density, allowing the combustion turbine to generate additional energy.

The second cooling system would consist of an 11-cell wet cooling tower installed during Phase 1 that would evaporatively cool the water that has passed through the steam condenser to condense the low-pressure steam to water. An additional four-cell cooling tower would be installed as part of Phase 2. The cooling tower for the steam cycle built during Phase 1 would cycle water at the rate of about 219,000 gallons per minute (gpm). The smaller cooling tower added as part of Phase 2 would recycle about 82,125 gpm. About 2,400 gpm of water would be evaporated or lost as water droplets (drift) from the cooling towers during full load operation of the 720-MW (Phase 1 and Phase 2) power plant. Make-up water for the cooling towers would be provided from the groundwater supply wells. The water in the cooling tower would be cycled through the cooling system up to 12 times. To keep the dissolved solids concentration from going too high, a slip stream of cooling water would be discharged to the evaporation ponds (refer to Section 2.2.1.6) and make-up water would be added. Water for cooling needs would be treated with sodium hypochlorite (bleach) to control algal fouling. Less than 0.2 ppm of residual chlorine would be expected at the cooling water cycle outlet.

2.2.1.6 Waste Management

Solid and Hazardous Waste/Materials

Most of the solid waste generated during both construction and operation of the proposed power plant and associated facilities would be non-hazardous wastes typical of those generated by other human activities, such as used rags, empty parts containers, and office waste. About 50 tons per year (tpy) of general solid waste (rubbish) would be expected from routine operations.

Solid waste would be temporarily stored at the proposed power plant site in containers provided by a commercial waste handling facility. These materials would be collected and transported by a licensed hauler to an approved disposal facility authorized to accept this type of waste. All waste collection and disposal would be performed in accordance with regulatory requirements (Resource Conservation and Recovery Act [RCRA]) and applicable health and safety standards.

Several special or potentially hazardous wastes would be generated from routine operations. These include waste lubricating oils (12 tpy) and associated used oil filters, spent solvents (12 tpy), 100 empty drums per year, and spent SCR catalyst (24 tpy). Used oil, spent solvents, used oil filters and empty drums would be recycled by a licensed contract recycling company. Spent SCR catalyst would be returned to the supplier to be recycled or disposed of as a hazardous waste in an approved and permitted landfill.

Other hazardous wastes generated would include chemical cleaning wastes (such as alkaline and acid cleaning solutions used during pre-operational chemical cleaning of the HRSGs), acid cleaning solutions used for chemical cleaning of the HRSGs after the units are put into service, and turbine wash and HRSG fireside wash waters. These would be classified as characteristically hazardous because of their typically high metal concentrations. They would be stored temporarily on site in portable tanks and would be disposed of in accordance with applicable regulatory requirements (RCRA). About 120 tpy of these cleaning/flushing waste solutions could be expected from routine operations.

Hazardous materials, including solvents, acid, and oil, would be stored and used during construction and operation of the proposed power plant and associated facilities. Table 2-1 lists the various chemicals that likely would be used at the proposed power plant or other facilities. All materials would be stored, handled, and used in accordance with applicable regulations and standards (RCRA), and workers would be properly trained in hazardous materials identification and handling.

TABLE 2-1 CHEMICALS STORED AT THE PROPOSED POWER PLANT SITE			
	Chemical Name*	CAS Number	Maximum Quantity On-Site
Aqueous Ammonia (19 to 30% solution)	Ammonium Hydroxide	1336-21-6	10,000 gallons
NALCO 356	Cyclohexylamine (20 to 40%) Morpholine (5 to 10%)	108-91-8	2,000 gallons
TRIACT 1800	Cyclohexylamine (10 to 20%)	108-91-8	2,000 gallons
Ammonia Refrigerant (R717)	Anhydrous Ammonia	7664-41-7	14,000 gallons
Sulfuric Acid	Sulfuric Acid (93%)	7664-93-0	6,000 gallons
Aluminum Sulfate	Aluminum Sulfate	10043-01-3	Variable
Bleach	Sodium Hypochlorite (10%)	7681-52-9	6,000 gallons
Sodium Hydroxide	Sodium Hydroxide (50%)	1310-73-2	6,000 gallons
Disodium Phosphate	Di-Sodium Phosphate	7558-79-4	500 pounds
Trisodium Phosphate	Tri-Sodium Phosphate	760-54-9	500 pounds
Ammonium Bifluoride	Ammonium Bifluoride	N/A	200 pounds
Sodium Carbonate	Sodium Carbonate	N/A	500 pounds
Hydrochloric Acid	Hydrochloric Acid (30%)	7647-01-0	10,000 gallons
Citric Acid	Hydroxy-propoinic-tricarbonxylic Acid	77-7279	500 gallons
STABREX ST70	Sodium Hydroxide (1 to 5% solution)	1310-73-9	2,000 gallons
NALCO 7280	Polyacrylic Acid (20 to 40% solution) Other Proprietary Chemicals	N/A	250 gallons
ELIMIN-OX	Carbohydrazide Amino Compounds	497-18-7	2,000 gallons
NALCO 7408	Sodium Bisulfite (40 to 70% solution)	7631-90-5	250 gallons
NALCO 22106	Sodium Polyacrylate Aryl Sulfonate	N/A	2,000 gallons
NALCO 7213	Tetrasodium ethylenedia-minetetraacetate (10 to 20% solution) Sodium Polyacrylate	64-02-8	2,000 gallons
Mineral Insulating Oil[1]	Oil	N/A	25,000 to 40,000 gallons
Lubrication Oil	Oil	N/A	12,000 gallons
Hydraulic Oil	Oil	N/A	600 gallons
No. 2 Diesel	Oil	N/A	500 gallons
Various Cleaning Detergents	Various	N/A	100 gallons
Laboratory Reagents (Liquids and Solids)	Various	N/A	Small Quantities

* Provides the most toxic chemical used in the solution or formulation

[1] The majority of the mineral insulating oil would be stored at the substation.

Bulk chemicals used at the proposed power plant would be stored in storage tanks, and other chemicals would be stored in returnable delivery containers. Chemical storage and chemical feed areas would be designed to contain leaks and spills. Berms and drain piping design would allow a full-tank capacity spill without overflowing the berms. For multiple tanks located within the same bermed area, the capacity of the largest single tank would determine the volume of the bermed area and drain piping. Drains from the chemical storage and feed areas would be directed to a neutralization area for neutralization, if necessary. Drain piping for volatile chemicals would be equipped with traps and isolated from other drains to eliminate noxious or toxic vapors. After neutralization, water collected from the chemical storage areas would be directed to the cooling tower basin whenever possible. Locations of chemicals and lube oils expected to be used at the proposed power plant are noted on Figures 2-4b and c.

Aqueous ammonia would be used in the SCR system. The aqueous ammonia would be stored in tanks within a containment basin. Ammonia vapor detection equipment would be installed to detect escaping ammonia and activate alarms and the automatic vapor suppression features.

Potential discharges from areas containing or using hazardous materials, and the best management practices that would be used to ensure discharges do not occur or are contained, are discussed in the *Big Sandy Stormwater Pollution Prevention Plan*, which is included as Appendix A.

Wastewater/Stormwater

Sanitary wastes would be directed to a septic system and drain field constructed for the proposed power plant; the location within the proposed power plant site is noted on Figure 2-4b. Process water would be used in boilers and for cooling and cleaning purposes. Process wastewater would be recycled to the maximum extent feasible, and wastewater that could no longer be recycled would be evaporated. No discharge of process wastewater is proposed, and the proposed power plant would be designed and operated as a zero discharge facility. Process wastewater would be treated using an advanced wastewater treatment system, which would return relatively clean water to the process and send a concentrated brine waste stream to an evaporation pond.

Floor drains would discharge to an oil/water separator, where oily wastes would be removed and the water sent to the process wastewater treatment system. A licensed contractor would collect and recycle or dispose of these oily wastes.

Stormwater from the power plant site surface runoff also would be discharged to the evaporation ponds. Section 2.2.8.4 provides a summary of the stormwater management features of the Proposed Action.

Evaporation Ponds

Two wastewater storage/evaporation ponds would be constructed west of the proposed power plant and substation (refer to Figure 2-4a). The two ponds would be bisected by a small drainage channel. Together, the ponds would occupy a total of 18 acres. Each pond would be fenced with four-strand barbed wire. The ponds would receive discharged process wastewater, cooling tower blowdown water, and stormwater runoff from the proposed power plant site and substation. The ponds would require a permit from ADEQ for aquifer protection, and would meet the design requirements of ADEQ and the Arizona Department of Water Resources (ADWR).

Each pond would be provided with two liners. A leak detection and leachate collection system would be installed between the liners. The outer (bottom) liner would consist of 12 inches of clay or an alternative material with a hydraulic conductivity of 1×10^{-6} centimeters per second (cm/sec) or less. Above the leak detection system, an inner (top) liner would be constructed with a 60 mil high-density polyethylene (HDPE) geomembrane. The HDPE would be textured on both sides to increase frictional resistance to slippage of cover material.

The interior bottom of each pond above the inner liner would be covered with a 12-inch-thick layer of prepared cover material to prevent wind uplifting, mechanical damage, and other types of potential damage to the inner liner.

Interior slopes of the ponds on top of the inner liner would be covered with a 12-inch-thick layer of prepared cover material, a layer of 10-ounce sewn polypropylene geotextile, and a minimum of a 9-inch-thick layer of riprap with an average size of 6 inches. The size of the riprap might be increased to accommodate surface waves in the pond. Exterior slopes of the dike surrounding each pond would be covered with a 6-inch layer of gravel or crushed rock for wind and rainwater protection.

Each pond would be provided with an independent leak detection and removal system (LDRS) between the inner and outer liners. An HDPE geonet with a minimum thickness of 150 mils would be installed between the liners to collect leakage through the inner liner and carry the liquids to a drainage trench located in the center bottom of each cell. The drainage trench would be rock-filled and constructed with a minimum of a 6-inch-diameter perforated HDPE pipe. A geotextile cushion layer would be placed around the rock to prevent punctures of the geomembrane liner.

Each pond would have a rock-filled collection sump constructed within the LDRS. This collection sump would have a minimum depth of 30 inches. A perforated HDPE sump pipe would be installed inside of each sump. Each sump pipe would extend up the side slope of the cell to a concrete access area. A horizontal sump pump would be installed inside each sump pipe to pump out leakage and return it back into the pond. Each pump would have a local mounted controller with instrumentation. Each pump would be sized to remove twice the maximum leakage resulting from one 100-millimeter-diameter hole per acre with the pond at its maximum water level.

The pond influent system would be designed so that each pond could operate independently should a shutdown of a pond for maintenance be required. Discharge into each pond would be via pipes installed over the top of the dike and into each pond.

The calculated volume of stormwater retention required at the proposed power plant site and substation would be 7.44 acre-feet (324,086 cubic feet). This amount of storage was determined using information and calculation procedures in accordance with the ADEQ guidelines and procedures for stormwater detention/retention, which predicted a 100-year, 24-hour storm event (refer to Section 2.2.8.4). This amount was added to the amount of process wastewater expected in order to properly size the evaporation ponds.

2.2.1.7 Plant Auxiliaries

Lighting

Lights would be necessary to safely operate the facility at night. Lighting would be limited to areas required for safety in and around the proposed power plant and substation; no lighting is proposed for the area around the evaporation ponds. Lighting would be shielded from public view where and when possible. Lighting would be directed downward and shielded in accordance with the Mohave County Night Sky Ordinance. Highly directional, high-pressure sodium vapor fixtures would be used.

Communication Facilities

A microwave communication tower and antenna would be constructed on the proposed power plant site to deliver signals from control centers and other remote locations, and to report operating status. This network also would provide voice communication from dispatchers to power plant operators and maintenance personnel. Microwave communications require an unobstructed "line of sight" between antennas. A communications tower about 6 meters (20 feet) high would be constructed at the proposed power plant site, with a microwave antenna aimed toward an existing communication link on Aubrey Peak or in Wikieup.

Grounding and Cathodic Protection

The Proposed Action would include a grounding system that would be designed and installed in accordance with applicable industry standards.

The proposed power plant's electrical system would be susceptible to ground faults, lightning, and switching surges that could result in high voltage, creating a hazard to site personnel and electrical equipment. The grounding system would minimize these risks by shunting over-voltage phenomena to ground in a manner that would reduce exposure of personnel or equipment to excessive voltage, current, or temperature. Industry standards and guidelines for grounding of generation equipment and substations would be followed.

The grounding grid would be a network of bare copper conductors, laid out in an orthogonal pattern. The conductor size, spacing of conductors, and depth of burial would be determined by design based upon a number of factors, including soil characteristics and maximum ground fault and lightning intensity. Ground rods might be driven deeper into the earth and bonded to the grid, if necessary, to obtain adequate contact with the earth. There would be risers from the grid to the surface, where grounding wires to equipment and structures would be connected.

Cathodic protection systems would be provided to control the corrosion of underground metal piping. Cathodic protection would include protective covering of pipes, as well as sacrificial anode systems. Depending upon the corrosion potential and the site soils, either passive or impressed current cathodic protection would be provided.

Fire Protection

Fire protection would be supplied by the use of diesel-driven emergency fire pumps, in accordance with National Fire Protection Association (NFPA) guidelines. Fire detection devices would be installed at key points throughout the proposed power plant. These would include smoke detectors, flame detectors, and temperature detectors, as appropriate.

Fixed fire suppression systems would be installed at determined fire risk areas, such as the turbine lubrication oil equipment and cooling towers. The power plant fire suppression water loop also would supply water to a vapor suppression system at the aqueous ammonia storage tank area. Sprinkler systems also would be installed in the control/administration building and fire pump building, as required by NFPA and local code requirements. The combustion turbine generator units would be protected by a deluge spray mist-type fire protection system.

Hand-held fire extinguishers and hand cart extinguishers of the appropriate size and rating would be located in accordance with NFPA 10, Standard for Portable Fire Extinguishers, throughout the facility.

Safety Systems

Several safety features would be integrated into the power plant design, including the following:

- Emergency power for control and protection systems for the combustion turbines would be supplied from redundant direct current systems within the respective combustion turbine. Power for control and protection systems for the boilers, steam turbine, and balance of plant would be supplied from a redundant direct current system (batteries) not associated with the combustion turbines.

- All electrical systems would be grounded to reduce the potential for electrical shock.

- All high-pressure steam systems would be routinely tested and inspected to ensure adequate reliability and safe operation.

- All structures would be designed and constructed to comply with Uniform Building Code (UBC) Seismic Zone 2b practices.

- Safety showers and eyewashes would be provided adjacent to, or in the area of, all chemical storage and use areas. Hose connections would be provided near the chemical storage and feed areas to flush spills and leaks to the neutralization facility. Power plant personnel would use state-approved personal protective equipment during chemical spill containment and cleanup activities. Personnel would be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material would be stored on site for spill cleanup.

- 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.