- Electric equipment insulating materials would be specified to be free of polychlorinated biphenyls (PCBs).

- Hazardous wastes generated during construction would be handled, controlled, and disposed of by the contractor in accordance with standard industry practices and appropriate regulations.

- A 6-foot-high chain-link fence would be installed around the perimeter of the proposed power plant site and around individual water well heads. A four-strand barbed wire fence would be installed around the evaporation ponds. A cattle guard and gate would be installed where the access road enters the plant, and the gate would remain closed during normal operating hours.

2.2.1.8 Operational Noise

A typical combined-cycle power plant generating 720-MW of power has a characteristic noise level of 75 A-weighted decibels (dBA) at 400 feet from the main facilities. Much of this noise originates from the turbines and cooling towers, but operational noise can occur from a variety of sources and activities at the plant. Section 3.1.8 provides more detail on noise levels that could be expected at various distances from the proposed power plant boundary.

2.2.2 Transmission System Modifications

2.2.2.1 Substation and Electrical Equipment

The substation would provide the interconnection between the proposed power plant and the Mead-Phoenix Project 500-kV transmission line. The proposed electrical substation for the high-voltage transmission interconnection would cover about 12 acres and would be located between the proposed power plant and the existing Mead-Phoenix Project 500-kV transmission line. The transmission line crosses the proposed power plant site, eliminating the need for new electrical transmission lines to connect the proposed power plant to the regional grid. Western would design, construct, maintain, and operate the proposed substation. Figure 2-4a shows the location of the substation, and Figure 2-8 provides a photograph of a typical substation. A substation contains several different kinds of equipment arranged to carry out electrical functions, minimize safety risk, and accommodate operation and maintenance. The discussion below describes the equipment that would be installed in the proposed substation.

Transformers

Three 3-phase 500/16-kV transformers would be installed during the first phase of the proposed Project to step-up the voltage from the proposed power plant. Electricity produced by the steam turbine generators and the combustion turbine generators would be transformed to 500-kV for delivery over the transmission system. Each generator would be connected to the high-voltage substation via generator leads, conductor support structures, and a generator step-up transformer. Also, one 3-phase 69/16-kV transformer for interconnecting with the existing Mohave Electric Cooperative (MEC) 69-kV transmission line would be used for construction power and station service. One 3-phase 16/12.47-kV transformer would be installed for serving water supply pump loads. A 500/69-kV transformer may be installed to strengthen the tie with the local 69-kV system. For Phase 2 of the proposed Project, one additional 3-phase 500/16-kV generator step-up transformer would be installed.

The step-up transformers each would contain about 45 cubic meters (12,000 gallons) of cooling oil. An oil containment liner would be installed to collect and retain oil within the substation should an oil spill occur, in accordance with a Spill Prevention, Control and Countermeasures (SPCC) Plan. Only newly purchased electrical equipment certified as PCB-free would be installed.

Photo of Typical Substation

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Figure 2-8

Power Circuit Breakers

Breakers automatically interrupt power flow on a transmission line at the time of an electrical fault. Depending upon the final design, eight or nine breakers would be provided in the substation to connect the proposed power plant to the Mead-Phoenix Project 500-kV transmission line. The type of breaker planned for the proposed substation, called a gas breaker, would be insulated by special nonconducting gas (sulfur hexafluoride [SF_6]). Small amounts of hydraulic fluids would be used to open and close the electrical contacts within the breaker.

SF_6 is a greenhouse gas. The use, storage, and replacement of SF_6 would be monitored and managed by Western to minimize any releases to the environment. SF_6 gas in substation circuit breakers would be contained within sealed units. Equipment as delivered from the manufacturer would be required to be factory-tested and certified not to leak. After installation, the equipment would be scanned for detection of leaks, and repairs made as appropriate. During use, the equipment would be monitored by periodic substation inspections for indications of leakage. During servicing, SF_6 gas would be evacuated using sealed gas containment equipment, thereby remaining totally contained.

Switches

Switches are devices used to mechanically disconnect or isolate equipment. Switches would be located on both sides of circuit breakers.

Buswork, Bus Pedestals

Power moves within a substation and between breakers and other equipment on bundled aluminum conductors, which are elevated by bus poles and towers called bus pedestals. Buswork within the proposed substation would transport the entire plant's power output to the Mead-Phoenix Project 500-kV transmission line. Bus pedestals would be grounded in accordance with the National Electrical Safety Code (NESC).

Substation Fence

A chain-link fence with standard barbed wire on top would provide security for the substation. Adequate space would be provided inside the fence to maneuver construction and maintenance vehicles. The fencing would be grounded in accordance with the NESC.

Substation Rock Surfacing

A 6-inch layer of rock and binder material selected for its insulating properties would be placed on the ground within the proposed substation to help protect operation and maintenance personnel from electrical danger in the event of electrical failures.

Control House

Electric/electronic controls and monitoring equipment for the power system would be housed in a building within the proposed substation. Control houses would be heated and air-conditioned to provide a controlled environment for equipment. Electrical service would be provided by a station-service transformer that would provide 208/120-volt (V) service to the control house.

2.2.2.2 Transmission Interconnection

The proposed substation would be located east of the Mead-Phoenix Project 500-kV transmission line between two existing transmission line structures. Western proposes to install two new turning dead-end structures to provide a tie with the new substation. Each turning structure would be a steel-lattice self supporting tower or three new single-pole structures, and provide for turns of 90 degrees or greater into the new substation. It is envisioned that the new structures would be located within the existing Mead-Phoenix Project 500-kV transmission line right-of-way in the span between the two existing structures west of the proposed substation. However, depending on outage requirements, it may be necessary to erect the structures adjacent to, and east of, the existing right-of-way to reduce outage time

during installation, or install temporary wood-pole structures to bypass the substation until the proposed power plant is ready for interconnection.

Prior to placing the substation in service, the existing Mead-Phoenix Project conductors in the span west of the substation would be cut and attached to the new turning structures. New conductors would be installed from the new turning structures to A-frame tubular steel take-off structures, and between the take-off structures and bus tubing within the substation. Typical dead-end turning structures are shown on Figure 2-9. The locations of the new dead-end structures are indicated on Figure 2-4a.

2.2.2.3 Communication Facilities

Primary Communication System

Substation equipment would be operated remotely from the Western Desert Southwest Region Operations Center in Phoenix through a Supervisory Control and Data Acquisition (SCADA) system. The system would communicate with the control house of the proposed substation through links with an existing microwave system. To provide the links, Western would install a communications tower within the proposed substation adjacent to the control house. The height of the tower would be determined during the design phase of the communication tower, but is expected to be less than 60 feet high. A microwave dish about 10 feet in diameter would be installed on the tower and pointed towards an existing Western microwave tower at Hayden Peak in the Hualapai Mountains. A microwave dish about 10 feet in diameter would be added to the Hayden Peak tower. The addition of the microwave dishes would provide a link with Western's existing microwave communications system.

Dual/Redundant Communication System

A redundant communication system also would be installed. The redundant system would be designed to provide a backup communication system in the event that the primary communication system is interrupted. There are two options for installing the redundant communication system. The first option would include the following two actions:

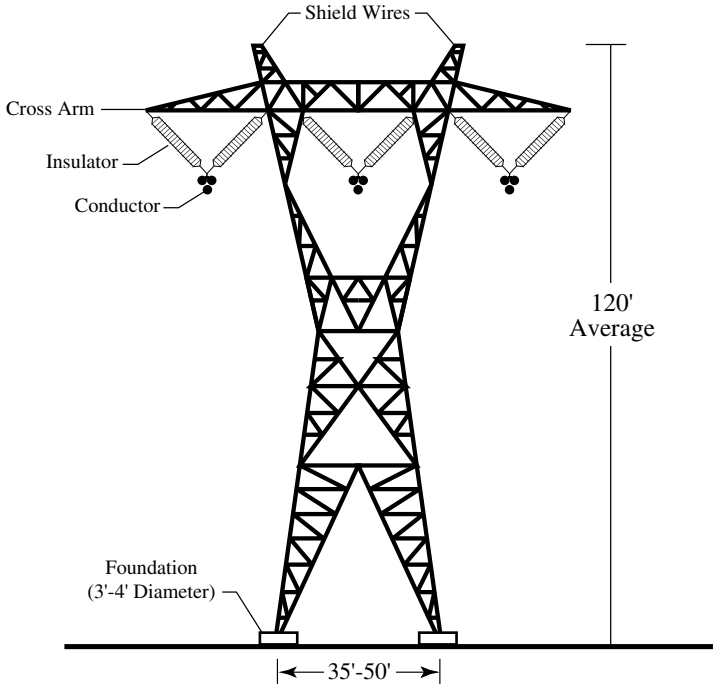
1. Replacing an existing overhead static wire with an optical ground wire (OPGW) on the existing Mead-Liberty 345-kV transmission line between the proposed substation and Western's existing Peacock Substation. From the Peacock Substation, there is a fiber optic path to Western's Phoenix Substation in Phoenix. The Peacock Substation is about 46 miles north of the proposed substation.

2. Adding a microwave link between Western's Phoenix Substation and Perkins Substation via an existing Western microwave facility at Towers Mountain (located at latitude 34 degrees, 14', 06", longitude 112 degrees, 21', 59"). New microwave dishes would be required at Phoenix, Towers Mountain, and Perkins.

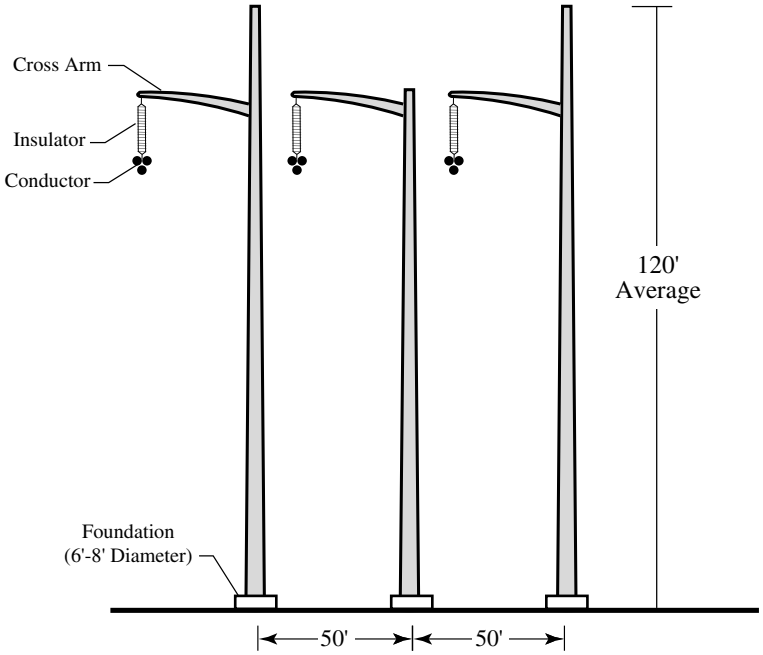
The second option would involve linking the proposed substation with the existing Salt River Project (SRP) microwave system, which currently is being used as a backup for the Mead-Phoenix Project 500-kV transmission line. This option would entail installing microwave dishes at the proposed substation and an existing SRP microwave facility. An intermediate tower may be required if a microwave path cannot be found between the proposed substation and an SRP microwave tower. Western would select the redundant communication system upon completion of further communications study.

Regeneration stations would not be required for the installation of OPGW. Western would own the OPGW, electronics equipment used by Western, and the ancillary facilities. The Project would not change the size of the right-of-way or the way in which the transmission line is maintained. No new road construction would be required. New ground disturbance during construction would be limited to pulling and tensioning sites along the Mead-Liberty 345-kV transmission line, trenching between the

Self-supporting Steel-lattice



Self-supporting Tubular Steel



Note: Dimensions are approximate
Drawings are not to scale

Dead-end Turning Structure

Big Sandy Energy Project EIS

Figure 2-9

substation and a transmission structure on the Mead-Liberty 345-kV transmission line, west of the proposed substation, and OPGW spool storage and handling areas. It is anticipated that all pulling and tensioning sites would be within the existing transmission line right-of-way. Each pulling and tensioning site would temporarily disturb an area about 120 by 120 feet or 0.33 acre. The sites would be located in previously disturbed areas to the extent feasible within the existing right-of-way. The number of pulling and tensioning sites would depend on the lengths of OPGW procured for the installation. Typically, the cable lengths average about 3 miles in length. Therefore, with a length of about 46 miles, 15 sites would be needed, involving the temporary disturbance of about 5 acres of existing right-of-way.

The OPGW would be composed of not more than 48 dielectric fibers (which do not conduct electricity) encased in a metal jacket that protects the fibers and serves the purpose of the static line it would replace. The fibers with their protective coatings, including the metal jacket, would create a cable about 1 inch in diameter. The cable would not emit any additional noise, or electric or magnetic fields. The OPGW would be attached at or near the top of each electrical transmission line structure above the electrical conductors. The OPGW would not be used for commercial purposes.

2.2.3 Water Supply System

The water supply system for the Project water requirements would consist of up to five groundwater wells, pumps, a water storage tank, and associated piping. Groundwater from a deep aquifer in the Big Sandy Valley is the planned source of water for the Project. Raw water would be provided from up to five groundwater wells drilled and completed to a depth of about 1,500 feet. Up to four of these would be on private land in Section 7, and one well that already has been drilled as a test production well is in the southwest corner of Section 5 adjacent to the proposed power plant site. A water pipeline (either aboveground or buried within the access road right-of-way) would direct the water to the proposed power plant and agricultural area. Where the pipeline would parallel the power plant access road, it would be buried within the road right-of-way. Figure 2-10 shows the proposed location of the wells and water pipelines, plus other plant utilities.

Under normal operating conditions, two of the wells would be pumped at any one time, each at a rate of about 1,200 gpm. The wells would be cycled at about two-week intervals. The maximum pumping rate would be about 5,000 gpm, which would utilize up to all five of the wells. The maximum annual consumption of water would be about 4,850 acre-feet (equivalent to 3,000 gpm). Approximately 81 percent of the water extracted would be used for cooling within the cooling towers themselves and 2 percent of the water would be conveyed to the evaporation ponds. Of the remaining 17 percent, approximately 13 percent would be used for the proposed agricultural activities, and 4 percent would be used for plant personnel and evaporative losses.

The electrical groundwater pumps would be powered from the proposed power plant via an underground 4,160-V electrical circuit. That line, and a control line, would be buried in or immediately adjacent to the well access roads.

An aboveground pipeline from each well would be constructed to a 250,000-gallon water storage or “head” tank to be located on the northeast well pad site in Section 7 (Figure 2-10). A single underground line would convey water from this tank to the 600,000-gallon raw water supply tank on the proposed power plant site near the administration (control room) building. Some of the wells also would be able to provide water directly to the proposed agricultural activities discussed in Section 2.2.6 through either aboveground or buried pipelines that would be placed within the access road right-of-way.

Demineralized water for power plant requirements would be generated from the well water using a reverse-osmosis system, followed by a mixed-bed demineralizer unit. The output of this unit would go to one demineralized water