river, its TDS would increase by up to 6%.	Section 4.2.4.1
J. Kasper, Intervenors	*J. Kasper declared that TDS removed during the treatment process at the LRPC is not returned to the New River.*	
	Calculations performed for this EIS indicate that operation of the power plants would reduce the annual TDS loads to the New River. For example, operation of both plants would reduce the annual TDS load to the New River by about 9 million lb (4 million kg). This reduction would primarily occur because less water would be delivered to the New River by the combined plants and the Zaragoza Oxidation Lagoons outfalls. Although the net load of TDS to the New River would be reduced, its TDS concentration would increase by up to 6%. Important TDS constituents for the New River are chloride, sodium, magnesium, calcium, carbonate, bicarbonate, nitrate, and sulfate. Although phosphorus is not listed as one of the salts of concern, it is a very important water quality parameter in terms of system eutrophication. Phosphorus reduction to the New River due to plant operations would be about 150,000 lb (68,000 kg) annually.	Sections 3.2.1.1, 4.2.4.1, and 5.4.2
	J. Kasper further declares that any changes in salinity of the Salton Sea attributable to plant operations would be entirely reversed if the flows from the New River are restored to their present levels.	
	All else being equal, this statement is correct, but not discussed in the EIS because salt would continue to flow into the Sea during the operational period of the power plants, and other activities would be taking place. The potential impacts of these and other activities are discussed under Cumulative Impacts (Chapter 5).	

TABLE C-2 (Cont.)

Declaration Author and Affiliation	Summary of Issue and Resolution	Where Issue Is Addressed in the EIS
	Declarations Related to Water Impacts	
J. Nichols, Intervenors	*J. Nichols declared that a 0.14% increase in Salton Sea salinity after a year's time would have no adverse effect on aquatic organisms in the Sea.*	
	Calculations performed for this EIS indicated that the salinity of the Sea would increase by 0.14% due to a reduction in volume caused by a decreased inflow from the New River. After 1 year, an additional increase would occur due to continued salt inflow to the Sea. Impacts to organisms in the Salton Sea due to these increases could have adverse impacts to aquatic species, even before the critical level of 60,000 mg/L is reached (in an estimated 36 years).	Sections 4.2.4.2 and 4.4.4.3
	Declarations Related to Air Quality Impacts	
P. English, Plaintiff	*P. English declares that because the EA did not disclose levels of NH_3 emissions from the plants, and thus, the corresponding increases in PM_{10}, the EA's projected 24-hour average of 3 $\mu g/m^3$, underestimates the true cumulative impact from the pollutant.*	
	This EIS accounts for both direct PM_{10} emissions and PM_{10} concentrations produced by secondary formation in the atmosphere from conservative estimates of plant emissions of NH_3 and NO_x. The estimated maximum 24-hour concentration increase in the United States from direct emissions from both plants is 2.45 $\mu g/m^3$, while the estimated 24-hour contribution from secondary PM_{10} is 1 $\mu g/m^3$, which totals to less than the 5-$\mu g/m^3$ SL.	Section 4.3.4.4.2
W. Stockwell, Plaintiff	*W. Stockwell concurs with P. English, stating that maximum combined NH_3 emissions of the plants of 1,016 tons/yr (922 t/yr) pose a serious threat of irreparable environmental harm from the production of secondary PM_{10} from plant NH_3 emissions. He concludes that due to the relative presence of NO_x and NH_3 in the atmosphere in the vicinity of the plants, a substantial fraction of NH_3 emitted could form PM_{10}.*	

TABLE C-2 (Cont.)

Declaration Author and Affiliation	Summary of Issue and Resolution	Where Issue Is Addressed in the EIS
	Declarations Related to Air Impacts	
	In the EIS analysis of secondary PM_{10} formation in the form of NH_4NO_3, it is concluded that power plant contributions would be controlled by NO_x emissions rather than NH_3 emissions and that the maximum 24-hour concentration increment would be 1 μg/m^3, as noted above. This estimate used a conversion factor of 0.6 grams of NH_4NO_3 formed for 1 gram of NO_x emitted from the plants, a value conservatively adapted from Stockwell et al. (2000) for winter-time conditions in the San Joaquin Valley to the north. This result is compared to a study by Chow and Watson (1995) that concluded that secondary NH_4NO_3 contributions from all sources to total PM_{10} in the border region were small, on the order of 2 to 3 μg/m^3. This EIS concludes that impacts of secondary PM_{10} from plant emissions would be de minimis.	Section 4.3.4.4.2
S. Heisler, Intervenors	*S. Heisler notes that while NH_3 is not a regulated air pollutant, estimated concentration increases from plant emissions can be compared to health-based reference values. He computed a 1-hour maximum concentration at the border of 13.4 μg/m^3 and an annual average of 0.63 μg/m^3 and compared these increases to California acute and chronic RELs of 3,200 μg/m^3 and 200 μg/m^3, respectively. On the question of contributions of plant ammonia emissions to secondary PM_{10}, Heisler further concludes that because the region is ammonia rich, plant emissions would not lead to significant formation of NH_4NO_3.*	
	This EIS also modeled the air concentration increases that would be produced from plant emissions of ammonia slip. Estimated maximum values for the proposed action are 4.05 μg/m^3 for 1-hour average and 0.061 μg/m^3 for annual average. These values are far below the EPA's reference concentration for chronic exposure of 100 μg/m^3 to which they are compared (Table 4.3-4).	Section 4.3.4
	Regarding formation of secondary PM_{10} from plant emissions of NH_3, this EIS likewise concludes that the region is NH_3 rich and that such formation would be controlled by plant NO_x emissions, as discussed above.	Section 4.3.4.4.2

TABLE C-2 (Cont.)

Declaration Author and Affiliation	Summary of Issue and Resolution	Where Issue Is Addressed in the EIS
	Declarations Related to Air Impacts	
	S. Heisler, in a supplemental declaration, reports that computed total PM_{10} levels attributable to both plant direct emissions and secondary formation from ammonia slip are below EPA SLs at the border.	
	This EIS conducts a similar analysis, except that it is assumed that secondary PM_{10} formation is governed by plant NO_x emissions, rather than NH_3 emissions. This EIS also concludes that total PM_{10} contributions would be below SLs.	Section 4.3.4
P. Fontana, Intervenors	*P. Fontana calculated increases in NH_3 concentrations in air in the border region assuming worst-case emission rates from the power plants. He reported 1-hour acute values and annual averages that are both below chronic RELs. He further notes, as did S. Heisler in his declaration, that cooling tower NH_3 emissions, based on a calculation by J. Kasper, would be a small fraction of stack emissions of ammonia slip.*	
	The EIS analysis of direct NH_3 impacts is discussed above. Ammonia emissions from cooling towers are also assumed to be a small fraction of ammonia slip emissions.	Section 4.3.4
P. English, Plaintiffs	*P. English, in a supplemental declaration, argues that, irrespective of SLs, any increase in PM_{10} would have serious and irreparable health impacts from respiratory causes. He further asserts that it is "commonly accepted that there is a causal linear nonthreshold relationship between particulate matter with health outcomes." He then calculates such expected outcomes from plant impacts using factors he took from the scientific literature.*	
	This EIS acknowledges that increases in PM_{10} concentrations in the air basin could have adverse health effects in the way of respiratory illness. This EIS, however, does not attempt to compute the rates of any particular health outcomes, but defers instead to comparisons to SLs to gauge the magnitude of potential health impacts.	Sections 4.11.2 and 4.11.4

TABLE C-2 (Cont.)

Declaration Author and Affiliation	Summary of Issue and Resolution	Where Issue Is Addressed in the EIS
	Declarations Related to Air Impacts	
T. Tesche, Plaintiffs	*T. Tesche notes that the Conformity Review requires that Federal actions conform to the provisions of the State Implementation Plan and meet the provisions of the Clean Air Act. He asserts that since the project is in a nonattainment area for O_3 and PM_{10}, a complete conformity analysis of these pollutants must be performed when emissions from the power plants are included.*	
	This EIS confines the discussion of conformity review to the transmission line projects. Estimates of PM_{10} and O_3 precursor emissions from these projects are below those triggering such a review and, therefore, this EIS concludes that the actions are exempt from further review.	Section 4.3.4.3
	T. Tesche notes that the EA did not include the two domestic Mexico turbines in the analysis of air quality impacts for NO_x and CO, and, moreover, relied on "simple screening calculations" using the EPA's ISCST3 model.	
	This EIS includes analysis of the two domestic Mexico turbines to evaluate cumulative impacts to air quality, including that from NO_x and CO. The EPA's most recent dispersion model, AERMOD, was used to model pollutants from the power plants. Such modeling would not be considered "simple screening calculations."	Sections 4.3.2 and 4.3.4
	T. Tesche asserts that the EA did not "perform any substantive analysis of impacts to O_3 levels in the air basin," noting that, while the EPA has not issued formal guidance on photochemical modeling of O_3 production, it has sponsored a large body of literature devoted to the proper application of such models. He identifies several state-of-the art photochemical grid models available in the public domain. He further takes issue with the EA's assertion that the plant emissions of NO_x would have minimal impact on O_3 levels in the U.S., saying this conclusion is "unsupported conjecture."	
	This EIS used EPA's OZIPR model to estimate possible incremental O_3 formation from plant emissions of NO_x and VOC. This model is a single-day, one-dimensional photochemical box model and is thus not a grid model as suggested by Tesche, but is considered adequate for the needs of the EIS.	Section 4.3.2.2.2

TABLE C-2 (Cont.)

Declaration Author and Affiliation	Summary of Issue and Resolution	Where Issue Is Addressed in the EIS
	Declarations Related to Air Impacts	
	T. Tesche agrees with the EA conclusion that the Salton Sea Air Basin is NO_x limited under most circumstances and notes that small additions of NO_x can have significant impacts on O_3 formation and dismisses the use in the EA of an annual average NO_x level in the analysis of O_3 impacts.	
	This EIS examined air chemistry conditions in the air basin, including hourly O_3 and NO_2 levels, and characterizes the Mexicali-Imperial County area as being VOC limited with respect to O_3 formation, rather than NO_x limited.	Section 4.3.4.4.2
B. Delany, Intervenors	*On the issue of emissions of the greenhouse gas CO_2 from the LRPC, B. Delany notes that there currently are no requirements to control or regulate emissions of CO_2 in either Mexico or California. He notes that the gas-fired turbines at the LRPC are low emitters of CO_2 per megawatt of energy produced and estimates that the LRPC would emit 1.24 million tons (1.12 million t) annually out of a global total of 26 billion tons (24 billion t).*	
	This EIS conservatively estimates CO_2 emissions to be 2.6 million tons/yr (2.4 million t/yr) each for the two export turbines and the two Mexico turbines at the LRPC. A global total of 25 billion tons/yr (23 billion t/yr) is cited for 2001.	Section 4.3.4.4.3

[a] Abbreviations: AERMOD = AMS/EPA Regulatory MODel; BOD = biochemical oxygen demand; CO = carbon monoxide; CO_2 = carbon dioxide; COD = chemical oxygen demand; DOI = U.S. Department of Interior; EA = environmental assessment; EIS = environmental impact statement; EPA = U.S. Environmental Protection Agency; ISCST3 = Industrial Source Complex Short Term Dispersion Model 3; LRPC = La Rosita Power Complex; NH_3 = ammonia; NH_4NO_3 = ammonium nitrate; NO_2 = nitrogen dioxide; NO_x = nitrogen oxides; O_3 = ozone; OZIPR = OZone Isopleth Plotting Package Research; PM_{10} = particulate matter with a mean aerodynamic diameter of 10 μm or less; REL = reference exposure level; SL = significant level; TDS = total dissolved solids; TSS = total suspended solids; USGS = U.S. Geological Survey; VOC = volatile organic compound(s).

APPENDIX C REFERENCES

Chow, J.C., and J.G. Watson, 1995, *Imperial Valley/Mexico Cross Border PM_{10} Transport Study, EPA Region IX*, Draft Final Report, Desert Research Institute (DRI) Document No. 8623.2D1, April 21.

Stockwell, W., et al., 2000, "The Ammonium Nitrate Particle Equivalent of NO_x Emissions for Wintertime Conditions in Central California's San Joaquin Valley," *Atmospheric Environment* 34:4711–4717.

APPENDIX D:

AIR QUALITY MONITORING DATA IN THE UNITED STATES AND MEXICO BORDER REGION

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Ambient air quality data nearest the proposed transmission lines are collected at air quality monitoring stations in El Centro and Calexico, California, that are operated by the Imperial County Air Pollution Control District. The El Centro monitoring station is located at 150 9th Street, about 10 mi (16 km) northeast of the Imperial Valley Substation; the monitoring 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. The 9th Street station measures ozone (O_3), carbon monoxide (CO), and particulates. The Grant Street station measures O_3, particulates, and noncriteria pollutants. Two other air quality monitoring stations are located in Calexico; the Ethel Street station is located at 1029 Ethel Street, and the Calexico East station is opposite the border checkpoint on Highway 111. Each of these stations monitors O_3, particulates, CO, nitrogen oxides (NO_x; measured as nitrogen dioxide [NO_2]), sulfur dioxide (SO_2), and noncriteria pollutants.

Ambient air quality data are also collected in Imperial County at monitoring sites that are farther from the project area. These are Brawly Main Street, Westmorland West 1st Street, and Niland English Road, approximately 19, 20, and 40 mi (31, 32, and 64 km) northeast of the project 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 of the proposed transmission lines, respectively. These data are not reported here because of the distances of these sites 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 United States-Mexico border. These sites are also designated as California Air Resources Board (ARB) sites. They are loosely clustered within an approximate radius of several miles and generally lie 11 mi (18 km) east of the southern end of the proposed transmission lines and 8 mi (13 km) east of the Termoeléctrica U.S., LLC, and Baja California Power, Inc., power plants that supply power to the transmission lines in the project area. All 10 sites collect particulates and noncriteria pollutants, and four collect CO, NO_x (measured as NO_2), O_3, SO_2, particulates, lead, and noncriteria pollutants. These four are located at the Instituto Tecnológico de Mexicali (ITM), Universidad Autonomos de Baja California (UABC), El Centro de Bachillerato Tecnológico Industrial y de Servicios (CBTIS), and Colegio de Bachilleres (COBACH). Figures 3.3-12 and 3.3-13 in the environmental impact statement show the locations of monitoring sites operated in 2001 through 2003 that are located in the United States and Mexico border regions, respectively, including those described here.

Tables D-1 through D-8 show a cross section of annual data on criteria air pollutant measurements from 1988 to 2001 at the four monitoring sites in El Centro and Calexico in Imperial County and at the four monitoring sites in Mexicali described previously (ITM, UABC, CBTIS, and COBACH). 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 U.S. Environmental Protection Agency (EPA), Technology Transfer Network, U.S.-Mexico Border Information Center on Air Pollution (CICA: Centro de Información sobre Contaminación de Aire) (EPA 2003).[1]

The 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 particulate matter with an aerodynamic diameter of 10 μm or less (PM_{10}) that were generally made on an approximate 5-day cycle, although irregular sampling gaps also occurred. Measurements of criteria pollutants were not made every year at all of the sites listed, nor are they 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.

REFERENCE FOR APPENDIX D

EPA (U.S. Environmental. Protection Agency), 2003, "Summary Database of Border Air Quality," prepared by Centro de Información sobre Contaminación de Aire (CICA), Para la Frontera entre EE. UU. y México, maintained by EPA Technology Transfer Network, U.S.-Mexico Border Information Center on Air Pollution.

[1] 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.

TABLE D-1 Annual Criteria Pollutant Monitoring: Calexico, 1029 Ethel Street, Calexico High School

Year	Arithmetic Mean	Geometric Mean	Highest Value	Number of Observations
	CO 1-hour measurements			
1994	1.14 ppm	0.58 ppm	30.6 ppm	4,710
1995	1.22 ppm	0.59 ppm	32.0 ppm	8,289
1996	1.06 ppm	0.54 ppm	27.0 ppm	8,106
1997	1.05 ppm	0.55 ppm	24.0 ppm	8,306
1998	1.06 ppm	0.59 ppm	23.5 ppm	8,214
1999	1.13 ppm	0.62 ppm	22.9 ppm	8,281
2000	1.11 ppm	0.60 ppm	19.9 ppm	7,122
	NO_2 1-hour measurements			
1994	0.0149 ppm	0.0090 ppm	0.227 ppm	4,770
1995	0.0158 ppm	0.0054 ppm	0.217 ppm	8,334
1996	0.0143 ppm	0.0034 ppm	0.164 ppm	8,342
1997	0.0152 ppm	0.0092 ppm	0.128 ppm	7,569
1998	0.0143 ppm	0.0093 ppm	0.257 ppm	5,463
1999	0.0178 ppm	0.0122 ppm	0.286 ppm	8,205
2000	0.0186 ppm	0.0126 ppm	0.192 ppm	7,587
	O_3 1-hour measurements			
1994	0.0574 ppm	0.0529 ppm	0.125 ppm	4,795
1995	0.0616 ppm	0.0572 ppm	0.232 ppm	8,339
1996	0.0622 ppm	0.0583 ppm	0.146 ppm	8,381
1997	0.0557 ppm	0.0518 ppm	0.156 ppm	8,321
1998	0.0620 ppm	0.0590 ppm	0.139 ppm	8,307
1999	0.0616 ppm	0.0581 ppm	0.171 ppm	8,319
2000	0.0569 ppm	0.0538 ppm	0.169 ppm	7,592
	SO_2 1-hour measurements			
1994	0.0066 ppm	0.0036 ppm	0.060 ppm	4,052
1995	0.0052 ppm	0.0013 ppm	0.039 ppm	4,787
1996	0.0038 ppm	0.0016 ppm	0.036 ppm	7,826
1997	0.0028 ppm	0.0019 ppm	0.040 ppm	7,434
1998	0.0037 ppm	0.0024 ppm	0.035 ppm	7,359
1999	0.0028 ppm	0.0018 ppm	0.028 ppm	7,940
2000	0.0026 ppm	0.0018 ppm	0.026 ppm	7,595
	PM_{10} 24-hour measurements			
1995	65.0 $\mu g/m^3$	55.7 $\mu g/m^3$	180 $\mu g/m^3$	56
1996	73.9 $\mu g/m^3$	62.4 $\mu g/m^3$	193 $\mu g/m^3$	61
1997	77.8 $\mu g/m^3$	70.2 $\mu g/m^3$	166 $\mu g/m^3$	61
1998	66.5 $\mu g/m^3$	58.6 $\mu g/m^3$	160 $\mu g/m^3$	61
1999	72.2 $\mu g/m^3$	66.4 $\mu g/m^3$	181 $\mu g/m^3$	58
2000	84.3 $\mu g/m^3$	73.0 $\mu g/m^3$	268 $\mu g/m^3$	61
2001	85.3 $\mu g/m^3$	74.9 $\mu g/m^3$	437 $\mu g/m^3$	46

TABLE D-2 Annual Criteria Pollutant Monitoring: Calexico, Calexico-East, U.S. Port of Entry

Year	Arithmetic Mean	Geometric Mean	Highest Value	Number of Observations
	CO 1-hour measurements			
1996	0.0065 ppm	0.0009 ppm	0.072 ppm	5,364
1997	0.0108 ppm	0.0061 ppm	0.091 ppm	7,708
1998	0.0114 ppm	0.0070 ppm	0.105 ppm	7,618
1999	0.0133 ppm	0.0083 ppm	0.110 ppm	8,319
2000	0.0120 ppm	0.0072 ppm	0.124 ppm	6,979
	NO_2 1-hour measurements			
1994	0.0149 ppm	0.0090 ppm	0.227 ppm	4,770
1995	0.0158 ppm	0.0054 ppm	0.217 ppm	8,334
1996	0.0143 ppm	0.0034 ppm	0.164 ppm	8,342
1997	0.0152 ppm	0.0092 ppm	0.128 ppm	7,569
1998	0.0143 ppm	0.0093 ppm	0.257 ppm	5,463
1999	0.0178 ppm	0.0122 ppm	0.286 ppm	8,205
2000	0.0186 ppm	0.0126 ppm	0.192 ppm	7,587
	O_3 1-hour measurements			
1996	0.0609 ppm	0.0570 ppm	0.162 ppm	5,365
1997	0.0540 ppm	0.0520 ppm	0.121 ppm	7,484
1998	0.0656 ppm	0.0620 ppm	0.236 ppm	8,093
1999	0.0632 ppm	0.0610 ppm	0.156 ppm	8,323
2000	0.0558 ppm	0.0541 ppm	0.108 ppm	6,979
	SO_2 1-hour measurements			
1996	0.0018 ppm	0.0003 ppm	0.036 ppm	5,365
1997	0.0022 ppm	0.0013 ppm	0.035 ppm	7,487
1998	0.0031 ppm	0.0021 ppm	0.026 ppm	1,236
	PM_{10} 24-hour measurements			
1996	112.7 µg/m^3	90.3 µg/m^3	441 µg/m^3	44
1997	86.8 µg/m^3	76.9 µg/m^3	199 µg/m^3	60
1998	106.5 µg/m^3	79.1 µg/m^3	568 µg/m^3	58
1999	167.1 µg/m^3	130.1 µg/m^3	1342 µg/m^3	55
2000	244.1 µg/m^3	182.9 µg/m^3	1613 µg/m^3	58
2001	200.9 µg/m^3	123.3 µg/m^3	1867 µg/m^3	41

TABLE D-3 Annual Criteria Pollutant Monitoring: Calexico, 960 Grant Street

Year	Arithmetic Mean	Geometric Mean	Highest Value	Number of Observations
	O_3 1-hour measurements			
1998	0.0331 ppm	0.0307 ppm	0.090 ppm	1,690
1999	0.0583 ppm	0.0520 ppm	0.163 ppm	6,171
	PM_{10} 24-hour measurements			
1992	57.3 µg/m^3	49.2 µg/m^3	208 µg/m^3	48
1993	58.8 µg/m^3	49.2 µg/m^3	253 µg/m^3	61
1994	76.1 µg/m^3	65.4 µg/m^3	182 µg/m^3	45
1995	58.0 µg/m^3	47.2 µg/m^3	195 µg/m^3	62
1996	74.5 µg/m^3	64.7 µg/m^3	187 µg/m^3	57
1997	74.0 µg/m^3	62.7 µg/m^3	179 µg/m^3	50
1998	64.2 µg/m^3	52.0 µg/m^3	176 µg/m^3	60
1999	77.2 µg/m^3	66.2 µg/m^3	227 µg/m^3	60
2000	96.3 µg/m^3	85.2 µg/m^3	252 µg/m^3	56
2001	79.5 µg/m^3	65.0 µg/m^3	510 µg/m^3	46

TABLE D-4 Annual Criteria Pollutant Monitoring: El Centro, 150 9th Street

Year	Arithmetic Mean	Geometric Mean	Highest Value	Number of Observations
	CO 1-hour measurements			
1996	0.67 ppm	0.42 ppm	12 ppm	8,784
1997	0.48 ppm	0.34 ppm	6 ppm	8,702
1998	0.55 ppm	0.39 ppm	7 ppm	6,858
	O_3 1-hour measurements			
1992	0.0526 ppm	0.0479 ppm	0.12 ppm	7,966
1993	0.0629 ppm	0.0596 ppm	0.15 ppm	8,527
1994	0.0620 ppm	0.0579 ppm	0.13 ppm	8,384
1995	0.0601 ppm	0.0555 ppm	0.15 ppm	7,709
1996	0.0691 ppm	0.0660 ppm	0.14 ppm	7,100
1997	0.0628 ppm	0.0599 ppm	0.13 ppm	8,274
1998	0.0585 ppm	0.0562 ppm	0.13 ppm	7,685
1999	0.0681 ppm	0.0664 ppm	0.14 ppm	3,441

TABLE D-5 Annual Criteria Pollutant Monitoring: Mexicali, ITM

Year	Arithmetic Mean	Geometric Mean	Highest Value	Number of Observations
	CO 1-hour measurements			
1997	1.45 ppm	0.63 ppm	31.0 ppm	7,663
1998	1.50 ppm	0.67 ppm	27.5 ppm	8,081
1999	1.57 ppm	0.68 ppm	32.3 ppm	5,870
	NO_2 1-hour measurements			
1997	0.0186 ppm	0.0117 ppm	0.146 ppm	7,314
1998	0.0200 ppm	0.0127 ppm	0.158 ppm	8,189
1999	0.0204 ppm	0.0124 ppm	0.169 ppm	5,765
2000	0.0212 ppm	0.0138 ppm	0.179 ppm	8,059
	O_3 1-hour measurements			
1997	0.0629 ppm	0.0596 ppm	0.211 ppm	7,024
1998	0.0646 ppm	0.0615 ppm	0.155 ppm	8,082
1999	0.0614 ppm	0.0584 ppm	0.144 ppm	5,676
	SO_2 1-hour measurements			
1997	0.0027 ppm	0.0004 ppm	0.048 ppm	7,405
1998	0.0024 ppm	0.0003 ppm	0.055 ppm	7,894
1999	0.0033 ppm	0.0004 ppm	0.045 ppm	5,717
	PM_{10} 24-hour measurements			
1996	78.3 µg/m^3	70.1 µg/m^3	169 µg/m^3	12
1997	55.2 µg/m^3	50.5 µg/m^3	142 µg/m^3	51
1998	48.7 µg/m^3	41.9 µg/m^3	141 µg/m^3	58
1999	59.3 µg/m^3	51.8 µg/m^3	155 µg/m^3	61
2000	61.9 µg/m^3	54.6 µg/m^3	146 µg/m^3	58
2001	47.5 µg/m^3	41.3 µg/m^3	175 µg/m^3	36

TABLE D-6 Annual Criteria Pollutant Monitoring: Mexicali, UABC

Year	Arithmetic Mean	Geometric Mean	Highest Value	Number of Observations
	CO 1-hour measurements			
1997	1.75 ppm	0.74 ppm	40.0 ppm	6,678
1998	2.01 ppm	0.93 ppm	33.8 ppm	7,775
1999	2.14 ppm	0.95 ppm	36.1 ppm	8,150
	NO_2 1-hour measurements			
1997	0.0210 ppm	0.0142 ppm	0.138 ppm	6,845
1998	0.0228 ppm	0.0163 ppm	0.169 ppm	7,507
1999	0.0248 ppm	0.0175 ppm	0.216 ppm	7,502
2000	0.0242 ppm	0.0171 ppm	0.191 ppm	7,473
	O_3 1-hour measurements			
1997	0.0599 ppm	0.0554 ppm	0.171 ppm	6,208
1998	0.0551 ppm	0.0510 ppm	0.137 ppm	5,594
1999	0.0570 ppm	0.0525 ppm	0.143 ppm	7,495
	SO_2 1-hour measurements			
1997	0.0041 ppm	0.0009 ppm	0.088 ppm	6,508
1998	0.0028 ppm	0.0005 ppm	0.078 ppm	7,518
1999	0.0036 ppm	0.0008 ppm	0.054 ppm	8,060
	PM_{10} 24-hour measurements			
1997	98.0 $\mu g/m^3$	88.0 $\mu g/m^3$	231 $\mu g/m^3$	49
1998	82.6 $\mu g/m^3$	71.9 $\mu g/m^3$	190 $\mu g/m^3$	52
1999	88.4 $\mu g/m^3$	79.2 $\mu g/m^3$	285 $\mu g/m^3$	56
2000	96.8 $\mu g/m^3$	88.0 $\mu g/m^3$	276 $\mu g/m^3$	57
2001	73.8 $\mu g/m^3$	65.1 $\mu g/m^3$	349 $\mu g/m^3$	43

TABLE D-7 Annual Criteria Pollutant Monitoring: Mexicali, CBTIS

Year	Arithmetic Mean	Geometric Mean	Highest Value	Number of Observations
	CO 1-hour measurements			
1997	1.96 ppm	0.81 ppm	39.4 ppm	6,134
1998	2.09 ppm	0.98 ppm	41.8 ppm	7,896
1999	2.14 ppm	1.01 ppm	38.5 ppm	8,016
	NO_2 1-hour measurements			
1997	0.0232 ppm	0.0173 ppm	0.167 ppm	6,440
1998	0.0240 ppm	0.0177 ppm	0.18 ppm	7,771
1999	0.0268 ppm	0.0196 ppm	0.199 ppm	5,498
2000	0.0211 ppm	0.0145 ppm	0.163 ppm	3,892
	O_3 1-hour measurements			
1997	0.0636 ppm	0.0599 ppm	0.155 ppm	4,704
1998	0.0554 ppm	0.0517 ppm	0.194 ppm	7,212
1999	0.0567 ppm	0.0526 ppm	0.155 ppm	7,907
	SO_2 1-hour measurements			
1997	0.0035 ppm	0.0004 ppm	0.056 ppm	4,352
1998	0.0026 ppm	0.0002 ppm	0.046 ppm	7,701
1999	0.0033 ppm	0.0003 ppm	0.056 ppm	7,336
	PM_{10} 24-hour measurements			
1997	53.4 $\mu g/m^3$	49.5 $\mu g/m^3$	149 $\mu g/m^3$	46
1998	47.8 $\mu g/m^3$	40.9 $\mu g/m^3$	165 $\mu g/m^3$	58
1999	56.2 $\mu g/m^3$	49.8 $\mu g/m^3$	186 $\mu g/m^3$	61
2000	53.5 $\mu g/m^3$	47.5 $\mu g/m^3$	119 $\mu g/m^3$	58
2001	42.6 $\mu g/m^3$	37.5 $\mu g/m^3$	165 $\mu g/m^3$	40

TABLE D-8 Annual Criteria Pollutant Monitoring: Mexicali, COBACH

Year	Arithmetic Mean	Geometric Mean	Highest Value	Number of Observations
	CO 1-hour measurements			
1997	2.39 ppm	1.05 ppm	47.4 ppm	5,000
1998	2.49 ppm	1.08 ppm	48.4 ppm	7,956
1999	2.40 ppm	1.07 ppm	33.2 ppm	6,834
	NO_2 1-hour measurements			
1997	0.0206 ppm	0.0142 ppm	0.168 ppm	4,972
1998	0.0209 ppm	0.0133 ppm	0.228 ppm	7,502
1999	0.0245 ppm	0.0163 ppm	0.221 ppm	7,710
2000	0.0237 ppm	0.0157 ppm	0.189 ppm	6,261
	O_3 1-hour measurements			
1997	0.064 ppm	0.0596 ppm	0.168 ppm	4,557
1998	0.0702 ppm	0.0661 ppm	0.166 ppm	5,429
1999	0.068 ppm	0.0637 ppm	0.176 ppm	7,350
	SO_2 1-hour measurements			
1997	0.0027 ppm	0.0008 ppm	0.033 ppm	4,536
1998	0.0024 ppm	0.0006 ppm	0.038 ppm	7,424
1999	0.0034 ppm	0.0008 ppm	0.101 ppm	6,821
	PM_{10} 24-hour measurements			
1997	130.4 µg/m^3	111.1 µg/m^3	327 µg/m^3	30
1998	119.7 µg/m^3	102.3 µg/m^3	319 µg/m^3	46
1999	154.7 µg/m^3	132.2 µg/m^3	414 µg/m^3	61
2000	172.5 µg/m^3	156.8 µg/m^3	397 µg/m^3	55
2001	133.1 µg/m^3	115.5 µg/m^3	585 µg/m^3	40

APPENDIX E:

CONSULTATION LETTERS

Department of Energy
Washington, DC 20585

January 25, 2004

Kimberly Nicol
Eastern Sierra–Inland Deserts Region
California Department of Fish and Game
78078 Country Club Drive, Suite 109
Bermuda Dunes, CA 92201

Dear Ms. Nicol:

The U.S. Department of Energy (DOE), and the Department of the Interior's Bureau of Land Management (BLM) are preparing an environmental impact statement (EIS) concerning issuance of Presidential permits to Baja California Power, Inc. and Sempra Energy Resources. In the DOE proceedings, each applicant proposes to separately construct double-circuit 230,000-volt (230-kV) electric transmission lines across the U.S. border with Mexico. In the proceeding before BLM, each applicant has applied for a right-of-way grant in order to construct the domestic portion of the proposed transmission lines on Federal land. The transmission lines originate at new powerplants in Mexico, pass west of Calexico, California, and terminate at San Diego Gas & Electric Company's Imperial Valley Substation near El Centro, California. The EIS will evaluate the potential effects of construction of the transmission lines. Because operation of the powerplants may have a potential to affect the flow and quality of water in the New River, the EIS will also evaluate impacts of the project on the portion of the New River in the U.S. and also on the Salton Sea. The Notice of Intent to prepare the EIS was published in the *Federal Register* on October 30, 2003 (68 FR 61796). Additional information on these proposed projects can be found on the Internet at http://web.ead.anl.gov/bajatermoeis/documents/index.cfm.

An analysis of the potential impacts on species listed as endangered or threatened by the State of California will be conducted as part of the EIS. Consequently, we would appreciate receiving information on any state-listed species that may inhabit or visit the project area and on critical habitat that could potentially be affected by issuance of the presidential permit or the granting of a right-of-way through Federal lands.

Thank you in advance for your assistance. If you need further information regarding this request, please do not hesitate to contact me at (202) 586-9624 or call Dr. John Hayse at Argonne National Laboratory at (630) 252-7949. My mailing address is Ellen Russell, Office of Fossil Energy (FE-27), U.S. Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585. Copies of documents should be directed to Dr. Hayse at the address below.

Sincerely,

Ellen Russell

Ellen Russell
NEPA Document Manager
Office of Fossil Energy
U.S. Department of Energy

cc: John Hayse
Environmental Assessment Division
Argonne National Laboratory
9700 South Cass Avenue, Bldg 900
Argonne, IL 60439-4832

Lynda Kastoll
El Centro Field Office
Bureau of Land Management
1661 South 4th Street
El Centro, CA 92243

Department of Energy
Washington, DC 20585

January 25, 2004

Judy Gibson
Carlsbad Fish & Wildlife Office
6010 Hidden Valley Road
Carlsbad, CA 92009

Dear Ms. Gibson:

The U.S. Department of Energy (DOE), and the Department of the Interior's Bureau of Land Management (BLM) are preparing an environmental impact statement (EIS) concerning issuance of Presidential permits to Baja California Power, Inc. and Sempra Energy Resources. In the DOE proceedings, each applicant proposes to separately construct double-circuit 230,000-volt (230-kV) electric transmission lines across the U.S. border with Mexico. In the proceeding before BLM, each applicant has applied for a right-of-way grant in order to construct the domestic portion of the proposed transmission lines on Federal land. The transmission lines originate at new powerplants in Mexico, pass west of Calexico, California, and terminate at San Diego Gas & Electric Company's Imperial Valley Substation near El Centro, California. The EIS will evaluate the potential effects of construction of the transmission lines. Because operation of the powerplants may have a potential to affect the flow and quality of water in the New River, the EIS will also evaluate impacts of the project on the portion of the New River in the U.S. and also on the Salton Sea. The Notice of Intent to prepare the EIS was published in the *Federal Register* on October 30, 2003 (68 FR 61796). Additional information on these proposed projects can be found on the Internet at http://web.ead.anl.gov/bajatermoeis/documents/index.cfm.

An analysis of the potential impacts on federally-listed endangered, threatened, and candidate species and on critical habitats will be conducted as part of the EIS. Consequently, we would appreciate receiving information on any federally-protected species that may inhabit or visit the project area and on critical habitat that could potentially be affected by issuance of the Presidential permits or the granting of a right-of-way through Federal lands.

Thank you in advance for your assistance. If you need further information regarding this request, please do not hesitate to contact me at (202) 586-9624 or call Dr. John Hayse at Argonne National Laboratory at (630) 252-7949. My mailing address is Ellen Russell, Office of Fossil Energy (FE-27), U.S. Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585. Copies of documents should be directed to Dr. Hayse at the address below.

Sincerely,

Ellen Russell

Ellen Russell
NEPA Document Manager
Office of Fossil Energy
U.S. Department of Energy

cc: John Hayse
Environmental Assessment Division
Argonne National Laboratory
9700 South Cass Avenue, Bldg 900
Argonne, IL 60439-4832

Lynda Kastoll
El Centro Field Office
Bureau of Land Management
1661 South 4th Street
El Centro, CA 92243

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

In Reply Refer To: FWS-IMP-7SP-3911.1

MAR 0 1 2004

Ms. Ellen Russell
Office of Fossil Energy (FE-27)
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Ms. Russell:

We received on February 23, 2004, your letter dated January 25, 2004, regarding the Department of Energy proceedings pursuant to permit actions for the Baja California Power, Inc. and Sempra Energy Resources electric transmission lines originating from new power plants in Mexico. Per your request, we have enclosed with this letter a list of Federally listed species and candidates for Federal listing for Imperial County that may occur within the project area for your information. If you have any questions regarding this information, please contact Carol Roberts of my staff at (760) 431-9440 ext. 271.

Sincerely,

Carol A Roberts

for Therese O'Rourke
Assistant Field Supervisor

Enclosure

cc: John Hayse, Argonne National Laboratory

TAKE PRIDE® IN AMERICA

**Listed Endangered, Threatened,
and Candidate Species that May Occur in
Imperial County, California**

Common Name	Scientific Name	Status
MAMMALS		
Peninsular bighorn sheep	*Ovis canadensis*	E
Palm Springs ground squirrel	*Spermophilus tereticaudus chlorus*	C
BIRDS		
southwestern willow flycatcher	*Empidonax traillii extimus*	E
bald eagle	*Haliaeetus leucocephalus*	T, PD
brown pelican	*Pelecanus occidentalis*	E
Yuma clapper rail	*Rallus longirostris yumanensis*	E
California least tern	*Sterna antillarum browni*	E
least Bell's vireo	*Vireo bellii pusillus*	E, CH
yellow-billed cuckoo	*Coccyzus americanus*	C
REPTILES		
desert tortoise	*Gopherus agassizii*	T, CH
FISH		
desert pupfish	*Cyprinodon macularius*	E
PLANTS		
Peirson's milk-vetch	*Astragalus magdalenae* var. *peirsonii*	T, PCH

E: Endangered
T: Threatened
PE: Proposed Endangered
PT: Proposed Threatened
C: candidate for listing
CH: Critical Habitat designation
PCH: Proposed Critical Habitat
PD: Proposed for De-listing

APPENDIX F:

CALCULATIONS IN SUPPORT OF WATER RESOURCES ANALYSIS

APPENDIX F:

CALCULATIONS IN SUPPORT OF WATER RESOURCES ANALYSIS

F.1 MIXING MODEL

The principal type of calculation performed for this environmental impact statement (EIS) was a mixing calculation used to estimate upstream and downstream concentrations for the water quality parameters of interest (total dissolved solids [TDS], total suspended solids [TSS], biochemical oxygen demand [BOD], chemical oxygen demand [COD], selenium, and total phosphorus). This model was used for both the proposed action that would use a wet cooling system and the dry cooling alternative.

When two streams of water mix together to form a new stream, the following relationships can be used to estimate the properties of the new stream if the mass of water and mass of solute are conserved (Walski et al. 2001):

$$V_1 + V_2 = V_3 \tag{F.1}$$

and

$$V_1C_1 + V_2C_2 = V_3C_3\ , \tag{F.2}$$

where V_1, V_2, and V_3 are the flows in streams 1 through 3, respectively, and C_1, C_2, and C_3 are the concentrations of a water quality parameter in streams 1 through 3, respectively. Equation F.1 expresses conservation of water mass, and Equation F.2 expresses conservation of the mass of solute.

Equations F.1 and F.2 can be combined to find the concentration of a water quality parameter in a stream as follows:

$$C_3 = \frac{C_1V_1 + C_2V_2}{V_1 + V_2}\ . \tag{F.3}$$

Equation F.3 assumes that streams 1 and 2 are both upstream of stream 3, with known flows and concentrations.

For the present analysis, it was first necessary to evaluate the conditions upstream of the power plants (i.e., water quality parameters were known at the Calexico gage and in discharge water from the Zaragoza Oxidation Lagoons but not known upstream of these two facilities). For this initialization, values for C_3 and V_3 and C_2 and V_2 were known, and those for C_1 and V_1 needed to be calculated. Flow V_1 was simply the difference between V_3 and V_2; that is:

$$V_1 = V_3 - V_2\ . \tag{F.4}$$

The unknown upstream water quality parameter, C_1, was then evaluated, with the following expression derived from Equations F.1 and F.2:

$$C_1 = \frac{C_3V_3 + C_2V_2}{V_3 - V_2} \ . \tag{F.5}$$

For operation of a single power plant (either the La Rosita Power Complex or the Termoeléctrica de Mexicali plant), water quality parameters were estimated by using Equation F.5 for initial upstream conditions (Calexico gage and Zaragoza Oxidation Lagoons), followed by Equation F.3 for the initial condition and modified lagoons flow, and then followed by another calculation for the power plant and combined output of the initial conditions and lagoons. For both plants operating at the same time, Equation F.5 was first used to estimate the initial upstream conditions, and then Equation F.3 was sequentially applied for the Zaragoza Oxidation Lagoons and each of the power plants.

F.1.1 Salton Sea Salinity

The salinity of the Salton Sea was calculated as the mass of salt present divided by the volume of water in the Sea:

$$TDS = \frac{Mass\ of\ \ salt}{Volume\ of\ \ Sea} \ . \tag{F.6}$$

Changes in salinity for the Sea are a function of two processes: (1) a decrease in volume of the Sea because of water consumption by the power plants and (2) continued inflow of TDS to the Sea. The salinity of the Sea due to a reduction in volume was calculated with Equation F.6, using the modified Sea volume and a total mass of salt of 9.126×10^{11} lb (4.1×10^{8} kg).

Because of the high rate of evaporation from the Sea (70.8 in./yr or 1.8 m/yr), the Sea would adapt to its new inflow quickly. The reduction in Sea volume can be represented by the following equation, which is a form of level-pool routing (Henderson 1966):

$$\frac{dV}{dt} = I - O \ , \tag{F.7}$$

where

I = inflow to the Sea,

O = outflow from the Sea (evaporation only),

t = time, and

V = volume of the Sea.

Integrating Equation F.7 and solving for time gives the following result:

$$\Delta t = \frac{\Delta V}{I - EA} \ , \qquad \text{(F.8)}$$

where E is the rate of evaporation from the Sea, A is its surface area, and ΔV is the change in volume of the Sea caused by plant operations. In actual practice, the area of the Sea changes with time, and the integration cannot be performed as easily. However, because the change in area is small relative to the initial area of the Sea, it can be considered to be independent of time.

Assuming that the Salton Sea is currently in a state of equilibrium (i.e., the annual evaporation is equal to the total yearly inflow), a more accurate value for the rate of evaporation is 5.724 ft/yr (1.744 m/yr). At this rate, Equation F.8 predicts that the volume of the Sea would adjust to its new value for both plants operating in a time period of 1 year. This calculation assumes an annual average inflow to the Sea of 1,329,333 ac-ft (1.64×10^9 m^3) for both plants operating 100% of the time and a surface area for the Sea of 234,113 acres (94,780 ha).

The second component contributing to the salinity of the Sea is continued inflow of salt. The continued salt inflow acts as a source for further salinization. The rate of salinization of the Sea was estimated by using an initial TDS load of 4.6×10^6 tons/yr (9.2×10^9 lb/yr) and an initial volume of the Sea equal to 7,624,843 ac-ft (9.4×10^9 m^3); all of the salinity entering the Sea was assumed to add to its TDS. The rate of increase is then given by the expression:

$$\Delta TDS = \frac{TDS\ inflow\ load}{Volume\ of\ \ Sea} \ . \qquad \text{(F.9)}$$

For the above initial conditions, the rate of salinity increase for the Sea is about 444 mg/L/yr.

Impacts of plant operations on the rate of salinization were then analyzed by using new Sea volumes based on plant operations and reduced salinity loads from the New River. The combined processes of volumetric reduction and continued salinization were then evaluated for conditions specific to the two power plants, and a final TDS was calculated for 1 year of plant operations.

F.1.2 Time to Achieve 60,000 mg/L for the Salton Sea

The time needed for the Salton Sea to increase its TDS from an initial value to 60,000 mg/L was calculated with the following expression:

$$Time = \frac{60{,}000 - Initial\ concentration}{Salinization\ rate} \ . \qquad \text{(F.10)}$$

The time in Equation F.10 is in years for a salinization rate in mg/L/yr and an initial TDS in mg/L.

F.2 REFERENCES

Henderson, F.M., 1966, *Open Channel Flow*, Macmillan Publishing Co., Inc., New York, N.Y.

Walski, T.M., et al., 2001, *Haestad Methods Water Distribution Modeling*, Haestad Press, Waterbury, Conn.

APPENDIX G:

DATA IN SUPPORT OF AIR QUALITY ANALYSIS

APPENDIX G:

DATA IN SUPPORT OF AIR QUALITY ANALYSIS

G.1 INTRODUCTION

This appendix contains information and analysis related to the assessment of air quality impacts of the various alternatives considered. Table G-1 contains a summary of the power plant emissions used in air modeling. The values in this table are conservative in that they assume operation of the plant at maximum capacity 100% of the time. Also, in many cases, values are for maximum permitted or guaranteed emission rates rather than for expected emission rates, which are typically lower.

Tables G-2 and G-3 present the most recent available regional emission rates for criteria pollutants and ozone (O_3) precursors in Imperial County and in Mexicali. These data were drawn upon to generate the emission rates for volatile organic compounds (VOC), nitrogen oxides (NO_x), and carbon monoxide (CO) presented in Table G-4, which were used in the O_3 modeling for this environmental impact statement. The results of a sensitivity analysis of O_3 modeling that used the U.S. Environmental Protection Agency's Ozone Isopleth Plotting Program Revised (OZIPR) model are presented in Table G-5. A discussion of the results of the sensitivity analysis is presented in association with these results.

TABLE G-1 Sempra and LRPC Power Plant Emission and Air Modeling Input Data[a]

	Intergen LRPC Plant			Sempra TDM Plant	
	Value				
Parameter	EBC (1 gas turbine to 1 steam turbine)	EAX (3 gas turbines to 1 steam turbine)	Source/Basis	Value	Source/Basis
NO_2 concentration	3.5 ppm	25 ppm no SCR; 2.5 ppm when SCR added	Vendor guarantee; Intergen 2/5/04	2.5 ppm	Vendor guarantee and permit limit; Sempra 1/12/04
NO_2 mass rate	31.08 lb/h (136 tons/yr)	218 lb/h (955 tons/yr) no SCR; 21.8 lb/h when SCR added	Intergen 2/5/04	9.7 kg/h as NO_2 for each unit, 19.4 kg/h (187 tons/yr) for both units	Sempra 2/6/04
	Total: 3,000 tons/yr for all 4 units				
CO concentration	30 ppm	30 ppm	Vendor guarantee	4 ppm	Vendor guarantee and permit limit; Sempra 1/12/04
CO mass rate	166 lb/h (727 tons/yr)	498 lb/h (assume 3 × EBC)	EBC mass rate Sempra; EAX = 3 × EBC	9.4 kg/h for each unit, 18.8 kg/h (181 tons/yr) for both units	Sempra 2/6/04
	Total: 664 lb/h (2,908 tons/yr) for all 4 units				
PM_{10} mass rate (stacks only)	52.3 lb/h (229 tons/yr)	156.9 lb/h (3 × EBC)	Intergen 2/5/04 EBC); EAX = 3 × EBC	12.3 kg/h for each unit, 24.6 kg/h (237 tons/yr) for both units	Sempra 2/6/04
	Total: 209.2 lb/h (916 tons/yr) all 4 units				
PM_{10} cooling towers	9.4 tons/yr	28.2 tons/yr	Estimate based on Blythe II	18.8 tons/yr	Assume same as Blythe II
	Total: 37.6 tons/yr				
$PM_{2.5}$	Assume same as PM_{10}	Assume same as PM_{10}	Intergen 2/05/04	Assume same as PM_{10}	Sempra 1/30/04
SO_2	0.20 grain/100 SCF, and 0.008% H_2S (by volume)		Intergen 2/5/04	0.20 grain/100 SCF, and 0.008% H_2S (by volume)	Assume same factor as Intergen
VOC	0.02 lb/MMBtu	0.02 lb/MMBtu	Intergen 2/5/04	384 tons/yr (based on 0.02 lb/MMBtu)	Assume same factor as Intergen
NH_3 concentration	10 ppm	5 ppm (when SCR added)	Vendor guarantee	10 ppmv per day	Vendor guarantee; Sempra 1/12/04

TABLE G-1 (Cont.)

Parameter	Intergen LRPC Plant: Value: EBC (1 gas turbine to 1 steam turbine)	Intergen LRPC Plant: Value: EAX (3 gas turbines to 1 steam turbine)	Intergen LRPC Plant: Source/Basis	Sempra TDM Plant: Value	Sempra TDM Plant: Source/Basis
NH_3 mass rate	33.8 lb/h (148 tons/yr)	50.7 lb/h (222 tons/yr)	Intergen 2/5/04 EBC; EAX = 3/2 × EBC	276 tons/yr (28.6 kg/h for 8,760 h/yr operation, total for both units)	Sempra 1/12/04
	Total: 85.5 lb/h (370 tons/yr when all 4 units equipped)				
CO_2	296,000 lb/h (1.3 million tons/yr)	888,000 lb/h (3.9 million tons/yr)	Intergen 2/5/04	849 lb/MWh (679.7 MW), or 2.5 million tons/yr (both units)	Sempra 1/12/04
	Total: 5.2 million tons/yr				
Gas consumption	Total for LRPC: 68.5 million MMBtu/yr		Intergen 1/29/04	38.4 million MMBtu/yr	Sempra 1/12/04
Stack height	56 m	56 m	DOE 2001	60 m	Sempra 1/12/04
Stack diameter	5.49 m	5.49 m	Intergen 2/5/04	5.79 m	Sempra 1/12/04
Stack flow rate	21.0 m/s	21.0 m/s	Intergen 2/5/04	1,711,200 m^3/h	Sempra 2/6/04
Stack temperature	77°C	77°C	Intergen 2/5/04	85°C	Sempra 1/12/04
Meteorological data	Imperial County		Database	Imperial County	Database

[a] Abbreviations: CO = carbon monoxide; CO_2 = carbon dioxide; EAX = Energiá Azteca X, S. de R.L. de C.V.; EBC = Energiá de Baja California; MMBtu = million British thermal units; NH_3 = ammonia; NO_2 = nitrogen dioxide; $PM_{2.5}$ = particulate matter with a mean aerodynamic diameter of 2.5 µm or less; PM_{10} = particulate matter with a mean aerodynamic diameter of 10 µm or less; ppm = part(s) per million; SCR = selective catalytic reduction (system); SO_2 = sulfur dioxide; and VOC = volatile organic compound(s).

TABLE G-2 Estimated Annual Average Emissions for 2003 in Imperial County

Air Resources Board

Almanac Emission Projection Data (published in 2004)

2003 Estimated Annual Average Emissions

IMPERIAL COUNTY

All emissions are represented in Tons per Day and reflect the most current data provided to ARB.
Download these results (as a comma delimited file).
Download more detailed data (as a comma delimited file).
Start a new query.

STATIONARY SOURCES	TOG	ROG	CO	NOX	SOX	PM	PM10	PM2.5
FUEL COMBUSTION								
ELECTRIC UTILITIES	0.33	0.04	0.19	0.78	0.06	0.09	0.04	0.04
MANUFACTURING AND INDUSTRIAL	0.10	0.05	0.49	4.70	0.06	0.30	0.27	0.25
FOOD AND AGRICULTURAL PROCESSING	0.05	0.04	0.04	0.55	-	0.03	0.02	0.02
SERVICE AND COMMERCIAL	0.05	0.02	0.13	0.68	0.00	0.07	0.07	0.07
OTHER (FUEL COMBUSTION)	0.02	0.01	0.03	0.16	0.00	0.01	0.01	0.01
*** TOTAL FUEL COMBUSTION**	**0.54**	**0.17**	**0.88**	**6.87**	**0.13**	**0.50**	**0.41**	**0.39**
WASTE DISPOSAL								
OTHER (WASTE DISPOSAL)	0.02	0.02	-	-	-	-	-	-
*** TOTAL WASTE DISPOSAL**	**0.02**	**0.02**	-	-	-	-	-	-
CLEANING AND SURFACE COATINGS								
LAUNDERING	0.04	0.01	-	-	-	-	-	-
DEGREASING	0.23	0.20	-	-	-	-	-	-
COATINGS AND RELATED PROCESS SOLVENTS	0.91	0.87	-	-	-	-	-	-
ADHESIVES AND SEALANTS	0.07	0.06	-	-	-	-	-	-
*** TOTAL CLEANING AND SURFACE COATINGS**	**1.25**	**1.13**	-	-	-	-	-	-
PETROLEUM PRODUCTION AND MARKETING								
PETROLEUM REFINING	0.00	0.00	-	-	-	-	-	-
PETROLEUM MARKETING	0.81	0.80	-	0.00	-	-	-	-
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.01	0.01	-	-	-	-	-	-
*** TOTAL PETROLEUM PRODUCTION AND MARKETING**	**0.82**	**0.81**	-	**0.00**	-	-	-	-
INDUSTRIAL PROCESSES								
FOOD AND AGRICULTURE	-	-	-	0.00	-	0.42	0.16	0.04
MINERAL PROCESSES	0.01	0.01	0.04	0.01	0.01	4.91	2.57	1.07
METAL PROCESSES	-	-	-	-	-	0.00	0.00	-
OTHER (INDUSTRIAL PROCESSES)	0.07	0.06	0.02	0.02	0.02	0.00	0.00	0.00
*** TOTAL INDUSTRIAL PROCESSES**	**0.07**	**0.07**	**0.06**	**0.03**	**0.03**	**5.32**	**2.73**	**1.11**
**** TOTAL STATIONARY SOURCES**	**2.70**	**2.20**	**0.94**	**6.90**	**0.16**	**5.82**	**3.14**	**1.51**
AREA-WIDE SOURCES	**TOG**	**ROG**	**CO**	**NOX**	**SOX**	**PM**	**PM10**	**PM2.5**
SOLVENT EVAPORATION								
CONSUMER PRODUCTS	1.46	1.22	-	-	-	-	-	-
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.61	0.60	-	-	-	-	-	-
PESTICIDES/FERTILIZERS	4.01	4.01	-	-	-	-	-	-

TABLE G-2 (Cont.)

ASPHALT PAVING / ROOFING	1.71	1.71	-	-	-	-	-	-
*** TOTAL SOLVENT EVAPORATION**	**7.79**	**7.54**	-	-	-	-	-	-
MISCELLANEOUS PROCESSES								
RESIDENTIAL FUEL COMBUSTION	0.09	0.04	0.64	0.10	0.00	0.09	0.09	0.08
FARMING OPERATIONS	118.39	9.47	-	-	-	27.85	12.99	2.25
CONSTRUCTION AND DEMOLITION	-	-	-	-	-	3.85	1.89	0.39
PAVED ROAD DUST	-	-	-	-	-	8.72	3.99	0.67
UNPAVED ROAD DUST	-	-	-	-	-	55.39	32.92	6.98
FUGITIVE WINDBLOWN DUST	-	-	-	-	-	339.18	172.79	37.53
FIRES	0.00	0.00	0.03	0.00	-	0.00	0.00	0.00
WASTE BURNING AND DISPOSAL	2.14	1.08	12.02	0.28	0.03	2.22	2.18	2.08
COOKING	0.03	0.02	-	-	-	0.08	0.06	0.04
*** TOTAL MISCELLANEOUS PROCESSES**	**120.66**	**10.61**	**12.69**	**0.38**	**0.03**	**437.39**	**226.90**	**50.03**
**** TOTAL AREA-WIDE SOURCES**	**128.45**	**18.16**	**12.69**	**0.38**	**0.03**	**437.39**	**226.90**	**50.03**
MOBILE SOURCES	**TOG**	**ROG**	**CO**	**NOX**	**SOX**	**PM**	**PM10**	**PM2.5**
ON-ROAD MOTOR VEHICLES								
LIGHT DUTY PASSENGER (LDA)	3.56	3.26	29.73	2.80	0.01	0.08	0.08	0.05
LIGHT DUTY TRUCKS - 1 (LDT1)	1.58	1.46	15.44	1.34	0.01	0.03	0.03	0.02
LIGHT DUTY TRUCKS - 2 (LDT2)	1.13	1.03	10.92	1.18	0.00	0.03	0.03	0.02
MEDIUM DUTY TRUCKS (MDV)	0.48	0.44	4.49	0.52	0.00	0.01	0.01	0.01
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.19	0.18	1.15	0.12	0.00	0.00	0.00	0.00
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.03	0.03	0.23	0.04	-	-	-	-
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.37	0.35	2.65	0.20	-	-	-	-
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.22	0.20	2.83	0.36	-	-	-	-
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.01	0.01	0.02	0.15	0.00	0.00	0.00	0.00
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.01	0.00	0.01	0.07	0.00	0.00	0.00	0.00
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.02	0.02	0.14	0.66	0.01	0.02	0.02	0.02
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.41	0.36	1.64	6.35	0.06	0.19	0.19	0.16
MOTORCYCLES (MCY)	0.08	0.08	0.49	0.01	-	-	-	-
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.01	0.01	0.04	0.20	0.00	0.00	0.00	0.00
HEAVY DUTY GAS URBAN BUSES (UB)	0.21	0.17	1.79	0.13	-	-	-	-
SCHOOL BUSES (SB)	0.03	0.02	0.39	0.08	0.00	0.00	0.00	0.00
MOTOR HOMES (MH)	0.08	0.07	1.79	0.11	-	-	-	-
*** TOTAL ON-ROAD MOTOR VEHICLES**	**8.40**	**7.68**	**73.75**	**14.31**	**0.09**	**0.38**	**0.38**	**0.29**
OTHER MOBILE SOURCES								
AIRCRAFT	2.55	2.28	8.39	1.75	0.26	0.16	0.16	0.16
TRAINS	0.51	0.45	1.61	7.95	0.72	0.24	0.24	0.22
RECREATIONAL BOATS	0.45	0.41	4.56	0.21	0.00	0.02	0.02	0.02
OFF-ROAD RECREATIONAL VEHICLES	0.10	0.09	1.21	0.03	0.00	0.00	0.00	0.00
OFF-ROAD EQUIPMENT	0.70	0.63	5.84	1.63	0.00	0.12	0.11	0.10
FARM EQUIPMENT	0.37	0.33	2.20	2.28	0.02	0.15	0.15	0.14
FUEL STORAGE AND HANDLING	0.22	0.22	-	-	-	-	-	-
*** TOTAL OTHER MOBILE SOURCES**	**4.89**	**4.41**	**23.81**	**13.85**	**1.00**	**0.70**	**0.69**	**0.64**
**** TOTAL MOBILE SOURCES**	**13.29**	**12.09**	**97.55**	**28.16**	**1.09**	**1.07**	**1.06**	**0.92**
GRAND TOTAL FOR IMPERIAL	**144.44**	**32.44**	**111.19**	**35.45**	**1.28**	**444.28**	**231.10**	**52.46**

Start a new query.
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Source: California Air Resources Board, 2003. Available at http://www.arb.ca.gov/ei/maps/statemap/cntymap.htm.

TABLE G-3 Summary of Regional Emissions Inventories in the Six Northern Mexico States

Total 1999 Emissions Inventory for the Six Northern Mexican States (Final)
Mg/Year, by State, By Municipality
Excludes Natural Sources

State	Municipality	NO_x	SO_x	VOC	CO	PM_{10}	$PM_{2.5}$	NH_3
Baja California	Ensenada	7,761.7	1,789.0	16,692.9	17,352.3	14,874.8	3,641.6	3,629.2
Baja California	Mexicali	8,671.1	5,835.0	22,078.4	51,331.2	32,458.1	8,724.4	5,446.2
Baja California	Tecate	551.8	590.4	2,144.5	2,495.6	2,627.7	500.0	88.2
Baja California	Tijuana	12,879.7	9,789.0	41,802.8	87,057.1	65,012.6	12,490.9	1,127.2
Baja California	Playas de Rosarito	6,580.5	24,134.5	2,737.6	4,259.5	3,957.8	2,214.8	71.9
Total - State		***36,444.7***	***42,137.9***	***85,456.2***	***162,495.6***	***118,931.0***	***27,571.8***	***10,362.6***
Coahuila	Abasolo	100.9	10.5	43.2	156.0	79.3	29.1	81.6
Coahuila	Acuña	1,005.2	813.5	3,969.3	5,947.5	5,445.4	1,016.9	1,247.8
Coahuila	Allende	132.9	60.6	394.1	562.8	1,030.2	176.9	138.8
Coahuila	Arteaga	114.8	39.1	437.7	1,145.1	833.8	198.8	389.7
Coahuila	Candela	280.7	38.6	90.6	256.1	151.3	65.5	185.0
Coahuila	Castaños	574.5	151.3	768.8	910.5	1,196.3	266.1	361.4
Coahuila	Cuatrociénegas	324.4	119.7	251.9	507.1	862.4	243.1	278.4
Coahuila	Escobedo	83.8	4.0	55.2	135.4	144.7	30.9	201.4
Coahuila	Francisco I. Madero	239.2	58.2	707.0	1,281.9	1,553.1	279.8	1,144.4
Coahuila	Frontera	920.4	361.8	2,254.1	4,166.2	2,532.1	616.9	132.9
Coahuila	General Cepeda	291.7	17.5	276.1	740.3	628.9	149.9	797.1
Coahuila	Guerrero	164.3	21.3	66.9	167.1	137.5	45.5	783.4
Coahuila	Hidalgo	143.9	20.3	96.5	141.4	273.3	74.9	384.8
Coahuila	Jiménez	1,216.0	156.3	497.6	1,417.9	643.5	230.9	605.3
Coahuila	Juárez	16.7	1.7	57.1	59.5	116.6	23.2	257.5
Coahuila	Lamadrid	33.1	6.8	35.1	72.0	69.9	19.3	58.0
Coahuila	Matamoros	315.8	72.8	1,243.3	2,333.7	3,064.6	534.9	2,577.4
Coahuila	Monclova	8,711.2	4,035.7	5,792.3	12,546.4	15,342.7	9,366.1	462.3
Coahuila	Morelos	337.6	59.0	190.5	401.0	413.0	112.5	242.3
Coahuila	Múzquiz	571.1	346.6	1,093.4	1,907.5	2,105.5	403.2	1,329.1
Coahuila	Nadadores	109.3	10.7	106.2	257.7	306.1	65.7	159.7
Coahuila	Nava	103,926.9	151,139.2	555.4	3,104.2	9,314.2	8,233.1	336.6
Coahuila	Ocampo	753.9	158.1	351.8	1,365.1	795.5	227.4	854.9
Coahuila	Parras	957.3	134.2	992.5	2,107.0	1,674.2	399.0	911.0
Coahuila	Piedras Negras	1,157.7	589.5	4,436.2	6,722.3	6,206.5	1,172.0	329.6
Coahuila	Progreso	114.6	29.7	89.2	172.4	221.6	47.4	322.3
Coahuila	Ramos Arizpe	2,493.3	569.8	3,741.6	7,503.2	1,782.7	579.4	1,087.1
Coahuila	Sabinas	386.1	241.7	1,273.5	1,381.5	1,940.3	418.4	535.6
Coahuila	Sacramento	17.6	2.9	34.2	82.9	101.1	19.9	82.9
Coahuila	Saltillo	5,570.8	1,888.4	15,573.9	43,156.2	23,927.7	7,447.0	1,639.4
Coahuila	San Buenaventura	71.9	14.1	300.5	574.1	966.6	165.8	751.6
Coahuila	San Juan de Sabinas	371.7	963.7	749.6	1,120.1	1,402.8	262.8	194.1
Coahuila	San Pedro	741.0	157.4	1,486.1	2,939.3	3,166.7	643.6	931.6
Coahuila	Sierra Mojada	420.8	35.8	144.1	332.3	324.1	81.8	321.1
Coahuila	Torreón	4,849.2	4,141.2	12,885.2	39,447.7	19,748.9	4,139.2	3,672.6
Coahuila	Viesca	1,731.7	231.5	847.2	2,465.1	1,163.9	374.4	1,185.9
Coahuila	Villa Unión	126.2	15.6	117.6	206.8	317.4	61.5	486.3
Coahuila	Zaragoza	153.8	29.9	281.0	454.6	630.9	119.0	1,416.4
Total - State		***139,531.9***	***166,748.6***	***62,286.6***	***148,227.9***	***110,637.5***	***38,344.0***	***26,877.3***
Chihuahua	Ahumada	491.5	53.1	245.2	418.7	628.4	127.1	987.0
Chihuahua	Aldama	610.8	43.1	349.3	689.0	963.2	197.4	885.2
Chihuahua	Allende	125.0	7.2	146.6	301.3	467.7	85.3	221.7
Chihuahua	Aquiles Serdán	38.7	4.0	60.9	174.4	253.6	45.2	38.0
Chihuahua	Ascensión	465.0	95.8	448.9	1,079.9	1,188.6	255.5	1,105.2
Chihuahua	Bachiniva	57.6	6.8	145.1	307.0	413.1	89.8	533.1
Chihuahua	Balleza	251.2	33.9	507.7	1,714.7	1,074.8	317.5	887.5
Chihuahua	Batopilas	65.9	11.2	387.6	1,364.3	753.4	236.2	299.5
Chihuahua	Bocoyna	289.1	57.9	910.3	2,949.3	1,253.4	436.6	359.4
Chihuahua	Buenaventura	1,706.5	317.4	677.8	1,859.8	1,339.6	472.9	1,004.4
Chihuahua	Camargo	508.4	224.1	817.0	1,521.4	2,279.4	987.1	2,452.1
Chihuahua	Carichí	107.0	13.4	256.7	862.0	530.5	156.2	545.7
Chihuahua	Casas Grandes	191.1	7.5	348.0	1,354.5	607.9	199.4	797.9
Chihuahua	Coronado	157.1	21.2	68.8	206.1	148.3	47.9	240.5
Chihuahua	Coyame del Sotol	135.3	17.5	58.5	156.9	110.1	38.6	639.7
Chihuahua	La Cruz	159.1	14.5	73.7	211.7	210.2	51.6	178.3
Chihuahua	Cuauhtémoc	931.9	480.8	2,481.6	4,219.7	6,345.4	1,278.0	2,836.7
Chihuahua	Cusihuiriachi	28.7	2.2	142.8	253.4	477.4	100.6	1,131.5
Chihuahua	Chihuahua	10,745.3	9,414.2	18,561.0	58,745.3	24,990.0	6,229.0	3,136.8
Chihuahua	Chínipas	47.1	3.8	252.5	1,006.0	443.4	156.9	236.0
Chihuahua	Delicias	4,565.3	39,197.4	2,847.4	4,904.1	8,079.1	3,414.1	1,193.5
Chihuahua	Dr. Belisario Domínguez	52.4	6.2	74.4	182.3	217.5	47.0	256.0
Chihuahua	Galeana	273.1	39.8	106.7	335.1	241.3	81.1	224.4
Chihuahua	Santa Isabel	78.9	11.4	90.2	198.6	297.6	63.8	138.9
Chihuahua	Gómez Farías	106.3	51.6	251.3	543.9	567.3	133.7	341.9
Chihuahua	Gran Morelos	65.6	11.8	81.0	183.3	230.0	51.2	152.1

TABLE G-3 (Cont.)

Natural Sources
1999 Emissions Inventory for the Six Northern States (Final)
Mg/Year, by Municipality

State	Municipality	NO_x	SO_x	VOC	CO	PM_{10}	$PM_{2.5}$
Baja California	Ensenada	1,267.0		5,401.5			
Baja California	Mèxicali	2,021.8		10,367.5			
Baja California	Tecate	1,009.1		2,600.1			
Baja California	Tijuana	118.4		213.3			
Baja California	Playas de Rosarito	36.5		62.1			
Total - State		***4,452.8***	***0.0***	***18,644.6***	***0.0***	***0.0***	***0.0***
Coahuila	Abasolo	298.1		2,791.0			
Coahuila	Acuña	4,252.5		24,563.1			
Coahuila	Allende	232.0		497.4			
Coahuila	Arteaga	873.9		5,522.6			
Coahuila	Candela	805.5		5,024.2			
Coahuila	Castaños	1,219.4		5,741.1			
Coahuila	Cuatrociénegas	3,998.7		25,902.4			
Coahuila	Escobedo	405.5		1,521.4			
Coahuila	Francisco I. Madero	2,297.0		5,836.3			
Coahuila	Frontera	333.4		1,040.7			
Coahuila	General Cepeda	678.0		2,848.3			
Coahuila	Guerrero	1,430.2		4,152.1			
Coahuila	Hidalgo	880.5		3,044.0			
Coahuila	Jiménez	1,772.1		3,728.6			
Coahuila	Juárez	421.9		1,430.1			
Coahuila	Lamadrid	322.8		1,780.7			
Coahuila	Matamoros	835.1		1,009.6			
Coahuila	Monclova	928.2		2,136.2			
Coahuila	Morelos	194.1		393.0			
Coahuila	Múzquiz	3,680.3		46,038.7			
Coahuila	Nadadores	293.1		905.9			
Coahuila	Nava	698.9		2,715.7			
Coahuila	Ocampo	6,988.3		84,016.2			
Coahuila	Parras	3,151.1		30,363.5			
Coahuila	Piedras Negras	466.8		1,284.1			
Coahuila	Progreso	880.1		2,458.1			
Coahuila	Ramos Arizpe	1,724.3		4,860.2			
Coahuila	Sabinas	1,092.8		3,592.0			
Coahuila	Sacramento	67.7		2,833.0			
Coahuila	Saltillo	2,044.3		12,286.0			
Coahuila	San Buenaventura	2,768.5		10,946.1			
Coahuila	San Juan de Sabinas	354.8		1,145.8			
Coahuila	San Pedro	5,778.8		20,446.1			
Coahuila	Sierra Mojada	1,107.5		15,309.2			
Coahuila	Torreón	537.1		970.0			
Coahuila	Viesca	3,088.7		4,470.3			
Coahuila	Villa Unión	1,547.1		2,879.0			
Coahuila	Zaragoza	3,632.0		29,590.8			
Total - State		***62,081.1***	***0.0***	***376,073.7***	***0.0***	***0.0***	***0.0***
Chihuahua	Ahumada	1,331.2		41,097.5			
Chihuahua	Aldama	1,461.5		13,400.4			
Chihuahua	Allende	369.3		1,910.3			
Chihuahua	Aquiles Serdán	281.3		630.3			
Chihuahua	Ascensión	1,208.2		44,850.1			
Chihuahua	Bachíniva	685.7		8,133.2			
Chihuahua	Balleza	570.5		103,864.4			
Chihuahua	Batopilas	229.8		43,305.6			
Chihuahua	Bocoyna	387.9		40,315.2			
Chihuahua	Buenaventura	1,184.7		36,716.8			
Chihuahua	Camargo	1,159.1		19,305.6			
Chihuahua	Carichí	728.2		54,143.5			
Chihuahua	Casas Grandes	563.6		72,947.6			
Chihuahua	Coronado	437.2		3,398.7			
Chihuahua	Coyame del Sotol	1,232.2		14,291.6			
Chihuahua	La Cruz	346.6		2,625.4			
Chihuahua	Cuauhtémoc	3,380.2		49,689.4			
Chihuahua	Cusihuiriachi	1,366.1		13,221.2			
Chihuahua	Chihuahua	2,080.6		92,759.1			
Chihuahua	Chínipas	125.5		23,920.6			
Chihuahua	Delicias	170.9		564.8			
Chihuahua	Dr. Belisario Domínguez	309.3		7,043.3			
Chihuahua	Galeana	373.8		11,952.3			
Chihuahua	Santa Isabel	659.4		4,740.7			
Chihuahua	Gómez Farías	444.3		10,486.2			
Chihuahua	Gran Morelos	316.3		7,256.6			

Source: ERG, Acosta y Asociados, and TransEngineering, 2004, *Mexico National Emissions Inventory, 1999; Six Northern States, Final*, April 30.

G.2 SENSITIVITY ANALYSIS OF OZONE MODELING USING THE OZIPR MODEL

Simulation of O_3 formation and transport is a highly complex and resource-intensive exercise. Regulatory agencies are encouraged to use three-dimensional Eulerian photochemical grid models, such as the Models-3/Community Multiscale Air Quality (CMAQ) model, to evaluate the relationship between precursor emissions and O_3. As a choice of models to complement photochemical grid models, the Empirical Kinetic Modeling Approach (EKMA), which is implemented by the OZIPR model, may be used to help select strategies for simulation with a photochemical grid model and to corroborate results obtained with a grid model. Considering the magnitude of O_3 precursor emissions in the area, ambient O_3 impacts from the power plants are expected to be small. Accordingly, a screening type of model meets the needs of the objectives of this environmental impact statement (EIS); namely, to understand the nature and general magnitude of impacts of plant operations on O_3 production in the region. An analysis of the sensitivity of the results of the model to changes in inputs has been performed, and the model performance has been determined to meet the needs of this analysis. The sensitivity analysis is discussed below.

These simulations are based on annual total emissions (no information on detailed seasonal/daily/diurnal patterns) and typical average meteorological conditions for the region. The OZIPR model is a simple one-dimensional photochemical box model that cannot adequately account for the complex nature of the atmosphere and the behaviors of pollutants (meteorology, emissions, transport, deposition, etc.). Accordingly, these results indicate the average direction and magnitude of the expected influence of the power plant emissions on peak O_3 concentrations. Results should be interpreted with caution.

To determine the relative importance of the major model input parameters, several OZIPR sensitivity runs were made. Various values for model inputs were selected to encompass the full range of reasonably expected conditions for the study area. As described in the discussion of O_3 formation in Section 4.3.4 of the main text, because data for ambient VOC concentrations and speciation are not available for the study area, values for Phoenix, Arizona, from the OZIPR database were considered the best available and were used. Model inputs were varied as follows:

- Base case: Modeling area of 154 mi^2 (400 km^2) and meteorological conditions for Phoenix (Phx_sum1) of T_{max} = 105.1°F (40.6°C), RH = 15 to 28%, mixing height = 4,029 to 14,459 ft (1,228 to 4,407 m);

- Modeling area of 77 mi^2 (200 km^2) (same as doubled emission rates);

- Modeling area of 309 mi^2 (800 km^2) (same as halved emission rates);

- Meteorological conditions for Phoenix (Phx_sum2) of T_{max} = 100.0°F (37.8°C), RH = 26 to 45%, mixing height = 7,238 (morning) to 11,280 ft (afternoon) (2,206 to 3,438 m);

- Meteorological conditions for Phoenix (Phx_sum3) of T_{max} = 110.5°F (43.6°C), RH = 9.5 to 19%, mixing height = 925 (morning) to 18,960 ft (afternoon) (282 to 5,779 m);

- VOC speciation for Los Angeles; and

- VOC speciation for Houston.

The base case represents average emission rates for regional sources and average initial concentrations of the O_3 precursors VOC, NO_x, and CO for high O_3 days. Also, meteorological conditions for the base case are most representative of typical summer days in the study area. Conditions represented by Phx_sum2 and Phx_sum3 are observed less frequently than conditions represented by Phx_sum1 in the study area.

Regional and power plant emission data and sensitivity results are shown in Tables G-4 and G-5, respectively. Peak O_3 levels associated with TDM and LRPC power plant operations are predicted to decrease or increase, depending on whether conditions fall within the VOC- or NO_x-limited regime, respectively, on the VOC-NO_x-O_3 plot produced by the model. Such plots are shown in Figure G-1 for the base case, which falls in the VOC-limited regime, and for the Phx_sum3 case, which falls in the NO_x-limited regime of the model. The following is a summary of the results of the sensitivity analysis:

- Halving the source area (same as doubling the emission rates) increases the peak O_3 for the baseline (no plants operating) from 137.3 parts per billion (ppb) to 150.7 ppb. However, O_3 concentrations decrease up to 4.7 ppb with increasing NO_x and VOC emissions from the power plants (compared with no change for the base case), as results fall in the VOC-limited regime of the OZIPR plot. NO_x emissions increase when fewer selective catalytic reduction (SCR) systems are installed, while VOC emissions are the same for all plant configurations modeled. The baseline for all cases represents no plant emissions.

- Conversely, doubling the source area (same as halving the emission rates) decreases the baseline peak O_3 from 137.3 ppb to 128.3 ppb for the base case. Peak O_3 increases up to 1.5 ppb over the baseline with increasing emissions from the plants, as the conditions fall in the NO_x-limited regime of the OZIPR plot.

- For meteorological conditions with the lowest afternoon mixing height (Phx_sum2), peak O_3 concentrations are the highest, having a baseline of 166.8 ppb. However, peak O_3 concentrations fall up to 15.5 ppb from the baseline with increasing plant emissions, as the conditions fall in the VOC-limited regime of the OZIPR plot.

- For meteorological conditions with the greatest afternoon mixing height (Phx_sum3), modeled peak O_3 concentrations are the lowest, having a baseline of 99.2 ppb. Peak O_3 increases by up to 3.6 ppb over the baseline with increasing plant emissions, as results fall in the NO_X-limited regime of the OZIPR plot (e.g., see Figure G-1). Overall peak O_3 levels are reduced in this case, primarily because of dilution in the larger mixing volume.

- For the scenario in which the initial concentrations of NO_X and VOC are doubled (similar to doubled emissions), baseline peak O_3 concentrations increase to 165.9 ppb, while O_3 falls up to 9.4 ppb from the baseline with increasing plant emissions, as the conditions fall in the VOC-limited regime of the OZIPR plot.

- For the scenario in which the initial concentrations are halved, the baseline peak O_3 concentration decreases to 116.5 ppb, while O_3 rises up to 2.5 ppb over the baseline with increasing plant emissions, as the conditions fall in the NO_X-limited regime of the OZIPR plot.

- For the cases using VOC speciation data for Los Angeles and Houston, changes in peak O_3 concentrations from the base case are minor (less than 1 ppb), thus showing that the model is insensitive to this variable.

In summary, sensitivity analysis results predict that either increases or decreases in peak O_3 concentrations would result from plant emissions, depending on the input data set used. In general, the modeled increases in peak O_3 concentrations are substantially less than the modeled decreases in peak O_3 concentrations under the range of conditions examined in this sensitivity study. Cases that fall in the NO_X-limited regime exhibit increasing peak O_3 concentrations with increasing power plant emissions, but they still have much lower overall peak O_3 concentrations than those that fall in the VOC-limited regime. Cases that fall in the VOC-limited regime exhibit steady or decreasing peak O_3 concentrations with increasing power plant emissions. The base case, representing the most frequently observed model conditions in the region, falls into this category. In conclusion, sensitivity analysis shows that increases in O_3 concentrations from plant emissions would be limited to a few parts per billion under a reasonably wide range of model assumptions, while even greater reductions of peak O_3 concentrations would be possible under conditions that fall into the VOC-limited regime**.**

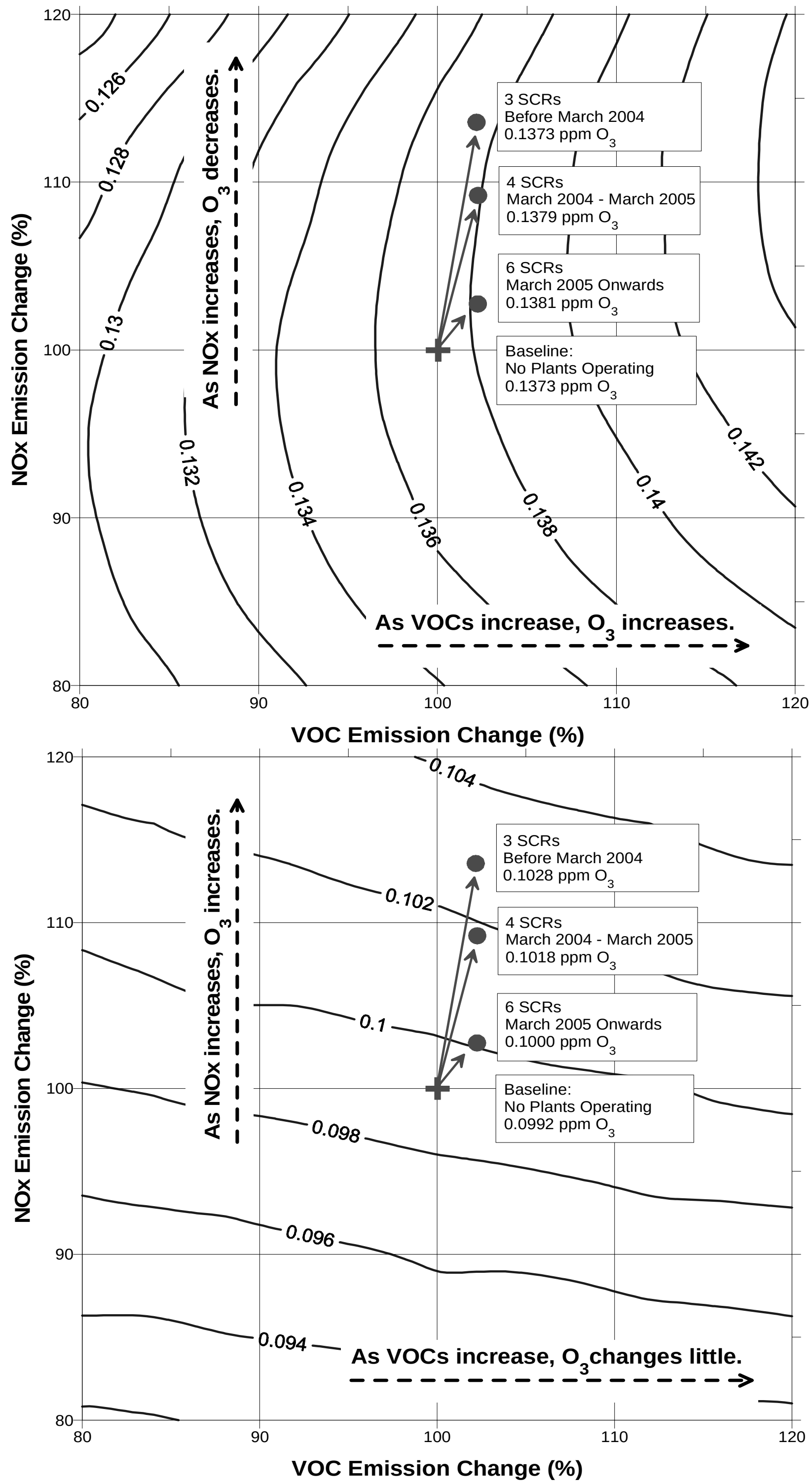

FIGURE G-1 Comparison of Base Case (top, VOC-limited regime) and Phx_sum3 Case (bottom, NO_x-limited regime)

TABLE G-4 Emission Rates for Imperial County in 2003 and Mexicali in 1999

	2003 Imperial County		1999 Mexicali			Imperical County and Mexicali		Emission Rate
Pollutant	(tons/yr)[b]	(tons/d)	(Mg/yr)	(tons/yr)	(tons/d)	(tons/yr)	(tons/d)	(kg/km^2/h)[c]
VOC[a]	11,840.6	32.44	32,445.9	35,764.9	97.99	47,605.5	130.43	12.33
NO_x	12,939.3	35.45	10,692.9	11,786.7	32.29	24,726.0	67.74	6.40
CO	40,584.4	111.19	51,331.2	56,582.0	155.02	97,166.4	266.21	25.16

[a] Reported as reactive organic gases for Imperial County and as VOC for Mexicali.

[b] To convert short tons to metric tons, multiply by 0.9072.

[c] Assumed an area of 154 mi^2 (400 km^2).

TABLE G-5 Changes in Peak O_3 Concentrations (in parts per billion [ppb]) Associated with TDM and LRPC Power Plant Operations for Different Model Input Parameters

	TDM/LRPC					
	Emissions (tons/yr)[a]		Increase to Imperial County and Mexicali (%)		Base Case	
Scenario	NO_x	VOC	NO_x	VOC	Peak O_3	ΔO_3
3 SCRs	3,188.0	1,069.0	12.9	2.2	137.3	0.0
4 SCRs	2,328.5	1,069.0	9.4	2.2	137.9	0.6
6 SCRs	609.5	1,069.0	2.5	2.2	138.1	0.8
Baseline					137.3	

	Area = 200 km^2		Area = 800 km^2		Met = Phx_sum2		Met = Phx_sum3	
Scenario	Peak O_3	ΔO_3	Peak O_3	ΔO_3	Peak O_3	ΔO_3	Peak O_3	ΔO_3
3 SCRs	146.0	–4.7	129.8	1.5	151.3	–15.5	102.8	3.6
4 SCRs	148.5	–2.2	129.7	1.4	158.2	–8.6	101.8	2.6
6 SCRs	151.2	0.5	129.2	0.9	166.8	0.0	100.0	0.8
Baseline	150.7		128.3		166.8		99.2	

	Initial Concentrations × 2		Initial Concentrations × 1/2		LA: VOC Speciation		Houston: VOC Speciation	
Scenario	Peak O_3	ΔO_3	Peak O_3	ΔO_3	Peak O_3	ΔO_3	Peak O_3	ΔO_3
3 SCRs	156.5	–9.4	119.0	2.5	135.8	–0.2	135.0	–0.2
4 SCRs	160.3	–5.6	118.5	2.0	136.4	0.4	135.6	0.4
6 SCRs	166.4	0.5	117.5	1.0	136.7	0.7	135.9	0.7
Baseline	165.9		116.5		136.0		135.2	

[a] To convert short tons to metric tons, multiply by 0.9072.

APPENDIX H:

HEALTH RISK ASSESSMENT FOR AIR TOXICS

APPENDIX H:

HEALTH RISK ASSESSMENT FOR AIR TOXICS

This document presents the methodology and results of a health risk assessment (HRA) performed to assess potential public exposure and impacts associated with emissions of hazardous air pollutants (HAPs) and ammonia from the operation of the Termoeléctrica de Mexicali (TDM) and La Rosita Power Complex (LRPC) power plants. This document provides an overview of the methods used in the HRA, the assumptions used in calculating HAP emission rates, and a summary of the potential risks for the various alternatives described in Chapter 2 of this EIS.

H.1 PROJECT BACKGROUND

This HRA analyzes the potential risks in the United States that may result from operations of the LRPC and TDM power plants as described in Chapter 2. This HRA contains a review of the health risks associated with the no action and proposed action alternatives, as described below.

H.1.1 No Action

Under the no action alternative, no additional transmission lines would be built. Therefore, there would be no health risk impacts in the United States linked to operation of the additional lines. For the purposes of this analysis, it was assumed that the TDM plant, which would use the proposed transmission lines and would have no other outlet for power, would no longer operate or produce emissions. Therefore, the risks in the United States attributed to the TDM plant would be zero.

It was further assumed that the two export turbines at the LRPC power plant would no longer be able to export power to the United States over the proposed transmission lines. The Energiá de Baja California (EBC) unit would not operate and would produce no emissions. However, electrical output of the Energiá Azteca X, S. de R.L. de C.V. (EAX) export turbine would be integrated with the Comisíon Federal de Electricidad (CFE) system and would export power to the United States over the existing Imperial Valley (IV)-La Rosita line. Therefore, impacts in the United States would occur as a result of operation of the EAX export turbine. Operation of and impacts from the two EAX Mexico gas turbines would also occur and are included in the no action alternative, for a total of three turbines at the LRPC.

H.1.2 Proposed Action

Under this alternative, Presidential permits would be granted by the U.S. Department of Energy (DOE), and corresponding right-of-ways (ROWs) would be granted by the

U.S. Department of the Interior, Bureau of Land Management (BLM); the additional transmission lines would be constructed; and the TDM power plant and the export turbines at the LRPC power plant would operate. Operation of the two EAX Mexico turbines would also occur; therefore, the proposed action contains an analysis of all six turbines at the TDM and LRPC power plants. Because the proposed action in the air impacts analysis presented in Section 4.3 includes TDM and only the two LRPC export units, the results obtained in this HRA are more conservative and are comparable to the cumulative impacts discussed in Section 4.3.

H.2 HEALTH RISK ASSESSMENT PROCEDURES

The methods used to assess potential human health risks due to emissions of HAPs followed the California Office of Environmental Health Hazard Assessment (OEHHA) risk assessment guidelines (OEHHA 2003), as supplemented by the California Air Resources Board (ARB 2003) interim guidance for residential inhalation exposure. In this document, these guidelines are referred to as the "HRA Guidelines." A Tier 1 point estimate HRA, as described in these guidelines, was performed for the projects.

The HRA was conducted in three steps. First, emissions of HAPs, plus ammonia, from 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.

Since a portion of the toxics potentially emitted by the TDM and LRPC power plants are considered multipathway air toxics, a multipathway risk analysis was performed. The multipathway analysis evaluated the following routes of exposure: inhalation, soil ingestion, dermal absorption, mother's milk ingestion, and plant product ingestion. Inhalation and ingestion of contaminated plant products would be the dominant pathways for public exposure to chemical substances released by the TDM and LRPC power plants.

H.2.1 Emissions Characterization

The TDM and LRPC power plant operations were evaluated to determine if HAPs would cause adverse health effects when released to the atmosphere. The HAPs evaluated in this HRA were identified from available emission factors obtained from the U.S. Environmental Protection Agency (EPA) AP-42 emission factor database (AP-42, Table 3.1-3, Natural Gas-Fired Stationary Gas Turbines, April 2000); the risk values were obtained from OEHHA. In addition to AP-42 emission factors, emission rates from ammonia slip were also included. To estimate emission rates, 8,760 hours per year of operations were assumed for all HAPs from the turbines and duct burners.

To calculate emissions by using AP-42 emission factors, the maximum potential combined fuel heat input rates for the turbines and duct burners were used for each facility. The maximum potential fuel rate for the TDM facility is 38,400,000 million British thermal units per year (MMBtu/yr), while the maximum potential fuel rate for the LRPC power plant is 68,500,000 MMBtu/yr. Since the fuel rates are provided for all combined turbine/duct burner pairs at each facility, it was assumed that all of the natural gas would be burned in the turbines.

The TDM power plant emissions are controlled with oxidation catalysts, and a control efficiency of 50% was assumed for all HAPs. This control efficiency is a reasonable average level of control for organic HAPs from natural-gas-fired combustion turbines equipped with oxidation catalysts. The actual control efficiency will vary for each compound, although the EPA has determined a control efficiency of 85 to 90% for formaldehyde, which is the predominant HAP emitted by the gas-fired combustion turbines (EPA 2002). The LRPC turbines do not have oxidation catalysts; therefore, no control was assumed for the LRPC emissions.

To estimate the potential emissions of ammonia due to ammonia slip from the selective catalytic reduction (SCR) systems, the total annual ammonia emissions from each facility were assumed. This total included the projected installation of SCR on all turbines at the LRPC by March 2005. The TDM power plant has been equipped with SCR since its inception.

To estimate hourly emission rates, the annual fuel input rates for each facility were divided by 8,760 hours per year. The plantwide natural gas fuel input rate was divided equally among the number of turbines to obtain modeled emission rates for a single turbine at each facility. Table H-1 presents the emission calculations for a single turbine at the TDM plant. Table H-2 presents the emission calculations for a single turbine at the LRPC plant.

H.2.2 Risk Assessment Dispersion Modeling Methodology

The exposure assessment portion of the HRA was conducted by using the proposed EPA guideline model AERMOD (AMS/EPA Regulatory MODel) Version 02222. Modeled stack parameters for the turbines represent 100% load conditions, consistent with the criteria pollutant modeling discussed in Section 4.3.2. Modeled stack parameters for all sources are provided in Table H-3.

Direction-specific downwash parameters were included for each stack, which were calculated by using the EPA-approved Building Profile Input Program (Version 95086), as adapted to accommodate the Plume Rise Model Enhancements (PRIME) algorithms currently employed by AERMOD Version 02222. The modeled receptors were consistent with the criteria pollutant modeling performed in Section 4.3.2 and included receptors along the U.S.-Mexico border and a Cartesian grid inside the United States.

The same 5 years of meteorological data (1993–1995, 1998, and 1999) from the Imperial and Miramar Naval Air Stations were used, as discussed in the criteria pollutant modeling in Section 4.3.2. To determine the worst-case year for annual impacts (cancer risk and

TABLE H-1 Ammonia and HAP Emission Rates at the TDM Power Plant[a]

Pollutant	AP-42 Emission Factor[b] (lb/MMBtu)	Total Annual Emission Rate[c] (tons/yr)	Single Turbine Hourly Rate[d] (g/s)	Single Turbine Annual Rate[d] (g/s)
Acetaldehyde	4.00×10^{-5}	0.38	5.52×10^{-3}	5.52×10^{-3}
Acrolein	6.40×10^{-6}	0.06	8.84×10^{-4}	8.84×10^{-4}
Ammonia[e]	NA[f]	276.00	3.97	3.97
Benzene	1.20×10^{-5}	0.12	1.66×10^{-3}	1.66×10^{-3}
1,3-Butadiene	4.30×10^{-7}	0.00	5.94×10^{-5}	5.94×10^{-5}
Formaldehyde	7.10×10^{-4}	6.82	9.80×10^{-2}	9.80×10^{-2}
Naphthalene	1.30×10^{-6}	0.01	1.80×10^{-4}	1.80×10^{-4}
Propylene oxide	2.90×10^{-5}	0.28	4.00×10^{-3}	4.00×10^{-3}
Toluene	1.30×10^{-4}	1.25	1.80×10^{-2}	1.80×10^{-2}
Xylene (total)	6.40×10^{-5}	0.61	8.84×10^{-3}	8.84×10^{-3}
Ethylbenzene	3.20×10^{-5}	0.31	4.42×10^{-3}	4.42×10^{-3}
PAHs[g]	2.20×10^{-6}	0.02	3.04×10^{-4}	3.04×10^{-4}
Total HAPs (excludes ammonia)		9.9 tons/yr		

[a] HAP emissions assume 50% control from oxidation catalyst.

[b] Source: AP-42, Table 3.1-3, Natural Gas-Fired Stationary Gas Turbines (April 2000).

[c] Maximum fuel input = 38,400,000 MMBtu/yr for two turbines (19,200,000 MMBtu/yr per turbine).

[d] Modeled emissions rates calculated from ton/yr rates assuming 8,760 h/yr operation.

[e] Ammonia emission rates obtained from Table 4.3-1a (p. 4-40 of the EIS).

[f] NA = not applicable.

[g] PAHs = polycyclic aromatic hydrocarbons.

noncarcinogenic chronic hazard index) and peak hourly impacts (acute hazard index), all stacks were modeled with a unit emission rate of 1 gram per second (g/s). Because of the relatively large distance to the nearest receptors along the U.S.-Mexico border (approximately 4 mi [6 km]), the peak impacts due to each individual stack did not vary by more than 6% for each of the 5 years.

The worst-case year for peak hourly impacts for all stacks was 1998, and the worst-case year for annual impacts for all stacks was 1995. Thus, the 1998 meteorological data were used to estimate the acute hazard indices, and the 1995 meteorological year was used to estimate the cancer risks and noncarcinogenic chronic hazard indices. The worst-case single stack impact for each facility was conservatively assumed to represent the impact from all turbines for each facility.

TABLE H-2 Ammonia and HAP Emission Rates at the LRPC Power Plant[a]

Pollutant	AP-42 Emission Factor[b] (lb/MMBtu)	Total Annual Emission Rate[c] (ton/yr)	Single Turbine Hourly Rate[d] (g/s)	Single Turbine Annual Rate[d] (g/s)
Acetaldehyde	4.00×10^{-5}	1.37	9.85×10^{-3}	9.85×10^{-3}
Acrolein	6.40×10^{-6}	0.22	1.58×10^{-3}	1.58×10^{-3}
Ammonia[e]	NA[f]	370.00	2.66	2.66
Benzene	1.20×10^{-5}	0.41	2.96×10^{-3}	2.96×10^{-3}
1,3-Butadiene	4.30×10^{-7}	0.01	1.06×10^{-4}	1.06×10^{-4}
Formaldehyde	7.10×10^{-4}	24.32	1.75×10^{-1}	1.75×10^{-1}
Naphthalene	1.30×10^{-6}	0.04	3.20×10^{-4}	3.20×10^{-4}
Propylene oxide	2.90×10^{-5}	0.99	7.14×10^{-3}	7.14×10^{-3}
Toluene	1.30×10^{-4}	4.45	3.20×10^{-2}	3.20×10^{-2}
Xylene (total)	6.40×10^{-5}	2.19	1.58×10^{-2}	1.58×10^{-2}
Ethylbenzene	3.20×10^{-5}	1.10	7.88×10^{-3}	7.88×10^{-3}
PAHs[g]	2.20×10^{-6}	0.08	5.42×10^{-4}	5.42×10^{-4}
Total HAPs (excludes ammonia)		35.2 tons/yr		

[a] Assumes no control of HAP emissions.

[b] Source: AP-42, Table 3.1-3, Natural Gas-Fired Stationary Gas Turbines (April 2000).

[c] Maximum fuel input = 68,5400,000 MMBtu/yr for four turbines (17,125,000 MMBtu/yr per turbine).

[d] Modeled emissions rates calculated from ton/yr rates assuming 8,760 h/yr operation.

[e] Ammonia emission rates obtained from Table 4.3-1a (p. 4-4 of the EIS).

[f] NA = not applicable.

[g] PAH = polycyclic aromatic hydrocarbons.

H.2.3 Risk Characterization

Carcinogenic risks (defined as a 70-year residential exposure) and potential chronic and acute health effects were assessed by using the dispersion modeling described above (OEHHA exposure assumptions and numerical values of toxicity provided in the HRA Guidelines). The environmental pathways analyzed consisted of all pathways recommended in the HRA Guidelines as appropriate for the impact area in the United States.

As specified in the HRA Guidelines, a Tier 1 HRA utilizes a combination of the average and high-end point estimates to estimate exposure. The average and high-end point estimates are defined in the HRA Guidelines in terms of a probability distribution of values for the given exposure variant. The mean represents the average values for point estimates, and the 95th percentiles represent the high-end point estimates from the distributions identified in OEHHA (2000).

TABLE H-3 Modeled Stack Parameters

Model ID[a]	UTM X (m)	UTM Y (m)	Height (m)	Temp. (K)	Exit Velocity (m/s)	Diameter (m)
SESTK1	625477	3607809	60.0	358.2	18.05	5.79
SESTK2	625477	3607765	60.0	358.2	18.05	5.79
LRSTK1	628531	3607621	56.0	349.8	21.00	5.49
LRSTK2	628571	3607608	56.0	349.8	21.00	5.49
LRSTK3	628610	3607596	56.0	349.8	21.00	5.49
EPSTK1	628791	3607880	56.0	349.8	21.00	5.49

[a] SESTK1 and SESTK2 are the two TDM turbines. LRSTK1-3 and EPSTK1 are the four LRPC turbines.

This HRA followed the most current requirements adopted by the State of California for conducting risk assessments, including use of the Hot Spots Analysis and Reporting Program (HARP) model. The HARP model (Version 1.0) is the only readily available software that conforms to the HRA Guidelines and is capable of performing both the average and high-end risk calculations. For the purposes of this HRA, the average point estimate inhalation and multipathway risks are defined as provided in the HRA Guidelines. The high-end point estimate risks are defined as a combination of the high-end exposure assumptions for multipathway toxics combined with the ARB Interim HRA Guidelines exposure assumptions for the inhalation pathway, which uses the 80th percentile breathing rate rather than the 95th percentile breathing rate (ARB 2003).

To calculate the risks for a single turbine at each plant, the HARP model[1] used the worst-case ground level concentrations (GLCs) of each pollutant by using a two-step process as described below. The GLCs were calculated by using the worst-case single-turbine impact from each plant and the emission rates provided in Tables H-1 and H-2. Table H-4 provides the GLCs for a single TDM turbine and a single LRPC turbine. This GLC risk assessment method uses the latest dispersion techniques available from AERMOD, coupled with the current risk assessment guidelines required by OEHHA. It also provides consistency with the dispersion modeling approach used to assess impacts to air quality as described in Section 4.3.

[1] The HARP model has a significant limitation in that the EPA Industrial Source Complex Short-Term (ISCST3) model is the built-in dispersion model for performing the exposure assessment. HARP does not allow for the use of other dispersion models, such as AERMOD, in the full dispersion exposure assessment. However, HARP does have the ability to accept externally calculated GLCs of individual pollutants, thereby bypassing the soon-to-be phased out ISCST3 model, with impacts calculated by using AERMOD. This method of using GLCs calculated by AERMOD provides the ability to determine a conservative impact for each facility, since the single-turbine peak impacts are simply multiplied by the number of turbines for each alternative.

TABLE H-4 Maximum Ground Level Concentrations for a Single Turbine at the TDM and LRPC Power Plants

	Maximum TDM Ground Level Concentration (μg/m^3)		Maximum LRPC Ground Level Concentration (μg/m^3)	
Pollutant	1-Hour[a]	Annual[b]	1-Hour[c]	Annual[d]
Acetaldehyde	2.71×10^{-3}	2.92×10^{-5}	4.92×10^{-3}	5.50×10^{-5}
Acrolein	4.34×10^{-4}	4.67×10^{-6}	7.88×10^{-4}	8.80×10^{-6}
Ammonia	1.95	2.10×10^{-2}	1.33	1.48×10^{-2}
Benzene	8.14×10^{-4}	8.75×10^{-6}	1.48×10^{-3}	1.65×10^{-5}
1,3-Butadiene	2.92×10^{-5}	3.14×10^{-7}	5.29×10^{-5}	5.91×10^{-7}
Formaldehyde	4.81×10^{-2}	5.18×10^{-4}	8.74×10^{-2}	9.76×10^{-4}
Naphthalene	8.81×10^{-5}	9.48×10^{-7}	1.60×10^{-4}	1.79×10^{-6}
Propylene oxide	1.97×10^{-3}	2.11×10^{-5}	3.57×10^{-3}	3.99×10^{-5}
Toluene	8.81×10^{-3}	9.48×10^{-5}	1.60×10^{-2}	1.79×10^{-4}
Xylene (total)	4.34×10^{-3}	4.67×10^{-5}	7.88×10^{-3}	8.80×10^{-5}
Ethylbenzene	2.17×10^{-3}	2.33×10^{-5}	3.94×10^{-3}	4.40×10^{-5}
PAHs	1.49×10^{-4}	1.60×10^{-6}	2.71×10^{-4}	3.02×10^{-6}

[a] Maximum TDM single turbine hourly impact: 0.49101 μg/m^3.

[b] Maximum TDM single turbine annual impact: 0.00528 μg/m^3.

[c] Maximum LRPC single turbine hourly impact: 0.49959 μg/m^3.

[d] Maximum LRPC single turbine annual impact: 0.00558 μg/m^3.

The risks from a single turbine at each facility were calculated first, prior to estimating the risks for each alternative, each of which consists of multiple turbines. The worst-case GLCs for a single turbine at each facility were input to the HARP model directly. The default OEHHA site parameters were used for the multipathway analysis for polycyclic aromatic hydrocarbon (PAH) emissions (note that total PAH emissions were conservatively modeled as benzo(a)pyrene). The average point estimate risks were calculated in a single HARP run for each plant. To calculate the high-end residential cancer risk, HARP was run twice for each plant as follows:

1. An inhalation-only cancer risk assessment analysis was run by using exposure assumptions consistent with the ARB interim guidance.

2. A multipathway cancer risk assessment analysis was run by using high-end point estimate residential exposure assumptions to obtain the multipathway component of the PAH risks.

For the high-end risk calculations, the total inhalation cancer risk under Step 1 was added to the multipathway contribution under Step 2 to obtain the high-end residential cancer risk for a single turbine at each plant. The chronic noncancer and acute hazard indices for a single turbine at each plant were obtained from the high-end point estimate HARP runs.

Any number of worst-case single turbine risk calculations can be summed to estimate the total risk for the given scenario. This approach is reasonable since the emission rates for each turbine at each plant are identical, and the peak impacts for each individual turbine vary by only a few percent. Adding the worst-case turbine risks to estimate total plant risk is a conservative assumption and provides a health-protective approach to estimating the project risks.

The chief cancer risk exposure assumption is one of continuous exposure (at maximum emission rates) over a 70-year period. The RELs are defined as the concentration below which there are no observable health risks. When combined with proposed EPA dispersion modeling methodologies, the use of the HRA Guidelines risk methods (via the HARP model that incorporates cancer potency factors and RELs) provides an upper bound estimate of the true risks. That is, the actual risks are not expected to be any higher than the predicted risks and are likely to be substantially lower.

H.3 RISK ASSESSMENT RESULTS

The estimated risks for each alternative are discussed in this section. As described in the EIS, the no action alternative consists of three turbines operating at the LRPC. The proposed action consists of four turbines at the LRPC plant and two turbines at the TDM plant, for a total of six turbines. For each alternative, it was assumed that the respective number of turbines would operate concurrently and continuously (i.e., 8,760 hours per year).

To estimate the risks for the no action alternative, the single LRPC turbine risks were multiplied by three to estimate the total risks. To estimate the proposed action risks due to LRPC operation, the single LRPC turbine risks were multiplied by four. To estimate the proposed action risks due to TDM operation, the single TDM turbine risks were multiplied by two. The risks from all TDM and LRPC turbines were summed to obtain the total proposed action risks.

The current methodology for making risk management decisions in California requires only that a project analyze 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 no action risks estimated for the three existing LRPC turbines are considered background sources and are subtracted from the proposed action risks to obtain the incremental increase in risk. On the basis of California risk assessment procedures, only the incremental increase in potential risks is compared to the significance thresholds.

The incremental increases in risk for the no action and the proposed action alternatives are presented in Table H-5. Two-point estimate cancer risks are presented that represent the average and high-end exposure assumptions. The no action cancer risk ranges from 0.41 per million to 1.50 per million for the average and high-end exposure assumptions, respectively. The proposed action cancer risk ranges from 0.60 per million to 2.22 per million.

TABLE H-5 Estimated Risks for the No Action and Proposed Action Alternatives

	Cancer Risk (per million)		Chronic Hazard Index[a]	Acute Hazard Index[a]
Alternative	Average	High-End	High-End	High-End
No action (background)	0.41	1.50	0.002 (0.00022)	0.02 (0.0013)
Proposed action	0.60	2.22	0.003 (0.00051)	0.03 (0.0029)
Incremental increase	0.20	0.72	0.001 (0.00028)	0.01 (0.0016)
Significance threshold	1 per million		1.0	1.0

[a] Values in parentheses represent the contributions from ammonia to the hazard index.

For this assessment, significance criteria of an increase in cancer risk of 1 per million and an increase in the chronic and acute hazard indices of 1.0 were chosen. As shown in Table H-5, the incremental (proposed action minus no action) increase in cancer risk ranges from 0.20 per million to 0.72 per million. The average and high-end point estimate risks are below the significance threshold of 1 per million. The estimated chronic and acute hazard indices, which include contributions from ammonia, are well below the significance threshold of 1.0 for the hazard indices. As stated above, only the incremental increase in risks are the values compared with the significance thresholds, per the California risk assessment policy.

The results of the supplemental HRA are considered to be conservative, as the analysis includes the following aspects:

- The turbines were assumed to operate at a 100% capacity factor, that is, at 100% load for 8,760 hours per year.
- The AP-42 emission factors for HAPs and the health risk factors are considered conservative.
- The worst-case turbine impacts for each power plant were summed to obtain the total risks for each alternative.
- A 70-year, 24-hour-per-day residential exposure duration was assumed.
- An average control efficiency of 50% from the oxidation catalyst was assumed at TDM, but the EPA (2002) indicates that up to 90% control is achievable for formaldehyde when an oxidation catalyst is used.
- The high-end cancer risk exposure assumptions are extremely conservative, and the actual risks are likely substantially lower.

Although the high-end cancer risks for both alternatives exceed the significance level of 1 per million, it should be noted that the Tier 1 high-end point estimate approach defined by OEHHA provides the absolute upper bound of the potential risks. The HRA Guidelines provide options for refining the HRA (Tiers 2 through 4). These higher tiers include site-specific site parameters and a stochastic, or probabilistic, approach using exposure factor distributions for one or more variables in the model. Statistical methods are applied to assess the variance and stochastic risk estimates expressed as a range rather than as a single point estimate, as provided in this HRA. However, since only the incremental increase in risk is required for risk management decisions, the incremental increase in risks due to the proposed action does not pose a significant health risk.

For reference, the risks due to each individual facility are provided in Table H-6. The same risk calculation methodology used for the alternatives was used in this analysis (four turbines operating at LRPC and two turbines operating at TDM). The TDM risk is much lower due to the fact that there are only two turbines present at the TDM power plant compared with four at the LRPC power plant. In addition, the TDM turbines are controlled with oxidation catalysts, while the LRPC turbines do not have HAP controls.

TABLE H-6 Estimated Risks for Each Power Plant

	Cancer Risk (per million)		Chronic	Acute
Facility	Average	High-End	Hazard Index High-End[a]	Hazard Index High-End[a]
LRPC (four turbines)	0.54	2.00	0.002 (0.00030)	0.02 (0.0017)
TDM (two turbines)	0.06	0.22	0.0007 (0.00021)	0.007 (0.0012)
Significance threshold	1 per million		1.0	1.0

[a] Values in parentheses represent the contributions from ammonia to the hazard index.

H.4 REFERENCES

ARB (California Air Resources Board), 2003, *Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk,* Oct.

EPA (U.S. Environmental Protection Agency), 2002, "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines," Memo from S. Roy to Docket A-95-51, April 3.

OEHHA (California Office of Environmental Health Hazard Assessment), 2000, *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part IV, Technical Support Document for Exposure Assessment and Stochastic Analysis*, Oct.

OEHHA, 2003, *The Air Toxics "Hot Spots" Program Guidance Manual for Preparation of Health Risk Assessments*, Aug. 2003 (released to the public in Oct. 2003).

APPENDIX I:

CONTRACTOR DISCLOSURE STATEMENTS

CONTRACTOR DISCLOSURE STATEMENT
Argonne National Laboratory

Argonne National Laboratory (ANL) is the contractor assisting the U.S. Department of Energy (DOE) in preparing the environmental impact statement (EIS) for the Imperial-Mexicali 230-kV transmission lines projects. DOE is responsible for reviewing and evaluating the information and determining the appropriateness and adequacy of incorporating any data, analyses, or results in the EIS. DOE determines the scope and content of the EIS and supporting documents and will furnish direction to ANL, as appropriate, in preparing these documents.

The Council on Environmental Quality's regulations (40 CFR 1506.5(c)), which have been adopted by DOE (10 CFR Part 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for the purposes of this disclosure is defined in the March 23, 1981, "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 *Federal Register* 18026–18028 at Questions 17a and 17b. Financial or other interest in the outcome of the project includes "any financial benefit such as promise of future construction or design work on the project, as well as indirect benefits the consultant is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)," 46 *Federal Register* 18026–18038 at 10831.

In accordance with these regulations, Argonne National Laboratory hereby certifies that it has no financial or other interest in the outcome of the project.

Certified by:

Anthony J Dvorak

Signature

Anthony J. Dvorak

Name

Director, Environmental Assessment Division

Title

2/25/04

Date

CONTRACTOR DISCLOSURE STATEMENT
aleslie associates LLC

aleslie associates LLC is a subcontractor to Argonne National Laboratory assisting the U.S. Department of Energy (DOE) in preparing the environmental impact statement (EIS) for the Imperial-Mexicali 230-kV transmission lines projects. DOE is responsible for reviewing and evaluating the information and determining the appropriateness and adequacy of incorporating any data, analyses, or results in the EIS. DOE determines the scope and content of the EIS and supporting documents and will furnish direction to aleslie associates LLC, as appropriate, in preparing these documents.

The Council on Environmental Quality's regulations (40 CFR 1506.5(c)), which have been adopted by DOE (10 CFR Part 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for the purposes of this disclosure is defined in the March 23, 1981, "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 *Federal Register* 18026–18028 at Questions 17a and 17b. Financial or other interest in the outcome of the project includes "any financial benefit such as promise of future construction or design work on the project, as well as indirect benefits the consultant is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)," 46 *Federal Register* 18026–18038 at 10831.

In accordance with these regulations, aleslie associates LLC hereby certifies that it has no financial or other interest in the outcome of the project.

Certified by

ACD Leslie

Signature

Alistair C.D. Leslie

Name

Vice-President

Title

3/10/04

Date

APPENDIX J:

OVERVIEW OF MEXICO PERMITS
FOR THE LRPC AND TDM POWER PLANTS

APPENDIX J:

OVERVIEW OF MEXICO PERMITS
FOR THE LRPC AND TDM POWER PLANTS

This appendix provides an overview of the permitting process required in Mexico for construction and operation of the La Rosita Power Complex (LRPC) and the Termoeléctrica de Mexicali (TDM) power plants based on information provided by the power plant companies (Kiernan 2004; Abreu 2004). The following sections summarize the regulatory requirements, agency responsibilities, and permits and approvals obtained by the power plant companies.

J.1 REGULATORY REQUIREMENTS

The General Law of Ecological Equilibrium and Environmental Protection (Ley General del Equilibrio Ecológico y la Protección al Ambiente (LGEEPA, hereafter referred to as the “General Ecology Law”) establishes the overall regulatory framework for environmental compliance in Mexico. The General Ecology Law, as amended, sets forth control and safety measures, penalties for noncompliance, and guidelines for environmental impact statements (EISs) and risk assessments. It is implemented through five sets of regulations that encompass the general areas of environmental impact, atmospheric pollution, hazardous waste, pollution generated by motor vehicles, and noise emissions (Gonzales and Gastelum 1999).

The specific requirements for the preparation and approval of Environmental Impact Assessments, equivalent to EISs and known in Mexico as Manifestaciónes de Impacto Ambiental or MIAs, are set forth in the set of regulations of the General Ecology Law known as the Regulations of the General Law of Ecological Equilibrium and Environmental Protection for Matters Related to Environmental Impact (Reglamento de la Ley General del Equilibrio Ecológico y Protección al Ambiente en Materia de Impacto Ambiental), promulgated on June 7, 1988. These regulations require that an MIA be prepared for a project under Mexico Federal jurisdiction and submitted to the National Institute of Ecology (Instituto Nacional de Ecología or INE) for approval prior to beginning construction. For industrial projects, an assessment of potential safety risks associated with facility operations (a “risk study”) also must be submitted to the INE for approval.

The 1996 amendment of the LGEEPA authorized the Mexico government to issue environmental standards, known as Normas Oficiales Mexicanas (NOMs) (Gonzales and Gastelum 1999). To date, more than 250 NOMs have been established to regulate areas such as air emissions, wastewater discharges, hazardous waste, and health and safety. Table J-1 summarizes the NOMs applicable to the power plant projects.

TABLE J-1 Applicable Mexico Environmental Standards and Regulations

Regulation Number	Description	Technical Area
NOM-043-ECOL-1993	Maximum permissible limits of solid particulates from stationary sources	Air quality
NOM-085-ECOL-1994	Maximum permissible limits of smoke, total suspended particulates, sulfur dioxide (SO_2), and nitrogen oxides (NO_x) from stationary sources	Air quality
NOM-086-ECOL-1994	Environmental specifications for liquid and gaseous fuels used in stationary and mobile sources	Air quality
NOM-020-SSAI-1993	Ambient air quality standards for ozone (O_3) concentration values for protection of public health	Air quality
NOM-021-SSAI-1993	Ambient air quality standards for carbon monoxide (CO) for protection of public health	Air quality
NOM-022-SSAI-1993	Ambient air quality standards for SO_2 for protection of public health	Air quality
NOM-023-SSAI-1993	Ambient air quality standards for nitrogen dioxide (NO_2) for protection of public health	Air quality
NOM-024-SSAI-1993	Ambient air quality standards for total suspended solids for protection of public health	Air quality
NOM-025-SSAI-1993	Ambient air quality standards for particulate matter smaller than 10 micrometers for protection of public health	Air quality
NOM-001-ECOL-1996	Maximum permissible limits of pollutants in wastewater discharges to national receiving bodies	Water quality
NOM-002-ECOL-1996	Maximum permissible levels of contaminants in wastewater discharges to municipal or urban sewage systems	Water quality
NOM-081-ECOL-1994	Noise emission standards for stationary sources	Noise
NOM-059-ECOL-1994	Ecological criteria to determine which species are endangered, rare, on the verge of extinction, or subject to special protection	Endangered species
NOM-052-ECOL-1993	Hazardous waste characteristics and list	Hazardous waste
NOM-054-ECOL-1993	Procedure for determination of incompatibility between two or more hazardous wastes	Hazardous waste
NOM-114-ECOL-1998	Environmental protection for the planning, design, construction, operation, and maintenance of communication and transmission lines located in urban, suburban, rural, farming, and industrial areas	Electric power transmission lines

J.2 AGENCY RESPONSIBILITIES

J.2.1 Federal Regulatory Agencies

The Secretariat of Environment and Natural Resources (Secretaría del Medio Ambiente y Recursos Naturales, SEMARNAT) is the government agency with primary responsibility in Mexico for developing and implementing policy and regulations relating to natural resource management and environmental protection. In general, SEMARNAT has the following responsibilities:

- Formulating national environmental policies and coordinating all activities relating to the protection, restoration, and conservation of ecosystems and natural resources with the aim of achieving sustainable development.

- Issuing Mexico official environmental standards (i.e., NOMs) pertaining to the sustainable use of natural resources, preservation, environmental quality, flora, fauna, wastewater discharges, mining, hazardous materials, and hazardous and solid wastes.

- Evaluating Environmental Impact Assessments (i.e., MIAs) for development projects proposed by the public and private sectors.

- Managing the use of national waters, setting conditions for wastewater discharges into national receiving bodies (including soil and infiltration into aquifers), and organizing projects for the improvement of national dams.

- Establishing, in coordination with other agencies and entities, economic instruments for the protection, restoration, and conservation of the environment.

Several governmental agencies fall under the jurisdiction of SEMARNAT, including the National Water Commission (Comisión Nacional del Agua, CNA), the National Institute of Ecology (Instituto Nacional de Ecología, INE), and the Federal Agency for the Protection of the Environment (Procuraduria Federal de Protección al Ambiente, PROFEPA) (Gonzales and Gastelum 1999).

The National Water Commission is responsible for the quality and preservation of national waters and related real property such as wetlands, marshes, and beaches. It oversees compliance with the Law of National Waters (Ley de Aguas Nacionales), and it regulates and issues permits to discharge wastewater into federally chartered receiving bodies, such as rivers, lakes, soil, and groundwater.

The INE is responsible for ecological matters and the protection of the environment. It develops environmental programs, issues administrative orders and standards, determines the adequacy (and grants federal approval) of environmental impact assessments (i.e., MIAs), and coordinates the development of environmental programs with state agencies.

The PROFEPA is the primary Mexico federal agency authorized to enforce environmental laws in Mexico, including the regulations for management and disposal of hazardous and industrial waste and air emissions. It is responsible for investigations and inspections of facilities and is in charge of the prosecution of environmental crimes.

J.2.2 State and Local Regulatory Authorities

Nonfederal issues and environmental matters in Mexico are under the jurisdiction of the respective states and municipalities. The policies of the states and municipalities must meet Mexico federal requirements. The state and local governments are responsible for land use licensing, construction permitting, regulating air emissions from nonfederal activities, regulating solid waste disposal, and permitting for water supply from local networks discharging to municipal sewage systems.

The Dirección de Ecología de Estatal de Baja California (Ecology Directorate of the State of Baja California) is responsible for issuing environmental permits for all state facilities that are not under Mexico federal jurisdiction and for the management and disposal of nonhazardous solid waste within the state.

The Comisión de Estatal de Servicios Públicos de Mexicali (CESPM, the State Commission of Public Services of Mexicali) regulates the supply of drinking water, wastewater, and treated water as well as treatment and recycling of wastewater within the Municipality of Mexicali.

J.3 PERMITS AND APPROVALS

The LRPC and TDM power plants obtained several Mexico permits and approvals applicable to the construction and operation of their respective facilities, falling into these general categories:

- Environmental (e.g., air quality, noise, geology/soils, endangered species, solid and hazardous waste, and risk assessment);
- Safety;
- Construction (e.g., crane and hoisting equipment licenses, rights-of-way and land use authorizations);
- Communications equipment;
- Occupancy;

- Sanitation;
- Hydrostatic testing;
- Fire department and civil protection;
- Federal land use concessions;
- Import and export of electrical power; and
- Mechanical and heating, ventilation, and air conditioning (HVAC) installation and pressure vessel registry.

These permits and approvals are described in more detail in the following sections.

J.3.1 La Rosita Power Complex

The construction and operation of the two units at the LRPC — Energiá de Baja California (EBC) and Energiá Azteca X (EAX) — required a series of permits and approvals from various Mexico regulatory authorities. Because the EBC and EAX units include separate transmission lines, with the EBC line connecting at the U.S. border with a new transmission line owned and operated by Baja California Power, Inc., and the EAX line connecting to the electric power grid in Mexico, each unit was subject to independent permitting requirements, and each unit obtained its own permits and approvals (Table J-2).

Intergen submitted the MIA (the equivalent of an EIS) for the EAX unit to the INE on August 15, 2000; it was approved on November 15, 2000. The MIA for the EBC unit was submitted to the INE on April 6, 2001; it was approved on June 28, 2001. These authorizations extend to the new transmission lines included as part of each unit.

J.3.2 Termoeléctrica de Mexicali

The construction and operation of the TDM power plant required a series of permits and approvals from various Mexican regulatory authorities (Table J-2). Sempra reports that more than 50 permits, licenses, or other authorizations were obtained from at least 8 different agencies and subagencies of the Mexico government. The TDM plant also entered into a contract with CESPM for the supply of sewage water to be treated at the wastewater plant for the power plant. The INE approved the MIA for the TDM plant on January 23, 2001.

TABLE J-2 Primary Permits and Approvals Obtained by the LRPC and TDM Power Plants

Permit or Approval Type	Permitting or Approval Agency	Description of Requirement
Manifestación de Impacto Ambiental (MIA)	• SEMARNAT • INE	Project-specific MIA required for power facilities that will generate more than 3 MW of electricity; the assessment also covers ancillary facilities, including transmission lines.
Risk study	• SEMARNAT • INE	Assessment of potential safety risks required for industrial facilities, including power plants.
Construction permit/license	• Municipality of Mexicali	Required for construction activities at the facility.
Independent power producer permit	• Comisión Reguladora de Energia (CRE, Energy Regulatory Commission)	Permit required for independent power generation
Power import permit	• CRE	Permit required for the importation of power for use at the facilities, including for start-up.
Power export permit	• CRE	Permit required to export power outside of Mexico.
Land use/property ownership	• CNA • Municipality of Mexicali	License required for industrial land use; right-of-way permit required for installation of pipelines (water and wastewater) and transmission lines crossing local roads, railroad tracks, and private lands.
Pressurized vessels/steam generators	• Ministry of Labor and Social Welfare (STPS)	Authorization required to operate pressurized vessels and steam generators.
Environmental operating license	• SEMARNAT	Environmental operating license required for all facilities, requiring compliance with the MIA, the wastewater discharge authorization, and other Mexico environmental laws.
Waste disposal authorization	• SEMARNAT	Authorization required for the off-site disposal of nonhazardous waste.
Wastewater discharge	• CNA	Permit required to discharge wastewater into national receiving bodies (i.e., canals that discharge to the New River).

Source: Kiernan (2004); Abreu (2004).

J.4 REFERENCES

Abreu, A., 2004, "Power Plant Permitting Summary (TDM Power Plant)," personal communication from Abreu (Sempra Energy Resources, Inc., San Diego, Calif.) to K. Picel (Argonne National Laboratory, Argonne, Ill.), Oct. 6.

Gonzalez, G.R., and M.E. Gastelum, 1999, *Overview of the Environmental Laws of Mexico*, National Law Center for Inter-American Free Trade. Available at http://www.natlaw.com/pubs/spmxen13.htm.

Kiernan, S., 2004, "Power Plant Permitting Summary (LRPC)," personal communication from Kiernan (Intergen, Burlington, Mass.) to K. Picel (Argonne National Laboratory, Argonne, Ill.), Sept. 30.

APPENDIX K:

ANALYSIS OF THE USE OF ZERO-LIQUID DISCHARGE TECHNOLOGIES AT THE POWER PLANTS IN MEXICO

APPENDIX K:

ANALYSIS OF THE USE OF ZERO-LIQUID DISCHARGE TECHNOLOGIES AT THE POWER PLANTS IN MEXICO

Zero-discharge technologies were investigated as a possible wastewater management alternative technology to reduce impacts to the New River and Salton Sea from the La Rosita Power Complex (LRPC) and Termoeléctrica de Mexicali (TDM) power plants. Implications for the installation and operation of such a technology are discussed in detail below. The potential impacts on salinity and other water quality measures resulting from installation of the technology at both plants are also presented.

Zero-discharge water management systems for steam electricity-generating stations have historically been applied in areas that are deficient in water supply, remote from suitable receiving streams for wastewater discharge, and/or at projects seeking to streamline their licensing schedule (Kasper 2004). With zero-discharge plants, an attempt is made to minimize wastewater production, reuse as much wastewater as possible within the plant, and employ evaporation to eliminate the remainder of the wastewater produced. In the discussion presented below, the technology is considered mainly as a means of reducing discharges of total dissolved solids (TDS) from the LRPD and TDM power plants to the New River.

Cooling systems are typically the major users of water at power plants. Open recirculating cooling systems employing cooling towers (such as those at the LRPC and TDM power plants) require makeup water for losses due to evaporation and blowdown (water that must be removed from the system on a regular basis in order to maintain proper chemical conditions and efficient operations). Blowdown of water in the recirculating cooling system is required to mitigate corrosion of system materials and to prevent scaling on heat exchanger surfaces. Cooling tower blowdown is typically the largest wastewater stream in a combined-cycle power plant. Other, smaller streams of wastewater may include wastewater from the treatment process, floor and equipment drains, heat recovery steam generator blowdown, and evaporative cooler blowdown.

If there is sufficient space on site and if local meteorological conditions are favorable for evaporation, the most cost-effective method of achieving zero-liquid discharge is to dispose of all the wastewater to solar evaporation ponds. Where space is unavailable, land is too costly, or areas have net annual precipitation, mechanical evaporators are employed to remove the wastewater. Evaporator distillate can be recovered as feedwater to the makeup demineralizer system or as partial cooling tower makeup (makeup water is water that is used to replace water that has been removed by design from the system through blowdown and evaporation and other system losses). Evaporator concentrate must be further processed to remove water vapor in a spray dryer or crystallizer. The resultant solid salts of the processes are trucked off site for disposal.

Economics dictate that the flow of wastewater to evaporation ponds or mechanical evaporators be minimized because the construction, operation, and maintenance of ponds and mechanical evaporators can be expensive. Typically, cooling tower systems are run at more than one cycle of concentration (i.e., the number of times that the water is reused in the system) in order to minimize blowdown discharge (four to five cycles are employed at the LRPC and TDM power plants). Low-concentration soluble salts in the cooling water are problematic for power plants and must be controlled by using sidestream lime softeners and/or membranes. Very often, chemicals added for cooling system maintenance, such as scale inhibitors and dispersants, conflict with the chemical conditions that need to be maintained in the softener. Low-concentration soluble salts are precipitated in the softener, and the resultant sludge must be dewatered and properly disposed of.

The design of a successful zero-discharge management system is complex, as is its operation. It is influenced by space limitations, water quality, degree of operator attention, system materials, and other variables. It is challenging enough to design a successful zero-discharge system when such a design is the original intent. To modify an existing plant, such as the Energiá de Baja California (EBC) plant at LRPC, to a zero-discharge design would impose formidable challenges that might or might not be successfully addressed.

A zero-discharge system requires that control systems be modified and expanded to allow plant operators to base decisions on real-time data for wastewater stream flows and storage tank inventories. Intermediate wastewater storage tanks must be added to provide buffers in case of downstream mechanical equipment failures. For instance, it is common practice to install a single mechanical evaporator train rather than redundant trains because of the significant capital costs incurred. Most evaporator suppliers recommend that 7 days' storage of wastewater be provided upstream to allow for equipment repair and/or replacement. For example, if sidestream treatment to reduce cooling tower blowdown was proven to be infeasible at EBC, a storage pond or tank with a capacity of approximately 4,490,924 gal (17,000 m^3) would be required (Kasper 2004). The complexity of a zero-discharge system requires that the power plant hire additional operating staff to monitor and manage its operation. Similar issues and requirements would be expected to apply at the TDM plant.

In addition to the design and operational complexities discussed above, the benefits of installing zero-discharge systems at the power plants would be questionable. Table K-1 shows the concentrations for TDS, total suspended solids (TSS), biochemical oxygen demand (BOD), chemical oxygen demand (COD), phosphorus (P), and selenium (Se) at the Calexico gage at the U.S.-Mexico border for no plants operating, the LRPC and TDM power plants operating simultaneously at 100% power, and the LRPC and TDM plants operating at 100% under a zero-discharge limit. For the zero-discharge limit scenario, the power plants are assumed to draw a total of 10,667 ac-ft/yr (0.41 m^3/s) of water from the lagoons. This value is consistent with the total consumptive water use for both plants operating (Section 4.2.4). Water required under the proposed action (13,387 ac-ft/yr) (0.52 m^3/s) includes blowdown water for the cooling towers. This water would not be required for the zero-discharge limit scenario.

The calculations show that a zero-discharge scenario would produce both beneficial and adverse mixed water quality impacts at the U.S.-Mexico border relative to both the LRPC and TDM power plants operating under normal (i.e., wet cooling) conditions. Concentrations of TDS

TABLE K-1 Estimated Concentrations of Various Constituents in New River Water as a Result of Installing Zero-Liquid Discharge Technology at the Power Plants

	Concentration (mg/L) in the New River at the U.S. Border			Concentration Changes Resulting from Use of Zero-Liquid Discharge Systems at Both Power Plants	
Constituent	No Plants Operating	Proposed Action	Zero-Discharge	Change Relative to Proposed Action (mg/L)	Change Relative to Proposed Action (%)
TDS	2,620	2,766	2,709	–57	–2.1
TSS	52.7	51.5	52.3	0.8	1.6
BOD	27.5	25.9	26.5	0.6	2.3
COD	53.6	44.5	46.8	2.3	5.2
P	2.0	1.85	1.9	–0.05	–2.7
Se	0.021	0.022	0.022	0.0	0.0

would decrease by about 2%, thereby providing a beneficial impact, while the concentrations for TSS, BOD, COD, and Se would slightly increase; COD would increase by more than 5%. Flows to the New River would be reduced slightly compared with both plants operating under normal wet-cooling conditions because of the elimination of wastewater discharges from the plants.

In conclusion, not only would the retrofit of zero-discharge systems to the power plants prove technically challenging and incur higher capital and operating costs, as discussed above, it would also produce very minor water quality benefits to the New River. Therefore, the impacts of this technology are not evaluated further in this environmental impact statement as a reasonable alternative technology for Alternative 3.

APPENDIX K REFERENCE

Kasper, J.R., 2003, “Results of Analytical Sampling of Gray Water, Effluent, and Influent for the Zaragoza Oxidation Lagoons,” personal communication from Kasper (Aquagenics, Inc., Woburn, Mass.) to K. Picel (Argonne National Laboratory, Argonne, Ill.), Dec. 9.

APPENDIX L:

TDM AND LRPC POWER PLANT PHOTOGRAPHS

TDM POWER PLANT

FIGURE L-1 Aerial View of the TDM Power Plant (North is to the right of the photograph. The facility property totals approximately 78.2 acres [31.7 ha]. The power plant and its facilities occupy approximately 26.8 acres [10.9 ha].)

FIGURE L-2 Aerial View of the Cooling Tower (The cooling tower measures 350 ft [106.5 m] in length and 35 ft [41.1 m] in width, by 57 ft [17.4 m] in height. Each cooling fan measures 36 ft [11 m] in diameter. Note the truck on the road to the west of the cooling tower [north is to the right of the picture] for scale.)

FIGUER L-3 View of Gas Turbine Inlet Air Structure, Gas Turbine, Heat Recovery Steam Generator, and Stack for One of the Two Units at TDM (The inlet air filter structure measures 69.5 ft [21.2 m] high from ground elevation, 44 ft [13.4 m] wide. The length of the turbine train front to back [from air filter structure to end of stack width] is 282 ft [86 m]. Note the pickup truck below inlet filters for scale.)

FIGURE L-4 View of Solids Removed from Sewage Treatment Processing at the TDM Facility (This is a view of the filter press house and the dump bin where solids are deposited for disposal in the solid waste landfill.)

LRPC POWER PLANT

FIGURE L-5 View of EAX-1C Export Gas Turbine Showing the Location of the Selective Catalytic Reduction (SCR) System for NO_X Control Installed in March 2004 (If an oxidizing catalyst was installed under Alternative 3, it would be retrofitted in the vicinity of the SCR catalyst.)

FIGURE L-6 Aerial View of LaRosita 1 (LR1), the EAX Unit (The 11-unit cooling tower is shown on the right and the three gas turbines on the left. Each of the gas turbines is equipped with a heat recovery steam generator that powers a single steam turbine in a combined-cycle mode.)

FIGURE L-7 View of the EAX Unit from the Field

FIGURE L-8 Aerial View of LaRosita 2 (LR2), the EBC Export Unit (This unit consists of a single gas turbine and a single steam turbine operating in a combined cycle. The on-site water treatment plant is near the top of the picture.)

FIGURE L-9 View of the EBC Unit at Night

FIGURE L-10 Aerial View of the LRPC Sewage Treatment Plant next to the Zaragosa Oxidation Lagoons during Construction (November 2001)

FIGURE L-11 Overflow from the Disinfection Chamber to the Gray Water Pump Well

FIGURE L-12 Sewage Treatment Plant Aeration Tank

APPENDIX M:

DISTRIBUTION LIST

Sempra-Intergen Project
Privileged Documents
Administrative Record Index

Surname	First Name	Organization	Address 1	Address 2	City	State	Zip
Abreau	Alberto	Director, Permitting	Sempra Energy	101 Ash Street, P.O. Box 1831	San Diego	CA	92112
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Allen	Douglas W.		Desert Protective Council, Inc.	P.O. Box 3636	San Diego	CA	92163-1635
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Ball	Jason			9521 39th	Olympia	WA	98516
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Barrett	Marie			2035 Forrester Rd.	El Centro	CA	92243
Barry	Tom	Co-Director, Americas Program	Interhemispheric Resource Center	P.O. Box 2178	Silver City	NM	88062-2178
Bartridge	Jim	Aspen Environmental Group		1760 Creedside Oaks Drive, Suite 170	Sacramento	CA	95833-3632
Betterly	William		CDD Advisory Council	15400 Highway 173	Hesperia	CA	92345
Bingaman	The Honorable Jeff	United States Senate	Ranking Minority Member, Committee on Energy & Natural Resources				
Birdsall	Brewster	Aspen Environmental Group		235 Montgomery Street, Suite 935	San Francisco	CA	94104-3002
Birdsall	Steven	Air Pollution Control Officer	Imperial County Air Pollution District	150 S. 9th	El Centro	CA	92243-2850
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Chary	Lin Kaatz			7726 Locust Avenue	Gary	In	46403
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Collins	Kimberly			P.O. Box 406	Calexico	CA	
Collins	The Honorable Susan	United States Senate			Washington	DC	20510
Cooper	Carey L.	Klinedinst, Fliehman & McKillop, P.C.		501 West Broadway, Suite 600	San Diego	CA	92101
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Cordova Jr.	Ralph		County of Imperial	940 West Main, Ste. 205	El Centro	CA	92243
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Crawford	Crystal	Chair, Borders Committee	San Diego Association of Governments	401 B Street, Suite 400	San Diego	CA	92101-4231

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Doyle	Mark			4804 50th Street	San Diego	CA	92115
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Galvin	Peter		Centerl for Biological Diversity	1095 Market Street, Suite 511	San Francisco	CA	94103
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Weiner	Terry			3606 Front Street Rear	San Diego	CA	92103
Weldon	David			612 South G Street	Imperial	CA	92251
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Wilson	Olive			280 2nd Street, NE	Primghar	IO	51245
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Yruretagoyena	Carlos			P.O. Box 512	Calexico	CA	92232-0512
		Citizens Congressional Task Force on the New River		4151 Highway 86, Building 4	Brawley	CA	92227
		Environmental Compliance Section	Imperial Irrigation District	318 So. 8th Street	Brawley	CA	92227
		Clerk of the Board	County Board of Supervisors	940 West Main Street	El Centro	CA	92243