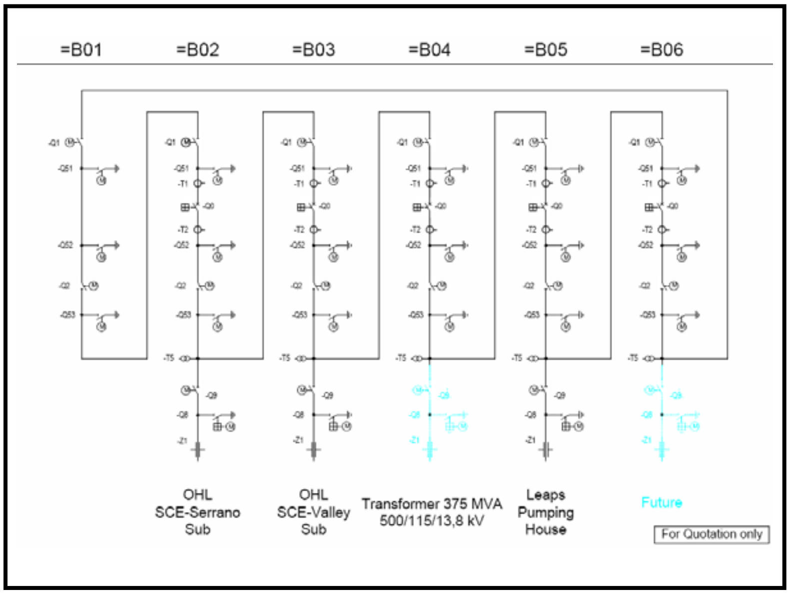
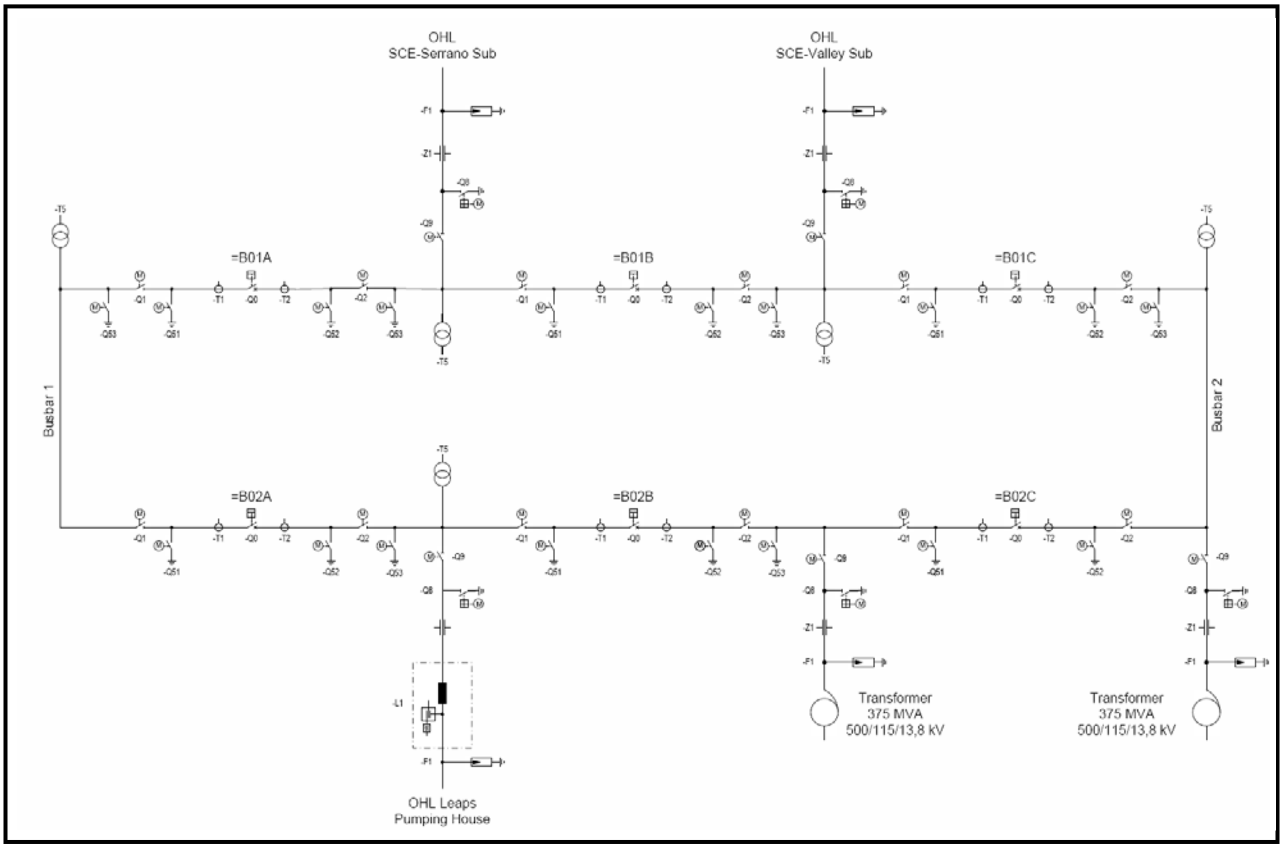


Figure 3-21
NORTHERN (LAKE) 115-KV SUBSTATION SINGLE-LINE DIAGRAM
Source: Siemens Power Transmission & Distribution

Rated voltage	145 kV
Rated frequency	50 Hz
Rated lightning impulse withstand voltage	650 kV
Rated power frequency withstand voltage	275 kV
Rated current busbar	1250 A
Rated current feeder	1250 A
Rated short - time withstand current	31,5 kA / 1s
Rated short - circuit breaking current	31,5 kA
Indoor ambient temperature	__°C
Closing (Insertion) Resistor	yes / no
Rated switching impulse withstand voltage	____ kV



The GIS building will be one structure with an internal wall which will serve as the line of demarcation between the parties.

The proposed GIS configuration consists of three bays of 1½ CB 500-kV switchgear (Siemens 8DQ1). Bays 1 and 2 are for the connection to the Valley-Serrano line and the SCE 115-kV reinforcement project. The third bay is for the LEAPS and TE/VS Interconnect 500-kV connection. The 500-kV GIS connection to the LEAPS and TE/VS Interconnect 500-kV OHL is done using the third breaker and a half scheme, as shown in Figure 3-16 (Northern [Lake] 500-kV/115-kV Substation - Conceptual Site Plan). All equipment will be rated at 550-kV, 4000A, and 63kA. The new substation will require a connection to SCE's existing SCE 13.8-kV lines for station power and, as an option, five circuits, of 115-kV loop in/out connection.

The connection to the SCE 115-kV reinforcement project is done using the second breaker and a half scheme, as shown in Figure 3-16 (Northern [Lake] 500-kV/115-kV Substation - Conceptual Site Plan). This connection would serve to eliminate the Elsinore substation or Skylark substation 115-kV connections from the Midpoint (LEAPS) substation. This 115-kV tie would likely include a tap changing transformer for flow control and may include fault current upgrades to SCE's existing Elsinore or Skylark substations.

Conceptual elevation drawings for the 115-kV substation are presented in Figure 3-20 (Northern [Lake] 115-kV Substation – Conceptual Elevation Drawings) and technical data is presented in Figure 3-21 (Northern [Lake] 115-kV Substation – Single-Line Diagram).

◊ **Southern (Pendleton or Case Springs) substation**.[25] The proposed Southern (Pendleton or Case Springs) 230-kV gas-insulated substation (GIS), located near existing Tower No. 163 (Z322651), shall serve as the southern interconnection. As illustrated in Figure 3-22 (Southern [Pendleton or Case Springs] Substation Site), the approximately 35-acre new Southern substation (500-kV, 230-kV, 69-kV upgrades/voltage support, and 13.8-kV station power) will be located near the SDG&E's existing 230-kV transmission lines on publicly owned lands near the northern border of Camp Pendleton and the southern border of the TRD. SCE's existing 230-kV transmission lines extend between SDG&E's existing Talega and Escondido substations. The loop-in consists of Tower 163 removal, installation of two 230-kV anchor bolted dead-end steel poles, and hardware and conductor.

The SDG&E 230-kV GIS will include: (1) breaker and a half bus design; (2) the initial 4-bay arrangement of the GIS will accommodate four transmission line positions, three bank positions, and one spare position; the ultimate arrangement will allow for a future fifth bay; (3) 12-230-kV circuit breakers and the associated disconnect switches, ground switches, potential transformers, and gas-insulated

[25]/ As part of the LEAPS project, pumped storage electrical generation from the Santa Rosa powerhouse will be connected to a new substation, identified as the Midpoint (LEAPS) substation, where the voltage will be stepped up to 550 kV. The generation will be transmitted via a 500-kV transmission line to the GIL. The 500-kV transmission will then be brought overhead about 16.7 miles to the Southern (Pendleton or Case Springs) substation where it will be stepped down to 230-kV via three (3) 550/230-kV transformers, then through three 230/230 phase shifting transformers. The leads from the phase shifting transformers will be connected overhead to the bus work of the newly constructed Southern (Pendleton or Case Springs) substation.

bus; (4) two station service transformers; (5) three metering units; (6) required line synchronizing potential transformers; (7) all structures & foundations, busses and equipment within switchyard fence; (8) a dedicated block wall control house, substation below grade conduits and cables, protection systems, supervisory control/telecommunications equipment, batteries and low voltage circuits (all the required protection, metering, telemetering, SCADA and communication equipment and systems); (9) ground grid; (10) lighting; (11) transmission line air-to-gas transitions into the GIS; and (12) air-to-gas transitions for the phase shifting transformer leads.

The new Southern 500-kV/230-kV substation will include flow control. Three phase-shifting transformers, sized for nominal operation at 25-30 degrees with a southern flow of 1,500 MW, are proposed. A phase-shifting transformer angular range analysis has been conducted and is included in Table 3-2 (LEAPS Project Phase Shifting Transformer Angular Range Analysis – Power Flow Testing of System Conditions and Associated Angular Phase Shifts).

A conceptual site plan of the new Southern substation is presented Figure 3-23 (Southern [Pendleton or Case Springs] 500-kV Substation - Conceptual Site Plan) and Figure 3-24 (Southern [Pendleton or Case Springs] 230-kV Substation – Conceptual Site Plan). The Southern substation is electrically depicted in Figure 3-25 (Southern [Pendleton or Case Springs] Substation - Single-Line Diagram).

Table 3-2
PHASE SHIFTING TRANSFORMER ANGULAR RANGE ANALYSIS
Power Flow Testing of System Conditions and Associated Angular Phase Shifts

LEAPS Project Phase Shifting Transformer Angular Range Analysis
Power Flow Testing of System Conditions and Associated Angular Phase Shifts

Siemens PTI
July 10, 2007

Case No.	SDGE Net Ties (MW)	SCE Net Ties (MW)	Path 44 Flow (MW)	LEAPS Gen (MW)	LEAPS Phase Shifters Flow (MW)	LEAPS Phase Shifters Angle (Degrees)	Case Description
1	-3016	-6941	163	500	1.000	-20,63	2015 Heavy Summer CAISO Jan. 26,2007 Testimony Case - Green Path +Leaps
2	-3051	-7003	939	500	1.340	-6,16	Same as Case 1 with Imp. Val.-Miguel 500 kV Line Out
3	-3017	-7460	117	0	1.001	-24,57	Same as Case 1 with LEAPS Generation Off
4	-3051	-7530	930	0	1.336	-24,57	Same as Case 3 with Imp. Val.-Miguel 500 kV Line Out
5	-3016	-6941	716	500	243	0,00	Same as Case 1 with LEAPS Phase Shifters at 0 Degrees
6	-3016	-6941	890	500	7	6,70	Same as Case 1 with LEAPS Phase Shifters at 0 MW Flow
7	-3016	-6941	972	0	9	5,98	Same as Case 3 with SCE Gen up 320 MW, LEAPS Phase Shifters at 0 MW Flow
8	-2556	-6941	-84	500	999	-24,71	Same as Case 1 with Otay Mesa ON Max (All SDGE Generation on at Max)
9	-2457	-7453	-139	0	994	-27,12	Same as Case 8 with LEAPS Generation Off
10	-4004	-6621	750	500	1.000	-16,44	Same as Case 3 with Encina Off, SCE Gen up 320 MW, 660 MW Added in Palo Verde Area
11	-4004	-6621	1491	500	7	12,70	Same as Case 10 with LEAPS Gen On, Phase Shifters at 0 MW Flow
12	-4004	-6621	1161	500	447	0,00	Same as Case 10 with LEAPS Gen On, Phase Shifters at 0 Degrees
13	-4002	-6401	935	500	1.002	-14,71	Same as Case 10 with Solar A Off, 230 at Mtn Vista, 670 in Palo Vere Area
14	-4005	-7151	742	0	1.000	-18,68	Same as Case 10 with LEAPS Generation Off
15	-4053	-6402	1811	500	1.440	-16,27	Same as Case 10 with Loss of Imp. Val.-Miguel 500 kV Line
16	-4056	-6925	1810	0	1.427	-18,61	Same as Case 10 with LEAPS Gen Off, Loss of Imp. Val.-Miguel 500 kV Line
17	-4044	-8166	-68	500	1.391	-16,27	Same as Case 10 with Loss of Two SONGS Units
18	-1291	-2997	767	-600	-615	11,05	2010-11 Light Winter CSRTP Case, LEAPS pumping 600, supplied from SDGE
19	-1929	-2370	1197	-600	-613	15,48	Same as Case 18 with Palomar and Encina Off, SCE Gen up 620 MW
20	-1932	-2947	1144	-600	-615	15,43	Same as Case 18 with Palomar and Encina Off, 620 MW Gen in Palo Verde Area
21	-3017	-6941	165	500	1.000	-24,39	Same as Case 1 with one Case Springs Phase Shifter out of service
22	-3017	-6941	-4	500	1.228	-34,94	Same as Case 21 and remaining two phase shifters at 124% of nominal rating
23	-3051	-6980	907	500	1.376	-20,63	Same as Case 2 with phase angles held same as in Case 1 (no auto change)

Notes - SDGE and SCE Net Tie Flows - Negative Value is import
Path 44 Flow south (SCE to SDGE) is Positive Value
LEAPS Phase Shifter Flow from LEAPS toward Case Springs 230 kV Bus is a Positive Value
LEAPS Phase Shifter Angle is measured at the side near the 500/230 kV Transformers, flow values are measured on Case Springs 230 kV side

Source: Siemens Power Transmission & Distribution

- **Facility modifications and upgrades**. Separately addressed below are upgrades and other modifications to SCE's and SDG&E's existing transmission facilities that have been identified as needed to accommodate power flows from the TE/VS Interconnect in each utility's respective interconnection facilities studies (IFS), as conducted for the LEAPS and TE/VS Interconnect projects. The Applicant understands that these upgrades will be needed in the event either the TE/VS Interconnect only or the combined TE/VS Interconnect and LEAPS projects are built.

  The Applicant notes that SCE and SDG&E, along with the CAISO, rather than TNHC, have responsibility to identify upgrades to the utilities' respective existing systems that may be needed to accommodate TNHC's proposed new transmission line. TNHC reports here the upgrades that the utilities have identified to date.[26]

  It is the Applicant's understanding that construction and operation of the TE/VS Interconnect project will require certain improvements to SCE's existing Valley substation (Romoland, Riverside County) and Serrano substation (Orange, Orange County) and SDG&E's existing Talega substation (Camp Pendlteton, San Diego County) and Escondido (Escondido, San Diego County) substations.

  Because these substation modifications would occur in areas that are already graded and surfaced, only minimal additional disturbance to those areas would be anticipated as a result of any project-related improvements. As identified by the two utilities, the utility-identified upgrades and improvements to existing SCE and SDG&E facilities are described below. The list of improvements may, however, be subsequently modified in accordance with the provisions of the large-generator interconnection agreements (LGIAs) that will be executed between the Applicant and SCE and between the Applicant and SDG&E.

  ◊ **Southern California Edison Company upgrades**.[27] The SCE-IFS concluded that introduction of the new LEAPS generation would trigger one single-contingency overload (Etiwanda-Vista 220-kV transmission line) and aggregate six pre-existing single-contingency and double-contingencies caused by presumed prior interconnections of facilities that are ahead of the LEAPS project in the CAISO's generation interconnection queue. The analysis further identified four 500-kV, 21 220-kV, and 21 115-kV locations where the LEAPS project caused an increase on the three-phase short-circuit duties of 0.1 kA or more and indicated that all circuit breakers at those locations should be evaluated.

    Those overloads and the actions required to address them, whether predicated by the LEAPS project or other facilities ahead of the proposed project in the Application Queue, are listed below.

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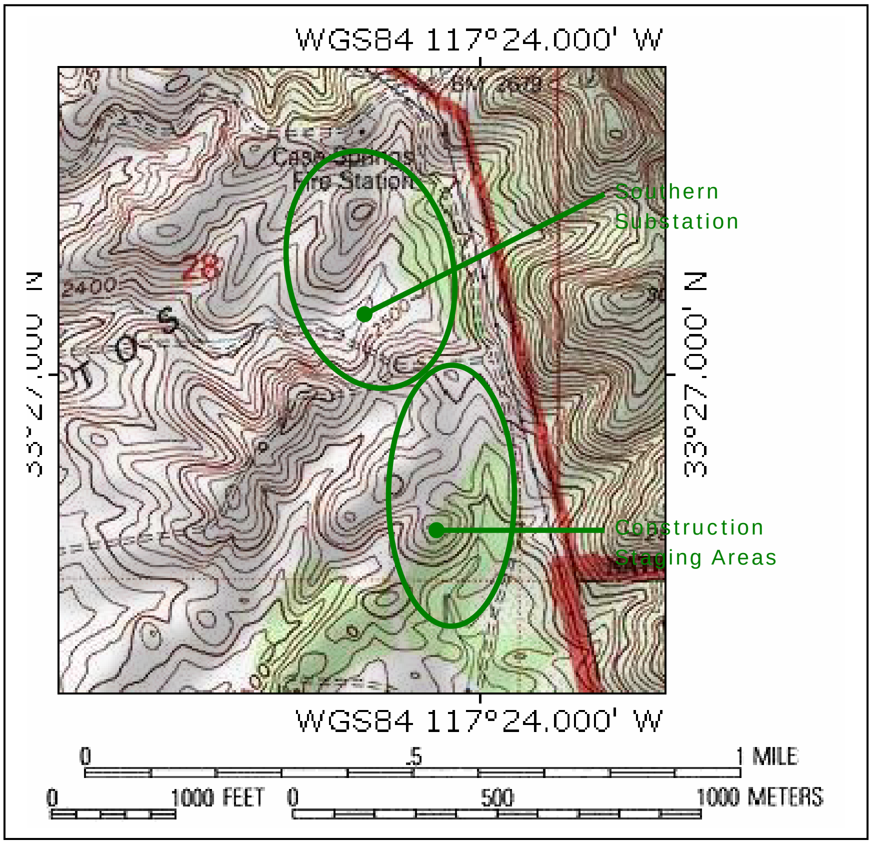
[26]/ TNHC formally requested in 2005 that the CAISO direct SDG&E to study, in connection with TNHC's request for interconnection of the proposed LEAPS project, the effects on SDG&E's system of incremental imports of 1000 MW of power via the TE/VS Interconnect project. The CAISO determined that SDG&E's generation interconnection studies would address the effects of the 500 MW of LEAPS generation, while the CAISO's own transmission planning process would evaluate the proposed 1000 MW incremental transmission import from the TE/VS Interconnect project. The CAISO has not provided TNHC with the results of such an evaluation.

[27]/ On January 25, 2007, the CPUC approved SCE's CPCN for the Palo Verde-Devers Line No. 2 (PVD-2) project. The PVD-2 project is a 230-mile 500-kV transmission line from the Haraquahala Generating Company's Harquahala switchyard (near Phoenix, Arizona) to SCE's Devers substation near Palm Springs. In May 2007, the Arizona Corporation Commission rejected SCE's application. SCE is currently revisiting the system impact study for the proposed interconnection due to the resulting delays in PVD-2.



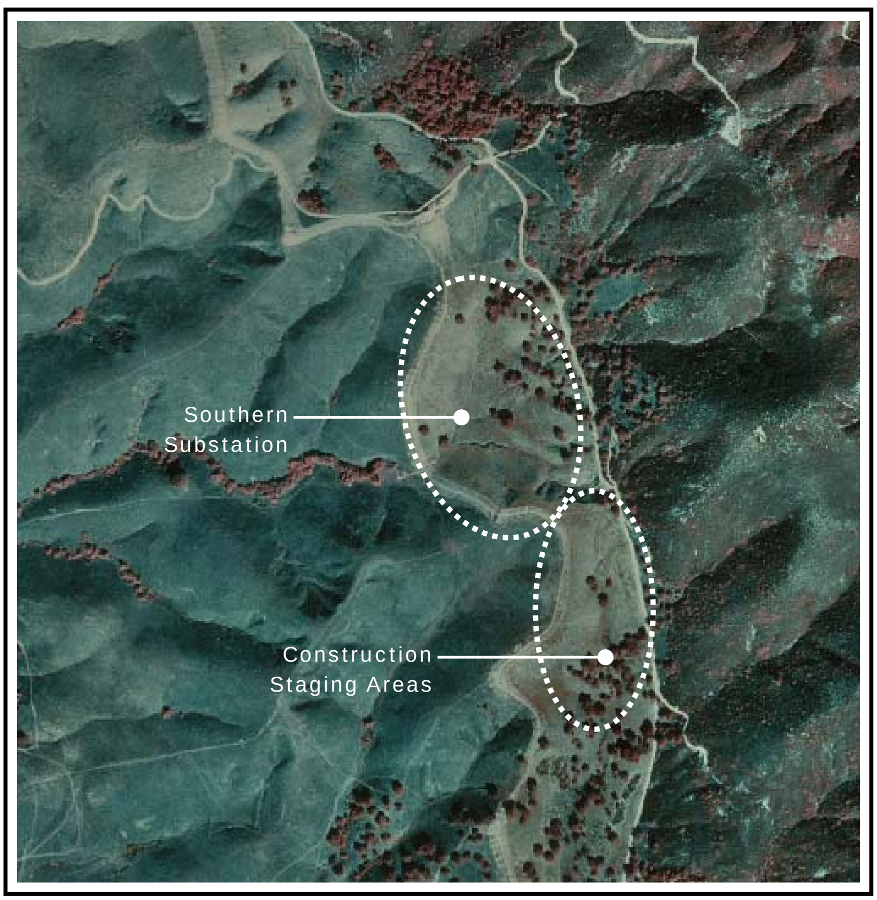


Figure 3-22
SOUTHERN (PENDLETON OR CASE SPRING) SUBSTATION SITE
Source: The Nevada Hydro Company, Inc.

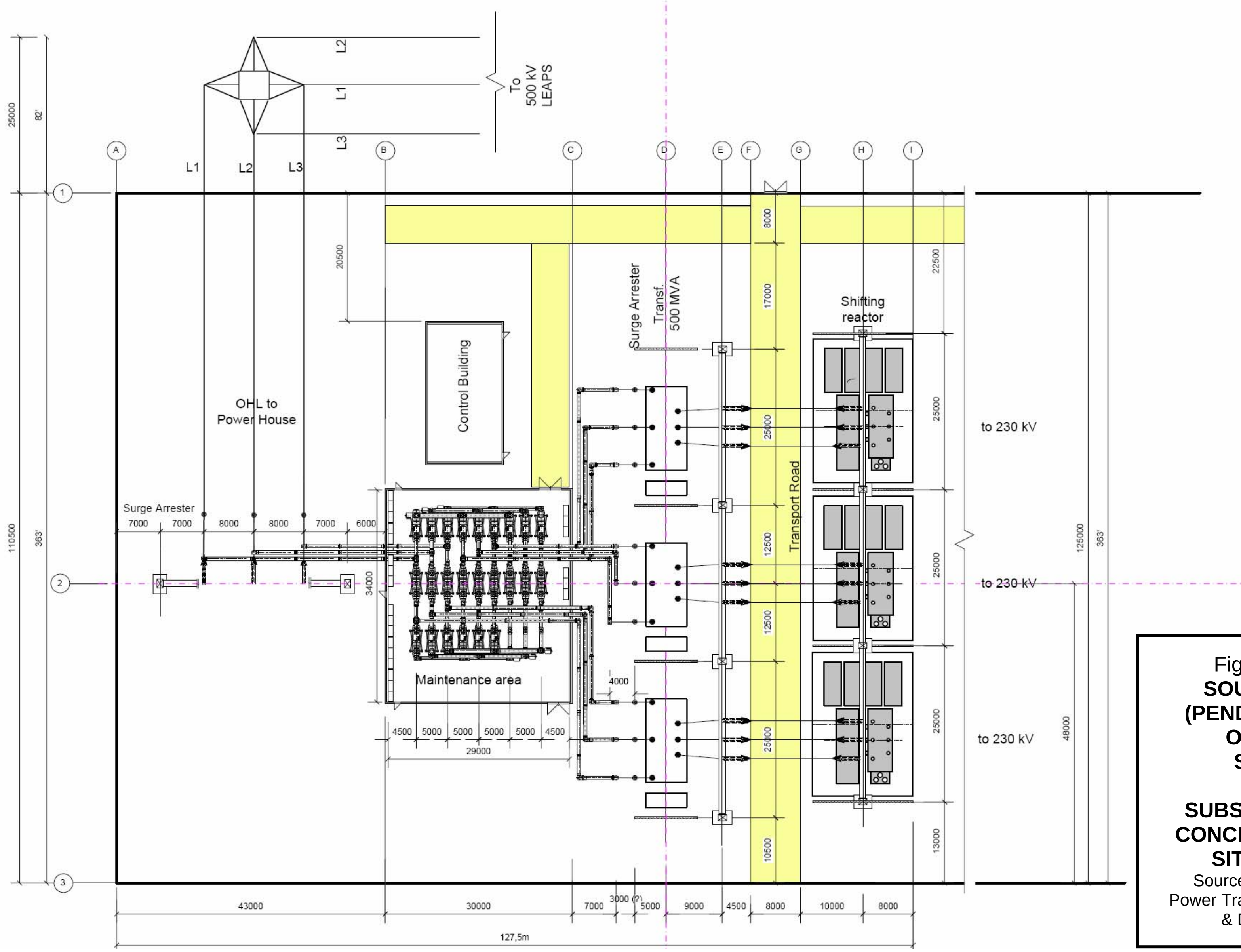


Figure 3-23
SOUTHERN (PENDLETON OR CASE SPRING) 500-KV SUBSTATION CONCEPTUAL SITE PLAN
Source: Siemens Power Transmission & Distribution

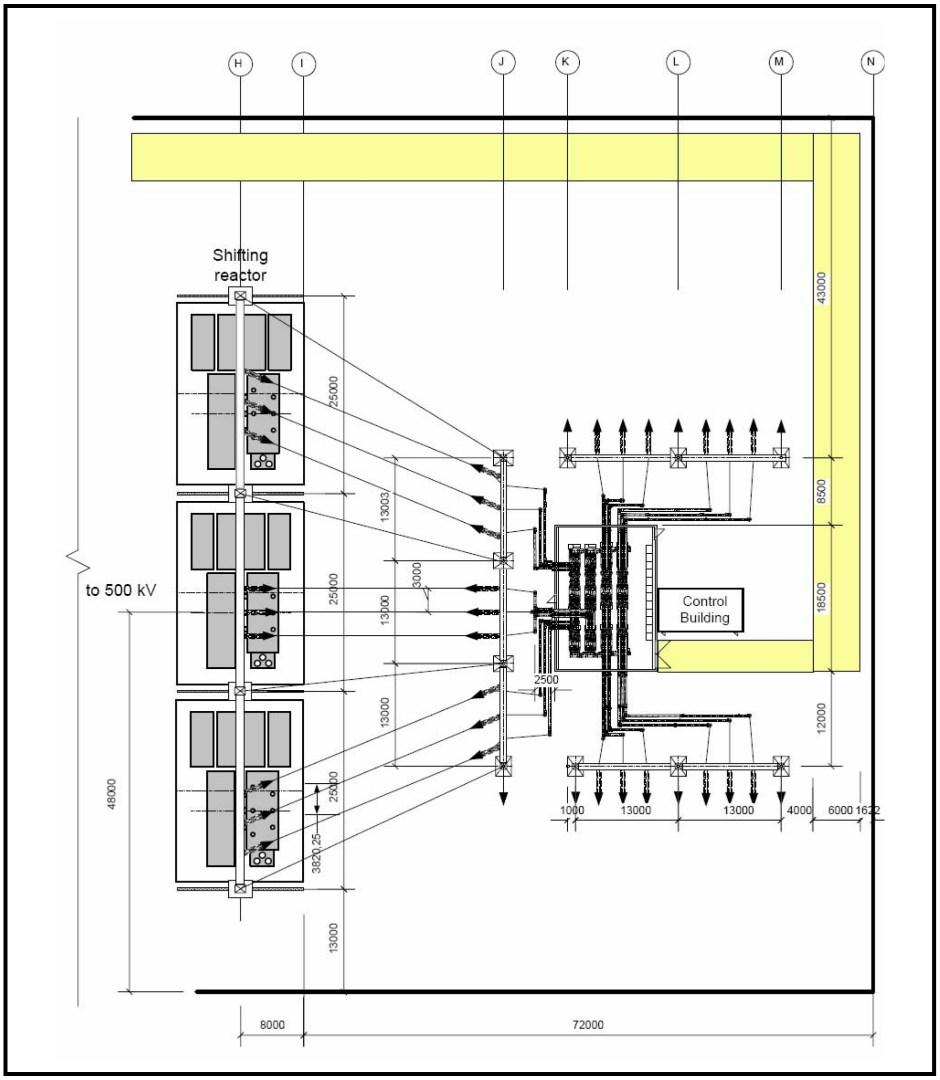


Figure 3-24
SOUTHERN (PENDLETON OR CASE SPRING) 230-KV SUBSTATION CONCEPTUAL SITE PLAN
Source: Siemens Power Transmission & Distribution

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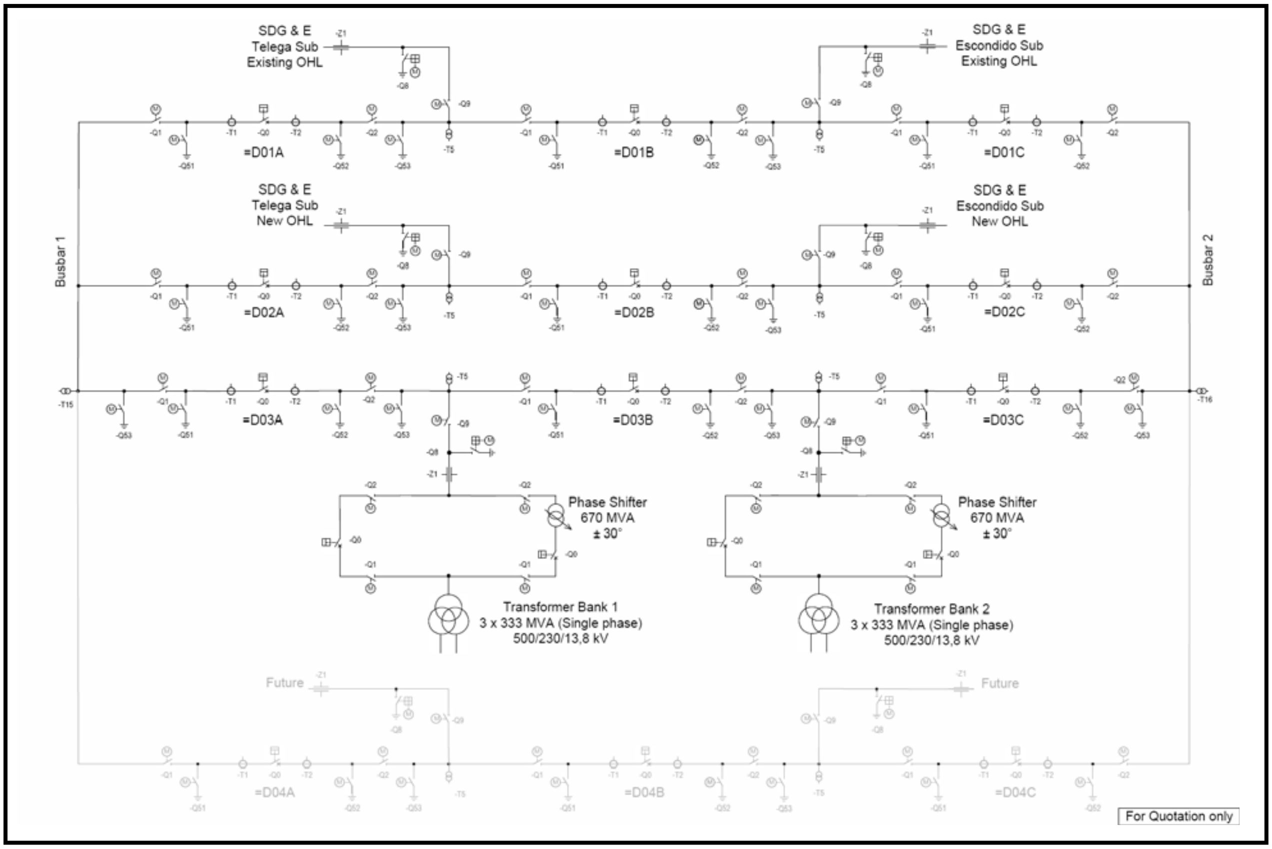
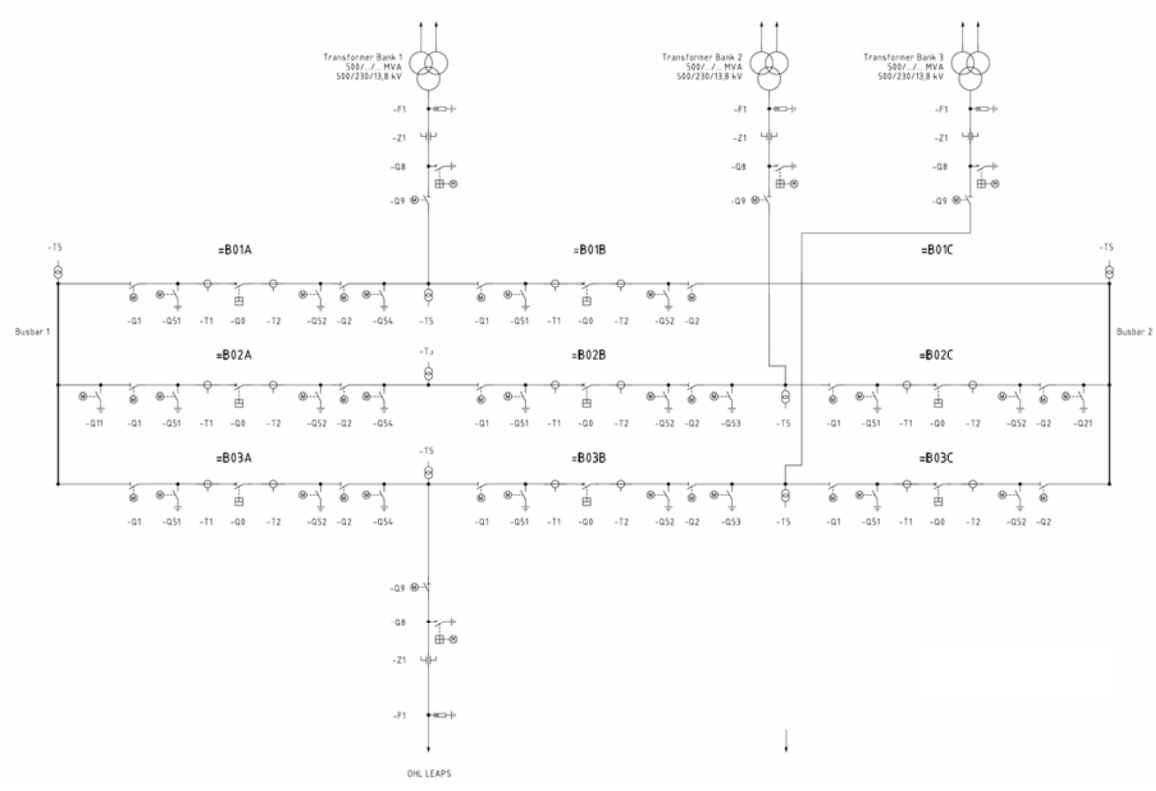
Rated voltage	245 kV
Rated frequency	60 Hz
Rated lightning impulse withstand voltage	1050 kV
Rated power frequency withstand voltage	460 kV
Rated current busbar	1250 A
Rated current feeder	1250 A
Rated short - time withstand current	31,5 kA / 1s
Rated short - circuit breaking current	31,5 kA
Indoor ambient temperature	-5°C…+40°C
Outdoor ambient temperature	-5°C…+49°C

Figure 3-25 (1 of 2)
SOUTHERN (PENDLETON OR CASE SPRINGS) 230-KV SUBSTATION SINGLE-LINE DIAGRAM
Source: Siemens Power Transmission & Distribution



Rated voltage	550 kV
Rated frequency	60 Hz
Rated lightning impulse withstand voltage	1150 kV
Rated power frequency withstand voltage	740 kV
Rated current busbar	4000 A
Rated current feeder	4000 A
Rated short - time withstand current	63/ 1s
Rated short - circuit breaking current	63 kA
Indoor ambient temperature	-5°C…+40 °C
Outdoor ambient temperature	-5°C…+49 °C

Figure 3-25 (2 of 2)
SOUTHERN (PENDLETON OR CASE SPRINGS)
500-KV SUBSTATION
SINGLE-LINE DIAGRAM
Source: Siemens Power Transmission & Distribution



- Etiwanda-San Bernardino 220-kV T/L. Eliminate the existing line-to-ground clearance restrictions to restore the line conductor rating to N=2480, N-1=2850, and N-2=3350A and replace two 1200A disconnect switches at Etiwanda with 3000A rated to support 60% of highest contingency load of 3093A or 1855A.
- San Bernardino-Vista 220-kV T/L. Upgrade the line by replacing 2-1033KCMIL ACSR conductors with new 2-1590KCMIL ACSR rated N=3230, N-1=3710, and N-2=4360A and replace four 2000A disconnect switches at each San Bernardino and Vista (total of 8) with 3000A rated to support 60% of highest contingency load of 3745A or 2250A.
- Etiwanda-Vista 220-kV T/L. Replace 2000A wave trap at Etiwanda with 3000A rated and N-2 rating of 3210A to support the highest contingency load of 3071A.

As further indicated by SCE, TNHC's interconnection facilities shall consist of one interconnection position in the TNHC's 500-kV switchrack, using double bus-double breaker configuration, two 500-kV circuit breakers, associated meters, metering equipment, protective relays disconnects, associated 500-kV generation tie-line (Northern [Lake]-Midpoint [LEAPS] 500-kV generation tie-line), and appurtenant facilities.

SCE's interconnection facilities at the Northern (Lake) substation shall include the following: (1) install one dead-end structure (108-feet high by 90-feet wide); (2) install three 500-kV CCVT potential devices; (3) install three 500-kV surge arresters; (4) install three 500-kV 4000A wave traps and line tuners; (5) install three line tie-downs with 2-2156KCMIL ACSR conductors; (6) install dual communication channels on separate routes to support the line protection relays on the new Lake-LEAPS 500-kV transmission line (T/L); one of the communication channels will be provided by installing OPGW on the new 500-kV transmission line; (7) install new light-wave and channel equipment to support Lake-LEAPS 500-kV T/L protection, supervisory control and data acquisition (SCADA) and applicable SCE voice and data requirements; (8) construct approximately six miles of new ADSS fiber optic cable to extend existing SCE fiber optic cable from either the Elsinore or Skylark substations to the LEAPS generating facility; the combined (existing + new) fiber optic cable provides the required alternate route between Lake substation and the LEAPS generating facility; (9) install the following relay protection devices for the Lake-LEAPS gen-tie line protection (a) two GE C60 breaker management relays, (b) one SEL-311L line current differential (digital F.O. channel), (c) one GE L90 line current differential (digital F. O. channel), (d) install one GE D60 directional comparison pilot relaying (digital F.O./MW channel), (e) install one RFL 9745 tele-protection channel DTT (digital F.O. channel), (f) install one RFL 9745 tele-protection channel DTT (M/W channel), (g) install one 32/64 digital fault recorder, (h) install one Ethernet service drop, and (h) install one SEL-2030; (10) install one RTU at Lake substation to monitor the typical bulk power elements such as MW, MVAR, and phase amps at each line and also kV at lines and busses and all circuit breaker status/control, protection relays status and alarms; (11) the RTU will transmit information to the SCE Grid Control Center via the existing Mira Loma Regional Control Center System.

SCE interconnection facilities at the LEAPS generating facility shall consist of the installation of new light wave and channel equipment to support Northern (Lake)-Midpoint (LEAPS) 500-kV generation tie-line protection, SCADA, and applicable SCE voice and data requirements.

SCE's reliability network upgrades at the Northern (Lake) substation shall include the following: (1) engineer and construct a new 500-kV interconnection facility to loop the Serrano-Valley 500-kV T/L and provide one 500-kV line position to terminate TNHC's 500-kV line; (2) install two 500-kV operating buses covering three positions; (3) install three bus dead-end structures (60-feet high by 90-feet wide); (4) install twelve bus dead-end insulator assemblies; (5) install three 500-kV potential devices; (6) install two 270-foot sections of 2-2156KCMIL ACSR bus conductors (approximately 3,250 feet of conductor); (7) Position 1 (a) install one dead-end structure (108-feet high by 90-feet wide), (b) install three 500-kV - 3000A – 40 kA circuit breakers, (c) install six 500-kV horizontal mounted group operated disconnect switches; two of them equipped with grounding attachments, (d) install six 500-kV bus supports, (e) install three 500-kV CCVT potential devices, (f) install three 500-kV surge arresters, (g) install three 500-kV, 4000A wave traps and line tuners, (h) install three line tie-downs with 2-2156KCMIL ACSR conductors, (g) install three 660-foot sections 2-2156KCMIL ACSR bus conductors (approximately 4.000 feet of conductor); (8) Position 2 install one line dead-end structure (108-feet high by 90-feet wide) to terminate the conductors from the Serrano 500-kV T/L at position 2N and cross them over to the structure at position 1S; (9) Position 3 (a) install one dead-end structure (108-feet high by 90-feet wide), (b) install two 500-kV - 3000A – 40 kA circuit breakers, (c) install four 500-kV horizontal mounted group operated disconnect switches; one of them equipped with grounding attachments, (d) install fifteen 500-kV bus supports, (e) install three 500-kV CCVT potential devices, (f) install three 500-kV surge arresters, (g) install three 500-kV, 4000A wave traps and line tuners, (h) install three line tie-downs with 2-2156KCMIL ACSR conductors, (i) install three 660-foot sections 2-2156KCMIL ACSR bus conductors (approximately 4,000 feet of conductor); (10) Mechanical-Electrical Equipment Room (MEER) install a new 30-foot by 20-foot MEER building to house the following equipment (a) batteries and battery charger, (b) light and power selector switch, (c) light and power panel, (d) A.C. distribution panel, and (e) D.C. distribution panel; (11) Protection Relays (500-kV T/L) install the following relays at each of the two remaining line positions (a) two G.E. C60 breaker management relays, (b) one SEL-311L line current differential (digital F.O. channel), (c) one G.E. L90 line current differential (digital F.O. channel), (d) one G.E. D 60 directional comparison pilot relaying (digital F.O./MW channel), (e) one RFL 9745 tele-protection channel DTT (digital F.O. channel), and (f) one RFL 9745 tele-protection channel DTT (M/W channel); (12) Others (a) install one 32/64 digital fault recorder, (b) install one Ethernet service drop, (c) install one SEL-2030 connected to all three SEL-311L relays; and (13) Other station elements to be Installed (a) install Telecommunications tower and MW dish antenna, (b) install 2,320 linear feet of 8-foot perimeter fence with double barbed wire to cover a 760-foot by 400-foot area, (c) install one 20-foot double door driveway gates, (d) install grounding grid to cover a 766-foot by 406-foot area (3 feet outside the perimeter fence), (e) perform grading and site preparation of a 780-foot by 420-foot area (10 feet outside the perimeter fence), (f) install approximately 2,000 linear feet of 25-foot paved driveway, and (g) install approximately 1,500 linear feet of control cable trench.

SCE's reliability network upgrades at the Serrano substation shall include the following: (1) upgrade the Valley 500-kV line protection as needed to change the line to a new Lake 500-kV T/L; (2) replace the existing LFCB relay with a new SEL-311L line current differential relay and the modification of the existing D60 and L90 relays to change the existing transfer trip schemes from Valley substation to Lake substation, and (3) reconfigure the existing digital channel from Valley substation to Lake substation and the modification of the existing SEL 2030 telecommunications processor with Ethernet to provide connection to the new SEL relay.

SCE's reliability network upgrades at the Valley substation shall include the following: (1) upgrade the Serrano 500-kV line protection as needed to change the line to the new Lake 500-kV T/L; (2) replace the existing LFCB relay with a new SEL-311L line current differential relay and the modification of the existing D60 and L90 relays to change the existing transfer trip schemes from Serrano substation to Lake substation; (3) reconfigure the existing digital channel from Serrano substation to Lake substation and the modification of the existing SEL 2030 telecommunications processor with Ethernet to provide connection to the new SEL relay; and (4) replace six 31.5 kA 115 kV circuit breakers with new 40 kA rated circuit breakes and upgrade six 31.5 kA circuit breakers to 40 kA.

SCE's reliability network upgrades at the Etiwanda generating station shall include the following: (1) replace the 2000A wave trap on the Vista 220-kV line position with 3000A rated wave trap, with N-2 contingency rating of 3210A to support the maximum N-2 line loading of 3071A; and (2) replace twenty four 63 kA 220 kV circuit breakers with new 80 kA rated circuit breakers and upgrade the Etiwanda 220 kV switchyard to 80 kA rating. The remaining scope of work for the switchyard upgrade has not been completed at this time; it is, however, expected that, in addition to the work just described, the following additional upgrades would be required (a) replace 28 220-kV disconnect switches, (b) replace 24 220-kV surge arresters, (c) replace all line and bank vertical risers with tubular conductors, (d) replace all 4/0 CU connectors to the ground grid with new 350 kCMIL ACSR, and (e) install new sections of 350 kCMIL ACSR ground grid and connect to the existing 4/0 CU grid.

Upgrades to SCE's PTP telecommunication network shall include the following: (1) install dual communication channels on separate routes to support the line protection relays on the new Lake-Serrano and Lake-Valley 500-kV T/L; (2) install a new microwave path from Lake substation to the existing Santiago Peak communication site (a) Lake substation install new light wave, microwave (including dish antennas), channel equipment for 500 kV line protection communications tower, fiber optic cable, and DC system, plus new voice and data network infrastructure (operations phones, modem lines, LAN connections to relays, etc.), (b) Serrano substation install new light wave and channel equipment for 500-kV line protection , plus incremental addition of voice and data network infrastructure (rack phones, modem lines, LAN connections to relays, etc.), (c) Valley substation install new light wave and channel equipment for 500 kV line protection, plus incremental addition of voice and data network infrastructure (rack phones, modem lines, LAN connections to relays, etc.), (d) Santiago Peak communications site install new microwave and dish antennas to link Lake substation to Serrano and Valley substations for 500-kV line protection, (e) Mira Loma substation install new light wave equipment to link Lake substation to Serrano substation for 500-kV line protection (i) install dual communication channels on separate routes to support the line protection relays on the new Lake-LEAPS 500-kV generation tie-line (A) install OPGW on the new Lake-LEAPS 500 kV generation tie-line to provide additional communications channel, and (B) Outside plant construction [1] construct approximately six miles of new ADSS fiber optic cable to extend existing SCE fiber optic cable from either the Elsinore or Skylark substations to the LEAPS generating facility; the combined (existing + new) fiber optic cable provides the required alternate route between Lake substation and the LEAPS generating facility, and [2] the communications channels described above will also be used to provide the power management circuits required for the Remote Terminal Units (RTU) to be installed at Lake substation and the LEAPS generating facility.

Power system control network upgrades shall include the following: install one RTU at Lake substation to monitor the typical bulk power elements such as MW, MVAR, and phase amps at each line and also kV at lines and busses and all circuit breaker status/control, protection relays status and alarms. The RTU will transmit information to the SCE Grid Control Center via the existing Mira Loma Regional Control Center System.

◊ **San Diego Gas & Electric Company upgrades**. The SDG&E-FIS short-circuit analysis indicated that the addition of the LEAPS project, without phase shifting transformers, causes ten existing breakers to become over-dutied during fault conditions. The LEAPS project, with phase shifting transformers, caused six existing breakers to become over-dutied during fault conditions. The mitigation for the over-dutied breakers will be their replacement with a higher-rated breaker. The thermal analysis indicated there are two SDG&E facility overloads caused solely by the addition of the LEAPS project that require mitigation: (1) the Pendleton-Talega 230-kV line segment, and (2) the Pendleton-Escondido 230-kV line segment.

The following plan of service mitigates all project-related SDG&E facility overloads: (1) add proposed Pendelton-Talega No. 2 230-kV line with about 14 SM of 2-1033 ACSR; (2) reconductor proposed Pendleton-Talega No. 1 230-kV line with about 14 SM of 2-1033 ACSR; and (3) add proposed Pendelton-Escondido No. 2 230-kV line with about 37 SM of 1-1033 ACSR. The following delivery network upgrades are needed to mitigate these overloads: (1) bundle the existing line of the Talega-Southern (Talega-Pendleton or Talega-Case Springs) 230-kV #1 line to provide 912 MVA capacity; and (2) addition of a second Talega-Southern-Escondido (Talega-Pendleton-Escondido or Talega-Case Springs-Escondido) 230 kV line with about 37 SM of 1-1033 ACSR conductor, including the addition of the 230-kV bay positions at the Talega and Escondido 230-kV substations (the Talega-Southern [Talega-Pendleton or Talega-Case Springs] 230-kV portion of this line is to have a capacity of 912 MVA and the Southern-Escondido [Pendleton-Escondido or Case Springs-Escondido] 230-kV #2 line's capacity will be 456 MVA). Looping the second Escondido-Talega tie-line into the Southern (Pendleton or Case Springs) 230-kV switch rack will require the following additional upgrades at Escondido and Talega substations to accommodate the new terminal additions.

- Escondido substation upgrades: (1) relocation and replace Bank 71; (2) modify the north and south buses to make room for a new bay addition; (3) install a new 230kV breaker and half bay to include 1-bank, 1-tie, and 1-line positions; (3) lot-support structures as required; (4) 1-230/69kV transformer; (5) 2-230kV circuit breakers; (6) 5-230kV disconnect switches; (7) power and control wiring; (8) tie-line protection; (9) metering; (10) SCADA and communication interface; and (11) re-route the existing 12kV ducts to make room for Bank 71.

- Talega substation upgrades: (1) install a new 230-kV, breaker and half bay to include 1-line and 1-tie positions; (2) lot-support structures as required; (3) 2-230-kV breakers; (4) 4-230-kV disconnect switches; (5) power and control wiring; (6) tie-line protection; and (7) SCADA and communication interface.

With the exception of new transmission towers and the towers located adjacent to the proposed Southern (Pendleton) substation, an approximately 51-mile long second (double circuit) 230-kV transmission line (Talega-Escondido No. 2) will be constructed on and installed along existing support structures (already containing one 230-kV circuit) connecting SDG&E's Talega and Escondido substations. The conductor type for the second 230-kV circuit, between the Talega and Escondido substations, is proposed as 3M Company Composite Conductor Part Number 3M1033-T13, or equivalent, with the upgraded path nominally rated at 1,500 MW with overload at approximately 2,000 MW. The existing Talega-Escondido No. 1 circuit will be reconductored as specified in the SDG&E-IFS.

SDG&E's existing Talega-Escondido 230-kV transmission line (23030) was originally licensed and constructed using double-circuit structures with only one circuit installed.[28,29] The existing 230-kV Talega-Escondido circuit (Talega-Escondido No. 1) will be modified and upgraded to loop it in/out (with the new, second conductor) of the proposed Southern (Pendleton or Case Springs) substation. The new 230-kV circuit (Talega-Escondido No. 2) will be added to the existing spare tower steel pole supports. This re-conductoring and added circuit will bring the SDG&E 230-kV Talega-Escondido path rating to 1,500 MW. SDG&E has indicated that information concerning the general arrangement pole type, structure details, and structure stringing loads are "confidential."

SDG&E's typical four-legged double-circuit 230-kV steel-lattice tower is illustrated in Figure 3-26 (Typical Double-Circuit 230-kV Steel-Lattice Tower) and SDG&E's

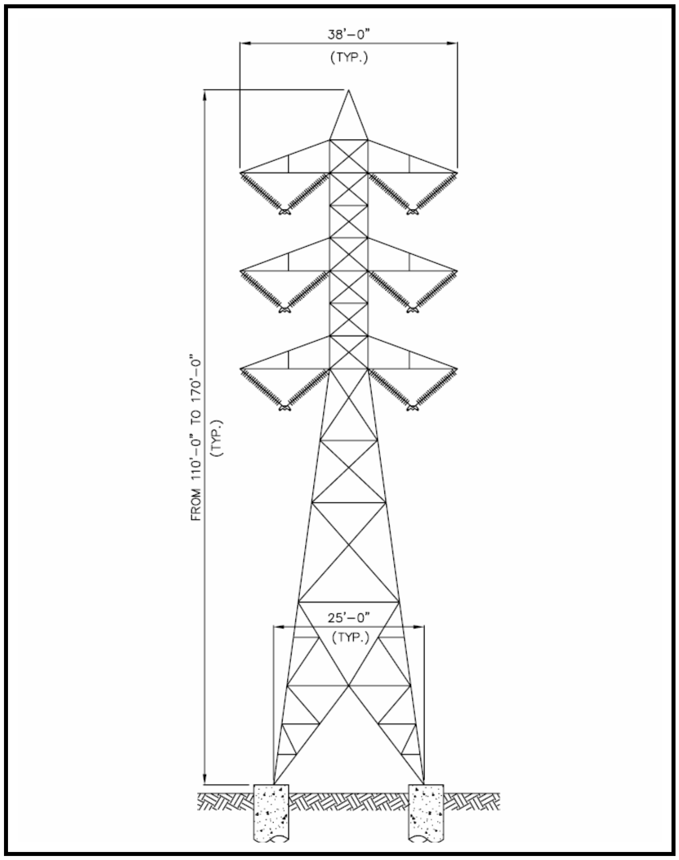
[28]/ California Public Utilities Commission and Bureau of Land Management (Dudek & Associates), Public Scoping Report – San Diego Gas and Electric Company Valley-Rainbow 500 kV Interconnect Project, CPCN Application No. 01-03-036, October 2001, p. 1.

[29]/ The CPUC issued a Certificate of Public Convenience and Necessity (CPCN) for construction of the existing SDG&E Talega-Escondido 230-kV transmission line in Decision No. 81069 (February 21, 1973). The 230-kV line was originally licensed and constructed using double-circuit structures, with only one circuit installed (Source: San Diego Gas & Electric Company [KEA Associates], Valley-Rainbow Interconnect Proponent's Environmental Assessment, March 2001, p. 2-3).

typical double-circuit 230-kV tubular steel pole tower is illustrated in Figure 3-27 (Typical Double-Circuit 230-kV Steel-Pole Tower).

Figure 3-26
TYPICAL DOUBLE-CIRCUIT 230-KV STEEL LATTICE TOWER
Source: San Diego Gas & Electric Company

Illustrated tower height and footings for level ground span. Actual height and footings depends on span length and terrain.



In order to accommodate the second conductor, it will be necessary to rebuild a 7.7-mile section (interconnecting SDG&E's existing Pala and Lilac substations) of the existing 69-kV transmission circuit on new 69-kV wood and steel poles adjacent to the existing 230-kV line within the existing 300-foot wide Talega-Escondido right-of-way. Subject to SDG&E specifications, the existing 7.7 miles of conductors used in the 69-kV circuit may remain on the 230-kV support structures and would be incorporated into the new 230-kV circuit.[30]

Typical single-circuit 69-kV wood and steel poles are illustrated in Figure 3-28 (Typical Single-Circuit 69-kV Wood and Steel Cable Pole).

The proposed Southern (Pendleton or Case Springs) 230-kV GIS is the southern interconnection for the proposed TE/VS Interconnect project. As indicated in SDG&E's December 15, 2006 IFS,[31] the proposed Southern (Pendleton or Case Springs) substation was modeled 14 miles from the SDG&E Talega substation and 37 miles from the SDG&E Escondido substation. The existing Talega-Escondido 230-kV line will loop into the Southern switchyard.

[30]/ *Op. Cit*., Valley-Rainbow Interconnect Proponent's Environmental Assessment, p. 2-3.
[31]/ San Diego Gas & Electric Company, Lake Elsinore Advanced Pumped Storage Project, Interconnection Facilities Study, Draft Report, December 15, 2006.

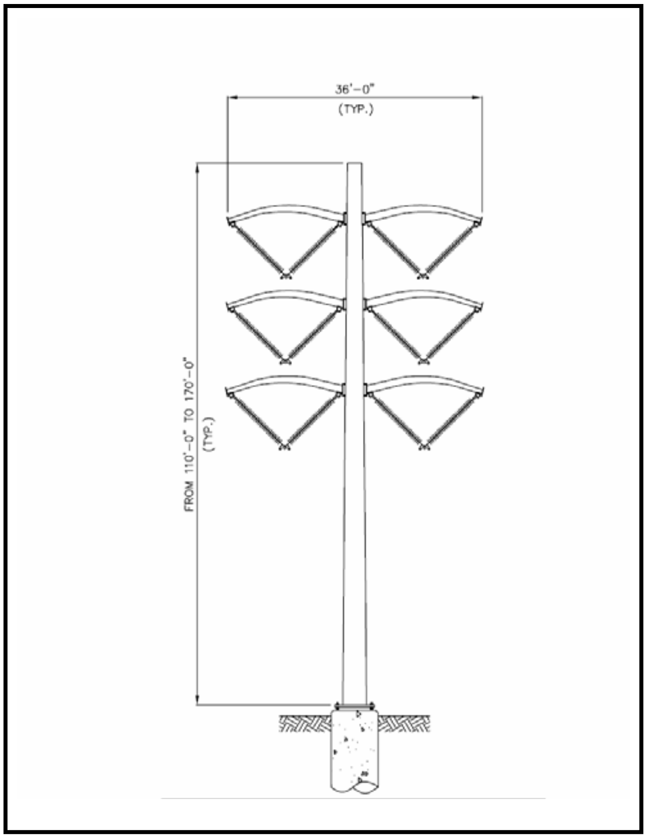
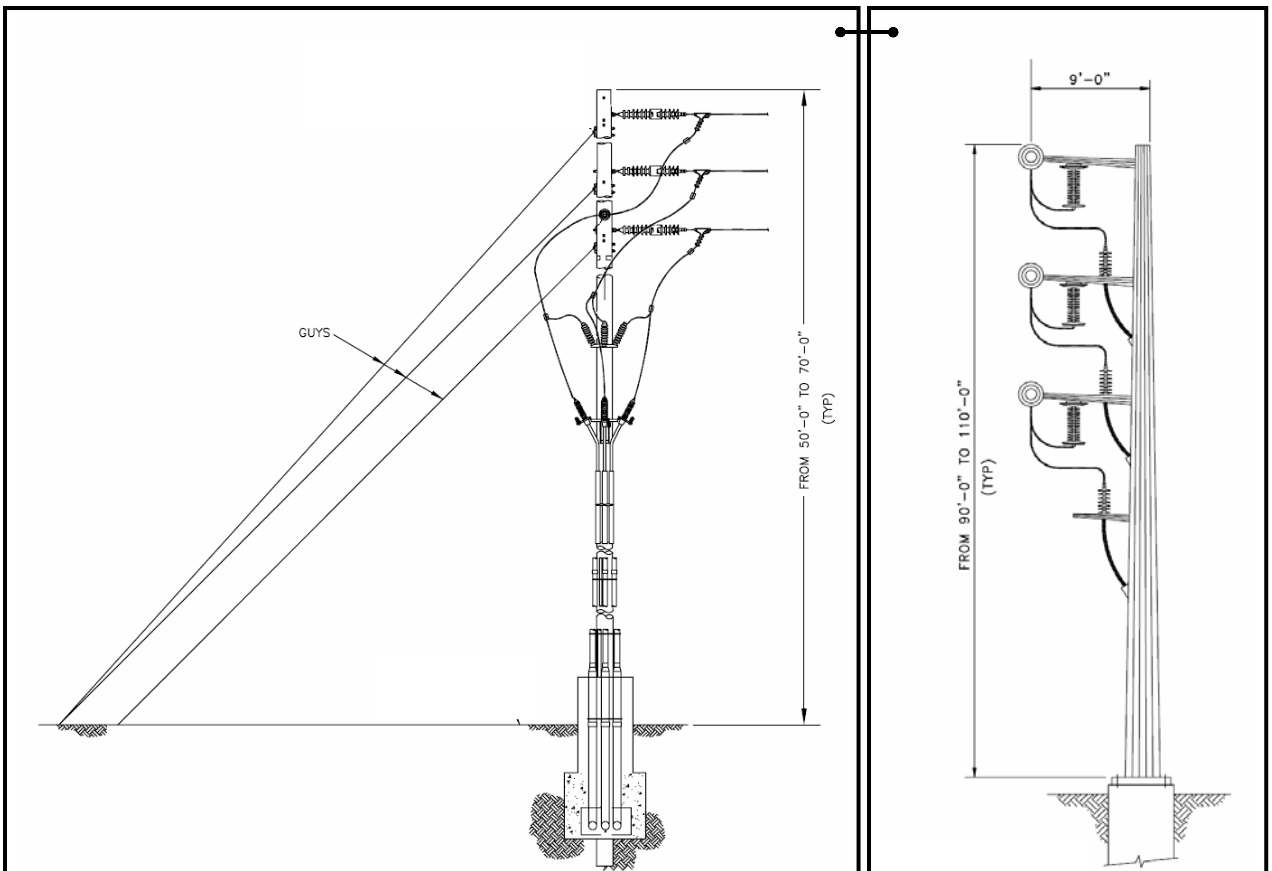


Figure 3-27
TYPICAL DOUBLE-CIRCUIT
230-KV STEEL POLE TOWER
Source: San Diego Gas & Electric Company

Illustrated tower height and footings for level ground span. Actual height and footings depends on span length and terrain.

Figure 3-28
TYPICAL SINGLE-CIRCUIT
69-KV WOOD AND STEEL CABLE POLE
Source: San Diego Gas & Electric Company



The switchyard will be constructed with GIS technology. Land requirements for the installation of the switchyard facilities will include: (1) a land right in recordable form that grants perpetual and assignable rights for the switchyard of a size and configuration and otherwise meeting SDG&E's specifications and requirements, all subject to approval by SDG&E in its reasonable discretion, and provided that the land rights may be in a form that limits use of the land to the switchyard; (2) the switchyard pad shall be graded to SDG&E's specifications in its sole discretion, consistent with SDG&E standard practices or good engineering practices, whichever is higher; (3) a wall or fence that encloses the switchyard land and provides for adequate access and working room, to SDG&E's specifications in its sole discretion, consistent with SDG&E standard practices or good engineering practices, whichever is higher.

The connection from the 230-kV phase shifting transformers into the switchyard will include three air-to-gas transformer bank terminations, overhead transformer leads, ground grid interconnection, and control junction box.

The SDG&E 230-kV GIS switchyard facilities will include: (1) breaker and a half-bus design; (2) the initial 4-bay arrangement of the GIS will accommodate four transmission line positions, three bank positions, and one spare position and the ultimate arrangement will allow for a future fifth bay; (3) the GIS facilities will include 12-230kV circuit breakers and the associated disconnect switches, ground switches, potential transformers, and gas-insulated bus; (4) two station service transformers; (5) three metering units; (6) required line synchronizing potential transformers; (7) all structures and foundations, busses, and equipment within switchyard fence; (8) a reinforced concrete-block built control house, substation below grade conduits and cables, protection systems, supervisory control/telecommunications equipment, batteries and low-voltage circuits (all the required protection, metering, telemetering, SCADA and communication equipment and systems); (9) ground grid; (10) lighting; (11) transmission line air to gas transitions into the GIS; and (12) air to gas transitions for the phase shifting transformer leads

SDG&E identified the following reliability network upgrades on its system:

- Loop-in of the existing Talega-Escondido 230-kV line. The Southern (Pendleton or Case Springs) substation will be located near the existing SDG&E Tower No. 163 (Z322651). The loop-in consists of Tower No. 163 removal, installation of two 230-kV anchor bolted dead-end steel poles, and hardware and conductor.

- Talega substation. The following Talega substation upgrades have been identified: (1) install a new 230-kV, breaker and a half bay to include 1-line and 1-tie positions; (2) lot-support structures as required; (3) two 230-kV breakers; (4) four 230-kV disconnect switches; (5) power and control wiring; (6) tie line protection; and (7) SCADA and communication interface.

- Escondido and Penasquitos substations. With regards to the replacement of 69-kV over-stressed breakers at the Escondido and Penasquitos substations, the short-circuit analysis also shows there are ten (10) overstressed breakers that need to be upgraded from 40 kA to 50 kA. Short-circuit constraints require the upgrading of the following breakers at the Penasquitos substation: PQ 665, 666, 667, and 70. Short-circuit constraints require the upgrading of the following breakers at the Escondido substation: ES 50, 684, 688, 6908, and 696.

The following Escondido substation upgrades have been identified: (1) relocate Bank 71; (2) modify the north and south buses to make room for a new bay addition; (3) install a new 230-kV breaker and a half bay to include 1-bank, 1-tie, and 1-line positions; (4) lot-support structures as required; (5) two 230-kV circuit breakers; (6) five 230-kV disconnect switches; (7) power and control wiring; (8) tie line protection; (9) metering; (10) SCADA and communication interface; and (11) re-route the existing 12-kV ducts to make room for Bank 71

▪ **Temporary construction sites**. Construction of the TE/VS Interconnect project will necessitate the use of a number of temporary construction marshalling, staging, laydown, and/or stockpiling sites. Excavation, construction, assemblage, and other related activities may also occur on these sites. When located adjacent to retained open space areas and NFS lands, the limits of work areas will be identified by a line of stakes with flags to prevent unnecessary disturbance of adjoining natural areas. Spoil areas will be located well away from streams and gulleys.

Construction trailers, temporary power drops or portable generators, portable comfort facilities, and other portable structures will be placed upon and utilized at each of those construction sites. Gravel parking lots will be created to reduce dust and erosion. Construction sites will be fenced and security lighting installed which will be orientated away from any abutting sensitive receptors. As required by applicable fire protection agencies, fuel modification zones will be established and maintained around each construction site. Non-toxic soil stabilizers shall be applied to all soil stockpiles.

Within the jurisdiction of the SARWQCB, prior to the commencement of grading operations, the project will obtain coverage under the "General Permit for Discharges of Storm Water Associated with Construction Activity" (Order No. 99-08-DWQ) (General Permit).[32] Under the General Permit, the Applicant will: (1) develop and implement a storm water pollution prevention plan (SWPPP) which specified Best Management Practices (BMPs) that will prevent all construction pollutants from contacting storm water and with the intent of keeping all products of erosion from moving off the site into receiving waters; (2) eliminate or reduce non-storm water discharges to storm sewer systems and other waters of the United States; and (3) perform inspection of all BMPs.

A number of temporary construction areas will be utilized for the construction of the proposed projects. The projects' proposed construction marshalling, staging, laydown, and stockpile areas are described below.

◊ **Substations**. As illustrated in Figure 3-15 (Northern [Lake] Substation Site) and Figure 3-22 (Southern [Pendleton or Case Springs] Substation Site), separate

[32]/ The General Permit authorizes the discharge of storm water to surface waters from covered construction activities and prohibit the discharge of materials, others than storm water and authorized non-storm water discharges and all discharges which contain a hazardous substance in excess of reportable quantities established at 40 CFR 117.3 and 302.4 unless a separate NPDES permit has been issued for those discharges.

construction laydown areas will be utilized during the construction of the Northern (Lake) and Southern (Pendleton or Case Springs) substations.

◊ **Transmission lines and towers**. As proposed and as illustrated in Figure 3-14 (Preliminary Tower Placement and Access Road Locations), new unimproved tower access roads will be approximately 14-foot wide, extending from existing improved or unimproved roads located in proximity to each tower sites. Those roads which are authorized by the Forest Service under the Applicant's special use permit (SUP) as temporary facilities will be revegetated once the transmission lines are energized and barriers, such as large boulders, placed to restrict further vehicular access.[33]

New authorized roads on NFS lands shall be designed in accordance with Forest Service standards and applicable BMPs. Unless alternative standards are identified, the Forest Service's "Preconstruction Handbook" (FSH 7709.56), including the erosion control and watershed protection measures specified therein, shall be followed for all construction roads. Where temporary or permanent vehicular access to individual tower sites is prohibited, helicopter pads, approximately 24 feet by 24 feet in dimension, will be cleared of vegetation in the vicinity of specified tower site, for loading and unloading of personnel, equipment, and materials. Wire-handling sites, up to approximately 1.5 acres in size and spaced about two-miles apart, will be created for pulling and tensioning equipment. Pulling and final tensioning of the conductors and ground wires will be accomplished from these pulling sites. New construction access roads may be required for the pulling equipment.

The proposed GIL underground segment of the 500-kV transmission line will be constructed through either a cut-and-cover trenching operation, with excavated material temporarily deposited within or adjacent to the transmission line right-of-way prior to reuse as cover material or off-site export, or will be bored through the use of a tunnel boring machine or conventional hard-rock mining operation. Vegetation will be cleared and soils from excavation work deposited along an abutting construction zone, extending along the length of the GIL segment.

Construction activities associated with the 230-kV line upgrade and the 69-kV line improvements would generally be confined to the existing SDG&E ROW. Should additional areas be required, construction staging activities would be confined to areas of prior ground disturbance.

After all construction tools and equipment have been removed from the tower site, any excess material (soil and rock) will be spread around or removed from the site. Upon NFS lands, a final inspection by the Forest Service will ensure that the site is left in an acceptable condition.

Fueling and maintenance operations will be conducted in accordance with the following minimum practices: (1) no refueling or maintenance activities will occur within riparian or wetland areas; (2) vehicle staging, maintenance, refueling, and fuel storage areas will be

[33]/ Barriers shall be spaced a maximum of 40 inches apart and will be clumped in a non-linear alignment to look as natural as possible. Barriers will use durable natural materials, such as rocks. No barriers will be placed that could cause safety concerns for the public or for equipment.

located a minimum of 150 feet horizontal distance from any stream or water body; (3) all vehicles operating within 150 feet of any stream or water body will be inspected daily for fluid leaks before leaving the construction staging area and any leaks detected will be repaired before the vehicle resumes operation; (4) when not in use, vehicles will be stored in the construction staging area; (5) spill kits (containing absorbent powder for petroleum products, absorbent power, bags for disposal, rubber gloves, and rags) will be available whenever five or more gallons of petroleum fuel are being used; and (6) no untreated wash and rinse water will be discharged into streams.

Except in remote locations where sensitive receptors would not be adversely impacted, no on-site equipment maintenance activities, involving the transport or start-up of heavy trucks or other construction equipment, shall occur on any of the construction sites prior to 7:00 AM or after 8:00 PM daily unless such activities occur 1,250 feet or more from the nearest residential receptor or are shielded from those receptors by intervening topography or by means of the use of a temporary sound wall or similar device.

- **Erosion and sediment controls**. Prior to the commencement of construction, a SWPPP will be formulated for the purpose of reducing excessive erosion, runoff, and adverse impacts on water quality. The SWPPP, including appropriate BMPs, will conform to and comply with the following standards, where applicable:

  - ◊ California Stormwater Quality Association's "Stormwater Best Management Practice Handbook - Construction"[34] (Construction Handbook);
  - ◊ United States Forest Service's "Water Quality Management for Forest Lands in California – Best Management Practices"[35];
  - ◊ Riverside County Flood Control and Water Conservation District's "Riverside County Stomwater Quality Best Management Practice Design Handbook"[36];
  - ◊ County of San Diego's "Stormwater Standards Manual"[37]; and NPDES requirements established by the SARWQCB and SDRWQCB.

  The SWPPP will include a spill control and countermeasure (SPCC) plan. At a minimum, emergency spill kits will be available on the sites at all times and a list of emergency spill response contacts included in the plan.

  To reduce accelerated erosion, land disturbance will be kept to the minimum necessary and restabilization of disturbed areas will occur as soon as practical. When possible, all erosion and sediment control measures will be installed prior to commencement of construction. All control measures will be maintained in effective condition throughout the construction period. Biweekly and post-storm inspection of all control measures will be conducted to ensure compliance with applicable discharge requirements. Access roads, staging, and laydown areas will be stabilized immediately after grading. The construction and laydown areas will be covered with a six-inch course of No. 1 aggregate applied immediately after grading. Any drainage from above spoils sites will

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[34]/ California Stormwater Quality Association, Stormwater Best Management Practice Handbook, 2003.

[35]/ United States Forest Service, Water Quality Management for Forest Lands in California – Best Management Practices, Pacific Southwest Region, September 2000.

[36]/ Riverside County Flood Control and Water Conservation District, Riverside County Stomwater Quality Best Management Practice Design Handbook, July 21, 2006.

[37]/ County of San Diego, County of San Diego Stormwater Standards Manual, Appendix A to the Watershed Management and Discharge Control Ordinance, San Diego County Code of Regulatory Ordinances, revised August 5, 2003.

be channeled around the spoils. Bulk storage structures for petroleum products and other chemicals will have adequate protection so as to contain potential spills and to prevent material migration from the storage site. Construction practices will ensure concentrations of the water-soluble components of oil and grease, if spilled, will not violate toxic substances criterion.

3.2.2 Lake Elsinore Advanced Pumped Storage Project[38,39]

The LEAPS project is an advanced pump storage facility with two 250-MW Voith Siemens Hydro Power Generation synchronous generators, 600 MW of pump load, step-up transformers, and appurtenant facilities. The LEAPS project consists of 500-MW of pump storage and includes associated transmission, subtransmission, local distribution lines,[40] and other appurtenant facilities. The LEAPS project brings with it a number of major benefits, including the generation of 500 MW of renewable energy at an efficiency of approximately 82 percent, black-start capability, spinning reserve, reactive power control, and full load output within about 30 seconds. This federal hydroelectric project is being licensed by FERC[41] (FERC Project No. 11858-002) under the provision of the FPA and is being permitted by the Forest Service under the provisions of the National Forest Management Act (NFMA). Section 15(e) of the FPA (16 U.S.C. 808[e]) specifies that any license issued by FERC shall be for a term that FERC determines to be in the public interest but not less than 30 years nor more than 50 years from the date of issuance. A 50-year federal hydropower license, with the potential for subsequent relicensing for an extended term beyond 50 years, has been assumed herein.

As depicted in Figure 3-29 (Lake Elsinore Advanced Pumped Storage Project – Conceptual Single-Line Drawing), the LEAPS project will interconnect to SCE's and SDG&E's existing transmission facilities via the TE/VS Interconnect and associated new substations interconnecting the TE/VS Interconnect transmission line with SCE's Serrano-Valley line and SDG&E's Talega-Escondido line, as described in Section 3.2.1 (Talega-Escondido/Valley-Serrano Transmission Project). The project includes looping the Valley-Serrano 500-kV line into the 500-kV bus at the new Northern (Lake) substation and looping the Talega-Escondido line into the 230-kV bus at the new Southern (Pendleton or Case Springs) substation.

The LEAPS project provides capacity, ancillary services, and energy storage capability allowing for the efficient and effective operation of the CAISO-controlled transmission system. The federal hydropower project will provide additional reliability to the southern California transmission grid and loads connected thereto. The LEAPS project seeks to complement existing generation by storing energy during low-demand periods and releasing the stored

[38]/ The description assumes that the LEAPS project constitutes a stand-alone project, separate and distinct from the TE/VS Interconnect project.

[39]/ Unless otherwise excluded by FERC, all the facilities, works, improvements, upgrades, and related actions and activities described herein are assumed to exist within and comprise the "project boundaries" for the purpose of FPA compliance.

[40]/ Transmission lines are generally defined as 115 kV and higher. Subtransmission systems are 69 kV to 138 kV. Distribution systems furnish power to retail customers and are less than 69 kV.

[41]/ FERC's authority to license hydropower projects is found in Part 1 of the FPA. Section 4(e) of the FPA (16 U.S.C. 797[e]) empowers FERC to issue licenses for projects that: (1) are located on navigable waters; (2) located on non-navigable waters over which Congress has Commerce Clause jurisdiction, were constructed after 1935, and affect the interests of interstate or foreign commerce; (3) located on public lands or reservations of the United States (excluding national parks); and/or (4) using surplus water or water power from a federal dam. Jurisdiction applies regardless of project size. Section 10(a)(1) of the FPA (16 U.S.C. 803[a][1]) establishes the comprehensive development standard which each project must meet to be licensed (Source: Federal Energy Regulatory Commission, Report on Hydroelectric Licensing Policies, Procedures, and Regulations – Comprehensive Review and Recommendations Pursuant to Section 603 of the Energy Act of 2000, May 2001, pp. 9-11).

energy during peak-load periods. The LEAPS project's operation will be beneficial to generation sources, including both renewable and non-renewable energy sources, that produce power during low-value off-peak periods. The LEAPS project will provide real and reactive power to the CAISO dispatchers on a nearly instantaneous basis in the event of a system disturbance and provide flow control between the SCE and SDG&E transmission systems. The LEAPS project incorporates the following features which will assist the CAISO in meeting its system reliability objectives: (1) extremely fast response (0-500 MW/15 seconds) and high availability factor; (2) system load following and regulation; (3) spinning and non-spinning capacity; (4) reactive support and voltage regulation capability; and (5) black-start capability.

The LEAPS project will conform to and comply with FERC's "Engineering Guidelines for the Evaluation of Hydroelectric Projects."[42] As stipulated in Part 12 (Safety of Water Power Projects and Project Works) therein, the licensee must use sound and prudent engineering practices in any action relating to the design, construction, operation, maintenance, use, repair, or modification of a water power project or project works (Section 12.5). Requirements include the preparation of an "emergency action plan" (EAP) developed in consultation and cooperation with appropriate federal, State, and local agencies responsible for public health and safety and designed to provide early warning to upstream and downstream inhabitants, property owners, operators of water-related facilities, recreational users, and other persons in the vicinity who might be affected by a project emergency (Section 12.20). The EAP shall conform to FERC guidelines (Section 12.22) and must be filed no later than 60 days before the initial filing of the LEAPS project's reservoir begins (Section 12.23).

Because the proposed upper reservoir's impoundment would be classified as a "high hazard dam" or "high hazard potential structure,"[43] the EAP will be developed in accordance with FERC[44] and Federal Emergency Management Agency[45] (FEMA) regulations, guideline, and manuals. Final dam design and specification shall be subject to the findings of the design-level seismic investigation conforming to FERC,[46] FEMA,[47] and applicable Department of Water Resources - Division of Safety of Dams[48] (DSOD) standards.

In accordance with Subpart D (Inspection by Independent Consultant), the LEAPS project will be periodically inspected and evaluated by or under the responsibility and direction of at least one independent consultant in order to identify any actual or potential deficiencies, whether in the condition of those project works or in the quality or adequacy of project maintenance, surveillance, or methods of operation, that might endanger public safety (Section 12.32).

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[42]/ Federal Energy Regulatory Commission, Engineering Guidelines for the Evaluation of Hydroelectric Projects, April 1991, updated July 1, 2005.

[43]/ Federal Emergency Management Agency, Federal Guidelines for Dam Safety – Hazard Potential Classification System for Dams, April 2004.

[44]/ Federal Energy Regulatory Commission, Guidelines for Preparation of Emergency Action Plans, November 1979, revised September 1988.

[45]/ Federal Emergency Management Agency, Federal Guidelines for Dam Safety, April 2004; Federal Emergency Management Agency, Federal Guidelines for Dam Safety – Emergency Action Planning for Dam Owners, April 2004; Federal Emergency Management Agency, Federal Guidelines for Dam Safety – Selecting and Accommodating Inflow Design Floods for Dams, April 2004.

[46]/ *Op. Cit.*, Engineering Guidelines for the Evaluation of Hydropower Projects, April 1991, updated July 1, 2005; Federal Energy Regulatory Commission, Guidelines for Public Safety at Hydropower Projects, March 1992.

[47]/ Federal Emergency Management Agency, Federal Guidelines for Dam Safety – Earthquake Analysis and Design of Dams, May 2005.

[48]/ Parts 1 and 2 of Division 3 (Dams and Reservoirs) of the CWC; Chapter 1 of Division 2, Title 23 (Waters) of the CCR; and Current Practices of the Department in Supervision of Dams and Reservoirs. Sections 6000-6004.5 of the CWC identify dams and reservoirs that are in State jurisdiction. Dams and reservoirs owned by the United States are not subject to State jurisdiction, except as otherwise provided by federal law.

As required, the Applicant's "standard technical information document" (STID) will include a surveillance and monitoring plan (SMP) providing the details of how the owner will monitor and evaluate the performance of the dam and project structures. The SMP will include the requirement to periodically submit a surveillance and monitoring report (SMR) presenting, evaluating, interpreting, and providing findings on the overall performance of the dam.[49]

Signage, conforming to FERC standards, will be placed at the hydropower facilities.[50] Excluding the afterbay, the project's facilities will be landscaped to provide screening along abutting street frontages. Final landscape plans for those facilities located on NFS lands will be developed in coordination with the Forest Service.

Table 3-3 (LEAPS Project - Summary of Principal Characteristics) summarizes the principal characteristics of the major project features of the LEAPS project. Presented below is a brief discussion of the key facilities that collectively comprise the LEAPS project, including non-energy-related facilities that are associated with the proposed project.

As indicated in Table 3-1 (TE/VS Interconnect Project and LEAPS Project Facilities), the TE/VS Interconnect and LEAPS projects share a number of common elements. For brevity, those common elements that have been previously described (under the discussion of the TE/VS Interconnect project) are not again repeated herein. Those facilities associated with the TE/VS Interconnect project, in combination with the following hydropower facilities, features, and other improvements constitute "project works" within the meaning of Section 4(e) of the FPA.

- **Lake Elsinore lower reservoir (afterbay)**. Lake Elsinore will serve as the afterbay for the LEAPS project. As illustrated in Figure 3-30 (Aerial Photograph of Existing Lower Reservoir [Lake Elsinore]), Lake Elsinore is a relatively shallow lake with a large surface area. The lake, a naturally occurring sink for the San Jacinto River watershed, has been significantly modified for water control.[51] At the current lake outlet sill elevation of 1255 feet AMSL, the lake has an average depth of 24.7 feet and the hypolimnetic water volume and surface area are 54,504 AF and 3,606 acres, respectively.[52] Waters within the lake are owned by the EVMWD and the real property within the OHWM is owned by and located within the corporate boundaries of the City. Public access to the lakeshore is limited to locations along the lakeshore where property is publicly owned.

  Water from Lake Elsinore will be used for the initial filling of the upper reservoir, for the replenishment of evaporative losses from that reservoir, and for any supply waters that may be required within either the Santa Ana River or San Juan Creek watersheds for the mitigation of any LEAPS-related water-diminishment or habitat restoration impacts.[53]

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[49]/ An outline of the Applicant's SMP is presented in "Supplement No. 1 to Geotechnical Feasibility Report – Preliminary Guidelines for a Monitoring and Surveillance Program, Lake Elsinore Advanced Pumped Storage Project, Riverside County, California" (GENTERRA Consultants, Inc., October 16, 2003), included in the FLA.

[50]/ Federal Energy Regulatory Commission, Safety Signage at Hydropower Projects, October 2001.

[51]/ Lichvar, Robert, Gustina, Gregory, Ericsson, Michael, Planning Level Delineation and Geospatial Characterization of Aquatic Resources for San Jacinto and Portions of Santa Margarita Watershed, Riverside County, California, United States Army Corps of Engineers, March 2003, p. 28.

[52]/ Lake Elsinore and San Jacinto Watershed Authority (Montgomery Watson Harza), Final Program Environmental Impact Report – Lake Elsinore Stabilization and Enhancement Project, SCH No. 2001071042, September 2005, p. 5-19.

[53]/ All such waters shall be provided under the terms of the existing Development Agreement and any subsequent agreements between the District and TNHC.

Table 3-3
LEAPS PROJECT
SUMMARY OF PRINCIPAL CHARACTERISTICS[1]

General	Characteristics
Installed Generating Capacity	502.5 MW
Energy Storage Capacity	6,000 MWh Nominal
Average Net Head (Generating)	1,538.4 feet
Maximum Gross Head	1,590 feet
Upper Reservoir (Decker Canyon)	
Gross Volume	5,750 acre feet (AF)
Maximum Normal Water Level	2790-feet AMSL
Minimum Normal Water Level	2660-feet AMSL
Inlet Elevation	2600-feet AMSL
Embankment Crest	2800-feet AMSL
Dam Design	Rock filled or reinforced concrete dam with face and liner
Max. Dam Height Above Foundation	300 feet
Water Surface Area at Maximum WL	83 acres
Water Surface Area at Minimum WL	25 acres
Nominal Evaporation	350 acre/feet/year (AFY)
Intake/Outlet Structure	Gated reinforced concrete structure equipped with coarse racks
Water Conduits	
Power Shafts	Single power shaft, 25-foot nominal diameter concrete-lined, steel liner length to be determined, 1,152-foot depth from intake to headrace tunnel
Power Tunnel	Single headrace tunnel, 15-ft. nominal diameter, concrete-lined, steel liner length to be determined, 4,500 ft. in length, 5% slope
Tailrace Tunnels	Single tunnel, concrete-lined, square and round in section, 5,000-ft. in length, 4% slope
Powerhouse (Santa Rosa)	
Generating/Pumping Equipment	2 251.25-MW units during generation (306.4-MW when pumping) reversible Francis-type pump turbines @450 RPM, 16 kV, centerline elevation 1,050 AMSL
Powerhouse Dimensions	375-ft. long, 85-ft. wide, 175-ft. high
Generator Floor Level	1,074.8 AMSL
Distribution Elevation	1,050 AMSL
Inlet Valve Floor Elevation	1,035.7 AMSL
Transformer Gallery Dimensions	375-ft. long, 50-ft. wide, 50-ft. high
Surge Chamber	To be determined
Vent Shaft	To be determined
Powerhouse Access Tunnels	2 tunnels, 30-ft. diameter, concrete-lined

Table 3-3 (Continued)
LEAPS PROJECT
SUMMARY OF PRINCIPAL CHARACTERISTICS

Lower Reservoir (Continued)	
Maximum Water Surface Elevation	1255-feet AMSL
Minimum Water Surface Elevation	1238-feet AMSL
Storage Capacity	127,692 AF
Surface Area	3,990 acres
Nominal Water Surface Elevation	1245.0 AMSL
Maximum Water Level	1247.0 AMSL
Nominal Evaporation	15,532.9 AF/year
Intake/Outlet Structure	RCC structure equipped with stoplogs and trashracks
Transmission	
Transformation	16 kV generator voltage to 500-kV transmission voltage in underground transformer gallery adjacent to powerhouse
Primary Transmission	2 circuits, 500 kV @1,750 MVA line from main transformers at powerhouse, gas-insulated lines for 3SM, overhead for 30SM
Standby Station Service	Single circuit, 13.8 kV @ 5 MVA, 4,800-ft. long overhead line
Local Feeder – Elsinore Substation	Single circuit 115 kV @ 50/100 MVA 7.5/8.5-SM overhead lines
Local Feeder – Skylark Substation	Single circuit 115 kV @ 50/100 MVA 5.8/6.8-SM overhead lines
Notes: 1. All engineering specifications remain subject to change and refinement.	

Source: The Nevada Hydro Company, Inc.

During the facility's operation, waters will be cycled between the existing lower reservoir and the new upper reservoir through a closed loop system.

As indicated in Table 3-4 (LEAPS Project Weekly Cycle – Hydraulic Maximum Drawdown and Active Storage Balance), under normal operations, approximately 3,000 AF of water will cycle between the two waterbodies, producing an approximately 20-inch maximum horizontal rise or fall of surface water elevations in Lake Elsinore during a weekly cycle (at lake elevation of 1240-feet AMSL). The maximum daily hydraulic drawdown for Lake Elsinore is projected to be about 0.98 feet per week and the maximum weekly hydraulic drawdown of Lake Elsinore is projected to be about 1.72 feet per week. The maximum projected drawdown of 1.72 feet per week represents 5,340.3 AF (maximum hydraulic storage). Since much of the shoreline slopes between 4 and 8 percent, the resulting shoreline fluctuation through each cycle will be between approximately 12 and 38 feet. A greater shoreline withdrawal could occur in areas with extremely shallow slope or if drawdown during the facility's operation were to exceed these projections.

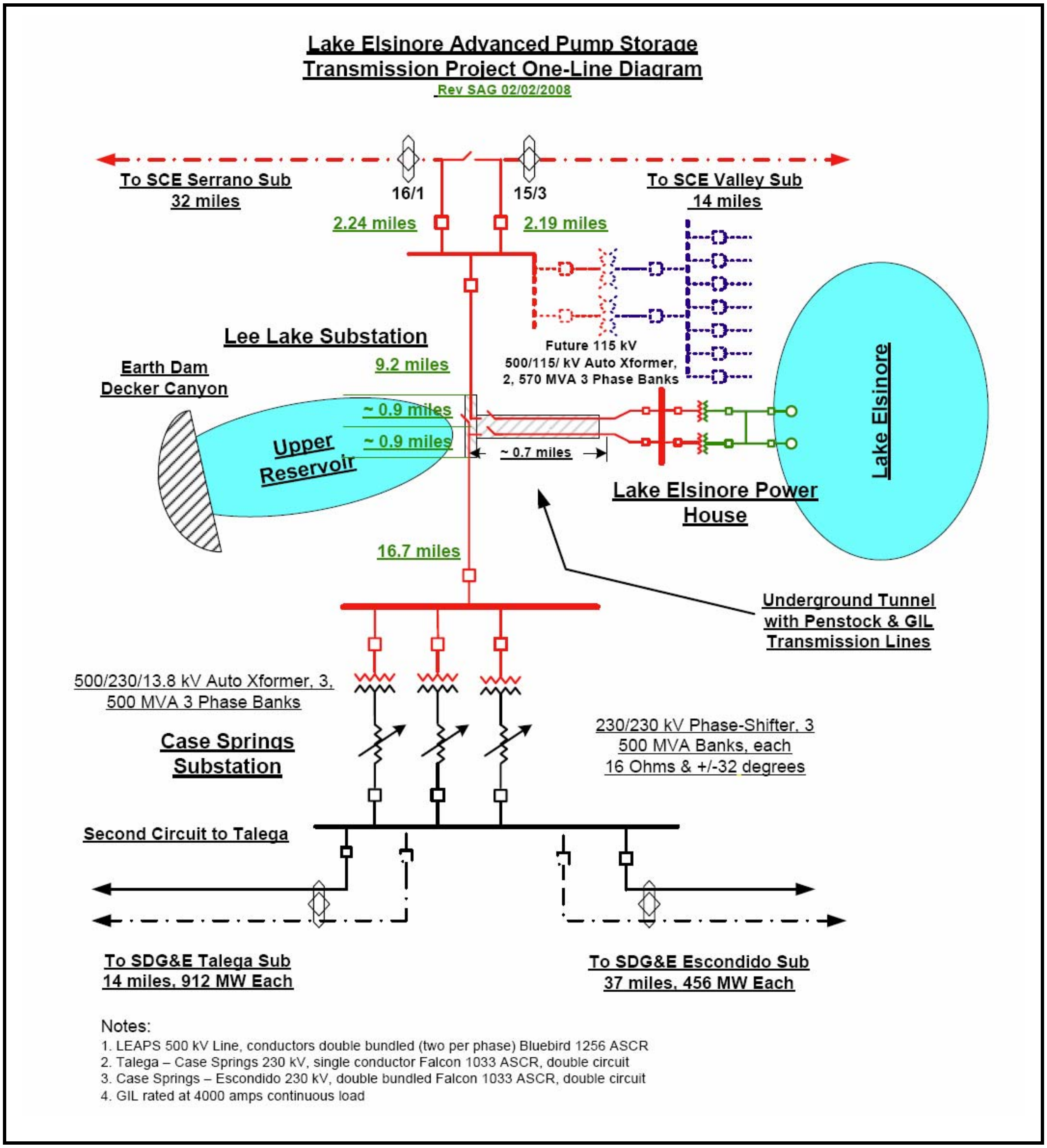

Figure 3-29
LAKE ELSINORE ADVANCED PUMPED STORAGE PROJECT
CONCEPTUAL SINGLE-LINE DRAWING
Source: The Nevada Hydro Company, Inc.

Figure 3-30
AERIAL PHOTOGRAPH OF EXISTING LOWER RESERVOIR (LAKE ELSINORE)
Source: Elsinore Valley Municipal Water District

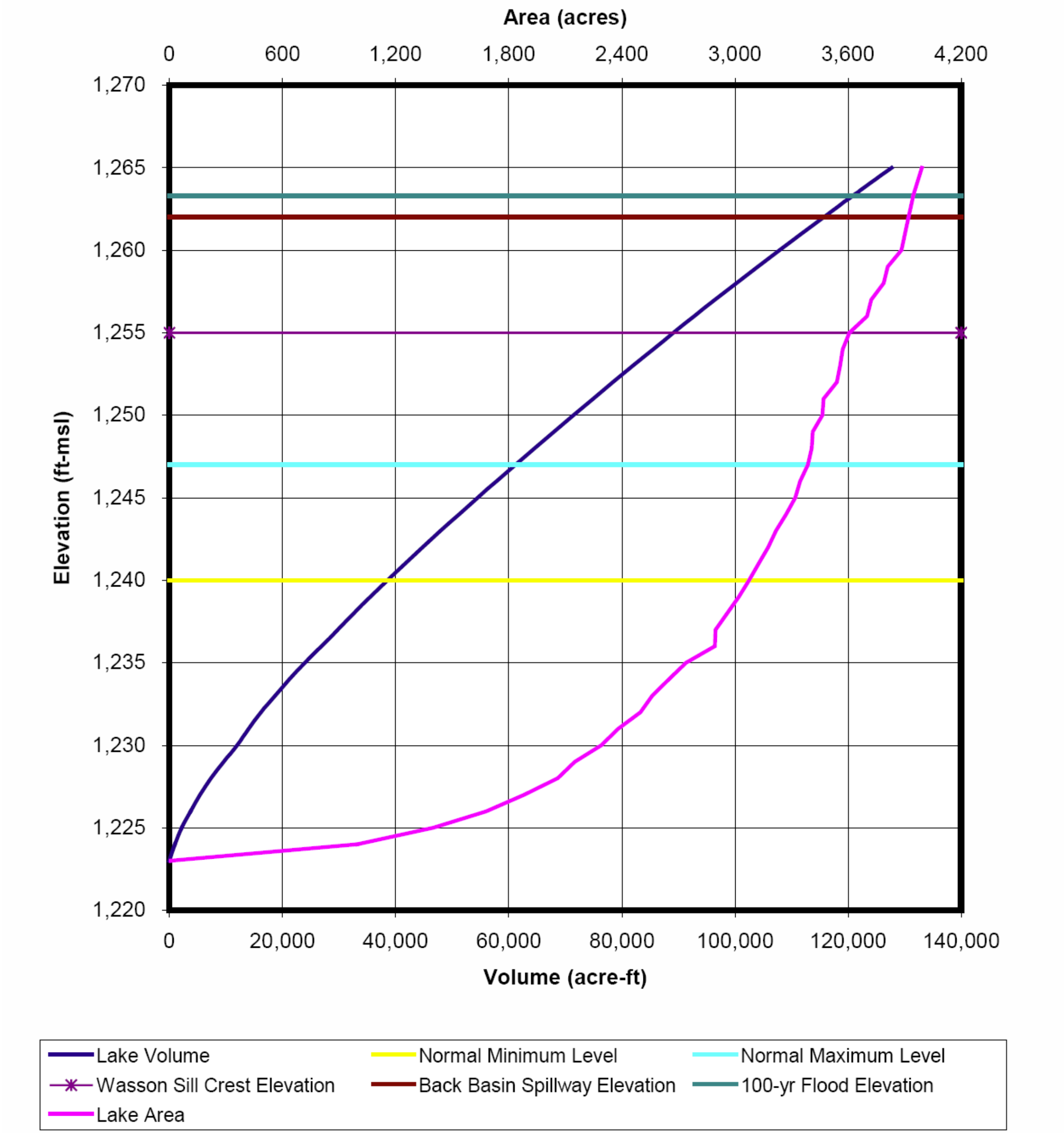

Figure 3-31
LAKE ELSINORE AREA – ELEVATION CURVE
Source: Santa Ana Water Project Authority

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