Section 2

2.1 PROJECT OVERVIEW

The proposed El Casco System Project includes the following elements:

- Construct the new El Casco 220/115/12 kV Substation within the Norton Younglove Reserve in the County of Riverside, associated 220 kV and 115 kV interconnections, and new 12 kV line getaways.

- Replace approximately 13 miles of existing single-circuit 115 kV subtransmission lines with new, higher capacity double-circuit 115 kV subtransmission lines and replace support structures within existing SCE rights-of-way in the Cities of Banning, Beaumont, and unincorporated Riverside County.[1]

- Replace approximately 1.9 miles of existing single-circuit 115 kV subtransmission lines with new, higher capacity single-circuit 115 kV subtransmission lines and replace support structures within existing SCE rights-of-way in the City of Beaumont and unincorporated Riverside County.

- Replace approximately 0.5 miles of existing single-circuit 115 kV subtransmission lines with new, higher capacity single-circuit 115 kV subtransmission lines on existing support structures within existing SCE rights-of-way in the City of Beaumont and unincorporated Riverside County.

- Rebuild 115 kV switchracks within Zanja and Banning Substations in the Cities of Yucaipa and Banning, respectively.

- Install telecommunications equipment at the proposed El Casco Substation and at SCE's existing Mill Creek Communications Site.

- Install fiber optic cables within public streets and on existing SCE structures between the Cities of Redlands and Banning.

Figure 2-1, El Casco Project Overview, identifies the proposed El Casco Substation and subtransmission line upgrade locations associated with the Proposed Project.

2.2 PROJECT PHASING

The El Casco System Project would be constructed in two phases (Phase 1 and Phase 2) from approximately June 2008 to June 2010, and the project would be operational in two phases. The 115 kV portion of the substation would be constructed as part of Phase 1, and would be operational by June 2009. Phase 1 would include construction of the following elements at El Casco Substation:

[1] Various segments of the existing 115 kV subtransmission lines also have distribution lines on the same structures. Where there are existing distribution lines on the structures, they would be transferred to the new structures.

- Grade the entire site
- Construct two Mechanical and Electrical Equipment Rooms (MEER)
- Construct the 12 kV switchrack with all positions equipped as designed
- Construct the 115 kV switchrack with two line positions equipped and two 115/12 kV bank positions equipped
- Construct two 115/12 kV transformer banks
- Install protective relays and Substation Automation System for 115/12 kV system
- Install 12 kV distribution line getaways
- Install microwave communication facilities including a microwave tower

In addition to the substation work described above, Phase 1 would include the following construction elements:

- Install a microwave tower at the Mill Creek Communications Site
- Loop in the existing Vista-San Bernardino-Maraschino 115 kV line to the new 115 kV switchrack

The 220/115 kV portion of the substation and remaining components of the project would be constructed as part of Phase 2, and would be operational by June 2010. Phase 2 would include construction of the following elements at El Casco Substation:

- Construct the 220 kV switchrack with all positions equipped as designed
- Construct two 220/115 kV transformer banks
- Equip two 220/115 kV bank positions and one additional 115 kV line position in the 115 kV switchrack
- Install protective relays and Substation Automation System for 220/115 kV system

In addition to the substation work described above, Phase 2 would include the following construction elements:

- Loop in the existing San Bernardino-Devers No. 2 220 kV line to the new 220 kV switchrack
- Rebuild 115 kV switchracks within Banning and Zanja Substations

- Replace approximately 13 miles of existing single-circuit 115 kV subtransmission lines with new, higher capacity double-circuit 115 kV subtransmission lines and replace support structures
- Replace approximately 1.9 miles of existing single-circuit 115 kV subtransmission lines with new, higher capacity single-circuit 115 kV subtransmission lines and replace support structures
- Replace approximately 0.5 miles of existing single-circuit 115 kV subtransmission lines with new, higher capacity single-circuit 115 kV subtransmission lines on existing support structures
- Loop in the existing fiber optic cable from the Devers-Vista No. 1 and 2 tower line to the MEER within El Casco Substation
- Install new fiber optic cable within public streets and on existing SCE structures between the Cities of Redlands and Banning

Upon completion of the 115/12 kV portion of the substation, the substation would serve local distribution loads currently served by Maraschino Substation. Upon completion of the 220/115 kV portion of the substation, the new El Casco 115 kV System would be created. This system would serve five existing distribution substations that are currently served by the Vista and Devers 115 kV Systems.

2.3 PROJECT LOCATION

SCE would construct the proposed El Casco Substation in northern Riverside County within the Norton Younglove Reserve in close proximity to San Timoteo Canyon Road and SCE's existing Devers-San Bernardino No. 2 220 kV transmission line right-of-way. The Devers-San Bernardino No. 2 220 kV transmission line would serve as the electrical source for the El Casco Substation and its 115 kV system. The 115 kV subtransmission line work would occur between El Casco, Maraschino, and Banning Substations within existing SCE rights-of-way within unincorporated Riverside County and the Cities of Beaumont and Banning. The project would also involve the rebuilding of switchracks at Banning and Zanja Substations in the Cities of Banning and Yucaipa, respectively. As part of the new fiber optic system, microwave towers would installed at El Casco Substation and the existing Mill Creek Communications Site, located on SCE-owned property within the San Bernardino National Forest. Five new fiber optic circuits would be installed between the Cities of Redlands and Banning within existing SCE rights-of-way.

2.4 SUBSTATION FACILITIES

2.4.1 El Casco Substation

2.4.1.1 Engineering Plan

The El Casco Substation would be an unattended, automated 220/115/12 kV low-profile substation. The approximately 28-acre proposed substation site would consist of approximately 14 acres within the substation perimeter fence. The remaining 14 acres outside the perimeter fence would be disturbed during construction. Details regarding the overall layout and equipment to be utilized at the substation are discussed in detail later in this section.

The substation would be served by looping in the existing Devers-San Bernardino No. 2 220 kV transmission line. Five 12 kV distribution lines would be constructed underground from the substation in a northeasterly direction, crossing beneath San Timoteo Creek and the railroad tracks, to San Timoteo Canyon Road to deliver power to local residents and businesses. Beyond this point, the exact location and routing of these proposed lines have yet to be determined but the lines would be installed underground within public streets. The 12 kV lines cannot be designed until the precise locations of the loads are determined.

2.4.1.1.1 Equipment

The substation incorporates low-profile design features, which limit the height of electrical equipment and structures. The substation would be equipped with one 220 kV switchrack, two 280 MVA 220/115 kV transformers, one 115 kV switchrack, one 45 MVAR 115 kV capacitor bank, two 28 MVA 115/12 kV transformers, one 12 kV switchrack, and two 4.8 MVAR 12 kV capacitor banks. The 220 kV and 115 kV switchracks would be designed with a breaker-and-a-half configuration. The 12 kV switchrack would be designed with an operating and transfer bus configuration, and would have provisions for a second operating bus.

Figure 2-2, El Casco Substation Site Plan, identifies the proposed layout for the new substation. Two MEERs would be constructed to house control and relay panels, batteries and battery chargers, and telecommunications equipment. Electrical equipment housed within the substation is summarized in Table 2-1, El Casco Substation Facility Summary. The El Casco Substation would also be equipped with a Substation Automation System (SAS), which is a system that provides for remote control and monitoring of all the equipment at the site. The substation would be unattended; therefore, SCE personnel would remotely interface with the SAS as needed. The SAS would include one Human Machine Interface (HMI) cabinet and approximately forty-two 19-inch equipment racks.

2.4.1.1.2 Maintenance Lighting

The proposed El Casco Substation would include maintenance lighting consisting of high pressure sodium lights located in the switchracks, around the transformer banks, and in areas of the yard where operations or maintenance activities may be required during nighttime hours. Maintenance lights would be controlled by a manual switch and would normally be in the off position. These lights would be directed downward and shielded to reduce glare outside the substation.

TABLE 2-1
EL CASCO SUBSTATION FACILITY SUMMARY

Equipment	Description
220 kV Switchrack	The 220 kV, low-profile switchrack would consist of seven bays.[2] Initially, two positions would be equipped as 220 kV line positions, and two positions would be equipped as transformer bank positions. The 220 kV dead-ends would be 49 feet high.
Transformers	Transformation would consist of two 280 MVA, 220/115 kV and two 28 MVA, 115/12 kV transformers. The 280 MVA transformers would be approximately 27 feet high. The 28 MVA transformers would be approximately 15 feet high.
115 kV Switchrack	The 115 kV, low-profile switchrack would consist of six bays. Three positions would be equipped as line positions, two would be equipped as 220/115 kV bank positions, and two would be equipped as 115/12 kV bank positions. The 115 kV switchrack would use high and low dead-end structures with elevations of 39 feet and 29 feet, respectively.
12 kV Switchrack	The 12 kV, low-profile switchrack would consist of eleven bays. Two bays would be equipped as bank positions, one bay would be equipped as a bus-tie position, and five would be equipped as line positions. Three bays would be available for future use. The switchrack would be approximately 15 feet high.
Capacitor Banks	One 45 MVAR, 115 kV capacitor bank with fused disconnects and a circuit breaker would be installed. Two 4.8 MVAR, 12 kV capacitor banks with fused disconnects and a vacuum switch would be installed. Each capacitor bank would be approximately 14 feet high.
MEERs	Two MEERs would contain control and relay panels, battery chargers, communication equipment, and local alarms. The larger MEER would be approximately 55 feet wide, 65 feet long, and 12 feet high. The smaller MEER would be approximately 15 feet wide, 20 feet long, and 10 feet high.

2.4.1.1.3 Substation Access

An approximately 24-foot wide asphalt concrete paved entry road located to the north and west of the substation site would be constructed to provide access to the substation from San

[2] The 220 kV and 115 kV switchracks would each be designed using a breaker-and-a-half configuration, so each "bay" results in two "positions" available for use.

Timoteo Canyon Road. The access road would be approximately 0.6 miles long. A gate would be installed near San Timoteo Canyon Road to control entry onto the access road.

2.4.1.1.4 Paving and Surfacing

The access road would be constructed in accordance with the proposed substation site plan, as depicted in Figure 2-2, El Casco Substation Site Plan. The access road would be paved with asphalt concrete over a compacted layer of aggregate base material placed on the sub-grade. Three types of surfacing would be utilized on the approximately 14 acres within the substation fence; crushed rock, asphalt pavement, and concrete foundation. The surface areas for each type are estimated as follows:

- Crushed rock surface – 10.5 acres
- Asphalt pavement – 2.5 acres (not including access road to station)
- Concrete foundations – 1.0 acre

2.4.1.1.5 Restroom

The new substation would accommodate one portable restroom, which would not require water or sewer service. The restroom would be maintained by an outside contractor who would collect and dispose of the waste.

2.4.1.1.6 Substation Security

A combination of masonry block walls and chainlink fences would be constructed around the perimeter of the substation. The block wall would be constructed along the north and east perimeters, and the fence would be installed along the south and west perimeters. Both the wall and the fence would have a minimum height of eight feet. Access gates would be located along the north and east perimeters. The primary gate would be approximately 30 feet wide and 8 feet high and the secondary gate would be 24 feet wide and 8 feet high. A band consisting of several strands of barbed wire would be affixed near the top of the wall and fence, as well as on the gates. Gates and MEERs would normally be locked and would only be unlocked when substation personnel are present at the station. All MEER doors would be remotely monitored using the SAS.

2.4.1.1.7 Landscaping

The landscaping plan for the proposed substation would incorporate primarily native vegetation and would be designed to filter views of the substation site. The landscaping plan would be prepared by a certified licensed landscape architect and would be consistent with Riverside County standards to the extent that consistency with these standards would not create unsafe conditions or facilitate unauthorized entry into the substation. Vegetation would be planted on graded side-slopes around the substation. Landscaping would require irrigation during the initial establishment phase. The method of irrigation will depend upon the availability of local water supplies at the site following construction of the substation. If local water supplies are not available, SCE would either construct a well with a holding tank or a cistern.

2.4.1.2 Construction Plan

2.4.1.2.1 Grading and Site Preparation

The substation requires a pad of approximately 14 acres within the fenceline. Due to the existing topography of the site, however, a total of approximately 28 acres would need to be graded in order to create the relatively flat 14-acre pad and to address potential landslide issues presented by the hillside south of the substation site. The substation pad is configured in an "L" shape because of constraints placed on the site in the form of easements, buffer zones, and property boundaries.

Initial site preparation would require the removal of all vegetation on the 28-acre site. The removed vegetation would be screened to remove loose soil and would then be disposed of at an approved green waste facility. If trash or other waste materials are found during this process, they would be inspected for contamination and hauled away to an approved disposal site. Any potential hazardous conditions would be investigated and mitigated prior to the commencement of grading. All utilities would be avoided or relocated prior to site preparation. If existing utilities are unexpectedly encountered during grading activities, the appropriate utility company would be contacted and necessary arrangements would be made.

Geotechnical surveys indicate that the northern portion of the site, currently a relatively flat area, is subject to potential liquefaction and lateral spreading hazards due to shallow groundwater levels and loose to medium dense soil. To address this issue, soil stabilization techniques such as deep soil mixing (DSM), which involves the mechanical blending of slurry with the on-site soils to make them stiffer and contain fewer voids, would be utilized below the locations where foundations for electrical equipment and the two MEERs are placed. DSM makes use of a hollow stem auger and mixing tool arrangement attached to a large drilling rig to inject and mix grout into the soil.

Geotechnical surveys also indicate that the southern portion of the site, currently a relatively hilly area, overlies an existing landslide and presents a potential future landslide hazard due to the presence of thin clay-rich layers (landslide failure planes) underground. To address this issue, soil stabilization techniques such as a compacted-fill earth buttress would be utilized at the graded slope behind the substation. Due to the site topography, it is estimated that approximately 350,000 cubic yards of soil would be removed from the hillside, sifted to remove any rocks greater than 3 inches in diameter, and replaced in the cut area to a 95% compaction factor. Some fill soil may be required to be imported to the site in order to complete the buttress.

Following completion of slope stabilization, the site would be contoured and the substation pad would be compacted and leveled. Soil cut from various areas of the site would be used as fill material in other areas. Material not suitable as fill would be stockpiled for other possible uses or disposed of at an approved facility. It is estimated that approximately 285,000 cubic yards of soil would be cut and 285,000 cubic yards of fill would be required for site preparation. The site would be graded using best engineering practices for soil content, compaction, and slope stability.

2.4.1.2.2 Drainage

The existing site slopes downward from south to north at an average of 40% in hillside areas and at an average of 5% in non-hillside areas. The western portion of the site is predominantly located within a 125 acre watershed. The runoff from this watershed sheet in general drains from south to north. Also, a loosely defined natural swale meanders through the western portion of the site and adjacent property and ultimately discharges runoff into the San Timoteo Creek. The eastern portion of the site is located on the perimeter of an adjacent watershed area that does not significantly impact drainage on the site.

The constructed substation would result in the slight redirection of the western watershed channel to an area outside of the substation perimeter fence. Stormwater runoff from the graded substation pad would be directed towards the north of the substation site. The hillside south of the substation would be finished at a 50% slope (i.e., 2 horizontal to 1 vertical slope) with concrete drainage terraces constructed at every 25-foot vertical elevation drop to prevent stormwater from flowing into the substation pad and to prevent erosion of the graded hillside. Any concentrated stormwater flow from the terraces would be routed to the east and west around the substation and into drainage channels that would flow toward the north of the property.

To prevent the concentrated stormwater flow from eroding the drainage channel, the rerouted channel west of the fenceline would be lined with rip rap or other erosion protection measures to dissipate the water into the ground. The stormwater runoff from the graded substation pad would ultimately flow into San Timoteo Creek in essentially the same manner as it does in the presently ungraded condition of the site. The quantity of runoff would be slightly increased over the existing quantity of runoff. Graded slopes around the substation would be landscaped with native vegetation to further reduce potential stormwater erosion.

2.4.1.2.3 Equipment Installation

After grading and site preparation are completed, the perimeter fences, foundations, and belowground facilities (e.g., ground-grid, conduit, etc.) would be constructed followed by installation of the above-ground structures and the electrical equipment. Equipment would be delivered to the site using the access routes described below. During the initial construction period, temporary equipment for fencing, sanitation, and construction power would be utilized. Construction power would likely be provided through small conductors placed on temporary poles installed along the access road from a supply point near San Timoteo Canyon Road. All construction support equipment would be removed upon completion of Phase 1 construction. Construction support services for Phase 2 would utilize those items placed into operation during Phase 1.

2.4.1.2.4 Access Road Improvement

An existing dirt road adjacent to the substation site would be improved from San Timoteo Canyon Road to the east for approximately 0.6 miles to provide access to El Casco Substation. The existing road closely parallels San Timoteo Creek. Because certain portions of the creek bank are eroding very close to the existing road, the location of the improved access road may be moved, up to 20 feet south of the existing road. In locations where the existing dirt road would be abandoned, it would be landscaped with native vegetation. The road would first be graded and compacted. A road base would then be placed. Finally, the road would be paved with asphalt. Existing drainage routes that currently intersect the dirt road would be conveyed across the improved road using culverts or wet crossings and discharged to the creek at their current locations.

2.4.1.2.5 Staging and Access

Material would be staged within the substation wall/fence during construction. All material for the proposed substation, including the transformers, would be delivered by truck. Construction traffic would use San Timoteo Canyon Road and would be scheduled for off-peak traffic hours to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work is being performed. The transformers would be delivered by heavy transport vehicles and off-loaded on site by large cranes with support trucks. A traffic control service would be used for transformer delivery.

2.4.1.2.6 Labor and Equipment

Construction would be performed by SCE construction crews and/or by contractors under the supervision of SCE personnel. Anticipated construction personnel and equipment are summarized in Table 2-2, Construction Personnel and Equipment Summary for Phase 1 (El Casco Substation), and Table 2-3, Construction Personnel and Equipment Summary for Phase 2 (El Casco Substation).

TABLE 2-2
CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY FOR PHASE 1 (EL CASCO SUBSTATION)

Construction Element	Number of Personnel	Number of Days	Equipment Requirements	
Site Management	2	Duration of Construction	1 – Office Trailer (Electric)	
Grading (including Soil Stabilization)	15	180	1 – 980 Loader (Diesel) 3 – Graders (Diesel) 2 – Compactor (Gas/Diesel) 1 – 20-ton Drilling Rig (Diesel)	3 – Water Trucks (Gas/Diesel) 4 – Dump Trucks (Diesel) 2 – Crew Trucks (Gas/Diesel) 1 – Survey Truck (Gas/Diesel) 1 – Soils Test Crew Truck (Gas/Diesel)
Civil (foundations, underground conduits, ground grid, etc.)	15	90	2 – Drillers (Diesel) 4 – Crew Trucks (Gas/Diesel) 1 – 14-ton Crane (Diesel) 3 – Dump Trucks (Diesel)	2 – Tractors (Diesel) 1 – 5-ton Truck (Gas/Diesel) 1 – Forklift (Diesel) 1 – Ditch Digger (Diesel)
Electrical (MEER, switchracks, conductors, circuit breakers, etc.)	25	180	4 – Manlifts (Diesel) 4 – Pickup Trucks (Gas/Diesel) 2 – 14-ton Cranes (Diesel) 2 – Crew Trucks (Gas/Diesel)	2 – 150-ton Cranes (Diesel) 1 – 5-ton Truck (Gas/Diesel) 1 – Forklift (Diesel) 4 – Carryall Vehicles (Gas/Diesel) 2 – Support Tucks (Gas/Diesel)

TABLE 2-2 *(Continued)*
CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY FOR PHASE 1 (EL CASCO SUBSTATION)

Construction Element	Number of Personnel	Number of Days	Equipment Requirements	
Maintenance (equipment preparation and verification)	5	30	1 – Foreman Truck (Gas/Diesel) 1 – Manlift (Gas/Diesel)	2 – Crew Trucks (Gas/Diesel) 2 – Gas/Processing Trailers (Electric)
Test (relays, energization, SAS, etc.)	4	180	1 – Pickup Truck (Gas/Diesel)	

TABLE 2-3
CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY FOR PHASE 2 (EL CASCO SUBSTATION)

Construction Element	Number of Personnel	Number of Days	Equipment Requirements	
Site Management	2	Duration of Construction	1 – Office Trailer (Electric)	
Civil (foundations, underground conduits, ground grid, etc.)	10	90	2 – Drillers (Diesel) 4 – Crew Trucks (Gas/Diesel) 1 – 14-ton Crane (Diesel) 3 – Dump Trucks (Gas/Diesel)	1 – Water Truck (Diesel) 2 – Tractors (Diesel) 1 – 5-ton Truck (Gas/Diesel) 1 – Forklift (Diesel) 1 – Ditch Digger (Diesel)
Electrical (MEER, switchracks, conductors, circuit breakers, etc.)	12	135	4 – Manlifts (Diesel) 4 – Pickup Trucks (Gas/Diesel) 2 – 14-ton Cranes (Diesel) 2 – Crew Trucks (Gas/Diesel)	2 – 150-ton Cranes (Diesel) 1 – 5-ton Truck (Gas/Diesel) 1 – Forklift (Diesel) 4 – Carryall Vehicles (Gas/Diesel) 2 – Support Tucks (Gas/Diesel)
Transformer Assembly (220/115 kV banks)	6	40	2 – Carry-all (Gas/Diesel) 1 – Manlift (Diesel) 1 – Forklift (Diesel)	2 – 50-ton Cranes (Diesel) 2 – Crew Trucks (Gas/Diesel) 1 – Processing Trailer (Electric)

TABLE 2-3 *(Continued)*
CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY FOR PHASE 2 (EL CASCO SUBSTATION)

Construction Element	Number of Personnel	Number of Days	Equipment Requirements	
Maintenance (equipment preparation and verification)	5	20	1 – Foreman Truck (Gas/Diesel) 1 – Manlift (Gas/Diesel)	2 – Crew Trucks (Gas/Diesel) 2 – Gas/Processing Trailers (Electric)
Test (relays, energization, SAS, etc.)	4	120	1 – Pickup Truck (Gas/Diesel)	

2.4.1.2.7 Hazardous Material Usage and Waste Generation

Construction of the El Casco Substation would require limited use of hazardous materials, including fuel, lubricants, and cleaning solutions. All hazardous materials would be stored, handled, and used in accordance with applicable regulations, including the Construction Storm Water Pollution Prevention Plan and the Spill Prevention Control and Countermeasure Plan, for the substation components.

Construction of the El Casco Substation would result in the generation of various waste materials, including materials associated with removal activities and construction of the substation. A summary of the waste generation estimates is presented in Table 2-4.

TABLE 2-4
CONSTRUCTION WASTE ESTIMATES (EL CASCO SUBSTATION)

Waste Item	Pounds Total	Pounds Reusable on Site	Pounds Recyclable or Disposed
Grading Element			
Soil/Vegetation	1,050,000	945,000	105,000
Sanitation Waste	500	0	500
Miscellaneous	500	0	500
Civil Element			
Soil	9,240,000	0	9,240,000
Wood	2,000	0	2,000
Concrete	2,000	0	2,000
Sanitation Waste	700	0	700

TABLE 2-4 *(Continued)*
CONSTRUCTION WASTE ESTIMATES
(EL CASCO SUBSTATION)

Waste Item	Pounds Total	Pounds Reusable on Site	Pounds Recyclable or Disposed
Miscellaneous	1,000	0	1,000
Electrical Element			
Wood	5,000	0	5,000
Aluminum	2,000	0	2,000
Copper	600	0	600
Steel	1,000	0	1,000
Sanitation Waste	700	0	700
Miscellaneous	1,000	0	1,000

2.4.1.2.8 Post Construction Clean-Up

All debris associated with construction of the substation would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable regulations.

2.4.1.2.9 Construction Schedule

Construction of the proposed El Casco Substation would take a total of approximately 24 months (for both Phase 1 and Phase 2 construction), commencing in approximately June 2008 and concluding in June 2010, including testing and energizing the substation. The planned operating date for Phase 1 is June 2009, and the planned operating date for Phase 2 is June 2010.

2.4.2 Zanja Substation

2.4.2.1 Engineering Plan

SCE's Zanja 115/33 kV Substation is connected to the Vista 115 kV System through one preferred 115 kV line. During abnormal conditions, Zanja Substation can be transferred to the Devers 115 kV System through an emergency 115 kV line. Figure 2-1 notes the location of the Zanja Substation. As a part of the Proposed Project, Zanja Substation would be transferred to the El Casco 115 kV System. To effectuate this transfer, the existing 115 kV switchrack would be replaced with a new switchrack, configured as a four-element 115 kV ring bus to implement necessary protection and switching for self restoring loop (SRL) operation. The switchrack would be built within the existing fenced-in substation area and would not disturb SCE property to the east of the substation. Existing poles, disconnects, and some other equipment, previously installed for interconnection of a mobile transformer unit, would be removed.

The new 115 kV switchrack would be a box steel structure approximately 72 feet wide by 72 feet long by 42 feet high. This structure would support bus work and would initially interconnect three circuit breakers and eight gang-operated disconnect switches. The switchrack could accommodate the addition of a fourth 115 kV circuit breaker, if needed in the future. Maintenance lighting, similar to that described for El Casco Substation above, would be installed within the new switchrack area.

The existing MEER is too small to accommodate installation of the SAS and the protective relays and telecommunications equipment necessary to remotely monitor and control the substation. Therefore, an additional MEER, approximately 15 feet wide by 20 feet long by 12 feet high, would be installed at the substation inside the perimeter fence. This installation would require construction of a new foundation. The new protective relaying, telecommunications, and automation equipment, including an HMI cabinet, would be installed inside the MEER on approximately seven 19-inch racks.

No modifications to the existing substation maintenance lighting (except for the new lighting installed for the new switchrack area), access, paving, restroom facilities, perimeter security, or landscaping would be necessary at this substation.

2.4.2.2 Construction Plan

2.4.2.2.1 Grading and Site Preparation

The new switchrack requires a pad of approximately 0.2 acres when completed. The pad would be located in the southeast corner of the existing substation property. The existing site is effectively level, however, during construction an area of approximately 0.4 acres would likely be disturbed in order to create the pad. Site preparation would require the removal of previously installed substation crushed rock. Materials removed during site preparation would be handled in the same manner as described above for El Casco Substation.

2.4.2.2.2 Drainage

There would be no change to the existing drainage patterns at Zanja Substation as a result of this work.

2.4.2.2.3 Equipment Installation

After grading and site preparation are completed, the foundations and below-ground facilities (e.g., ground-grid, conduit, etc.) would be constructed followed by installation of the above-ground structures and the electrical equipment. Equipment would be delivered to the site using the access routes described below.

2.4.2.2.4 Staging and Access

Material would be staged within the substation fence during construction. All construction material would be delivered by truck. Construction traffic would use Bryant Street and/or Mill Creek Road and would be scheduled for off-peak traffic hours to the extent possible. Concrete truck deliveries may need to be made during peak hours when foundation work is being performed. A traffic control service would be used for oversized material delivery.

2.4.2.2.5 Labor and Equipment

Construction would be performed by SCE construction crews and/or by contractors under the supervision of SCE personnel. Anticipated construction personnel and equipment are summarized in Table 2-5, Construction Personnel and Equipment Summary (Zanja Substation).

TABLE 2-5
CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY
(ZANJA SUBSTATION)

Construction Element	Number of Personnel	Number of Days	Equipment Requirements	
Site Management	2	Duration of Construction	1 – Office Trailer (Electric)	
Grading	8	10	1 – 980 Loader (Diesel) 1 – Graders (Diesel) 1 – Compactor (Gas/Diesel)	1 – Water Truck (Diesel) 1 – Survey Truck (Gas/Diesel) 1 – Soils Test Crew Truck (Gas/Diesel)
Civil (foundations, underground conduits, ground grid, etc.)	10	30	2 – Drillers (Diesel) 3 – Crew Trucks (Gas/Diesel) 1 – 14-ton Crane (Diesel) 2 – Dump Trucks (Gas/Diesel)	2 – Tractors (Diesel) 1 – 5-ton Truck (Gas/Diesel) 1 – Forklift (Diesel) 1 – Ditch Digger (Diesel)
Electrical (MEER, switchracks, conductors, circuit breakers, etc.)	20	60	4 – Manlifts (Diesel) 4 – Pickup Trucks (Gas/Diesel) 2 – 14-ton Cranes (Diesel) 2 – Crew Trucks (Gas/Diesel)	2 – 150-ton Cranes (Diesel) 1 – 5-ton Truck (Gas/Diesel) 1 – Forklift (Diesel) 4 – Carryall Vehicles (Gas/Diesel) 2 – Support Tucks (Gas/Diesel)
Maintenance (equipment preparation and verification)	5	20	1 – Foreman Truck (Gas/Diesel) 1 – Manlift (Gas/Diesel)	2 – Crew Trucks (Gas/Diesel) 2 – Gas/Processing Trailers (Electric)
Test (relays, energization, SAS, etc.)	4	30	1 – Pickup Truck (Gas/Diesel)	

2.4.2.2.6 Hazardous Material Usage and Waste Generation

Construction at Zanja Substation would require limited use of hazardous materials, including fuel, lubricants, and cleaning solutions. All hazardous materials would be stored, handled, and used in accordance with applicable regulations, including the Construction Storm Water Pollution Prevention Plan, for the substation modifications.

Construction at Zanja Substation would result in the generation of various waste materials, including materials associated with removal activities and substation modifications. A summary of the waste generation is presented in Table 2-6.

TABLE 2-6
CONSTRUCTION WASTE ESTIMATES
(ZANJA SUBSTATION)

Waste Item	Pounds Total	Pounds Reusable on Site	Pounds Recyclable or Disposed
Grading Element			
Soil/Vegetation	0	0	0
Sanitation Waste	0	0	0
Miscellaneous	0	0	0
Civil Element			
Soil	315,000	0	315,000
Wood	1,000	0	1,000
Concrete	2,000	0	2,000
Sanitation Waste	500	0	500
Miscellaneous	500	0	500
Electrical Element			
Wood	2,000	0	2,000
Aluminum	1,000	0	1,000
Copper	1,000	0	1,000
Steel	500	0	500
Sanitation Waste	500	0	500
Miscellaneous	500	0	500

2.4.2.2.7 Post Construction Clean-Up

All debris associated with work at Zanja Substation would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable regulations.

2.4.2.2.8 Construction Schedule

Construction at Zanja Substation would take approximately six months, commencing in late 2009 and concluding in early 2010, including testing and energizing the substation.

2.4.3 Banning Substation

2.4.3.1 Engineering Plan

SCE's Banning 115/33 kV Substation is connected to the Devers 115 kV System through one preferred 115 kV line. During abnormal conditions, Banning Substation can be transferred to an emergency 115 kV line which is also connected to the Devers 115 kV System. As an additional contingency during abnormal conditions, either the preferred line or the emergency line can be connected to lines fed by the Vista 115 kV System to enable the transfer of Banning Substation to the Vista System. As part of the Proposed Project, Banning Substation would be transferred to the El Casco 115 kV System. To effectuate this transfer, the existing 115 kV switchrack would be replaced with a new switchrack, configured as an operating and transfer bus to implement necessary protection and switching for SRL operation. In order to install the new switchrack at the substation, three existing 115/33 kV transformers and one 33 kV capacitor bank would need to be relocated within the existing substation fence.

A new 27-foot tall 115 kV switchrack designed for eight bays would be installed. Initially, four bays would be equipped as 115 kV line positions, two bays would be equipped as bank positions, and one bay would be equipped as a bus tie position. The switchrack could accommodate the addition of an eighth 115 kV circuit breaker, if needed in the future.

Two new low-profile transformer racks, approximately 27 feet high, would be constructed for the relocated transformers. Each installation would include foundations for two transformers and two 115 kV gang-operated disconnect switches. The transformers would be connected to the existing 33 kV switchrack through insulated cables installed in two cable trenches.

One of the two existing 33 kV capacitor banks would be replaced with a new capacitor bank located within the substation perimeter fence. The new capacitor bank would require construction of a new foundation and would be enclosed within a 6-foot tall chainlink fence. The capacitor bank would be connected to the existing 33 kV switchrack through an insulated cable installed in underground conduit.

The existing MEER is too small to accommodate installation of the SAS and the protective relays and telecommunications equipment necessary to remotely monitor and control the substation. Therefore, an additional MEER, approximately 15 feet wide by 20 feet long by 12 feet high, would be installed at the substation inside the perimeter fence. This installation would require construction of a new foundation. The new protective relaying, telecommunications, and automation equipment, including an HMI cabinet, would be installed inside the MEER on approximately seven 19-inch racks.

2.4.3.2 Construction Plan

2.4.3.2.1 Grading and Site Preparation

The new switchrack and relocated transformers require a pad of approximately 0.25 acres when completed. The existing site is effectively level, however, during construction an area of approximately 0.5 acres would likely be disturbed in order to create this pad. The pad would be located on the western half of the existing substation property. Initial site preparation would require the removal of any previously installed substation crushed rock. Materials removed during grading would be handled in the same manner as described above for El Casco Substation.

2.4.3.2.2 Drainage

There would be no change to the existing drainage patterns at Banning Substation as a result of this work.

2.4.3.2.3 Equipment Installation

After grading and site preparation is completed, the foundations and below-ground facilities (e.g., ground-grid, conduit, etc.) would be constructed followed by installation of the above-ground structures and the electrical equipment. Equipment would be delivered to the site using the access routes described below.

2.4.3.2.4 Staging and Access

Material would be staged within the substation fence during construction. All construction material would be delivered by truck. Construction traffic would use Lincoln Street and/or Hargrave Street and would be scheduled for off-peak traffic hours to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work is being performed. A traffic control service would be used for oversized material delivery.

2.4.3.2.5 Labor and Equipment

Construction would be performed by SCE construction crews and/or by contractors under the supervision of SCE personnel. Anticipated construction personnel and equipment are summarized in Table 2-7, Construction Personnel and Equipment Summary (Banning Substation).

TABLE 2-7
CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY
(BANNING SUBSTATION)

Construction Element	Number of Personnel	Number of Days	Equipment Requirements	
Site Management	2	Duration of Construction	1 – Office Trailer (Electric)	
Grading	8	10	1 – 980 Loader (Diesel) 1 – Graders (Diesel) 1 – Compactor (Gas/Diesel)	1 – Water Truck (Diesel) 1 – Survey Truck (Gas/Diesel) 1 – Soils Test Crew Truck (Gas/Diesel)
Civil (foundations, underground conduits, ground grid, etc.)	10	45	2 – Drillers (Diesel) 4 – Crew Trucks (Gas/Diesel) 1 – 14-ton Crane (Diesel) 3 – Dump Trucks (Gas/Diesel)	2 – Tractors (Diesel) 1 – 5-ton Truck (Gas/Diesel) 1 – Forklift (Diesel) 1 – Ditch Digger (Diesel)
Electrical (MEER, switchracks, conductors, circuit breakers, etc.)	20	75	4 – Manlifts (Diesel) 4 – Pickup Trucks (Gas/Diesel) 2 – 14-ton Cranes (Diesel) 2 – Crew Trucks (Gas/Diesel)	2 – 150-ton Cranes (Diesel) 1 – 5-ton Truck (Gas/Diesel) 1 – Forklift (Diesel) 4 – Carryall Vehicles (Gas/Diesel) 2 – Support Tucks (Gas/Diesel)
Maintenance (equipment preparation and verification)	5	30	1 – Foreman Truck (Gas/Diesel) 1 – Manlift (Gas/Diesel)	2 – Crew Trucks (Gas/Diesel) 2 – Gas/Processing Trailers (Electric)
Test (relays, energization, SAS, etc.)	4	40	1 – Pickup Truck (Gas/Diesel)	

2.4.3.2.6 Hazardous Material Usage and Waste Generation

Construction at Banning Substation would require limited use of hazardous materials, including fuel, lubricants, and cleaning solutions. All hazardous materials would be stored, handled, and used in accordance with applicable regulations, including the Construction Storm Water Pollution Prevention Plan for the substation modifications.

Construction at Banning Substation would result in the generation of various waste materials, including materials associated with removal activities and substation modifications. A summary of the waste generation is presented in Table 2-8.

TABLE 2-8
CONSTRUCTION WASTE ESTIMATES
(BANNING SUBSTATION)

Waste Item	Pounds Total	Pounds Reusable on Site	Pounds Recyclable or Disposed
Grading Element			
Soil/Vegetation	0	0	0
Sanitation Waste	0	0	0
Miscellaneous	0	0	0
Civil Element			
Soil	1,000,200	0	1,000,200
Wood	2,000	0	2,000
Concrete	1,000	0	1,000
Sanitation Waste	500	0	500
Miscellaneous	300	0	300
Electrical Element			
Wood	2,000	0	2,000
Aluminum	1,000	0	1,000
Copper	1,000	0	1,000
Steel	2,000	0	2,000
Sanitation Waste	500	0	500
Miscellaneous	1,000	0	1,000

2.4.3.2.7 Post Construction Clean-Up

All debris associated with work at Banning Substation would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable regulations.

2.4.3.2.8 Construction Schedule

Construction at Banning Substation would take approximately eight months, commencing in mid-2009 and concluding in early 2010, including testing and energizing the substation.

2.5 220 KV TRANSMISSION LINE LOOP IN

2.5.1 Engineering Plan

To connect the proposed El Casco Substation to the 220 kV transmission system, the existing Devers-San Bernardino No. 2 220 kV line would be looped into the new 220 kV switchrack by constructing two new line segments of approximately 500 feet each between the existing right of way (ROW) and the proposed El Casco 220 kV switchrack. This would create two new lines: the Devers-El Casco 220 kV line and the El Casco-San Bernardino 220 kV line. To support the two new line segments, three new double circuit lattice steel towers (LSTs) would be constructed. One tower would intercept the existing Devers-San Bernardino No. 2 220 kV transmission line between structures T-72 and T-73 to redirect the line into the substation. Two towers would be constructed between the existing ROW and the new El Casco Substation perimeter wall. See Figure 2-2, El Casco Substation Site Plan.

2.5.1.1 Structures and Associated Equipment

The three 220 kV double circuit LSTs would each be built on four drilled pier concrete footings. The dimensions of each footing are dependent on variables such as topography, tower height, span lengths, and soil properties. On average, a typical footing would have an above-ground projection of about 3 feet. Each LST would range in height from 100 to 130 feet. Final engineering will determine the exact height of each structure. All LSTs would be constructed of dull galvanized lattice steel angle members connected by steel bolts.

The proposed line segments would utilize a single 1033 kcmil aluminum conductor steel reinforced (ACSR) conductors with non-specular (dulled) finish. Each conductor would be attached to an LST by dead-end insulator assemblies, consisting of two polymer insulators each, oriented horizontally in each direction. Overhead ground wire would be strung on the peaks of the LSTs for the line segments between the existing ROW and the El Casco Substation 220 kV switchrack.

2.5.1.2 Spur Roads

Spur roads are roads that lead from the access road and dead-end into one or more tower sites. An approximate 200-foot long by 12-foot wide dirt spur road would be graded from the substation access road to the three new LSTs.

2.5.2 Construction Plan

2.5.2.1 <u>Tower Site Preparation</u>

Each tower site would be graded or cleared to provide a relatively level pad, free of any vegetation that would hinder tower construction. The tower site (approximately 100 feet by 100 feet) would be graded such that no ponding or erosive water flow would occur that would cause damage to the tower footings. The graded pad would be compacted to at least 90 percent relative density and would be capable of supporting heavy vehicles.

2.5.2.2 Staging and Access

Material would be staged within the substation wall/fence during construction. All material for the 220 kV transmission line loop-in work, including concrete, steel, and wire, would be delivered by truck. Construction traffic would use San Timoteo Canyon Road and would be scheduled for off-peak traffic hours to the extent possible. Concrete truck deliveries may need to be made during peak hours when footing work is being performed.

2.5.2.3 Foundations

After a geotechnical investigation and final engineering of the LST have been completed, pier-type foundations would be poured in place using augured excavation techniques. The depth of the underground portion of the footing would depend on the findings of the geotechnical report. The above ground portion of the footings would extend approximately three feet high.

2.5.2.4 Tower Assembly

LSTs would be assembled at each individual LST location. Crews would erect the steel onto the footings and would bolt together the panel sections until the entire LST is erected. Assembly and erection of the LSTs would require an erection crane to be set up approximately 60 feet from the centerline of each LST. The crane pad would be located transversely from each LST location.

2.5.2.5 Conductor Pulling

Conductor pulling includes all activities associated with the installation of conductors onto the LSTs. This activity includes the installation of overhead ground wire (OHGW) and primary conductor, vibration dampeners, weights, spacers, and dead-end hardware assemblies. Two cable pulls would be performed, one for each circuit, between the switchrack and the tower intercepting the 220 kV line. An 80-foot by 80-foot temporary staging area would be required at each of two pull locations.

Conductor pulling would be in accordance with SCE specifications and similar to process methods detailed in the Institute for Electrical Engineers Standard 524-1992 (Guide to the Installation of Overhead Transmission Line Conductors). Conductors are pulled using individual reels, with ropes strung along the towers. Conductors are pulled from each pull location using take up reels.

2.5.2.6 Labor and Equipment

Construction would be performed by SCE construction crews and/or by contractors under the supervision of SCE personnel. Anticipated construction personnel and equipment are summarized in Table 2-9, Construction Personnel and Equipment Summary (220 kV Transmission Line Loop In).

TABLE 2-9
CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY
(220 kV TRANSMISSION LINE LOOP IN)

Construction Element	Number of Personnel	Number of Days	Equipment Requirements	
Survey	4	5	2 – Pick-ups (Diesel)	
Receive and Load Out Materials	8	10	1 – 50-ton Hydro Crane (Diesel) 1 – 980 Loader (Diesel)	1 – 5-ton Forklift (Diesel) 1 – Pick-up (Diesel)
Spur Road Work	6	5	1 – D-6 CAT (Diesel) 1 – Motor Grader (Diesel)	1 – Water Truck (Diesel) 1 – Pick-up (Diesel)
Foundations	10	10	1 – Auger Truck (Diesel) 6 – Concrete Trucks (Diesel) 1 – Boom Truck (Diesel) 1 - Backhoe (Diesel)	1 – 10-ton Dump Truck (Diesel) 1 – Water Truck (Diesel) 2 – Pick-up (Diesel)
LST Assembly	16	40	1 – 150-ton Hydro Crane (Diesel) 1 – Pick-up (Diesel) 2 – Ton Trucks (Diesel)	1 - Semi-Tractor (Diesel) 1 – Compressor (Diesel) 1 – Water Truck (Diesel)
Conductor & Ground Wire Installation	10	15	3 – Bucket Trucks (Diesel) 1 – Tensioner (Diesel) 1 – 3 Drum Puller (Diesel) 1 – Single Drum Puller (Diesel) 1 – 50-ton Crane (Diesel) 1 – Semi Truck (Diesel) 1 – Static Tensioning Truck	1 – Sagger (Diesel) 1 – Pick-up (Diesel) 3 – Small Engines/Generators/Pumps (gas) 4 – 1-ton Flatbed Trucks (Diesel) 1 – Water Truck (Diesel)
Clean-Up	8	5	1 – Bucket Truck (Diesel) 1 – Pick-up (Diesel)	

2.5.2.7 Hazardous Material Usage and Waste Generation

Construction of the 220 kV transmission line loop in would require limited use of hazardous materials, including fuel, lubricants, and cleaning solutions. All hazardous materials would be stored, handled, and used in accordance with applicable regulations, including the Construction Storm Water Pollution Prevention Plan, for the transmission segments. Construction of the 220 kV transmission line loop in would generate waste in the form of wood, soil and vegetation, and sanitation waste.

2.5.2.8 Post Construction Clean-Up

All debris associated with construction of the 220 kV transmission line loop in would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable regulations.

2.5.2.9 Construction Schedule

Construction of the proposed 220 kV transmission line loop-in would take approximately 90 days, and is scheduled to begin in early 2010.

2.6 115 KV SUBTRANSMISSION LINE WORK

2.6.1 Engineering Plan

During Phase 1 of construction and operation, the proposed El Casco 115/12 kV Substation would be connected to the Vista 115 kV System. To accomplish this, the existing Maraschino-San Bernardino 115 kV subtransmission line would be looped into the proposed 115 kV switchrack. This would create the El Casco-San Bernardino 115 kV and the El Casco-Maraschino 115 kV subtransmission lines.

During Phase 2 of construction, modifications and additions to the existing 115 kV subtransmission lines in the area would be required to create the new El Casco 115 kV System. Two existing 115 kV subtransmission lines would be rebuilt (El Casco-Maraschino and Banning-Garnet-Maraschino-Windfarm) and one new 115 kV subtransmission line would be built (El Casco-Banning). See Figure 2-1, El Casco Project Overview.

2.6.1.1 Routing

Construction of the 115 kV subtransmission lines would occur as follows:

1) The existing Maraschino-San Bernardino 115 kV subtransmission line would be looped into the proposed El Casco 115/12 kV Substation during Phase 1 of construction. This would require constructing two new subtransmission line segments of approximately 900 feet each between the existing 115 kV ROW and the proposed

115 kV switchrack. To support the two new subtransmission line segments, twelve new double-circuit steel poles would be installed: two in the existing ROW, eight between the existing ROW and El Casco Substation, and two within the substation fence. These steel poles would be designed to support two sets of conductors, though only one set would be installed on each steel pole during Phase 1.

2) During Phase 2 of construction, the portion of the El Casco-Maraschino 115 kV subtransmission line between Maraschino Substation and the new line segments installed as part of Item 1 above would be rebuilt. The route begins just south of the proposed substation site and continues southeast within the existing ROW for approximately 5 miles and would require the replacement of existing single-circuit wood pole structures with double-circuit steel poles in this section. Throughout this section, some existing structures also support distribution lines, which would be transferred to the new steel poles. The route then continues east for approximately 1.0 mile into Maraschino Substation (this 1.0-mile segment is referred to as "Maraschino Loop West"). In this section, the first 0.5 miles would require the replacement of single-circuit wood poles with new single-circuit steel poles, while the second 0.5 miles would not require any pole replacements.

3) Portions of the existing Banning-Garnet-Maraschino-Windfarm 115 kV subtransmission line would also be rebuilt during Phase 2. The route begins at Maraschino Substation and heads south for approximately 0.7 miles to the existing ROW and would require the replacement of single-circuit wood poles with new single-circuit steel poles in this section (this 0.7-mile segment is referred to as "Maraschino Loop South"). At this point, the route turns east for approximately 7.0 miles and then north for approximately 0.7 miles into Banning Substation. These sections require the replacement of existing single-circuit wood pole structures with double-circuit steel poles. For approximately 1.2 miles (0.5 miles at the eastern end of the route and the 0.7 mile segment south of Banning Substation) the existing wood pole structures also support distribution lines, which would be transferred to the new steel pole structures. Two new switches would also be installed on the steel poles installed south of Banning Substation to allow this subtransmission line to be split, forming the Banning-Maraschino 115 kV and the Garnet-Windfarm 115kV subtransmission lines.

4) The El Casco-Banning 115 kV subtransmission line would be newly created during Phase 2. The route would begin at El Casco Substation, parallel to the El Casco-Maraschino 115 kV subtransmission line, and would be installed on the new double-circuit steel poles described above in Item 2 to the point where the El Casco-Maraschino 115 kV subtransmission line turns east towards Maraschino Substation. At that point, the El Casco-Banning 115 kV subtransmission line would continue southeast for approximately 0.8 miles, and would require the replacement of single-

circuit wood poles with new single-circuit steel poles in this section. The route would then connect with the portion of the rebuilt Banning-Maraschino 115 kV subtransmission line heading towards Banning Substation and would be installed on the new double-circuit steel poles described above in Item 3.

2.6.1.2 Structures and Associated Equipment

To accomplish all of the subtransmission line construction identified in both Phases 1 and 2, approximately 225 new steel poles, ranging from 65 to 85 feet tall, would be installed. Approximately 25% of these steel poles would be bolted-base tubular steel poles (TSP), and the remaining 75% would be direct-buried lightweight steel (LWS) poles. Except for the steel poles installed within the substation site, these structures would be placed within existing 115 kV ROWs or along public street ROWs. For segments of the 115 kV subtransmission line where existing distribution lines are also attached to the existing wood poles, the distribution lines would be transferred to the new steel poles.

All of the proposed subtransmission line work, both rebuild and new, would utilize single 954 kcmil solid aluminum conductor (SAC). Each conductor would be attached to a steel pole by either dead-end insulator assemblies consisting of dual polymer insulators attached to each crossarm in a horizontal configuration or suspension assemblies consisting of single polymer insulators attached to each crossarm in a vertical configuration. Overhead ground wires would be installed on the peaks of the steel poles. Distribution lines transferred to the new steel poles would typically be installed on standard wood crossarms with polymer insulators.

2.6.1.3 Access Roads and Spur Roads

Because the subtransmission portion of the Proposed Project occurs within existing ROWs, access roads are already in existence and are maintained on a regular basis. Therefore, no new access roads, improvements, or additional maintenance would be required for the 115 kV subtransmission line.

One new spur road would be constructed from the existing access road south of the substation site heading north approximately 600 feet along the new line route of the 115 kV loop-in to El Casco Substation. The new spur road would be approximately 12 feet wide with a maximum grade of approximately 15 percent.

2.6.2 Construction Plan

2.6.2.1 Steel Pole Site Preparation

Construction activities would begin with the survey of the 115 kV subtransmission line routes. To do so, survey crews would stake the steel pole locations, including reference points and centerline hubs. Survey crews would also survey limits of grading for steel pole excavations, the new stub road, and any necessary crane pads or lay-down areas.

Any steel poles that are replacing existing wood pole structures in existing ROW areas would be primarily installed at the same locations. Therefore, minimal new surface disturbance would be required at these locations as a result of this aspect of the 115 kV subtransmission line work. However, excavation would be required at these locations for the installation of the steel poles.

Depending on their location, the assembly and erection of some of the new TSPs may require that a new crane pad, approximately 50 feet by 50 feet (approximately 0.06 acres) each, be prepared to allow an erection crane to set up 60 feet from the centerline of each TSP. The crane pad would be located transversely from each applicable TSP location.

2.6.2.2 Staging and Access

Primary material staging areas would be established at El Casco Substation, as well as at Maraschino and Banning Substations, due to their proximity to certain portions of the work. Materials and equipment to be staged in these yards would include: wire reels, insulators and hardware, heavy equipment, light trucks, construction trailers, and portable sanitation facilities. All material for the 115 kV subtransmission line work would be delivered by truck. Construction traffic would primarily use San Timoteo Canyon Road near El Casco Substation, California Avenue near Maraschino Substation, and San Gorgonio Avenue near Banning Substation, and would be scheduled for off-peak traffic hours to the extent possible.

2.6.2.3 Steel Pole Installation

LWS poles would be installed in holes bored approximately 24-30 inches in diameter and approximately 10 feet deep. LWS poles are normally installed using a line truck. Once the LWS poles are set in place, bore spoils (material from the bored holes) would be used to backfill the hole. If the bore spoils are not suitable for backfill, imported material, such as clean fill dirt and/or pea gravel, would be used. Excess bore spoils would be distributed at each pole site or used as backfill for the holes left after removal of nearby wooden poles.

TSPs would be installed on top of cylindrical concrete footings approximately 6-8 feet in diameter and approximately 20-25 feet deep. After holes for the footings are bored, a steel (rebar) cage would be inserted into the hole, and then concrete would be poured into the hole to a level 1-2 feet above the natural surface. After the concrete has cured, the TSP would be bolted onto the footing. Excess bore spoils would be distributed at each pole site or used as backfill for the holes left after removal of nearby wooden poles.

Both LWS poles and TSPs consist of separate base and top sections for ease of construction. Steel pole installation would begin with initially laying the individual sections on the ground at each location. While on the ground, the top sections would be pre-configured with the necessary insulators and wire stringing hardware. The installation is completed by using a line truck (for LWS poles) or a crane (for TSPs) to position each pole base section in previously augured holes or on top of previously prepared foundations. When the base section is secured, the top section would then be placed above the base section. The two sections may be spot welded together for additional stability.

2.6.2.4 Removal of Existing Wood Poles

Following installation of the new steel poles, the existing wood poles would be completely removed (including the portion below ground surface) and the hole would be backfilled using imported fill in combination with fill that may be available as a result of excavation for the installation of the new steel poles. Depending on their condition and chemical treatment method, the wood poles to be replaced would be reused by SCE, returned to the manufacturer, disposed of in a Class I hazardous waste landfill, or disposed of in the lined portion of a Regional Water Quality Control Board (RWQCB)-certified municipal landfill.

2.6.2.5 Conductor Pulling

Conductor pulling includes all activities associated with the installation of conductors onto the steel poles. This activity includes the installation of primary conductor and ground wire, vibration dampeners, weights, and suspension and dead-end hardware assemblies.

A standard wire stringing plan includes a sequenced program of events starting with determination of the most effective wire pulls and wire pull equipment set-up positions. Depending on the concerns of various stakeholders along the line route, the stringing plan may require altered hours of operation, implementation of special dust control measures, or use of guard structures in particular areas to prevent inadvertent stoppages of traveled roadways.

Typically, wire pulls and splices occur every 6,000 feet. "Wire pulls" are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected, where possible, based on availability of dead end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment set ups. The dimensions of the area needed for conductor pulling set ups can vary depending upon the terrain, however, a typical set up for single circuit conductor pulling is approximately 100 feet by 200 feet. Where necessary due to space limitations, however, crews can work from within a somewhat smaller area.

Special equipment is positioned at each end of the conductor pull. At one end, a puller is positioned and on the other end a tensioner and wire reel stand truck is positioned. Once positioned, a lightweight sock line is installed through stringing sheaves on each steel pole for the particular set of spans selected for the conductor pull. The sock line is then used to pull in the conductor pulling cable. The conductor pulling cable is then attached to the conductor using a special swivel joint to prevent the wire from "basketing" and allowing it to rotate freely, thus preventing complications from twisting as the conductor unwinds off of the reel. Pulling, sagging, and clipping-in the conductors are then completed. Stringing equipment from one end of the pull is then rotated 180 degrees to face the new pull direction and the equipment from the other end of the pull is then "leapfrogged" to its new pulling position and the process is repeated. A similar process is employed for the ground wire. Conductor pulling would be in accordance with SCE specifications and similar to process methods detailed in IEEE Std. 524-1992 (Guide to the Installation of Overhead Transmission Line Conductors).

2.6.2.6 Labor and Equipment

Construction would be performed by SCE construction crews and/or by contractors under the supervision of SCE personnel. Anticipated construction personnel and equipment are summarized in Table 2-10, Construction Personnel and Equipment Summary (115 kV Subtransmission Lines).

TABLE 2-10
CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY
(115 kV SUBTRANSMISSION LINES)

Construction Element	Number of Personnel	Number of Days	Equipment Requirements	
Survey	4	5 (Ph. 1) 20 (Ph. 2)	2 – Picks-ups (Diesel)	
Receive and Load Out Materials	6	5 (Ph. 1) 25 (Ph. 2)	1 – 50-ton Hydro Crane (Diesel) 1 - 980 Loader (Diesel)	1 – 5-ton Forklift (Diesel) 1 – Pick-up (Diesel)
Spur Road Work	4	5 (Ph. 1) 25 (Ph. 2)	1 – Motor Grader (Diesel) 1 – Water Truck (Diesel)	1 – Pick-up (Diesel)
Steel Pole Construction and Conductor Installation	16	10 (Ph. 1) 95 (Ph. 2)	1 – 150-ton Hydro Crane (Diesel) 1 – Pickup (Diesel) 1 – Line Truck (Diesel) 1 – Wire Pulling Machine (Diesel) 1 – Wire Tension Machine (Gas) 2 – 30-ton Crane (Diesel) 2 – Truck Mounted Crane (Diesel)	1 – Water Truck (Diesel) 2 – Ton Trucks (Diesel) 1 – Semi-Tractor (Diesel)
Clean-up	4	5 (Ph. 1) 15 (Ph. 2)	1 – 10-ton Dump Truck (Diesel) 1 – Pick-up (Diesel)	

2.6.2.7 Hazardous Material Usage and Waste Generation

Construction of the 115 kV subtransmission lines would require limited use of hazardous materials, including fuel, lubricants, and cleaning solutions. All hazardous materials would be stored, handled, and used in accordance with applicable regulations, including the Construction Storm Water Pollution Prevention Plan, for the subtransmission line segments. Construction of the 115 kV subtransmission lines would result in the generation of various waste materials, including wood, soil and vegetation, and sanitation waste.

2.6.2.8 Post Construction Clean-Up

All construction debris associated with construction of the 115 kV subtransmission lines would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable regulations.

2.6.2.9 Construction Schedule

Construction of the 115 kV subtransmission line work for Phase 1 would require approximately 30 days to complete and is scheduled to begin in early 2009. Construction of the 115 kV subtransmission line work for Phase 2 would require approximately 180 days to complete and is scheduled to begin in late 2009.

2.7 12 KV DISTRIBUTION LINE GETAWAYS

2.7.1 Engineering Plan

Two underground duct banks, spaced six feet apart, and each consisting of six 5-inch conduits, would start at the southwest end of the 12 kV switchrack and would be routed towards the northeast corner of the substation. Two additional 5-inch conduits, for telecommunications purposes, would join each of those duct banks near the northeast corner of the substation. At the northeast substation corner, the duct banks would enter separate 26 inch (internal dimension) bore casings, spaced six feet apart, which would be installed underground for about 300 feet, beneath both the San Timoteo Creek and the adjacent railroad tracks, and then terminate in separate vaults on the south side of San Timoteo Canyon Road. The installation of the bore casings would be accomplished using horizontal directional drilling (HDD) techniques and would be designed so that the top of the casings would be approximately eight feet below the flow line of the creek.

2.7.2 Construction Plan

2.7.2.1 Conduit Installation

The installation of the conduit banks from the 12 kV switchrack to the casing entrances at the northeast corner would be completed shortly after the overall rough grading work is done on the site, and prior to the installation of the ground grid. This work would be completed during Phase 1 of construction as part of the substation construction work described above in Section 2.4.1.

2.7.2.2 Horizontal Directional Drilling

The HDD work would occur at approximately the same time as the remainder of the conduit bank installations inside the substation fenceline. One access hole for each casing, each approximately three feet wide by three feet long by three feet deep (approximately 27 cubic feet), would be dug near the northeast corner of the substation to aid in verifying the proper depth and angle of the drilling head. Another pair of holes, of approximately the same dimensions, would be dug at the end of the drilling limits, near San Timoteo Canyon Road, to provide access to the drilling head in order to change out the drilling tools. These exit holes would also serve as the locations where connections to future conduits to be installed east and west along San Timoteo Canyon Road would be made to extend the 12 kV lines to serve local loads. When the HDD work is completed, the entrance and exit holes are subsequently filled up, typically with the native soils that were previously removed, and compacted to the appropriate value.

The HDD work would be performed by a subcontractor experienced in this type of application, and only after applicable construction permits have been acquired. Standard practice for drilling an HDD crossing includes three phases to complete: 1) a small pilot hole is drilled initially to establish the crossing; 2) the pilot hole is then reamed to the approximate diameter of the casing to be installed and the hole is conditioned to minimize any potential cave-ins; and 3) finally, the casing(s) are pulled back into place. Once the casings are installed, the eight conduits would be placed inside, with spacers to maintain their configuration, and then a sand/cement slurry is used to fill any internal voids of the casing and provide additional structural support.

The initial bore hole would be supported by a water-based drilling fluid, such as bentonite, which has several functions including transport of cuttings, cooling off the drill bit, sealing and supporting the drilled hole, and providing lubrication to reduce friction during the pullback phase. Precautions would be taken to ensure that the drilling fluid does not enter roadways, streams, municipal storm or sanitary sewer lines, and/or any other drainage system or body of water.

2.7.2.3 Labor and Equipment

Construction would be performed by SCE construction crews and/or by contractors under the supervision of SCE personnel. Anticipated construction personnel and equipment for the HDD work are summarized in Table 2-11, Construction Personnel and Equipment Summary (12 kV Distribution Line Getaways).

TABLE 2-11
CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY
(12 kV DISTRIBUTION LINE GETAWAYS)

Construction Element	Number of Personnel	Number of Days	Equipment Requirements	
HDD	8	15	2 – Crew Trucks (Gas/Diesel) 1 – Horizontal Directional Drill (Gas/Diesel) 2 – Dump Trucks (Gas/Diesel)	1 - Backhoe (Diesel) 1 – 5-ton Truck (Gas/Diesel)

2.7.2.4 Construction Schedule

Installation of the HDD work would require 15 days to complete. This work is scheduled for early 2009.

2.8 TELECOMMUNICATIONS IMPROVEMENTS

The proposed El Casco System Project would require new telecommunication infrastructure to be installed to protect the transmission and subtransmission lines and provide protective relaying, Supervisory Control and Data Acquisition (SCADA), data, and telephone services to the substations served by the El Casco System.

Two telecommunications paths would be constructed, to provide for redundancy and enhanced reliability of the protection systems for the 220 kV transmission lines. The primary communication path would be a new microwave system installed between the proposed El Casco Substation and SCE's existing Mill Creek Communications Site. The secondary communication path would utilize a series of new fiber optic circuits installed between the Cities of Redlands and Banning.

The new microwave system would require construction of new microwave towers at both El Casco Substation and at the Mill Creek Communications Site. The new fiber optic system would consist of approximately 55 miles of fiber optic cable to be installed both overhead on existing poles or towers and underground primarily in existing conduits and substructures from El Casco Substation to Maraschino, Banning, Zanja, Mentone, Crafton Hills, and San Bernardino Substations.

Completion of the El Casco System Project telecommunications improvements would be staged to match the schedule of the substation work. Construction of the majority of the microwave system would be completed in 2009 to support the initial substation operations and protection of the associated 115 kV lines. Construction of the fiber optic cables and minor additions to the microwave system would be completed in 2010 to support the protection and operation of the new 220 kV lines and the additional 115 kV lines.

2.8.1 Microwave System

2.8.1.1 Engineering Plan

A new microwave path would be constructed between the proposed El Casco Substation and SCE's existing Mill Creek Communications Site to provide a communications circuit for control and protection of the newly formed El Casco System. The proposed microwave path length is approximately 9.2 miles. Based on preliminary microwave path engineering, using GIS data as well as computer modeling software, line-of-sight between the proposed El Casco Substation and Mill Creek Communications Site can be achieved using an 85-foot tall antenna tower at El Casco Substation and a 110-foot tall antenna tower at Mill Creek Communications Site. A field survey would be required to verify path clearance prior to construction of the proposed microwave system.

2.8.1.2 Construction Plan

2.8.1.2.1 El Casco Substation Antenna Tower

A new 85-foot tall, three-legged, self-supporting steel microwave antenna tower would be constructed adjacent to the larger MEER within the El Casco Substation. Tower footings would be installed and the antenna tower would be assembled and erected on site. One 10-foot diameter microwave antenna would be installed on the antenna tower.

2.8.1.2.2 El Casco Substation Communications Room

A dedicated communications room, measuring approximately 15 feet wide by 25 feet long, would be included within the larger El Casco Substation MEER to house communications equipment. The communications room would be equipped with AC power, batteries and a battery charger, an overhead cable tray, redundant air conditioners, and conduits for connection to fiber optic cables.

During Phase 1 of construction, one digital microwave terminal, two digital multiplexers, one communications alarm, two routers, one switch, and one DC power system would be installed in the communications room.

During Phase 2 of construction, two SONET terminals and an additional digital multiplexer would be installed in the communications room to facilitate connections between relays in order to support the protection of the new 220 kV transmission lines and 115 kV subtransmission lines.

2.8.1.2.3 Mill Creek Communications Site Antenna Tower

The existing antenna structure, mounted on the rooftop of the communications building at

Mill Creek Communications Site, is not adequate to support the additional microwave antenna needed for the El Casco System Project, nor is it tall enough to provide adequate line-of-sight to El Casco Substation. Therefore, a new 110-foot tall, three-legged, self-supporting steel lattice antenna tower would be constructed adjacent to the existing communications building. The specific location of the new antenna tower would be determined during final engineering. Existing site grounding would also need to be upgraded. Tower footings would be installed and the antenna tower would be assembled and erected on site. One 10-foot diameter microwave antenna would be installed on the new antenna tower and the two existing microwave antennas would be relocated from the rooftop structure to the new antenna tower. The existing rooftop structure would subsequently be removed.

2.8.1.2.4 Mill Creek Communications Site Communications Building

One digital microwave terminal and one digital multiplexer would be installed in the existing communications building during Phase 1 of construction. No additional equipment would need to be installed at this location during Phase 2 of construction.

2.8.1.2.5 Staging Areas

Temporary construction lay down areas, each approximately 60 feet by 60 feet, would be established for vehicle parking and material storage at each site prior to construction. All tower material would be delivered by truck and would be staged within these lay down areas. The construction crews would be responsible for cleaning up these areas prior to permanently vacating the job sites.

2.8.1.2.6 Labor and Equipment

Tower construction and installation of the antennas and associated equipment would be performed by SCE personnel and/or by contractors under the supervision of SCE personnel. Anticipated construction personnel and equipment are summarized in Table 2-12, Construction Personnel and Equipment Summary (Microwave System). Each tower section at El Casco Substation would be erected using a 100-foot crane and a 100-foot lift (bucket) truck. Each tower section at the Mill Creek Communications Site would be erected using a 150-foot crane and a 150-foot lift (bucket) truck.

TABLE 2-12
CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY (MICROWAVE SYSTEM)

Construction Element	Number of Personnel	Number of Days (per site)	Equipment Requirements
Antenna Tower Construction Crew	4	30 (Ph. 1) 0 (Ph. 2)	2 - Crew Trucks (Gas/Diesel) 1 – 100' Crane (Diesel) – El Casco 1 – 150' Crane (Diesel) – Mill Creek 1 - 100' Lift Truck (Diesel) – El Casco 1 - 150' Lift Truck (Diesel) – Mill Creek
Telecommunications Installation Crew	4	15 (Ph. 1) 10 (Ph. 2)	1 - 2-ton Truck (Gas/Diesel) 1 - Crew Truck (Gas)

2.8.1.2.7 Construction Schedule

During Phase 1 of construction, each antenna tower would require 30 days to assemble, and an additional 15 days would be necessary at each site to attach the microwave antennas and install the other required equipment inside the communication buildings. This work is scheduled for early 2009. The additional work necessary during Phase 2 of construction would require 10 days to complete and is scheduled for early 2010.

2.8.2 Fiber Optic System

2.8.2.1 Engineering Plan

2.8.2.1.1 Routing

Construction of five new fiber optic circuits would be required to provide the necessary communication paths for control and protection of the 220 kV transmission lines and 115 kV subtransmission lines, as well as the various substations in the area. Paths are designed to be diversely routed in order to provide adequate redundancy to mitigate for abnormal events.

The five circuits are described below:

1) "El Casco-San Bernardino" would be installed between El Casco and San Bernardino Substations, and would include taps into and out of Yucaipa, Zanja, Crafton Hills, and Mentone Substations. The total length of this circuit is approximately 180,000 feet, of which approximately 25,000 feet would be underground. See Figure 2-3.1, El Casco Substation to San Bernardino Substation Proposed Fiber Optic Cable Route.

2) "El Casco-Banning" would be installed between El Casco and Banning Substations, and would include a tap into and out of Maraschino Substation. The total length of this circuit is approximately 91,000 feet, of which approximately 7,000 feet would be underground. See Figure 2-3.2, El Casco Substation to Banning Substation Proposed Fiber Optic Cable Route.

3) "El Casco-M29 T2" would be installed between El Casco Substation and the existing transmission tower numbered "M29-T2" on the Devers-Vista 220 kV transmission line ROW, located directly south of the substation site. The total length of this circuit is approximately 3,000 feet, of which the entire length would be underground. See Figure 2-3.3, El Casco Substation to M30 T2 and EL Casco Substation to M29 T2 Proposed Fiber Optic Cable Routes.

4) "El Casco-M30 T2" would be installed between El Casco Substation and the existing transmission tower numbered "M30-T2" on the Devers-Vista 220 kV transmission line ROW, located approximately 1 mile west of the substation site. The total length of this circuit is approximately 8,000 feet, of which approximately 3,000 feet would be

underground. See Figure 2-3.3, El Casco Substation to M30 T2 and El Casco Substation M29 T2 Proposed Fiber Optic Cable Routes.

5) "Banning-M17 T1" would be installed between Banning Substation and the existing transmission tower numbered "M17-T1" on the Devers-Vista 220 kV transmission line ROW, located approximately 0.5 miles north of the intersection of Repplier Road and Florida Street in the City of Banning. The total length of this circuit is approximately 12,000 feet, of which approximately 2,000 feet would be underground. See Figure 2-3.4, Banning Substation to M17 T1 Proposed Fiber Optic Cable Route.

2.8.2.1.2 Structures

The majority of the proposed fiber optic cables would be constructed overhead on existing subtransmission and distribution wood and steel pole structures. Portions of the El Casco-San Bernardino circuit would be installed underground in existing underground conduit systems. Underground fiber optic cables would also be installed in the new distribution and telecommunication conduit system coming out of the El Casco Substation. Approximately four new wood poles, each approximately 40 feet tall, would be installed to carry a portion of the "El Casco-M30 T2" circuit.

2.8.2.1.3 Fiber Optic Cable

The proposed fiber optic circuits would utilize an all-dielectric self-supporting (ADSS) 48-strand single mode fiber optic cable, which is used for both overhead and underground installations. A total of approximately 294,000 feet of new fiber optic cable would be installed.

2.8.2.1.4 Fiber Optic Cable Attachments To Overhead Structures

For overhead attachments to wood or lightweight steel poles, the fiber optic cable would be supported by a high-strength engineered dielectric suspension support block. This suspension support block is oriented vertically and one per overhead structure would be required.

2.8.2.1.5 Fiber Optic Cable Installation In Underground Systems

Where fiber optic circuits are installed in underground conduit and structures, the ADSS cable would be installed within a high density polyethylene smoothwall innerduct, which provides protection and identification for the cable.

2.8.2.1.6 Access and Spur Roads

The construction of the fiber optic circuits would utilize facilities that are either located in franchise areas or along existing access and spur roads. No new roads would therefore be required for the installation and maintenance of this equipment.

2.8.2.2 Construction Plan

2.8.2.2.1 Staging Areas

Construction crews would establish a lay-down area for all material for the proposed fiber optic cable, which would be delivered by truck. Material would be placed inside the perimeter of a fenced material and staging yard during construction. The majority of the truck traffic would use major streets and would be scheduled for off-peak traffic hours. All construction debris would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable regulations.

The primary staging area would be established inside El Casco Substation, or, if room is not available, a suitable existing SCE facility near the substation would be utilized. This alternate staging area location would be selected based on its central location and proximity to the construction activities. Materials and equipment to be staged include: fiber optic cable reels and hardware, heavy equipment, light trucks, and portable sanitation facilities. In addition to the materials and equipment already described for new construction, the following may be temporarily stored in the primary staging yard: empty fiber optic cable and innerduct reels and other debris associated with the installation of the fiber optic cable process.

2.8.2.2.2 Conductor Pulling and Splicing

Fiber optic cable stringing includes all activities associated with the installation of cables onto the existing overhead wood and steel pole structures. Typically, fiber optic cable pulls occur every 6,000 to 10,000 feet, depending on terrain. Fiber optic cable splices are required at the end and beginning of each cable pull. "Fiber optic cable pulls" are the length of any given continuous cable installation process between two selected points along the overhead or underground structure line. Fiber optic cable pulls are selected, where possible, based on availability of pulling equipment and designated dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of fiber optic cable stringing and splicing equipment set ups. The dimensions of the area needed for stringing locations varies depending upon the terrain, however, a typical stringing set up is 40 feet by 60 feet.

Conductors are pulled using individual reels, with ropes strung along the poles. Conductors are pulled from each pull location using take up reels.

2.8.2.2.3 Labor and Equipment

Construction would be performed by SCE construction crews and/or by contractors under the supervision of SCE personnel. Anticipated construction personnel and equipment are summarized in Table 2-13, Construction Personnel and Equipment Summary (Fiber Optic System).

TABLE 2-13
CONSTRUCTION PERSONNEL AND EQUIPMENT SUMMARY (FIBER OPTIC SYSTEM)

Construction Element	Number of Personnel	Number of Days	Equipment Requirements	
Cable Construction	8	100	3 – Bucket Trucks (Diesel) 1 – Pick-up (Diesel) 2 – Cable Dollies	1 – Single Drum Puller (Diesel) 1 – 2 Axle Trailer
Receive and Load Out Materials	4	15	1 – 5-Ton Forklift (Diesel) 1 – Pick-up (Diesel)	
Clean-Up	4	15	2 – Bucket Trucks (Diesel) 1 – Pick-up (Diesel)	

2.8.2.2.4 Hazardous Material Usage and Waste Generation

Installation of the fiber optic cables would require limited use of hazardous materials, including fuel, lubricants, and cleaning solutions. All hazardous materials would be stored, handled, and used in accordance with applicable regulations.

2.8.2.2.5 Post Construction Clean-Up

All debris associated with installation of the fiber optic circuits would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable regulations.

2.8.2.2.6 Construction Schedule

Construction of the proposed fiber optic system would take approximately 130 days and is scheduled to begin in late 2009.