



BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

**In the Matter of the Application of The Nevada Hydro
Company for a Certificate of Public Convenience
and Necessity for the Talega-Escondido/Valley-
Serrano 500-kV Interconnect Project**

**Application No. 07-10-005
(Filed October 9, 2007)**

PROPONENT'S ENVIRONMENTAL ASSESSMENT

**TALEGA-ESCONDIDO/VALLEY-SERRANO
500-KV INTERCONNECT PROJECT**
(CPUC No. 07-10-005)

and the

**LAKE ELSINORE
ADVANCED PUMPED STORAGE PROJECT**
(FERC Project Nos. 11858-002 / ER06-278-005)

Submitted to:
CALIFORNIA PUBLIC UTILITIES COMMISSION
505 Van Ness Avenue
San Francisco, California 94102
(415) 703-2782

Project Proponent:
THE NEVADA HYDRO COMPANY, INC.
2416 Cades Way
Vista, California 92083
(760) 599-0086

January 2008

This page intentionally left blank.

PROPONENT'S ENVIRONMENTAL ASSESSMENT

TALEGA-ESCONDIDO/VALLEY-SERRANO 500-KV INTERCONNECT PROJECT (CPUC No. 07-10-005)

and the

LAKE ELSINORE ADVANCED PUMPED STORAGE PROJECT (FERC Project Nos. 11858-002 / ER06-278-005)

Submitted to:
CALIFORNIA PUBLIC UTILITIES COMMISSION
505 Van Ness Avenue
San Francisco, California 94102
(415) 703-2782

Project Proponent:
THE NEVADA HYDRO COMPANY, INC.
2416 Cades Way
Vista, California 92083
(760) 599-0086

January 2008

This page intentionally left blank.

TABLE OF CONTENTS
List of Sections

<u>Section</u>	<u>Page</u>
1.0 EXECUTIVE SUMMARY	1-1
1.1 Project Purpose and Need	1-1
1.2 Project Objectives	1-2
1.3 Project Description	1-2
1.3.1 Transmission Facilities	1-2
1.3.2 Substations and Switchyards	1-4
Southern (Pendleton or Case Springs) Substation	1-4
Northern (Lake) Substation	1-5
Midpoint (LEAPS) Substation	1-5
1.3.3 SDG&E System Upgrades	1-5
Participating Transmission Owner's Reliability Network Upgrades	1-6
Interconnection Customer's Delivery Network Upgrades	1-6
1.3.4 SCE System Upgrades	1-6
Upgrades to Existing SCE Facilities	1-7
500-kV Connection between Valley-Serrano and Northern (Lake) Substation	1-8
1.4 Lake Elsinore Advanced Pumped Storage Project	1-8
1.5 Access to Renewable Energy Resources	1-9
1.6 Permitting Background	1-9
1.7 Major Conclusions	1-12
1.8 Areas of Controversy	1-12
1.9 Major Issues to be Resolved	1-13
1.10 Interagency Coordination and Public Outreach	1-13
1.10.1 Interagency Coordination	1-13
1.10.2 Agencies/Organizations Associated with the Proposed Project	1-13
1.10.3 Public Outreach Efforts	1-14
2.0 PROJECT PURPOSE AND NEED	2-1
2.1 Introduction to the Project Purpose and Need	2-1
2.2 Needs Determination	2-1
2.2.1 Electric Transmission Need	2-2
2.2.2 Electric Generation Need	2-11
2.3 Off-Peak Consumption and On-Peak Generation	2-15
2.4 Benefits of the Proposed Projects	2-19
2.4.1 Transmission Benefits	2-19
2.4.2 Electrical Ratepayer Benefits	2-20
2.4.3 Access to Renewable Energy Resources	2-23
2.5 Statement of Applicant's Objectives	2-24
2.0 PROJECTS DESCRIPTION	3-1
3.1 Location and Vicinity	3-1
3.2 Description of the Proposed Projects	3-3
3.2.1 Talega-Escondido/Valley-Serrano 500-kV Interconnect Project	3-5
3.2.2 Lake Elsinore Advanced Pumped Storage Project	3-78
3.2.3 LEAPS Project Related Facilities (LEAPS Project Only)	3-112
3.2.4 LEAPS Project Related Activities (LEAPS Project Only)	3-117
3.3 Licensee, Owner, and Operator	3-118

Lake Elsinore Advanced Pumped Storage Generation Project
Talega-Escondido/Valley-Serrano 500-kV Interconnect Transmission Project

List of Sections (Continued)

<u>Section</u>		<u>Page</u>
3.4	Tentative Schedule	3-119
3.5	Discretionary Permits, Approvals, and Construction Requirements	3-119
3.6	Existing Agreements and Special Use Permits	3-126
3.7	Mandatory Conditions and Requirements	3-128
	3.7.1 Federal Power Act	3-128
	3.7.2 Federal Endangered Species Act	3-129
	3.7.3 National Historic Preservation Act	3-130
	3.7.4 Federal Clean Water Act	3-130
3.8	Additional Articles, Conditions, and Measures Incorporated into the Projects	3-130
3.9	Magnetic Field Reduction Measures	3-131
3.10	Additional Self-Imposed Actions	3-132
4.0	ENVIRONMENTAL AND REGULATORY SETTING	4-1
4.1	Aesthetics	4-3
	4.1.1 Regulatory Setting	4-3
	4.1.2 Environmental Setting	4-4
	City of Lake Elsinore	4-20
	County of Riverside	4-21
	County of San Diego	4-22
4.2	Agricultural Resources	4-22
	4.2.1 Regulatory Setting	4-22
	4.2.2 Environmental Setting	4-24
	City of Lake Elsinore	4-24
	County of Riverside	4-25
	County of San Diego	4-26
4.3	Air Quality	4-26
	4.3.1 Regulatory Setting	4-26
	4.3.2 Environmental Setting	4-40
	City of Lake Elsinore	4-47
	County of Riverside	4-47
	County of San Diego	4-48
4.4	Biological Resources	4-49
	4.4.1 Regulatory Setting	4-49
	4.4.2 Environmental Setting	4-56
	City of Lake Elsinore	4-117
	County of Riverside	4-117
	County of San Diego	4-118
4.5	Cultural Resources	4-119
	4.5.1 Regulatory Setting	4-119
	4.5.2 Environmental Setting	4-126
	Prehistoric Setting	4-126
	Ethnographic Setting	4-127
	Creation Stories: Lake Elsinore and its Associated Hot Springs	4-130
	Location of Ethnohistoric Villages	4-131
	Historic Setting	4-131
	Cleveland National Forest	4-133

Talega-Escondido/Valley-Serrano 500-kV Interconnect Project

Lake Elsinore Advanced Pumped Storage Project

<u>Section</u>	List of Sections (Continued)	<u>Page</u>
	Existing Cultural Resources	4-134
	Regional Paleontology	4-135
	City of Lake Elsinore	4-136
	County of Riverside	4-136
	County of San Diego	4-136
4.6	Geology and Soils	4-138
4.6.1	Regulatory Setting	4-138
4.6.2	Environmental Setting	4-145
	City of Lake Elsinore Background Reports	4-145
	United States Geological Survey Geologic Maps	4-146
	Regional Geology	4-152
	Geologic Hazards	4-155
	Geotechnical Feasibility Report	4-158
	County of Riverside	4-179
	County of San Diego	4-180
4.7	Hazards and Hazardous Materials	4-180
4.7.1	Regulatory Setting	4-180
4.7.2	Environmental Setting	4-186
	City of Lake Elsinore	4-187
	County of Riverside	4-188
	County of San Diego	4-188
	Camp Pendleton – Integrated Natural Resource Management Plan	4-188
	Electromagnetic Fields	4-193
	Aircraft and Other Aviation Hazards	4-197
	Hazardous Materials	4-197
4.8	Hydrology and Water Quality	4-198
4.8.1	Regulatory Setting	4-198
4.8.2	Environmental Setting	4-208
	Surface Waters	4-208
	Railroad Canyon Reservoir (Canyon Lake)	4-242
	Lake Elsinore	4-244
	Lee Lake (Corona Lake)	4-250
	San Juan Creek	4-250
	Ground Water	4-251
	Water Quality Control Plan for the Santa Ana River Basin (8)	4-252
	Water Quality Control Plan for the San Diego Basin (9)	4-258
	City of Lake Elsinore	4-260
	County of Riverside	4-260
	County of San Diego	4-267
4.9	Land Use and Planning	4-268
4.9.1	Regulatory Setting	4-268
4.9.2	Environmental Setting	4-275
	City of Lake Elsinore	4-275
	City of Corona	4-275
	County of Riverside	4-276
	County of San Diego	4-292
4.10	Mineral Resources	4-293
4.10.1	Regulatory Setting	4-293

Lake Elsinore Advanced Pumped Storage Generation Project
Talega-Escondido/Valley-Serrano 500-kV Interconnect Transmission Project

List of Sections (Continued)

<u>Section</u>		<u>Page</u>
	4.10.2 Environmental Setting	4-294
	County of Riverside	4-307
	County of San Diego	4-308
4.11	Noise	4-308
	4.11.1 Regulatory Setting	4-308
	4.11.2 Environmental Setting	4-311
	City of Lake Elsinore	4-313
	County of Riverside	4-314
	County of San Diego	4-315
4.12	Population and Housing	4-317
	4.12.1 Regulatory Setting	4-317
	4.12.2 Environmental Setting	4-318
4.13	Public Services	4-323
	4.13.1 Regulatory Setting	4-324
	4.13.2 Environmental Setting	4-327
	City of Lake Elsinore	4-338
	County of Riverside	4-339
	County of San Diego	4-341
	California Department of Forestry and Fire Protection	4-342
	Fire Ecology	4-347
	Helicopter Firefighting	4-349
	Other Considerations	4-351
4.14	Recreation	4-351
	4.14.1 Regulatory Setting	4-351
	4.14.2 Environmental Setting	4-354
	Cleveland National Forest	4-355
	City of Lake Elsinore	4-358
	Lee Lake (Corona Lake)	4-362
	County of Riverside	4-362
	Hang Gliding, Parachuting, and Gliding	4-362
4.15	Transportation and Traffic	4-365
	4.15.1 Regulatory Setting	4-365
	4.15.2 Environmental Setting	4-373
4.16	Utilities and Service Systems	4-375
	4.16.1 Regulatory Setting	4-375
	4.16.2 Environmental Setting	4-377
	Metropolitan Water District of Southern California	4-377
	Western Municipal Water District	4-377
	Elsinore Valley Municipal Water District	4-378
	Eastern Municipal Water District	4-381
4.17	Energy Resources	4-381
	4.17.1 Regulatory Setting	4-381
	4.17.2 Environmental Setting	4-383
5.0	ENVIRONMENTAL IMPACT ASSESSMENT SUMMARY	5-1
	5.1 Introduction to Environmental Impact Assessment Summary	5-1
	5.2 Significant Environmental Effects	5-2

List of Sections (Continued)

<u>Section</u>		<u>Page</u>
6.0	DETAILED DISCUSSION OF ENVIRONMENTAL IMPACTS	6-1
6.1	Introduction to Detailed Discussion of Environmental Impacts	6-1
6.2	Detailed Discussion of Environmental Impacts	6-1
6.3	Cumulative Impacts	6-1
6.3.1	Geographic Scope	6-1
6.3.2	Cumulative Impacts	6-2
	Aesthetics	6-2
	Agricultural Resources	6-3
	Air Quality	6-4
	Biological Resources	6-4
	Cultural Resources	6-5
	Geology and Soils	6-5
	Hazards and Hazardous Materials	6-5
	Hydrology and Water Quality	6-6
	Land Use and Planning	6-6
	Mineral Resources	6-6
	Noise	6-7
	Population and Housing	6-8
	Public Services	6-8
	Recreation	6-9
	Transportation and Traffic	6-9
	Utilities and Service Systems	6-10
	Energy Resources	6-10
7.0	MITIGATION MEASURES PROPOSED TO MITIGATE SIGNIFICANT EFFECTS	7-1
7.1	Introduction to Mitigation Measures Proposed to Mitigate Significant Effects	7-1
7.2	Identification of Acceptable Levels	7-1
7.3	Conditions Identified by Applicant or Imposed by Other Governmental Entities	7-13
7.4	Additional Mitigation Measures	7-14
8.0	ALTERNATIVES ANALYSIS	8-1
8.1	Introduction to the Alternatives Analysis	8-1
8.2	Alternatives Considered but Rejected by the Applicant	8-1
8.2.1	Non-Wires Alternative	8-1
8.2.2	Alternative Transmission Routing Alternatives	8-7
8.2.3	Alternative Transmission Technologies	8-30
8.2.4	Alternative Hydropower Sites	8-32
8.2.5	Alternative Electricity Storage Technologies	8-34
8.2.6	Generation-Interconnection Alternatives	8-36
8.2.7	Other Hydropower Alternatives	8-39
8.2.8	Other Generation Alternatives	8-42
8.2.9	Design Variation Alternatives	8-42
8.2.10	Concurrent vs. Sequential Construction Alternatives	8-43
8.2.11	Additional Considerations	8-44
8.3	Alternatives Under Consideration	8-44
8.3.1	“LEAPS Project Only” Alternative	8-45
8.3.2	“TE/VS Interconnect Project Only” Alternative	8-45

List of Sections (Continued)

<u>Section</u>		<u>Page</u>
8.3.3	“LEAPS Facilities Siting” Alternatives	8-47
	“Ortega Oaks Powerhouse” Alternative	8-47
	“Morrell Canyon Reservoir” Alternative	8-52
8.3.4	“500-kV Transmission Alignment” Alternatives	8-68
8.3.5	“No Project” Alternative	8-69
9.0	GROWTH INDUCING IMPACTS OF THE PROPOSED ACTION	9-1
9.1	Regulatory Setting	9-1
9.2	Environmental Setting	9-1
	9.2.1 Generation and Transmission Needs Determination	9-1
	9.2.2 Fossil-Fuel Consumption	9-2
9.3	Significant Irreversible Environmental Changes	9-4
	9.3.1 Use of Non-Renewable Resources	9-5
	9.3.2 Potential for Environmental Accidents	9-6
9.4	Growth Inducement	9-8
	9.4.1 Foster Economic or Population Growth	9-8
	9.4.2 Demand for Additional Housing	9-8
	9.4.3 Removal of Obstacles to Population Growth	9-10
10.0	DOCUMENTS INCORPORATED BY REFERENCE	10-1
10.1	CEQA and NEPA Documents Incorporated by Reference	10-1
10.2	FERC Licensing Documents Incorporated by Reference	10-9
10.3	Additional Environmental and Scoping Documents Incorporated by Reference	10-12
10.4	Interconnect System Impact Studies Incorporated by Reference	10-13
10.5	Interconnect Facilities Studies Incorporated by Reference	10-15
10.6	Additional Technical Studies and Other Material Incorporated by Reference	10-21
11.0	ORGANIZATIONS AND PERSONS CONSULTED	11-1
12.0	REFERENCES	12-1

List of Appendices

Appendix

- A Environmental Impact Assessment Summary Form
- B Articles, Conditions, and Environmental Protection and Enhancement Measures
- C Response to USFWS Comments Regarding Section 7 Consultation
- D Technical Analysis of the Potential Water Quality Impacts of the LEAPS Project on Lake Elsinore
- E Effects of LEAPS Operation on Lake Elsinore – Predictions from 3-D Hydrodynamic Modeling
- F Ecological Impacts from LEAPS Operation – Predictions Using a Simple Linear Food Chain Model
- G Landowners

Talega-Escondido/Valley-Serrano 500-kV Interconnect Project

Lake Elsinore Advanced Pumped Storage Project

List of Figures		
<u>Figure</u>		<u>Page</u>
1-1	Talega-Escondido/Valley-Serrano 500-kV Interconnect Project	1-15
2-1	California Extra High-Voltage Transmission Map – 500-kV/230-kV Map with Congestion Points	2-9
2-2	Critical Congestion Areas Identified by the United States Department of Energy	2-10
2-3	Areas of Blackout Risk	2-10
2-4	Annual Pattern of Daily Peak Demand	2-18
2-5	Load Profile of a Large Energy Storage Facility	2-18
3-1	Regional Vicinity Map	
3-1(1)	Portions of Riverside, Orange, and San Diego Counties	3-9
3-1(2)	Portion of South Coast Hydrologic Unit	3-10
3-1(3)	Portion of Cleveland National Forest	3-11
3-2	United States Marine Corps Base - Camp Joseph H. Pendleton	3-12
3-3	Proposed 500-kV Transmission Alignment Map	3-13
3-4	500-kV/230-kV Transmission Line - Conceptual Single-Line Drawing	3-17
3-5	SDG& 230-kV Transmission Line Upgrade Map (General)	3-18
3-6	SDG& 230-kV Transmission Line Upgrade Map (Specific)	3-19
3-7	Typical Single-Circuit 500-kV Steel Lattice Tower	3-30
3-8	Typical Single-Circuit 500-kV Monopole Tower	3-30
3-9	Typical Single-Circuit 500-kV H-Frame Tower	3-31
3-10	Gas-Insulated Line (GIL) Vault Transition to Pumphouse Section Drawing	3-31
3-11	GIL-OHL Transition Station North	
3-11(1)	GIL-OHL Transition Station North - Elevation Drawing	3-32
3-11(2)	GIL-OHL Transition Station North - Section Drawing	3-32
3-11(3)	GIL-OHL Transition Station North - Section Drawing	3-33
3-11(4)	GIL-OHL Transition Station North - Site Plan	3-33
3-12	GIL-OHL Transition Station South	3-34
3-13	GIL-Vault Single-Line Diagram Transition to Powerhouse	3-35
3-14	Preliminary Tower Placement and Access Road Location	3-37
3-15	Northern (Lake) Substation Site	3-50
3-16	Northern [Lake] 500/115-kV Substation - Conceptual Site Plan	3-51
3-17	Northern (Lake) 500-kV Substation - Conceptual Elevation Drawings	3-52
3-18	Northern (Lake) 500-kV Substation - Single-Line Diagram	3-53
3-19	SCE 500-kV/115-kV Reinforcement Project – Line and Bus Arrangement	3-54
3-20	Northern (Lake) 115-kV Substation - Conceptual Elevation Drawing	3-55
3-21	Northern (Lake) 115-kV Substation - Single-Line Drawing	3-57
3-22	Southern (Pendleton or Case Springs) Substation Site	3-61
3-23	Southern (Pendleton or Case Springs) 500-kV Substation - Conceptual Site Plan	3-62
3-24	Southern (Pendleton or Case Springs) 230-kV Substation - Conceptual Site Plan	3-63
3-25	Southern (Pendleton or Case Springs) Substation - Single-Line Diagram	
3-25(1)	Southern (Pendleton or Case Springs) 230-kV Single-Line Diagram	3-65
3-25(2)	Southern (Pendleton or Case Springs) 500-kV Single-Line Diagram	3-66
3-26	Typical Double-Circuit 230-kV Steel Lattice Tower	3-72
3-27	Typical Double-Circuit 230-kV Steel Pole Tower	3-73
3-28	Typical Single-Circuit 69-kV Wood and Steel Cable Pole	3-73
3-29	Lake Elsinore Advanced Pumped Storage Project Conceptual Single-Line Drawing	3-83

Lake Elsinore Advanced Pumped Storage Generation Project
Talega-Escondido/Valley-Serrano 500-kV Interconnect Transmission Project

List of Figures (Continued)

<u>Figure</u>		<u>Page</u>
3-30	Aerial Photograph of Existing Lower Reservoir (Lake Elsinore)	3-85
3-31	Lake Elsinore Area – Elevation Curve	3-83
3-32	Lake Elsinore Advanced Pumped Storage Project - Conceptual Drawings	
3-32(1)	Conceptual Study – Project Layout, General Notes, and Gas-Insulated Transmission Line Profile	3-91
3-32(2)	Conceptual Study- General Plan and Profile	3-92
3-32(3)	Conceptual Study – Concrete-Faced Rockfill (CFRF) Dam Plan and Sections	3-93
3-32(4)	Conceptual Study – Concrete-Faced Rockfill (CFRF) Dam Section and Profiles	3-94
3-32(5)	Conceptual Study – Rockfill Earth-Core (RFEC) Dam Plan and Sections	3-95
3-32(6)	Conceptual Layout – Roller-Compacted Concrete (RCC) Dam Plan and Sections	3-96
3-32(7)	Conceptual Study – Roller-Compacted Concrete (RCC) Dam Sections and Details	3-97
3-32(8)	Conceptual Study – Upper Reservoir Intake and Overflow Spillway Plan and Sections	3-98
3-32(9)	Conceptual Study – Powerhouse Plan and Elevation	3-99
3-32(10)	Conceptual Study – Lower Reservoir Outlet Plan and Profile	3-100
3-33	Santa Rosa Powerhouse and Midpoint (LEAPS) Substation Sites	3-103
3-34	Midpoint (LEAPS) Substation - Conceptual Site Plan	3-104
3-35	Midpoint (LEAPS) Substation - Conceptual Elevation Drawings	3-104
3-36	Midpoint (LEAPS) Substation - Single-Line Diagram	3-106
3-37	Upper Reservoir and Tunnel Construction Staging Areas	3-113
4-1	Aerial Photographs	4-9
4-2	Trabuco Ranger District – Scenic Integrity Objectives	4-17
4-3	City of Lake Elsinore – Landscape Viewshed Units	4-18
4-4	Williamson Act Contracts	4-27
4-5	Important Farmland Maps (2004)	4-30
4-6	Trabuco Ranger District – Existing Grazing Allocations	4-34
4-7	City of Lake Elsinore – Farmlands of Significance	4-35
4-8	Riverside County General Plan – Elsinore Area Plan	4-36
4-9	Percent of Total U.S. Emissions Released by Fossil-Fuel Electricity Generation Units and Other Sources in 1999	4-43
4-10	Electrical Supply and Demand Profile for Typical Hot Summer Day in California	4-44
4-11	Critical Habitat Designations – Quino Checkerspot Butterfly	4-66
4-12	Critical Habitat Designations – Coastal California Gnatcatcher Unit 10 (San Bernardino and Riverside Counties, California)	4-67
4-13	Critical Habitat Designations – Munz’s Onion	4-68
4-14	Critical Habitat Designations – Willow Flycatcher	4-69
4-15	Critical Habitat Designations – Least Bell’s Vireo	4-70
4-16	Focused Special Status Plant Survey Areas	4-89
4-17	Arroyo Toad Focused Survey Areas	4-89
4-18	Southern Willow Flycatcher and Least Bell’s Vireo Focused Survey Areas	4-90
4-19	Coastal California Gnatcatcher Focused Survey Areas	4-92
4-20	Riverside County Stephens’ Kangaroo Rat Habitat Conservation Plan Fee Assessment Area	4-92

List of Figures (Continued)

<u>Figure</u>		<u>Page</u>
4-21	Western Riverside County Multi-Species Habitat Conservation Plan	4-99
4-22	Major Vegetation Types Located within Camp Pendleton	4-100
4-23	Federally Listed Threatened and Endangered Plant and Wildlife Species at Camp Pendleton	4-101
4-24	Talega-Escondido Transmission Line – Vegetation Communities, Cover Types, and Special Status Botanical Species	4-102
4-25	Talega-Escondido Transmission Line Special Status Wildlife Species and Critical Habitat	4-121
4-26	South Coast Ecoregion – South Coast Missing Linkages	4-121
4-27	Santa Ana – Palomar Mountains Linkage	4-122
4-28	1901 USGS Topographic Quadrangle	4-133
4-29	Earthquake Fault Zones	4-143
4-30	Elsinore Fault	4-144
4-31	Physiographic Provinces of Southern California	4-159
4-32	City of Lake Elsinore – Geologic Formations	4-160
4-33	City of Lake Elsinore - Seismic Hazards	4-161
4-34	Liquefaction Susceptibility in the Lake Elsinore Area	4-162
4-35	Preliminary Geologic Map - Santa Ana 30' x 60' USGS Quadrangle (1999)	4-163
4-36	Major Structural Blocks of the Northern Peninsular Ranges Batholith	4-164
4-37	Geologic Map – San Bernardino and Santa Ana 30x60-Minute Quadrangles (2006)	4-165
4-38	Major Earthquake Faults	4-166
4-39	Geologic Map - Elsinore 7.5-Minute USGS Quadrangle (2003)	4-167
4-40	Geologic Map - Lake Elsinore 15-Minute Quadrangle (1959)	4-168
4-41	Geologic Maps - Fallbrook and Margarita Peak 7.5-Minute Quadrangles	4-166
4-42	Geologic Map – Oceanside 30x60-Minute Quadrangle	4-170
4-43	General Soil Map – Western Riverside County	4-171
4-44	Soil Survey Map – Upper Reservoir Sites	4-172
4-45	Soil Survey Map – LEAPS Powerhouse Site and Outlet Structure	4-173
4-46	Fault Map of California	4-174
4-47	Willard and Wildomar Faults	4-175
4-48	Percent Slope Map	4-176
4-49	Soil-Slip Susceptibility Map – Santa Ana 30'x60' Quadrangle	4-177
4-50	Skylark Airport Influence Policy Area	4-189
4-51	VFR and IFR Aeronautic Charts	4-190
4-52	Private Landing Strips	4-191
4-53	Camp Pendleton Aircraft Operations (Airspace)	4-192
4-54	Typical EMF Levels for Power Transmission Lines	4-195
4-55	Flood Insurance Rate Maps	4-203
4-56	City of Lake Elsinore – Hydrologic Resources	4-206
4-57	South Coast Hydrologic Region	4-213
4-58	San Juan Creek Watershed – Hydrologic Soils Group	4-237
4-59	San Juan Creek Watershed – Present Land Use (2000)	4-238
4-60	Lake Elsinore Elevations from 1912 through 1990	4-245
4-61	Lake Elsinore Elevations from 1992 to 2002	4-245
4-62	Fish Kill Record in Lake Elsinore	4-245
4-63	Distribution of Sediment within Lake Elsinore by Sediment Type	4-253
4-64	South Coast Hydrologic Region – Groundwater Basins	4-253
4-65	Elevation Contours of the Effective Base of Freshwater Aquifers in the Elsinore – Temescal Valleys	4-254

List of Figures (Continued)

<u>Figure</u>		<u>Page</u>
4-66	SARWQCB Order No. R8-2002-0011 [NPDES No. CAS 618033] Permit Area	4-261
4-67	SDRWQCB Order No. R9-2007-0001 – Environmentally Sensitive Areas	4-262
4-68	SDRWQCB Order No. R9-2007-0001 – Water Bodies Impaired for Sediment	4-263
4-69	County of Riverside - Hydrologic Soils Classification Group Maps	4-264
4-70	County of San Diego - Hydrologic Soils Classification Group Map	4-266
4-71	Cleveland National Forest, Trabuco Ranger District - Land Use Zones	4-277
4-72	Trabuco Ranger District – Recreational Opportunity Spectrum	4-278
4-73	Trabuco Ranger District – Inventoried Roadless Areas	4-279
4-74	Local Coastal Program	4-280
4-75	Military Operations Areas and Military Training Routes – South Southern California	4-281
4-76	Camp Pendleton - Restrictive Airspace R-2503B	4-281
4-77	Regional Aviation Airspace Profile – Special Use and Restricted	4-282
4-78	Camp Pendleton - Ground Training Operations	4-282
4-79	2005 Strategic Transmission Investment Plan	4-283
4-80	2007 Strategic Transmission Investment Plan	4-284
4-81	City of Lake Elsinore - Sphere of Influence	4-285
4-82	City of Lake Elsinore – Existing General Plan	4-286
4-83	City of Lake Elsinore – Existing Land Uses (2001)]	4-287
4-84	City of Corona – Sphere of Influence	4-288
4-85	City of Corona – Sphere of Influence Land-Use Plan	4-289
4-86	San Diego County General Plan – Land Use Policy Map	4-295
4-87	San Diego County General Plan – Community Planning Areas	4-296
4-88	Santa Margarita River Hydrologic Unit – Existing Land Uses	4-302
4-89	San Luis Rey River Hydrologic Unit – Existing Land Uses	4-303
4-90	Carlsbad Hydrologic Unit – Existing Land Uses	4-304
4-91	Aggregate Availability in Southern California	4-305
4-92	Mineral Resource Zone Designations – Western Riverside County	4-306
4-93	California Department of Health Noise/Land Use Compatibility Standards	4-311
4-94	1996 Aviation Facilities Inventory for the San Diego Region	4-315
4-95	Top Ten Counties in Population Increase in 2003	4-319
4-96	Trabuco Ranger District – Wildland Urban Interface Zones	4-329
4-97	Fire Hazard Severity Zones - Local and State Responsibility Area	4-330
4-98	Draft Fire Hazard Severity Zones (2006)	4-332
4-99	Areas of Wildfire Susceptibility - Elsinore Area Plan	4-334
4-100	Fire History (1910-2006)	4-335
4-101	County of San Diego – Fire Protection Districts	4-345
4-102	Riverside Unit – Assets at Risk	4-346
4-103	Riverside Unit – Fuel Types	4-346
4-104	Trabuco Ranger District - Recreation Fee Sites	4-357
4-105	Lake Elsinore Shoreline Zone Identification	4-363
4-106	Trabuco Ranger District – Route Inventory Maps	4-367
4-107	Trabuco Ranger District – Inventoried Roadless Areas	4-373
4-108	Elsinore Valley Municipal Water District – Service Area	4-385
4-109	Elsinore Valley Municipal Water District – Water/Supply Demand Forecast	4-385
4-110	Elsinore Valley Municipal Water District - Location of Existing Potable Water Sources	4-386
4-111	Elsinore Groundwater Basin	4-387

List of Figures (Continued)

<u>Figure</u>		<u>Page</u>
8-1	SDG&E's 230/500-kV System with the LEAPS Project)	8-9
8-2	CAISO South Regional Transmission Plan Projects	8-13
8-3	Previously Proposed Valley-Rainbow Interconnect Project	8-14
8-4	Relationship between the Proposed Projects and the Valley-Rainbow 500-kV Interconnect Project Alignments	8-15
8-5	Sunrise Powerlink Transmission Project	8-16
8-6	Sunrise Power Link Alternatives –System Alternatives	8-21
8-7	Full Loop Alternative	8-22
8-8	Tehachapi Transmission Project	8-28
8-9	Southern California Edison - Ivyglen Subtransmission Project	8-31
8-10	Southern California Renewable Energy Resources	8-37
8-11	Megawatts of Undeveloped Hydropower Potential in the California River Basins	8-37
8-12	Wind Generation and System Load Have Different Daily Patterns	8-38
8-13	Alternative Ortega Oaks Powerhouse Site	8-55
8-14	Alternative Morrell Canyon Upper Reservoir Site	8-56
8-15	Preliminary Inundation Map	8-61
8-16	Alternative Transmission Alignment	8-71
9-1	United States Electric Power Industry Net Generation	9-4

Lake Elsinore Advanced Pumped Storage Generation Project
Talega-Escondido/Valley-Serrano 500-kV Interconnect Transmission Project

List of Tables

<u>Table</u>	<u>Page</u>
2-1 San Diego Gas & Electric Company – Historic Peak Load Demand	2-7
2-2 California Energy Commission – Peak Demand Forecast for SCE and SDG&E Service Areas	2-14
2-3 California Independent System Operator – 2015 Load Summary	2-15
2-4 Summary Benefits and Net Benefits of the TE/VS Interconnect Project, LEAPS Project, and Combined TE/VS and LEAPS Projects	2-21
2-5 Energy and Ancillary Services (AS) Benefits of the TE/VS and LEAPS\ Projects Using Plexos Modeling	2-22
2-6 Additional Benefits	2-22
2-7 Ancillary Services MW Limits	2-22
2-8 Cost of 500 MW of Emission Reduction Credits in the South Coast Air Quality Management District	2-23
3-1 TE/VS Interconnect Project and LEAPS Project Facilities	3-4
3-2 Phase Shifting Transformer Angular Range Analysis – Power Flow Testing of System Conditions and Associated Angular Phase Shifts	3-59
3-3 LEAPS Project - Summary of Principal Characteristics	3-81
3-4 LEAPS Project Weekly Cycle – Hydraulic Maximum Drawdown and Active Storage Balance	3-87
3-5 Lake Elsinore Area Elevation Data	3-88
3-6 LEAPS Project - Powerhouse Equipment Characteristic	3-107
3-7 LEAPS Project - Preliminary Intake Design Hydraulic Specifications	3-109
3-8 TE/VS Interconnect Project Schedule	3-120
3-9 Discretionary Permits, Approvals, and Consultation	3-121
4-1 Ambient Air Quality Standards for Criteria Pollutants, Major Pollutant Source, and Primary Health Effects	4-42
4-2 Overview of Common Greenhouse Gases	4-43
4-3 Attainment Designations - Western Riverside County and Northern San Diego County	4-48
4-4 Final Environmental Impact Statement - Summary of Species and Critical Habitat Finding	4-52
4-5 Jurisdictional Acreage	4-54
4-6 Summary of Biological Resource Survey Types, Quantities, and Year Performed	4-57
4-7 Plant Communities – Acreage in Study Area	4-59
4-8 Special Status Plant Species	4-73
5-9 Sensitive Wildlife Species	4-82
4-10 Federally Listed Threatened and Endangered Plant and Wildlife Species at Camp Pendleton	4-111
4-11 Talega-Escondido 230-kV Transmission Line – Vegetation Communities Located within Study Area	4-114
4-12 Maximum Credible Earthquakes and Recurrence Intervals for Key Southern California Faults	4-146
4-13 Hazard, Safety, and Nuisance-Related LORS	4-182
4-14 Magnetic Fields as a Function of Distance from Power Lines	4-194
4-15 2002 CWA Section 303[d] List of Water Quality Limited Segments	4-201
4-16 Typical Contaminant Sources for Urban Storm Water Runoff	4-209

Talega-Escondido/Valley-Serrano 500-kV Interconnect Project

Lake Elsinore Advanced Pumped Storage Project

List of Tables (Continued)

<u>Table</u>		<u>Page</u>
4-17	Typical Contaminant Loading in Runoff for Various Land Uses	4-209
4-18	Hydrologic Units, Areas, and Subareas	4-210
4-19	Daily Discharge Statistics for USGS Gage No. 1107055 – San Jacinto River at Elsinore, California for Water Years 1975-2004	4-243
4-20	Average Sediment Properties by Type for Lake Elsinore	4-248
4-21	Daily Discharge Statistics for USGS Gage No. 11046530, San Juan Creek at La Novia Street Bridge Near San Juan Capistrano for Water Years 1986-2004	4-251
4-22	San Juan Basin Water Quality Data (1987)	4-252
4-23	Beneficial Uses	4-256
4-24	SDRWQCB Order No. R9-2007-0001 - Common Watersheds and Section 303(d) Impaired Waters	4-259
4-25	Cleveland National Forest - Suitable Uses Commodity and Commercial Uses	4-271
4-26	Annual Aircraft Operations	4-317
4-27	Population Growth (1990, 2000, and 2003)	4-319
4-28	Total Employment by Sector (1999 and 2000)	4-321
4-29	Employment Projections by Industry (2005-2025)	4-322
4-30	1999 Median Income	4-322
4-31	Growth Projections	4-323
4-32	Elsinore Valley Municipal Water District Service Area - Population and Employment Forecasts	4-323
4-33	Western Riverside County Fire Department Battalion 2 Fire Stations and Equipment Serving the City of Lake Elsinore	4-340
4-34	Northern San Diego County Fire Protection Districts' Fire Stations and Equipment	4-344
4-35	Description of Recreational Opportunity Spectrum Classes	4-356
4-36	Lake Elsinore Elevation and Volume in Main Basin	4-358
4-37	Shoreline Locations Potentially Affected by Lake Level Fluctuations	4-359
4-38	City of Lake Elsinore Revenues from Sale of Lake Day Use Passes (January 1-December 10, 2004)	4-360
4-39	City of Lake Elsinore Climate Summary – Temperatures and Precipitation	4-379
4-40	Elsinore Valley Municipal Water District – Existing Potable Water Sources	4-379
5-1	CEQA Compliance Matrix	5-3
5-2	CEQA/NEPA Cross Reference Guide	5-4
5-3	Talega-Escondido/Valley-Serrano 500-kV Interconnect Project Environmental Impacts Identified	5-5
5-4	Lake Elsinore Advanced Pumped Storage Project Environmental Impacts Identified	5-9
6-1	Generalized Geographic Scope of Cumulative Impacts	6-2
7-1	SCAQMD Air Quality Significance Thresholds	7-4
7-2	SDAPCD Thresholds for Stationary Sources	7-5
7-3	Additional Mitigation Measures Identified by the CPUC/BLM Talega-Escondido/Valley-Serrano 500-kV Interconnect Project	7-15
7-4	Additional Mitigation Measures Identified by the CPUC/BLM Lake Elsinore Advanced Pumped Storage Project	7-21
8-1	Planned Nameplate Capacity Additions from New Generation by Energy Source (2006-2010)	8-33

List of Tables (Continued)

<u>Table</u>		<u>Page</u>
8-2	Comparative Grading Quantities – Powerhouse	8-48
8-3	Comparative Design Characteristics - Decker Canyon and Morrell Canyon Upper Reservoirs	8-53
8-4	Lengths of Shafts and Tunnels for High-Head Conductor – Decker Canyon and Morrell Canyon Upper Reservoirs	8-54
9-1	Population, Housing, and Employment Growth – San Diego Region	9-1
9-2	California Gross-System Power (2006)	9-5
11-1	Applicant’s List of PEA Participants	11-2