Section 2 DESCRIPTION OF PROJECT AMENDMENT

This Section provides a description of the proposed modifications to the BSPP . The Final Decision describes the BSPP as a nominally rated 1000 MW solar thermal generating plant using four solar fields of concentrating parabolic trough mirrors and four power blocks. The Commission Final Decision includes a description of the linear facilities including a transmission line interconnecting to the Colorado River Substation, primary and secondary access roads, telecommunication facilities, and a natural gas pipeline. For convenience, the term “Approved Project” refers to the BSPP as described in the Commission Final Decision. The terms “Project Modifications” or “Modified Project” refers to the BSPP as proposed in this Petition.

2.1 GENERAL PROJECT DESCRIPTION

2.1.1 Description of Approved Project

The Commission issued a Final Decision for the BSPP which included a description of the BSPP as a solar thermal generating facility that would consist of four adjacent, independent, units of 250 megawatt (MW) nominal capacity each for a total nominal capacity of 1,000 MW. The Approved Project would have utilized solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola. A heat transfer fluid (HTF) is brought to high temperature (750°F) as it circulates through the receiver tubes. The HTF is then piped through a series of heat exchangers where it releases its stored heat to generate high pressure steam. The steam is then fed to a traditional steam turbine generator where electricity is produced. Individual components of the Approved Project included:

- Solar Field & Power Block #1 (northeast);
- Solar Field & Power Block #2 (northwest);
- Solar Field & Power Block #3 (southwest);
- Solar Field & Power Block #4 (southeast);
- Access road from and including upgraded portion of Black Rock Road to onsite office;
- Warehouse/maintenance building, assembly hall and laydown area;
- Telecommunications Lines;
- Natural Gas Pipeline;
- Concrete Batch plant;
- Fuel depot;
- Onsite transmission facilities, including central internal switchyard;
- 230 kV double circuit transmission line interconnecting to the Colorado

River Substation (Gen-Tie Line); and

- Groundwater wells used for water supply.

2.1.2 Description of Modified Project

The Modified Project includes replacing the solar thermal technology completely with PV generating technology. Access to the site will be the same as the Approved Project and the BSPP will continue to interconnect to the regional transmission grid at Southern California Edison's (SCE's) Colorado River Substation (CRS) which is currently under construction.

PVSI proposes to develop BSPP in eight operational phases designed to generate a total of approximately 1,000 MW nominal of electricity. Each phase will consist of approximately 125 MW nominal of electricity as shown on the Preliminary Layouts, Figures 2-1A and 2-1B. Figure 2-1A shows a preliminary project layout with Alternative 1 transmission corridor along the eastern boundary. Figure 2-1B shows a preliminary layout to accommodate Alternative 2 transmission corridor in the center of the site. During operations, all eight units would share an Operations and Maintenance (O&M) Facility, Onsite Substation, access and maintenance roads (either dirt, gravel or paved), perimeter fencing and other ancillary security facilities, and a double-circuit 230 kV gen tie transmission line.

The Modified Project will be located on public land within Bureau of Land Management (BLM) right-of-way (ROW) # CACA – 048811. PVSI has acquired control over two private parcels that could be included as part of the BSPP site. The first property is located near the center of the existing ROW, consists of approximately 160 acres and is known as the Strait-Murphy Property. PVSI now owns the Strait-Murphy Property. The second private parcel is located at the southern boundary near the transmission ROW as it leaves the solar facility ROW. This property consists of approximately 160 acres and is known as the Porter Property. PVSI has acquired an option to purchase the Porter Property.

The total proposed ROW acreage is approximately 7,025 acres including linear facilities outside of the proposed ROW area of approximately 183 acres. Including the 320 acres of private property (Strait-Murphy and Porter Properties), the total acreage of the Modified Project will be approximately 7,345 acres.

Assuming that required transmission upgrades and permits are in place and construction progresses as planned, the first phase of the approved 1,000 MW solar PV energy-generating project could start construction on the Project site as early as mid 2013. Subsequent phases would be constructed in phased stages (each 125 MW unit) moving across the site with potential overlap for start of the next phase prior to completion of previous phase and would continuing to support the commercial operation dates for the phases.

For ease of review, we have included the following list to identify the primary project modifications to the Approved Project:

- The previously planned four power blocks (which each included a steam turbine, evaporation pond, auxiliary boiler, air-cooled condenser, and equipment) and structures have been eliminated.
- The Land Treatment Units for heat transfer fluid (HTF) have been eliminated.
- The HelioTrough energy collection systems have been eliminated and replaced with PV panels configured for either horizontal tracking or fixed tilt operations.
- The substation will be relocated near the center of the disturbance area.
- The large assembly hall will be eliminated.
- The concrete batch plant will be eliminated.
- The natural gas line has been eliminated.
- The water treatment system, associated waste and evaporation ponds have been reduced from eight ponds to two.
- The large drainage structures surrounding the site will be reduced in size or eliminated.
- The amount of mass grading will be reduced.
- The Project footprint could include private land recently acquired by PVSI.
- The Project footprint has been modified to allow two alternative transmission and access road corridors to accommodate the NextEra McCoy and the EnXco Projects proposed to the north of the BSPP.
- A minor modification to a portion of the BSPP transmission line ROW in area of south of I-10 to accommodate NextEra McCoy Project and the EnXco McCoy Project transmission line interconnections to the CRS.
- Water use during constructions will be reduced from approximately 4,100 AF to 3,500-4,000 AF during the duration of construction.
- Water use during operations will be reduced from approximately 600 AFY to between 60 to 88 AFY.

The list above largely encompasses the items that were eliminated or reduced by the switch in technology from parabolic trough/concentrating solar thermal to PV technology. There are new elements of the Modified Project related to the PV technology (e.g., inverters, solar panels, an O&M building, etc). These elements and the currently proposed PV project are described in greater detail in this Section of the Petition.

2.2 PHOTOVOLTAIC TECHNOLOGY

The BSPP will involve the installation of PV modules with the capacity to generate a total of 1,000 MW of power under peak solar conditions. This Petition is based on current technology and installation methodology. Inverter hardware will be located in each Power Conversion Station (PCS), which will convert the direct current (DC) electric input into grid-quality alternating current (AC) electric output.

The PV modules that make up the Inverter Blocks have the capability to convert the sun's energy into DC electricity, each producing a relatively small amount of electricity, about several hundred watts each at rated conditions. Modules are electrically connected in series and parallel arrangements. A series arrangement increases the collective output voltage and a parallel arrangement increases the current to the desired levels for the DC collection system.

The modules being considered for this Modified Project are produced by a number of manufacturers of silicon crystalline and thin film modules. This technology is changing rapidly primarily in the areas of cost and efficiency. For reasons of availability to support the Modified Project delivery requirements and to allow PVSI to capitalize on the latest technological advances, multiple sources might be utilized. At this time PVSI has not selected whether it will install a Fixed-Tilt or Single-Axis Tracking modular system or a combination of both systems. While both systems are similar in how they generate and distribute electricity, the orientation and collection of the sun's energy is different. Appendix A contains specifications for several types of PV modules and racking systems.

2.2.1 Photovoltaic Modules

The solar PV modules, or panels, convert the solar energy into direct current. Different materials display different energy generation efficiencies; higher efficiency panels produce more electricity per given area, but generally cost more per panel area. Materials commonly used for PV solar cells include monocrystalline silicon, polycrystalline silicon, amorphous silicon, cadmium telluride, and copper indium selenide/sulfide. Several of the PV cells currently available are manufactured from bulk materials that are cut into very thin wafers, i.e., between 180 to 240 micrometers thick. Others are constructed from thin-film layers. PVSI is considering the installation of both polycrystalline and cadmium telluride solar cells. Both technologies are proven and viable for utility-scale PV plants. Characteristics of typical panels are given in Table 2-1.

TABLE 2-1
TYPICAL PV PANEL CHARACTERISTICS

Typical Panel Physical and Electrical Characteristics	Thin Film (CdTe) (First Solar FS Series 3)	Polycrystalline (Yingli Solar YGE 280 Series)
Length	1.2 m	1.9 m
Width	0.6 m	0.99 m
Weight	12 kg	26.8 kg
Cell Type	CdS/CdTe semiconductor, 154 active cells	72 multicrystalline
Frame Material	None	Anodized aluminum alloy, silver, clear
Cover Type	3.2 mm heat strengthened front glass laminated to 3.2mm tempered black glass	Low-iron tempered glass
Nominal Power	85 W	290 W
Efficiency	~12%	~15%
Voltage at Pmax	48.5 V	35.8 V
Current at Pmax	1.76 A	8.10 A
Open Circuit Voltage	61.0 V	45.3 V
Short Circuit Current	1.98 A	8.62 A
Maximum System Voltage	1000 V DC	1000 V DC
Temperature Coefficient of Pmpp	-0.25%/°C	-0.45%/°C

The system would incorporate high-efficiency commercially available solar PV panels that are Underwriters Laboratory (UL)-listed or approved by another recognized testing laboratory. By design, the solar PV panels would absorb sunlight to maximize electrical output and use anti-reflective glass. Due to the limited rotation angles, the solar PV panels have no potential for reflecting the sun's rays upon any ground-based observer off-site. These panels would be protected from impact by tempered glass, and would have factory applied ultraviolet (UV) and weather-resistant "quick connect" wire connectors.

Silicon is the traditional material choice for PV panel cells and PVSI is considering polycrystalline silicon PV modules for use at the BSPP. A CdTe solar panel uses solar cells constructed in a thin semiconductor layer (also known as a "thin film") to absorb and convert sunlight into electricity. PVSI is also considering the use of thin film CdTe panels as one of its technology options. If thin film CdTe panels are used, PVSI would ensure that the vendor offers a PV module recycling program through which any module may be returned for recycling.

PV modules can be mounted together in different configurations (also referred to "arrays") depending on the equipment selected. The BSPP arrays primarily would be organized into approximately 2 MW blocks, with some additional arrays configured in smaller blocks to utilize land space efficiently. Although the acreage of each block would depend on the technology, spacing, mounting equipment, and other design criteria subject to change in detailed engineering, each full-size block is expected to cover approximately 15 acres.

Multiple modules are connected in series, and groups of these series-connected modules in turn are connected to a DC to AC inverter, which converts the panel DC output to AC. Different manufacturers utilize different PV technologies, so the panel size and wattage rating varies between manufacturers. The PV modules will be electrically connected by wire harnesses and combiner boxes that collect power from several rows of modules and feed a PCS via underground DC cables. Inverter hardware located in each PCS converts the DC electric input into grid-quality AC electric output. A transformer then steps up the voltage of the array output for on-site transmission of the power to the PV Combining Switchgear (PVCS). Overhead or underground lines then take the electricity to the Onsite Substation where the voltage is stepped up and routed to CRS via the Gen-Tie Line. The PCS and transformer will be located within each PV block, and will be housed on concrete vaults, slabs or pier foundations.

2.2.2 Panel Supporting System

2.2.2.1 Fixed Tilt System

A fixed tilt racking system is supported by vertical steel posts that are spaced about 12 feet apart. The support posts generally project 5 to 6 feet above the ground and are vibrationally driven to a roughly equivalent depth into the ground. The fixed tilt system will not use permanent foundations enabling complete removal when the BSPP is decommissioned. A fixed tilt system can follow the terrain and to account for ground surface differences, simplifying grading. The support posts may vary in height above the ground surface to accommodate the terrain. The height of the structure will be approximately 9 feet depending on the tilt angle selected.

2.2.2.2 Single Axis Tracking System

Either of two types of single-axis tracker systems could be selected for the BSPP. Tracker Option 1 is a “ganged system” that would use one motor to control multiple rows of PV modules through a series of mechanical linkages and gearboxes. By comparison, Tracker Option 2, a stand-alone tracker system, would use a single motor and gearbox for each row of PV modules. A single-axis tracking system optimizes production by rotating the panels to follow the path of the sun throughout the day. The central axis of the tracking structure is oriented north to south and is constructed to rotate the panels east to west while limiting self shading between rows. Each tracker holds 30 to 50 PV modules mounted on a metal framework structure. The steel structure would be able to withstand high-wind conditions (up to 90 miles per hour), site-specific wind gust and aerodynamic pressure effects, and seismic events.

The drive unit typically consists of a bi-directional AC motor or a hydraulic system utilizing biodegradable fluid. The drive unit would be connected to an industrial-grade variable-frequency drive that translates commands from the control computer.

The tracker controller is a self-contained industrial-grade control computer that would incorporate all of the software needed to operate the system. The controller would include a liquid crystal display monitor that displays a combination of calibration parameters and status values, providing field personnel with a user-friendly configuration and diagnostic interface. The monitor would enable field adjustment, calibration, and testing.

2.2.2.3 System Foundations

Depending on the final PV technology and vendor selected, the design of the tracker support structures could vary. Typical installations of this type are constructed using steel piles or concrete foundations. Steel piles may be driven, screwed, or grouted. Driven steel pile foundations typically are galvanized and used where high load bearing capacities are required. The pile is driven using a hydraulic ram where up to two workers are required. Soil disturbance would be restricted to the pile insertion location with temporary disturbance from the hydraulic ram machinery, which is about the size of a small tractor. Screw piles, if used, would be driven into the ground with a truck-mounted auger requiring two or three people. Screw piles create a similar soil disturbance footprint as driven piles. Grouted steel piles, if used, would require pre-drilling with auger equipment so that the pile could be inserted into the cleaned hole. The pile then would be grouted into place from bottom to top until grout flows out of the top of the hole. Soil disturbance would be the same as the previous steel pile descriptions with additional disturbance from the soil removal and insertion of grout at the pile location. Concrete foundations avoid ground penetration by withstanding the design loads from the weight of the concrete itself. Concrete requires time to cure and can be pre-cast and transported to the site or poured in place for installation. Concrete foundations reduce the ground penetration, but increase the permanent disturbance.

The spacing between the rows of tracking units or fixed mounts is dependent on site-specific features and would be identified in the final design. PVSI’s preliminary configuration indicates the spacing at approximately 34 feet between rows (post to post), which allows at least 20 feet of clearance for maintenance vehicles and panel access.

2.2.3 Panel Orientation

The arrays and PCS would be accessible by two access corridors, one in a north-south direction every third block (approximately 3,000 feet) of nominal 24 foot width and the other in an east-west alignment passing every PCS unit of nominal 16 foot width. These access corridors would consist of unpaved compacted road base and would be used only as necessary during operation and maintenance activities.

2.2.3.1 Fixed Tilt System Orientation

The fixed tilt system employs a support table to which the modules are attached. The support table is set at a fixed tilt angle, typically 20 to 30 degrees from horizontal, and facing south. Preliminary designs for the BSPP anticipate a 30 degree tilt angle.

2.2.3.2 Single-Axis Tracking System Orientation

If a single-axis tracking system is employed the tracker assembly is fitted with a torque tube that attaches to the support posts. Each tracker assembly consists of a steel torque tube, on which rests the supporting frames for the PV modules. The wiring for the PV panels is also attached to the torque tube assembly. The single-axis tracker system employs controlled movement to tilt the PV panels so they face the sun and the assembly is oriented to allow the panel to track the sun in an east to west direction. This system aligns the solar PV modules toward the sun through the use of electric drives or actuators. In order to maximize electrical output and minimize shadowing of the panels, the tracker controllers turn the panels to face the sun at all times during the day and over the year, while avoiding shadowing on the adjacent string of panels. The method employed to avoid shadowing the adjacent panels in the early morning and late afternoon hours of operation is called “back-tracking”. The single-axis tracker control system also communicates with, and receives instructions from, the central control room via the Supervisory Control and Data Acquisition (SCADA) system.

As discussed above, PVSI has not selected the specific PV modules nor has it decided on whether a Tracker System, Fixed Tilt System, or combination of the two systems will be installed. As described in Sections 3, 4, 5, and 6 the potential effects from each system is analyzed and PVSI is requesting the Final Decision be amended in such a way as to allow the specific combination of technologies to be selected prior to construction without the need for filing another amendment.

2.2.4 Solar Field DC Distribution and Power Conversion

2.2.4.1 DC Distribution

The PV modules would be electrically connected in series by wire harnesses that conduct DC electricity to combiner boxes. Each combiner box would collect power from several rows of modules and feed a PCS via cables placed in covered underground trenches (or within above ground cable trays or conduits in limited circumstances where underground trenching is determined not to be practical). The DC trenches would be approximately 3 feet deep and from 1.5 to 2.5 feet wide. The bottom of each trench would be filled with clean fill surrounding the DC cables and the remainder of the trench would be back-filled with native soil and compacted to 90 percent (95 percent when crossing under roadways). Power screeners could be used on site for a limited period of time (less than 1 year) to extract the required clean fill from native soils for use as bedding material in the trenches. A power screener is a motorized piece of equipment that uses moving screens to filter soils to a particular granularity.

Each PCS comprises an inverter package consisting of multiple inverters connected to adjacent transformers. An overhead shade would cover the inverters or a common equipment enclosure would include multiple inverters. The individual inverter packages would be approximately 7 feet tall, and the transformer exterior to the enclosure would be approximately 6.5 feet tall.. The overhead shade would be 10 to 12 feet tall. The equipment enclosure, if utilized, would be up to approximately 35 feet long by 10 feet wide by 10 feet tall. In the PCS, the inverters would change the DC output from the combiner boxes to AC electricity. Integrated with the inverter, a data acquisition system (DAS) would utilize a data logger and sensors to record AC power output. Other integrated components would include equipment to record weather conditions, including ambient temperature measured in degrees Celsius (°C), incoming solar radiation measured in watts per square meter (W/m^2), and wind speed measured in meters per second (m/s). The DAS would enable system data transfer and performance monitoring via the proposed O&M facility.

The resulting AC current from each individual inverter would be routed through underground AC cables (or within above ground conduits in limited circumstances where underground trenching is determined not to be practical) to an oil-filled, medium voltage, step-up transformer positioned within secondary containment. Based on preliminary design, the 265 volt output from an inverter would be stepped up (increased) to the desired substation feed voltage of 34.5 kV by the transformer. The medium-voltage transformer would be placed on a pre-cast concrete pad or other foundation delivered by flatbed truck during construction. The medium voltage collection circuits would be installed underground to the substation in trenches that would be approximately 3 feet deep with pole-mounted above-ground circuits possible on the final "home runs" to the substations. The medium voltage cabling would create multiple collection circuits that would carry the electricity from the solar field to the unit's substation.

2.2.4.2 AC Collection

Multiple PCS blocks (approximately 10 MW total) would form a lateral configuration and transmit the AC power at 34.5 kV via aboveground double circuit monopoles or underground lines in covered trenches (or within above ground conduits in limited circumstances where underground trenching is determined not to be practical). Laterals would be combined into an aboveground or underground feeder line (24 to 26 MW) that would transmit the AC power to the Power Distribution Center (PDC) at the substation. As applicable, AC trenches would be approximately 3 feet deep and from 8 inches to 6.5 feet wide and also would be used to house fiber optic cables for communication. The bottoms of the trenches would be filled with sand surrounding the fiber optic cables, and the remainder of the trench would be back-filled with native soil and compacted.

The on-site electrical collection system is designed to minimize electrical losses within the BSPP prior to delivery to the On-Site Substation. At the Onsite Substation, the voltage of the Solar Facility-generated electricity will be stepped up to interconnect with the SCE regional transmission grid at the CRS.

2.3 SITE ACCESS

The Modified Project will utilize the same existing roads to reach the site as described in the Final Decision. Access to the BSPP will be via a new road (Dracker Drive) heading north from the frontage road. Dracker Drive will be accessed from a [may not need to be improved] section of Black Rock Road, along I-10, from the plant access road to the Airport/Mesa Drive exit. As part of the Notice to Proceed issued for BSPP Phase 1A of the CSP design, PVSI has already installed Desert Tortoise exclusionary fencing and conducted clearing and grubbing activities within the entire length of Dracker Drive starting at its intersection with Black Rock Road into the project site.

2.4 TRANSMISSION SYSTEM INTERCONNECTION

The Gen-Tie route remains largely unchanged from the Approved Project. It will proceed in a southerly direction, crosses over Interstate 10, and turns westward to the CRS, which is currently under construction. The metering point will be located in the switchyard on the Project site. The gen tie line will be owned and operated by PVSI. The only modification to the route will be a slight shift southward of a portion where the route turns west to accommodate future planned transmission lines.

The 230 kV double circuit transmission line will be constructed on self-supporting monopole structures up to approximately 145 feet high, except where FAA regulations and Riverside County Airport Land Use Commission (RCALUC) guidelines near the airport require shorter and/or H-frame structures. An area of approximately 200 by 200 feet (0.9 acre) per structure may be temporarily disturbed during construction.

The required right-of-way (ROW) width for the gen tie is approximately 120 feet. Where larger H-frame structures are used it is approximately 250 feet. The average span length between the transmission structures vary from approximately 800 feet for the 70-foot tall H-frame structures up to 1,200 feet for the self-supporting tubular steel 145-foot tall monopole structures. The gen tie line will be constructed using "strong" tubular towers at the cornering points of the line, which will have sufficient strength without guy wires. PVSI spent significant time in 2010 working with the FAA and RCALUC to minimize aviation-related impacts created by the project and its gen tie structures. The variation in height and other items were incorporated into the gen tie design to accommodate FAA and RCALUC concerns. It should be noted that the change in technology to PV reduced other aviation-related concerns. For example, the removal of the Air Cooled Condensers will eliminate prior concerns relating to upward thermal plume potential effects on aircraft. The switch in technology also removes the presence of Heat Transfer Fluid at the site which significantly reduces the fire hazards of the proposed project.

The Project was included in the "Transition Cluster" in the new GIPR process. The Phase One Study results for the Transition Cluster were released in August 2009. The Phase Two Study results for the Transition Cluster were released in July 2010. CAISO, SCE and the Applicant executed a Large Generator Interconnection Agreement (LGIA) in November 2010, which was approved by the Federal Energy Regulatory Commission (FERC) in March 2011. SCE and CAISO are currently reviewing the effect of switching solar technologies and whether that impacts the previous interconnection studies. Once this evaluation is complete, the LGIA will be amended to address the technology switch. The LGIA amendment, once executed, will require FERC review and approval.

2.5 ANCILLARY FACILITIES

2.5.1 Telecommunications Facilities

The Modified Project switchyard would also require the same new telecommunication infrastructure as originally approved. The telecommunication facilities will be installed to provide a protective relay circuit and a SCADA circuit together with data and telephone services. Voice and data communications for plant operations will be installed for use during construction and operations. The routing for this cable will end at the existing infrastructure near Mesa Drive. In addition, the BSPP has two other telecommunications lines required by CAISO to provide operational data to the CRS. The primary transmission-related telecommunications line will be strung overhead along the same poles as the 230 kV gen-tie line to the CRS. The redundant transmission-related telecommunications cable will be buried cable similar to the BSPP's telecommunications cable. The routing for both of the buried telecommunications cables will be adjacent to the site access road for the portion north of I-10. The redundant telecommunications line continues south of I-10 to the Colorado River Substation following the route of the gen-tie line, while the BSPP's telecommunications cable follows Black Rock Road to Mesa Drive.

2.5.2 Operations and Maintenance Facility

2.5.2.1 Operation and Maintenance Building

The BSPP would likely include an approximately 3,000-square-foot O&M building located on BLM-administered land near the center of the site and will be shared for services to all units. The building would provide an administration area, a work area for performing minor repairs, and a storage area for spare parts, transformer oil, and other incidental chemicals. The administration area would be air conditioned and include offices, conference rooms, a break room, rest rooms, and locker rooms with showers.

The building would be supported on reinforced concrete mat foundations or individual spread footings as determined during detailed design. Excavation for the footings would be approximately 2 feet deep. Excavation within the perimeter of the building would be approximately 1 foot deep. An aggregate or stone base would be laid after excavation. The floor would consist of a 6-inch reinforced concrete slab. Concrete for this slab would come from Blythe.

The O&M building would be a pre-engineered metal building approximately 17 feet high at its peak with a neutral-colored metal siding and roof to minimize visual impact. The building's maintenance area would include roll-up doors to provide equipment access as well as personnel access doors.

The proposed SCE distribution line would provide electrical service to the O&M building. Telecommunications would be provided by a new fiber optic line constructed at the same time as the distribution line.

An approximately 10,000-square-foot parking area would be provided at the O&M building.

2.5.3 Meteorological Station

The BSPP will not modify its Approved meteorological station.

2.5.4 Anemometers

Depending on the final design of the equipment, the solar arrays may be installed with tracker anemometer towers, which measure and communicate wind speed data to the facility control room for solar array panel tracker positioning in the event of high winds. Each tower measures approximately 30 feet in height, and would be installed within the arrays within the facility site. Figure 2-2 shows a typical tracker anemometer tower.

2.5.5 Fencing and Site Security

For public safety and site security, the BSPP would have fencing around the site and access will be controlled via gates located at the entrances to the facility. The main site gate would be either a motor-operated swing or rolling-type security access gate, and would be monitored through a security camera, swipe card, or other mechanism that would control and monitor access. There will be a guard shack at the main facility gate. Access through the main gate would be controlled during construction and operation of the BSPP to prevent unauthorized access to the solar plant site. All facility personnel, contractors, and visitors would be logged in and out of the facility through the main gate. A secondary access gate, similar in construction to the main gate, would be used for emergency purposes only. A Fire Department Knox Box or other access device and emergency contact placard would be provided at the main gate and secondary access gate to provide emergency access.

Fencing would be installed around the solar plant site perimeter, substations, and around the evaporation pond described in accordance with the existing Conditions of Certification. Individual units may be fenced with perimeter fencing as the construction and operation of the facility is phased. Security fencing would be chain-link, approximately 8 feet tall, with 3-strand barbed wire. Some modifications would be needed in areas of stormwater inflow and outflow from the solar field to allow for high flow events. The security fencing would be constructed slightly inside the solar plant site boundary to allow room for on-foot fence maintenance on the outside of the fence if necessary. Fencing would be designed to resist all wind or other loads imposed on the fence. Posts would be spaced a maximum of 10 feet apart. Tortoise fencing would be installed 1 foot below the ground surface and 2 feet above ground surface, using a fencing type recommended by USFWS and in accordance with the existing Conditions of Certification.

2.5.6 Temporary construction workspace, yards, staging areas

Temporary construction facilities will be built for materials storage, storage of equipment, for field fabrication facilities, and a construction office complex for employee work areas on the project during construction. Additionally, there will be a number of construction staging areas within the site boundaries that will be utilized throughout the approximately 48-month Project construction period and then decommissioned and/or replaced by arrays. Construction area lighting will be provided.

The staging areas will include material laydown and storage areas and an equipment assembly area. During construction, the area near the location of the O&M facility will also contain a guard shack, construction trailers, construction worker parking and portable toilet facilities that will serve the Project's sanitation needs during construction.

Temporary construction fencing will surround this area and the guard shack will be manned to provide security during construction. Additionally, the project will no longer need the large assembly hall structure originally planned to assemble the HelioTrough structures.

In addition to the permanent plant roads and parking, construction roads and parking will be required to provide access to construction facilities and the laydown area. Construction parking space will be provided near the construction office complex. These temporary roads may be all weather gravel surfaced and of sufficient width and location to accommodate efficient use and traffic pattern. The parking area will have barriers to control parking pattern and locations.

2.6 FIRE PROTECTION

Fires are most likely to be introduced from human activity, and also could occur as a result of lightning strikes or equipment malfunctions. Project-related fire-protection activities would be taken to limit personnel injury, property loss, and Project downtime resulting from a fire. During construction, a water truck or other portable trailer-mounted water tank would be kept on-site and available to workers for use in extinguishing small man-made fires. Fire watches would be required during hot work on-site. An Emergency Action Plan (EAP) would designate responsibilities and actions to be taken in the event of a fire or other emergency during construction. The EAP, including fire prevention and suppression, and a worker safety plan would be provided to BLM and local fire departments for approval before the receipt of a Notice to Proceed (NTP). During operation and maintenance of the BSPP, fire protection systems for the solar plant site would include a fire protection water system for protection of the O&M building, including portable fire extinguishers and possibly hydrants. The fire protection water system would be supplied from a 20,000-gallon raw and fire water storage tank located on the solar plant site near the O&M area.

To decrease the risk of fire during operation and maintenance of the Project, all vegetation underneath the panels would be managed via either mechanical mowing/trimming or with a BLM-approved herbicide in accordance with guidance provided in the Solar PEIS; Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States and the Final Vegetation Treatments Programmatic Environmental Report (PER) (BLM, 2007).[1] A pre-emergent herbicide would be applied in the spring,

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[1] The Record of Decision associated with the PER (72 FR 57065-01), published October 5, 2007, outlines the herbicides that are approved for use on public lands, including 14 herbicides with the following USEPA registered active ingredients: 2, 4-D, bromacil, chlorsulfuron, clopyralid, dicamba, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, sulfometuron methyl, tebuthiuron, and triclopyr identifies

and spot foliar applications may be used throughout the year to manage invasive vegetation.

The Final Decision outlines that Riverside County Fire Department would provide fire protection services to the BSPP. At this time PVSI is coordinating with both Riverside County and the City of Blythe to ensure that appropriate measures will be taken to control the risk of fire and to ensure the proper level of service is provided. With the elimination of the risks associated with use of Heat Transfer Fluid, it is likely that the impacts to Riverside County will be reduced from previously analyzed and it may be that the City of Blythe Fire Department can adequately provide fire protection services.

2.7 WATER SUPPLY AND USAGE

2.7.1 Water Supply and Use

The BSPP Final Decision allowed the construction of several wells to produce up to 600 AFY for operations and up to 4,100 AFY. Up to three wells are anticipated for the Modified Project and would be constructed in the same manner as outlined in the Final Decision.

Water from the proposed wells would be tested for and meet the domestic water quality and monitoring standards for constituents as required by the California Code of Regulations (22 Cal. Code Regs. §64400.80 et seq.). Regulated wells must be sampled for bacteriological quality once a month and the results submitted to the California Department of Health Services (DHS). The wells also must be monitored for inorganic chemicals once and organic chemicals quarterly during the year designated by the DHS. DHS would designate the year based on historical monitoring frequency and laboratory capacity. PVSI would sample and conduct groundwater quality monitoring consistent with the Waste Discharge Requirements issued as part of the Final Decision.

2.7.2 Construction-related Water Needs

Construction-related water use would support site preparation (including operation of a portable batch plant, if needed) and grading activities. During earthwork for the grading of access roads, foundations, equipment pads, and other components, the primary uses of water would be for compaction and dust control. Smaller quantities would be

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the states where the active ingredients are approved. It also identified six herbicide active ingredients that are not permitted for use BLM lands unless a need is shown by the BLM and updated risk assessments for human health and ecological risks are assessed. The six precluded active ingredients are: 2, 4-DP, asulam, atrazine, fosamine, mefluidide, and simazine.

required for preparation of the concrete required for building foundations and other minor uses. Subsequent to the earthwork activities, the primary water use would be for dust suppression. During the approximately 48-month construction period for all units, an estimated total of between 3,500 and 4,000 acre-feet of water will be needed for such uses as soil compaction, dust control, and sanitary needs for construction of the BSPP, depending on the configuration selected. The majority of the construction water use would occur during site grading operations. Water will be needed for dust abatement and moisture conditioning of soils to facilitate overland travel during construction of the transmission line for the various alternatives. Water will be stored onsite during construction using either temporary construction ponds or tanks.

Drinking (potable) water would be supplied for construction workers on-site, and is estimated to be approximately 10,000 gallons per month (approximately 0.5 acre-foot per year (AFY)), varying seasonally and by work activities. The potable water could be brought to the site by tanker truck, or groundwater could be used with a package water treatment system to treat the water to meet potable standards.

2.7.3 Operation and Maintenance-related Water Needs

Water quality is expected to be unsuitable for potable use without treatment, with between 730 and 3,100 milligrams per liter of total dissolved solids. Consequently, PVSI is considering either options for treatment of groundwater or the importation of trucked potable water to meet the Project's potable water requirements for operation and maintenance. If the groundwater option is selected, water would be treated with a conventional package water treatment system to assure that any drinking water meets potable standards.

Either a reverse osmosis/electrodeionization (EDI) system or a deep bed demineralizer system would be used for other (non-drinking water) purposes. The water treatment system design has not been developed, but could include either a trailer-mounted water treatment system or a free-standing facility. The water treatment system would supply water for the BSPP for the purposes and in the amounts indicated in Table 2-2.

A trailer-mounted water treatment system is a totally enclosed, self-contained, containerized water treatment system. This system would include filters and demineralizer vessels. These systems typically are leased with a service contract, contain all the necessary supplies for operation, and are taken off-site for the regular regeneration and periodic maintenance that is required. No wastewater discharge is expected.

TABLE 2-2
OPERATION AND MAINTENANCE-RELATED WATER USE

Water Use		PV Module Cleaning, Dust Control (1)		Potable water (2)	
Solar Field Unit		**Per Unit**	**Total**	**Per Unit**	**Total**
Annualized Average	Rate (gpd)	6,700 – 9,800	53,600 -78,400	138	1104
Estimated Peak	Rate (gpd)	33,500 – 49,500	268,000 – 396,000	230 -450	1,840 - 3,600
Estimated Annual	Use (AF)	7.5-11	60-88	0.5	2

The water treatment area would be constructed near the middle of the solar plant site. It would be a roughly square area up to a maximum of 3 acres excluding any area needed for the evaporation ponds if utilized. The water treatment area would contain the water treatment system and water storage area. A free-standing water treatment facility would contain different equipment from the trailer-mounted system, and be based predominately on reverse osmosis treatment. It would be constructed on site in an enclosure for permanent use. The enclosure would be a pre-fabricated steel building on a concrete foundation with a maximum height of 17 feet. Water treatment equipment would include pumps, filters, biocide or ozone injection, and a reverse osmosis/EDI system. The water treatment facility would house the filter replacements and tools needed for periodic maintenance of the system. Wastewater discharge would be non-hazardous, have a maximum quantity of up to 56 gallons per minute (gpm), and be produced primarily from the reverse osmosis reject. One or more on-site netted evaporation ponds (up to 8 acres total) would be required for disposal of the wastewater and would be constructed, operated and maintained, and ultimately removed from the water treatment area within the solar plant site boundary.

There would be three tanks on site for the storage of the raw fire water, potable water, and demineralized water for the BSPP. The raw water tank storage capacity also would provide the fire supply. This tank would hold up to 20,000 gallons. It would be constructed of bolted or welded steel and painted with a non-reflective coating to blend with the surrounding environment. The potable water tank would be of similar construction with a maximum volume of 7,500 gallons. The Demineralized water tanks with a total capacity of 80,000 to 100,000 gallons would store water to be used for panel washing. They would be stainless steel and painted with a non-reflective coating.

The panels would be cleaned on an as-needed basis, depending on the frequency of rainfall, proximity of arrays to airborne particulates and other factors. PVSI assumes that panel washing would occur in the fall and spring and take approximately 20 days to complete per unit per wash. Panel washing for both all units could take a total of 150 to 160 days per year to complete. Approximately 33,500 to 49,500 gallons per day (gpd) per unit, which equates to approximately between 60 and 80 AFY for the entire Modified Project, would be required to wash the panels.

Based on the anticipated uses (including drinking water, showers, restroom facilities, panel washing, dust suppression, and 3,000-gallon dedicated fire supply, among other uses), the estimated quantity of water needed for operation and maintenance of the BSPP would be approximately 7.5 to 11 AFY per unit, plus a total of 0.5 AFY of potable water. The primary use of water during operation and maintenance-related activities would be for panel washing and dust control (the proposed PV technology requires no water for the generation of electricity).

A BLM-approved dust suppressant would be applied to control dust. Water could be used to supplement the dust suppressant in some areas on a limited basis; the amount of water used depends on the type of suppressant used and the manufacturer's recommendations. The concentrate from a reverse osmosis treatment unit (if required for on-site water treatment) might be used for dust control by blending it with water from the on-site water wells.

2.8 CONSTRUCTION AND OPERATIONS

This section describes the construction activities and the operations of the Modified Project. The construction of the Project will begin once all applicable approvals and permits have been obtained and currently anticipated to be as early as April 2013. After the preconstruction surveys, construction mobilization, and site preparation are completed, construction of the BSPP and Gen-Tie Line will begin. Work will be completed in phased stages moving across the site so that completion of one phase is closely followed by the beginning of the next. Construction of all of the phases is anticipated to take approximately 48 months from the commencement of the construction process to full construction of the BSPP and Gen-Tie Line.

2.8.1 Construction Workforce Numbers

Typical construction work schedules are expected to be between 8 and 12 hours per day, Monday through Friday, from 7:00 am to 10:00 pm. The work schedule may be modified throughout the year to account for changing weather conditions (e.g., starting the workday earlier in the summer months to avoid work during the hottest part of the day for health and safety reasons). In the event that construction work takes place outside these typical hours, activities will comply with Riverside County standards for construction noise levels. For safety reasons, certain construction tasks, including final electrical terminations, must be performed after dark when no energy is being produced. The BSPP will use restricted nighttime task lighting during construction. No more lighting will be used than is needed in order to provide a safe workplace, and lights will be focused downward, shielded, and directed toward the interior of the site to minimize light exposure to areas outside the construction area.

The construction will take place in phases and it assumed that the grading of the next phase will take place shortly after erection of the previous phase begins. A preliminary construction schedule is presented in Appendix D, Table 7.

During Project construction, the workforce is expected to average approximately 450 to 600 employees over the 75-month construction period, with a peak workforce of approximately 700 employees during Months 5 through 38 of the construction period. The Project construction workforce will be recruited from within Riverside County and elsewhere in the surrounding region to the extent practicable.

2.8.2 Construction Equipment/Vehicles

Most construction equipment and vehicles will be brought to the BSPP at the beginning of the construction process during construction mobilization and will remain on site throughout the duration of the construction activities for which they were needed. Generally, the equipment and vehicles will not be driven on public roads while in use for the Project. In addition to construction worker commuting vehicles, as discussed above, construction traffic will include periodic truck deliveries of materials and supplies, recyclables, trash and other truck shipments.

Truck access to the site will be from I-10 and then via Mesa Drive Road to Black Rock Road. Construction truck deliveries and shipments will typically avoid the peak traffic hours in the morning and evening, so it is unlikely that Project deliveries will represent a substantial increase in traffic volumes during peak commuting hours. Materials will typically be delivered starting two weeks before the start of the associated task with the exception of electrical gear (PCSs, PVCs, etc.), which will be drop shipped just prior installation. An estimate of the types of construction equipment is presented in Appendix D, Table 9.

2.8.3 Site Clearing, Grading, and Compaction

PVSI will utilize construction grading and compaction techniques that will adequately prepare the Site for safe and efficient installation and operation of the PV arrays. The discussion below provides preliminary detail relative to the site preparation techniques that may be employed at the Site.

PVSI would utilize site preparation techniques that adequately prepare the site for safe and efficient and operation of PV arrays while allowing water to sheet flow across the site with negligible impact on surface water flow upstream and downstream of the site. The planned approach to Project Site preparation, which involves the use of “disc and roll” and micrograding techniques, reflects the results of field testing of various site preparation techniques at an off-site location by one of the PV manufacturers, with considerable experience in construction at desert locations in Southern California and Nevada. The worst case clearing, grading and compaction will be with the use of single-axis tracking systems. The descriptions below reflect that worst case grading.

2.8.3.1 Clearing

Vegetation would be cleared from roadways, access ways, and where concrete foundations are used for inverter equipment, substations, and the operations and maintenance building. Vegetation would be cleared for construction of the drainage controls. Organic matter would be mulched and redistributed within the construction area (except in trenches and under equipment foundations). Plant root systems would be left in place to provide soil stability except where grading and trenching are required for placement of solar module foundations, underground electric lines, inverter and transformer pads, road and access ways, and other facilities. During the site clearing process, the site would also be cleared of refuse, as necessary. Refuse materials encountered would be recycled or disposed.

2.8.3.2 Grading

The cut and fill depths across the Site will be minimized, and it is expected that no import or export of soil material will be required, as the amount of cut and fill would be balanced on site. Preliminary grading estimates are presented below in Table 2-3, which are significantly less than that for the Approved Project.

TABLE 2-3
ESTIMATED GRADING

Unit	Cut (cubic yards)	Fill (cubic yards)
1	200,000	170,000
2	120,000	100,000
3	250,000	200,000
4	210,000	180,000
5	200,000	170,000
6	500,000	400,000
7	800,000	700,000
8	1,100,000	900,000
Total	3,380,000	2,820,000

The estimates of cut and fill in Table 2-3 are less than the Approved Project which involved cut and fill volumes of approximately 8.3 million cubic yards.

Areas that make up more than half of the solar field would be prepared using conventional farming equipment including tractors with discing equipment and vibratory rollers. This technique is referred to as “disc and roll”. With this approach, rubber-tired farming tractors towing disc harrow equipment would disc the top 5 to 7 inches of soil. A water truck would follow closely alongside the tractor to moisten the soil to hold fugitive dust emissions to acceptable levels. The tractor may make several passes to fully disc the vegetation into the topsoil, preserving the underground root structure, topsoil nutrients and seed base; once the soil has been wetted on the first pass, additional water would not be needed for subsequent passes. A drum roller would then be used to flatten the surface and return the soil to a compaction level similar to the preconstruction stage. The intent of the roller would be to level the soil under the solar field area and even out the surface after the discing is complete.

In dispersed sections of the solar array field, there would be limited use of scrapers to perform micrograding. This technique is referred to as “isolated cut/fill and roll”. In general, portions of the site would be contour graded level; the macro-level topography and stormwater drainage would remain unchanged, but within each solar array, “high spots” would be graded and the soil cut from these limited areas used to fill “low spots” within the same array. Limited use of scrapers for micrograding would be employed only where needed to produce a more level surface than can be produced by the disc and roll technique.

Standard cut and fill techniques would be used in areas of the site where soil conditions do not lend themselves to discing. The overall objective of the earth moving would be to produce a consistent grade in each solar field area. Standard cut and fill techniques would be utilized within specific arrays to limit slope to within 3 percent. Essentially, the

BSPP site would be graded to a sufficiently level topography using the least practicable amount of conventional cut and fill grading. The grading plan would utilize hydrology analysis to identify and protect areas that are susceptible to scour from stormwater runoff, and otherwise manage stormwater runoff to maintain plant facilities and safety and to ensure that off-site drainage conditions upstream and downstream of the site are as close as practicable to preexisting conditions. Work over the site preparation period would be paced so that grading of an area takes place shortly before trenching and post installation are ready to begin. This would minimize the area of open, uncovered ground present at any one time during construction, and thereby minimize dust and erosion issues. As shown in Table 2-4 above, the amount of standard cut and fill grading techniques increases as development progresses westerly from the eastern boundary.

Work over the grading period would be paced so that grading of an area takes place shortly before trenching and post installation are ready to begin. This would minimize the area of open, uncovered ground present at any one time during construction, and thereby minimize dust and erosion issues.

2.8.3.3 Erosion Control

The Project would utilize site preparation techniques that adequately prepare the site for safe and efficient and operation of PV arrays while allowing water to sheet flow across the Site with negligible impact on surface water flow upstream and downstream of the Site. As noted above, the planned approach to Project Site preparation involves the use of "disc and roll" and micrograding techniques.

Based on a preliminary grading plan, PVSI commissioned a hydraulic evaluation contained in Appendix B. PVSI's final design will implement site design and protective erosion and drainage control design measures during construction and operation to minimize dust and erosion issues. Storm water flow will be managed to prevent downstream erosion and channelization.

Contour grading, erosion control design features, storm water mitigation measures and other protective measures (including avoiding the placement of PV module tables and piles within significant drainages and minimizing disturbance and compaction to the extent possible), will enable historic levels of runoff off site to be maintained at the BSPP and in downstream areas. While the final grading design has not been completed, the amount of grading is considerably less than the Approved Project and there is no need for the large drainage structures that were originally designed for the Approved Project.

The Project may need to obtain coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (General Permit) Water Quality Order 99-08-DWQ. PVSI will prepare and implement a construction Storm Water Pollution Prevention Plan (SWPPP) prior to the commencement of soil disturbance activities associated with Project construction. The SWPPP will describe construction Best Management Practices (BMPs) to manage storm water on the site to both protect the site and to minimize downstream erosion and sedimentation.

Several erosion control measures are planned during construction including stabilization of the heavily-used construction entrance area, employing a concrete wash-out area, as needed, and tire washes near the entrance to existing roadways. Silt fences are proposed for erosion control along neighboring properties.

The approximate percentage of the BSPP site that will be covered with impervious surfaces (inverter foundations, etc.) will constitute a fraction of one percent of the total surface area of the Site. The final Site Plan will be based on a detailed topographic survey of the Site, as well as detailed hydrologic and topographic studies that will be performed as a part of the permitting and engineering design process.

2.8.4 System Installation

Depending on the final PV technology and vendor selected, the design of the tracker support structures could vary. Typical installations of this type are constructed using steel piles or concrete foundations. Steel piles may be driven, screwed, or grouted. Driven steel pile foundations typically are galvanized and used where high load bearing capacities are required. The pile is driven using a hydraulic ram where up to two workers are required. Soil disturbance would be restricted to the pile insertion location with temporary disturbance from the hydraulic ram machinery, which is about the size of a small tractor. Screw piles, if used, would be driven into the ground with a truck-mounted auger requiring two or three personnel. Screw piles create a similar soil disturbance footprint as driven piles. Grouted steel piles, if used, would require pre-drilling with auger equipment so that the pile could be inserted into the cleaned hole. The pile then would be grouted into place from bottom to top until grout flows out of the top of the hole. Soil disturbance would be the same as the previous steel pile descriptions with additional disturbance from the soil removal and insertion of grout at the pile location. Concrete foundations avoid ground penetration by withstanding the design loads from the weight of the concrete itself. Concrete requires time to cure and can be pre-cast and transported to the site or poured in place for installation. Concrete foundations reduce the ground penetration, but increase the permanent disturbance.

The design method and installation time of the support structures would depend on the support structure and block design with driven piles being the fastest preferred installation method. Final construction and installation details would be determined in the detailed design of the Project.

Solar PV panels would be manufactured off-site and shipped to the site ready for installation. Concrete pads for the drive motors would be either pre-cast or post and brought to the site via flatbed truck. Once most of the components have been placed on their respective foundations, the electricians and instrumentation installers would run the electrical cabling throughout the solar field. After the equipment is connected, electrical service would be verified, motors checked, and control logic verified. The various hydraulic systems would be charged with their appropriate fluids and startup testing would proceed. As the solar arrays are installed, the balance of the plant would continue to be constructed and installed and the electrical power and instrumentation would be placed. Once all of the individual systems have been tested, integrated testing of the BSPP would occur.

2.9 PROJECT OPERATION AND MAINTENANCE

2.9.1 Operation and Maintenance Workforce

Approximately 20-30 permanent, full-time personnel would be employed at the solar plant site during daytime working hours assuming all units are operational. Temporary personnel would be employed, as needed, during seasonal periods when panel washing is required. Monthly visual inspections and annual (minimum) preventive maintenance would be performed. In accordance with United States Department of Labor, Occupational Safety and Health Administration (OSHA) safety regulations, at least two qualified personnel would be present during all energized electrical maintenance activities at the facility. Site security systems would be monitored regularly, by on-site personnel and an off-site 24-hour Remote Operations Center.

2.9.2 Automated Facility Control and Monitoring System

The proposed facility control and monitoring system would have two primary components: an on-site SCADA system and the accompanying sensor network. The on-site SCADA system would offer near real-time readings of the monitored devices, as well as control capabilities for the devices where applicable. Off-site monitoring/data trending systems would collect historical data for remote monitoring and analysis. For example, personnel at the Remote Operations Center would provide continuous 24/7/365 monitoring coverage of Project facilities and would respond to real-time alerts and system upsets using advanced monitoring applications that reside on the servers in their network.

2.9.3 Panel Washing

PV panel washing would be performed by seasonal maintenance crews in the fall and spring, taking approximately 20 days to complete each unit. Up to 50,000 gpd per unit would be required for this purpose. Several types of systems are currently available; most involve spraying filtered water onto the modules from a portable tank mounted in the bed of a pickup truck. Sometimes brushes, rods, or circular cleaning heads are used to remove debris. Surfactants would not be used in these procedures. The process water would be allowed to run off the modules and evaporate or percolate into the ground.

2.9.4 Road Maintenance

Paved roads would be maintained to preserve the asphalt surface from degradation. Maintenance would include seal coating the asphalt surface every 2 to 5 years to prevent decay and oxidization. Potholes or other damage would be repaired as soon as practical.

Unpaved roads would be maintained regularly to control the flow of water on and around the road, remove obstacles, and maintain a solid surface. Maintenance would be completed by conducting regular surveys to inspect the conditions of the road surfaces; blading, grading or compacting the road surfaces to preserve a minimally sloped and smooth planed surface; and applying dust palliatives or aggregate base as needed to reduce dust and erosion.

2.10 HAZARDOUS MATERIALS MANAGEMENT

2.10.1 Waste and Hazardous Materials Management

2.10.1.1 Wastewater

Two separate wastewater collection systems would be provided as part of the Project: one for sanitary wastes, and another to address the process wastewater.

The sanitary wastewater system would collect sanitary wastewater at the O&M building. Portable chemical toilets would be provided for workers in the solar fields. The sanitary wastewater from sinks, toilets, showers, other sanitary facilities in the O&M building would be discharged to a sanitary septic system and on-site leach field. The septic system would be designed and permitted in accordance with state and County regulations.

On-site water treatment would discharge minimal wastewater (up to 56 gpm). The Final Decision allows for each power block to have two 4-acre evaporation ponds for a total of eight 4-acre evaporation ponds. Waste Discharge Requirements for the ponds were included in the Final Decision. Based on analysis of need for the Modified Project the BSPP could require up to a total of 8 acres of netted evaporation ponds. The evaporation ponds would be located near the water treatment area.

The average pond depth design could be up to 8 feet and residual precipitated solids would be removed approximately every 8 to 10 years, as needed, to maintain a solids depth no greater than 3 feet for operational and safety purposes. The precipitated solids would be sampled and analyzed to meet the characterization requirements of the receiving disposal facility. The characteristics of the precipitated solids would determine the transportation and disposal methodology. It is anticipated the pond solids and other non-hazardous wastes would be classified as Class II non-hazardous industrial waste. Pond solids would be tested using appropriate test methods in advance of removal from the evaporation ponds to confirm this determination; however, preliminary estimates show the material would be non-hazardous.

2.10.1.2 Solid (Non-Hazardous) Waste

Construction, operation, maintenance, and decommissioning of the BSPP would generate non-hazardous solid wastes typical of power generation or other industrial facilities. Solar plant-related wastes generated during all phases of the Project would include: oily rags, worn or broken metal and machine parts, defective or broken electrical materials, other scrap metal and plastic, insulation material, empty containers, paper, glass, and other miscellaneous solid wastes including the typical refuse generated by workers. These materials would be disposed by means of contracted refuse collection and recycling services. Waste collection and disposal would be in accordance with applicable regulatory requirements to minimize health and safety effects.

Information on universal wastes anticipated to be generated during Project construction is provided in Table 2-4. Universal wastes and unusable materials would be handled, stored, and managed per California Universal Waste requirements.

Operation and maintenance of the Project would generate sanitary wastewater, non-hazardous wastes, and small quantities of hazardous wastes. Operation and maintenance of the Project's linear facilities (e.g., the gen-tie line) would generate minimal quantities of waste. The types of waste and their estimated volumes are summarized in Table 2-5.

Facility construction, operation, maintenance, and decommissioning would generate wastes that require proper management and in some cases off-site disposal. There are seven permitted Class III landfills located in the County within approximately 145 miles of the Project site. There are two major permitted Class I hazardous waste landfills located in California, located approximately 350 and 400 road miles from the site, respectively.

TABLE 2-4
SUMMARY OF CONSTRUCTION WASTE STREAMS AND MANAGEMENT METHODS

Waste Stream and Classification[a]	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	On-site Treatment	Waste Management Method/Off-site Treatment
Construction waste – Hazardous	Empty hazardous material containers	1 cubic yard per week (cy/wk)	Intermittent	None. Accumulate on site for <90 days	Return to vendor or dispose at permitted hazardous waste disposal facility
Construction waste – Hazardous	Solvents, used oil, paint, oily rags	175 gallons	Every 90 days	None. Accumulate on site for <90 days	Recycle or use for energy recovery
Spent batteries - Universal Waste	Lead acid, alkaline type	20 in 2 years	Intermittent	None. Accumulate on site for <90 days	Recycle
Construction waste – Non-hazardous	Scrap wood, concrete, steel, glass, plastic, paper	40 cy/wk	Intermittent	None	Recycle wherever possible, otherwise dispose to Class III landfill
Sanitary waste – Non-hazardous	Portable Chemical Toilets - Sanitary Waste	200 gallons/ day	Periodically pumped to tanker truck by licensed contractors	None	Ship to sanitary wastewater treatment plant
Office waste – Non-hazardous	Paper, aluminum, food	1 cy/wk	Intermittent	None	Recycle or dispose to Class III landfill

NOTE:
[a] Classification under 22 California Code of Regulations (CCR) §66261.20 et seq.

TABLE 2-5
SUMMARY OF OPERATION WASTE STREAMS AND MANAGEMENT METHODS

Waste Stream and Classification[a]	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				On site	Off site
Used Hydraulic Fluid, Oils and Grease – Non-RCRA[b] Hazardous	Tracker drives, hydraulic equipment	1000 gallons/year	Intermittent	Accumulated for <90 days	Recycle
Oily rags, oil absorbent, and oil filters – Non-RCRA Hazardous	Various	One 55-gallon drum per month	Intermittent	Accumulated for <90 days	Sent off site for recovery or disposed at Class I landfill
Spent batteries – Universal Waste	Rechargeable and household	<10/month	Continuous	Accumulate for <1 year	Recycle
Spent batteries – Hazardous	Lead acid	20 every 2 years	Intermittent	Accumulated for <90 days	Recycle
Spent fluorescent bulbs – Universal Waste	Facility lighting	< 50 per year	Intermittent	Accumulate for <1 year	Recycle
Sanitary wastewater – Nonhazardous	Toilets, washrooms	250 gallons/day	Continuous	Septic leach field	None

NOTES:
[a] Classification under 22 CCR §66261.20 et seq.
[b] Resource Conservation and Recovery Act

2.10.1.3 Hazardous Materials Management

During construction, all hazardous materials would be stored on-site in storage tanks, vessels, or other appropriate containers specifically designed for the characteristics of the materials to be stored. The storage facilities would include secondary containment in case of tank or vessel failure. Construction- and decommissioning-related hazardous materials used for development of the Project would include: gasoline, diesel fuel, oil, lubricants, and small quantities of solvents and paints. Material Safety Data Sheets for all applicable materials present on-site would be readily available to on-site personnel.

Fueling of some construction vehicles would occur in the construction area. Other mobile equipment would return to the laydown area for refueling. Special procedures would be identified to minimize the potential for fuel spills, and spill control kits will be carried on all refueling vehicles for activities such as refueling, vehicle or equipment maintenance procedures, waste removal and tank clean-out. Fuel for construction equipment could be provided by a fuel truck or could be stored on-site in aboveground double-walled storage tanks with built-in containment.

A Spill Prevention and Management Plan (SPMP) would include procedures, methods, and equipment supplied during construction to prevent discharges from reaching waters of the state. The plan would be certified by a Registered Professional Engineer and a complete copy of it would be maintained on-site.

During BSPP operation, a variety of chemicals and hazardous materials would be stored and used at the facility. Chemicals would be stored inside the O&M building as appropriate to prevent exposure to the elements and to reduce the potential for accidental releases, and in appropriate chemical storage containers. Bulk chemicals would be stored in storage tanks; other chemicals would be stored in returnable delivery containers. Chemical storage and chemical feed areas would be designed to contain leaks and spills. Containment berm and drain piping design would accommodate a full-tank capacity spill without overflowing the containment 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. The transport, storage, handling, and use of all chemicals would be conducted in accordance with applicable laws, ordinances, regulations, and standards.

The quantities of hazardous materials stored on-site would be evaluated to identify the required usage and to maintain sufficient inventories to meet use rates without stockpiling excess chemicals. Chemicals that could be present during construction, operation and maintenance of the BSPP are included in Table 2-6.

If a portable, trailer-mounted water treatment system would meet the BSPP flow and water quality demands described above, then no additional chemicals would be required for maintenance and regeneration of the system. However, if a site-specific water treatment system is used, then the regeneration process could require additional chemicals to maintain its performance. Such chemicals could include sodium hydroxide solution, sodium hypochlorite solution, and/or sulfuric acid solution.

TABLE 2-6
SUMMARY OF SPECIAL HANDLING PRECAUTIONS FOR LARGE QUANTITY HAZARDOUS MATERIALS

Hazardous Material	Use	Relative Toxicity[a] and Hazard Class[b]	Permissible Exposure Limit	Storage Description; Capacity	Storage Practices and Special Handling Precautions
Carbon Dioxide		Low toxicity; Hazard class – Nonflammable gas	TLV: 5,000 ppm (9,000 mg/m^3) TWA	Carbon steel tank, 15 tons maximum on-site inventory	Carbon steel tank with crash posts.
Diesel Fuel	Equipment refueling and emergency diesel fire pump	Low toxicity; Hazard class – Combustible liquid	PEL: none established TLV: 100 mg/m^3	Carbon steel tank (3,600 gallons)	Secondary containment, overfill protection, vapor recovery, spill kit.
Hydraulic fluid (if applicable)	Tracker drive units	Low to moderate toxicity; Hazard class – Class IIIB combustible liquid	TWA (oil mist): 5 mg/m^3 STEL: 10 mg/m^3	Hydraulic drive tank, approximately 20 gallons per tracker drive unit (if applicable) throughout solar field. Carbon steel tank, maintenance inventory in 55-gallon steel drums.	Found only in equipment with a small maintenance inventory. Maintenance inventory stored within secondary containment; alternative measures to secondary containment for equipment will be implemented at the project.
Lube Oil	Lubricate rotating equipment (*e.g.,* tracker drive units)	Low toxicity Hazard class – NA	None established	Carbon steel tank, maintenance inventory in 55-gallon steel drums.	Secondary containment for tank and for maintenance inventory.
Mineral Insulating Oil	Transformers/ switchyard	Low toxicity Hazard class – NA	None established	Carbon steel transformers; total on-site inventory of approximately 250,000 gallons (each 1 megavolt-ampere transformer contains approximately 500 gallons). Carbon steel tank, maintenance inventory in 55-gallon steel drums.	Used only in transformers, secondary containment for each transformer. Maintenance inventory stored within secondary containment; alternative measures to secondary containment for equipment will be implemented at the project.
Soil stabilizer Active ingredient: acrylic or vinyl acetate polymer or equivalent		Non-toxic; Hazard class - NA	None established	No on-site storage, supplied in 55-gallon drums or 400-gallon totes, used immediately	No excess inventory stored on-site.
Sulfur Hexafluoride	230 kV breaker insulating medium			Contained within switchyard equipment; maximum of 7500 lbs	Inventory management.
Acetylene	Welding gas	Moderate toxicity; Hazard class – Toxic	PEL: none established	Steel cylinders; 200 cubic foot each, 600 cubic foot total on site	Inventory management, isolated from incompatible chemicals.
Argon	Welding gas	Low toxicity; Hazard class – Nonflammable gas	PEL: none established	Steel cylinders; 200 cubic foot each, 600 cubic foot total on site	Inventory management.
Oxygen	Welding gas	Low toxicity; Hazard class – Oxidizer	PEL: none established	Steel cylinders; 200 cubic foot each, 600 cubic foot total on site	Inventory management, isolated from incompatible chemicals.

NOTES:

[a] Low toxicity is used to describe materials with a National Fire Protection Association (NFPA) Health rating of 0 or 1. Moderate toxicity is used describe materials with an NFPA rating of 2. High toxicity is used to describe materials with an NFPA rating of 3. Extreme toxicity is used to describe materials with an NFPA rating of 4.

[b] NA denotes materials that do not meet the criteria for any hazard class defined in the 1997 Uniform Fire Code.

PVSI would develop and implement a variety of plans and programs to ensure safe handling, storage, and use of hazardous materials (e.g., Hazardous Material Business Plan). Solar plant personnel would be supplied with appropriate personal protective equipment (PPE) and would be properly trained in the use of PPE as well as the handling, use, and cleanup of hazardous materials used at the facility and the procedures to be followed in the event of a leak or spill. Adequate supplies of appropriate cleanup materials would be stored on-site.

In addition to the chemicals listed above, small quantities (less than 55 gallons, 500 pounds or 200 cubic feet) of janitorial supplies, office supplies, laboratory supplies, paint, degreasers, herbicides, pesticides, air conditioning fluids (chlorofluorocarbons or CFCs), gasoline, hydraulic fluid, propane, and welding rods typical of those purchased from retail outlets also could be stored and used at the facility. These materials would be stored in the maintenance warehouse or office building. Flammable materials (e.g., paints or solvents) would be stored in flammable material storage cabinet(s) with built-in containment sumps. The remainder of the materials would be stored on shelves, as appropriate.

2.10.1.4 Hazardous Waste

Similar to the Approved Project small quantities of hazardous wastes would be generated during BSPP construction, operation, maintenance, and decommissioning. Hazardous wastes generated during the construction phase would include substances such as paint and primer, thinners, and solvents. Hazardous solid and liquid waste streams that would be generated during operation of the Project include substances such as used hydraulic fluids, used oils, greases, filters, etc., as well as spent cleaning solutions and spent batteries. Hazardous wastes generated during decommissioning would include substances such as: carbon dioxide, diesel fuel, hydraulic fuel and lube oil. To the extent possible, all hazardous wastes would be recycled.

PVSI or its contractor would obtain a hazardous waste generator identification number from the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) prior to generating any hazardous waste. All spills would be reported to BLM and the County. Spills greater than 25 gallons would be reported to the RWQCB. A sampling and cleanup report would be prepared and sent to the RWQCB to document each spill and clean up. Each spill, regardless of amount, would be cleaned up within 48 hours and a spill report completed. Copies of all spill and cleanup reports would be kept on-site.

2.11 FACILITY CLOSURE

The standards applied to closure of the facility for the Modified Project would not be different from those applicable to the Approved Project.

The principal materials incorporated into the PV arrays include glass, steel, and various semiconductor metals. The module production process is designed to minimize waste generation and maximize the recyclability and reusability of component materials. Some manufacturers employ the compound CdTe as the semiconductor material. Cadmium telluride is a stable compound of cadmium (Cd) and tellurium (Te). Cadmium, Cd, produced primarily as a byproduct of zinc refining, is a human carcinogen as an independent element, but when combined with Te, a byproduct of copper refining, forms the stable, non-hazardous compound CdTe. In module manufacturing Cd, a hazardous material, is safely sequestered in the form of CdTe in a module for the over 30-year lifetime of the module, after which it is recycled for use in new solar modules or other new products. If the BSPP selects panels that incorporate CdTe, it will participate in the manufacturer's recycling program. An analysis of CdTe is included in Section 4.5 of this Petition.