ATTACHMENT A
PLAN OF DEVELOPMENT
SOLAR TROUGH PROJECT

Amargosa South Site

Pacific Solar Investments Inc.

December 2007

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1.1 FACILITY DESCRIPTION

This solar facility will be a "solar trough" type of generation plant. As such, the facility will have two major components: a series of parabolic solar collectors (i.e. mirrors), and a conventional power block that will produce electricity. The facility size and specific design have not yet been finalized. However, we anticipate the facility will have a total power output of 500MW upon full build out. The plant will have the approximate characteristics listed below:

- Total land area for facility: 4,000 acres
- Gross power output: 500 MW
- Net power output: 1,200,000 MWhr/year
- Total solar field area: 2,000 acres
- Total net solar collector area: 1,000 acres
- Total number of mirrors: 1,000,000

The facility will have a life of approximately 40 years.

1.2 LOCATION OF FACILITY

Site: Amargosa South

Township Range Sections:

- Township 15 South/ Range 48 East:
  - Sections: 19, 20 ,21, 22, 27, 28, 29, 30, 31, 32, 33, 34

Area: approximately 7,700 acres

See Appendix Figure A-1 for facility location map.

1.3 PURPOSE AND NEED

The purpose of this facility is to generate solar renewable energy. This form of energy generation is amongst the cleanest in use. The energy generated by this facility will make a significant contribution to the renewable energy generation goals for Nevada, as stated in the Renewable Portfolio Standards (RPS).

This facility will generate approximately 1,200,000 MWhr (numbers corresponding to the gross output range of 500MW) of solar energy per year. This production will offset a large

amount of fossil fuel use, which, in turn, will result in a significant reduction in the release of greenhouse gases. In fact, 1.2 million MWhr of solar power will offset approximately 500,000 tons of CO2 annually.

1.5 ECONOMIC FEASIBILITY OF THE PROJECT

The applicant is an expert in the development of solar thermal projects in the US. Technical expertise is to be supplied by leading national engineering firms such as URS Corp., headquartered in San Francisco, with 25,000 employees worldwide, who have demonstrated expertise with the development and engineering requirements of a project of this size. URS has been deeply involved in the development of solar thermal projects in Southern California for over four years and has invested heavily in this process.

There are several financial companies who have expressed strong interest in securing the financing for a project of this size and who have demonstrated the ability to secure such financing. Financial modeling of the project has been prepared. The economic model results show that the facility would yield market rate returns for project equity and debt. As such, it has been determined that a solar trough facility of the size mentioned above can be successfully funded. The construction cost of the facility will likely be in excess of $2 billion and would be staged over several years. Operating costs will be approximately $15 million annually.

The produced electricity is intended to be sold to the Nevada utility market and, as such, the utility will pay for the power through a long-term Power Purchase Agreement (PPA) of between 20 and 30 years with a predetermined price. Based on this price, after taking into account the costs of development, engineering, construction, transmission and operations, it has been determined that the project is economically feasible and that the interest in the financial sector is sufficiently high such that the project would be able to secure the required financing at market rates.

1.6 ENVIRONMENTAL SUMMARY

The project will be located in Nye County, to the west of Indian Springs. It is anticipated that the workforce will originate from the Pahrump area. It is likely some workers will be housed in temporary trailers located on the site during construction.

Impacts on air quality will be minor, and will include some dust generation during construction, and limited air emissions from a boiler needed to maintain the heating fluid temperature at night. Visual impacts will be minimal due to the remoteness of the site, and lack of high structures. Impacts from clearing and grading operations will be controlled by using best management practices. Surface water drainage patterns will be altered on the site due to grading; however, runoff will be properly managed to avoid erosion or increased flooding in the project area. Noise will be emitted from the power block area; however, the

power block will be located in the interior of the site, so there will be minimal impacts on the site boundary.

There will be no impacts to fish or marine life. The site is not located within any known critical habitat area for plants or animals (e.g. desert tortoise). However, detailed biological surveys will be conducted on the site to inventory any sensitive animals or plant life. Appropriate mitigation will be proposed if necessary.

1.7 HAZARDOUS MATERIALS

There will be some hazardous materials stored and used at the site during construction and operation. These include, but are not limited to: lubricating oils, coolants, welding gases, gasoline, and liquid cleaners. These materials will be stored in accordance with accepted methods. The construction site will be monitored to identify any spills of these substances.

1.8 ALTERNATIVE SITES

Development of a concentrating solar project involves the use of large areas of land, depending upon the ultimate design of the facility and land characteristics. The site characteristics should meet the following criteria:

- Average wind speeds less than 30 mph
- Solar radiation of 6.5 kWh/m2/day or greater
- Ground slopes of less than 5%
- Close proximity to a rail line
- Proximity to required electric transmission interconnection
- Avoidance of sensitive lands
- Overall environmental impacts will be insignificant

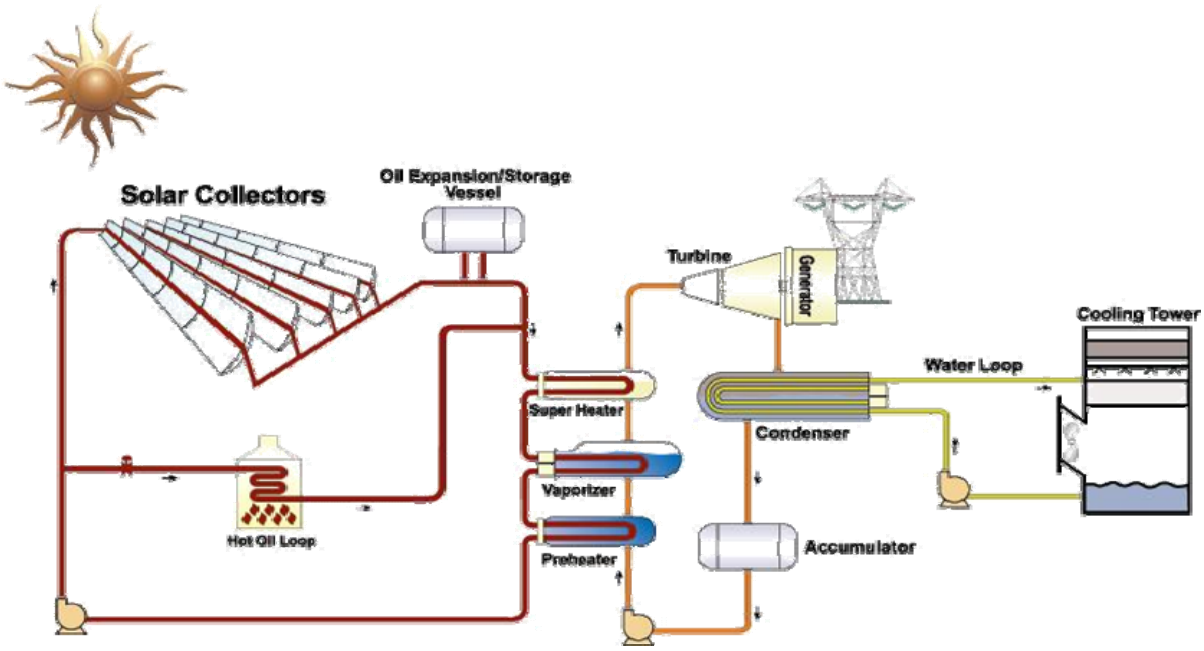
Studies of suitable land within the Mojave Desert area were conducted. Several other sites were identified, but they had some disadvantages, such as located on critical habitat.

All of the alternative sites are located on BLM land. The prime reason for this is that there are no private lands available in the areas with sufficient solar radiation that meet the area requirement stated above.

2.1 SOLAR TROUGH TECHNOLOGY AND FACILITY DESIGN

The proposed project is based on the "solar trough" technology and consists of two basic components: a series of parabolic solar collectors (i.e., solar field), and a conventional power block to produce electricity, shown in Figure 1.

FIGURE 1
PLANT LAYOUT



Thermal energy is collected via a field of parabolic collectors. The sun's energy is directed to an oil-filled pipe at the center of the collectors. This "heat transfer fluid" (HTF) is circulated through the solar field where it is heated and then delivered to heat exchangers located in the power block. The solar-heated HTF generates superheated steam in the heat exchangers. The steam is then fed to a standard steam turbine. The spent steam from the turbine is condensed in a conventional steam condenser and returned to the heat exchangers via condensate and feedwater pumps to be retransformed into steam. After passing through the HTF side of the heat exchangers, the cooled heat transfer fluid is recirculated through the solar field to repeat the process.

2.2 SOLAR FIELD

The solar field consists of rows of solar collectors driven by a single hydraulic drive train. The mirrored parabolic troughs concentrate solar radiation onto a steel heat collection pipe that has a special coating to enhance heat transfer and reduce reflection of heat energy. The

pipe is surrounded by an evacuated glass tube to improve performance. A microprocessor controller and light sensor system tracks the sun and keeps the collectors properly focused.

The heat transfer fluid is heated in the solar field to a temperature of 735°F. After being heated in the solar field, the HTF is transported to the heat exchangers. Here the HTF flows counter-current to the feedwater flow of the turbine steam-water system, which also passes through the heat exchangers. The HTF loop includes heaters operated with natural gas to maintain consistent and required fluid temperature. These heaters are also used to generate steam during periods of reduced solar radiation or if generation is needed during evening hours.

2.3 POWER BLOCK

The steam generator system consists of superheaters and steam generators (vaporizers) that raise the temperature and pressure of the steam to about 700°F and 1500 psia before entering the high-pressure section of the turbine. Steam exiting from the high-pressure casing is reheated before entering the low-pressure casing. Exhaust steam from the turbine is directed to the condenser. The turbine drives a generator, which will provide electrical power to the switchyard and grid.

2.4 COOLING SYSTEM

The cooling water system consists of a mechanical draft cooling towers, cooling water pumps, and associated instrumentation. The coolant is cooled in the towers and circulated by the pumps through the condenser. Wastewater from cooling tower blow down (used to control solids in the towers), boiler blowdown and other miscellaneous uses, will be directed to an evaporation pond. Sludge buildup in the pond will be disposed periodically.

2.5 CHARACTERISTICS FOR 500 MW PLANT

Table 1 presents approximate characteristics for a 500 MW solar thermal power plant.

TABLE 1
500 MW SOLAR THERMAL
POWER PLANT CHARACTERISTICS

Characteristic	Units	Value
Annual Net Power Output	MWhr	1,200,000
Turbine-Generator Output (Gross)	MW	550
Design Plant Output	MW	500
Generator	Voltage	138 kV @ 3 PH
Generator Power	MVA	600
Switchyard Voltage	kV	230
Turbine Inlet Steam Temperature/Pressure	F, psia	700°F/1500 psia
Maximum Steam Flow	Ton/hr	2,100
Total Plant Land Area	Acres	4,000
Annual Water Usage	Ac-ft	5,000
Total Solar Field Mirror Area	Acres	1,000
Number of Mirrors	Number	1,000,000
Field Outlet Transfer Fluid Temperature	°F	735
Electrical Conversion Efficiency	%	37

2.6 OPERATION

The plant is designed to maximize revenues though the use of solar energy. It is also possible to supplement production through fuel augmentation with natural gas. The project is capable of producing electricity solely through solar without appreciable gas usage.

2.7 MAINTENANCE

Maintenance for the power block is similar to that required for other gas-fired power plants. However, the solar field requires additional maintenance, primarily to keep the mirrors clean and operating at maximum design reflectivity. Mirror washing requires labor, equipment and demineralized water. A typical washing method involves using a tractor-pulled trailer containing a water tank and water pumps that spray water at a high pressure.

3.1 TRANSMISSION

Power will be transmitted to the grid via a 230kv transmission line which is 3 miles north of the project site. The interconnection point is anticipated to occur at Township 15 South / Range 48 East, in section 3.

3.2 WATER

It is assumed that water requirements will be met by installing wells on the site. The available brackish water will be treated before use.

3.3 ROADS

Presently existing access roads will be utilized to access the project site.

4.1 PERMITS REQUIRED

The permitting process would be a coordinated effort with the BLM executing the NEPA Lead Agency role and the state commission coordinating the permitting at the state level.

The facilitation of the EIS development in accordance with the NEPA process is a prerequisite to the initiation of Project permitting. Regulatory agencies require data adequate information on the Project description, impacts analysis assessment, and mitigation for identified impacts, as part of their permitting review and issuance process. An overview of the NEPA process is provided in Figure 2.

Table 2 provides an overview of the permitting process for agency reviews. In addition, Table 2 summarizes the permits anticipated assuming that the BLM is the lead agency.

4.2 RESOURCES AND MITIGATION

4.2.1 Air Quality

A small volume of air emissions will result from the use of natural gas to maintain the temperature of the heating fluid during nighttime hours. The project will not be a major source under Title V regulations.

4.2.2 Land (Soils, Vegetation)

Construction of the solar field and power block will require that large areas of land be disturbed via clearing and grading.

FIGURE 2
NEPA PROCESS OVERVIEW

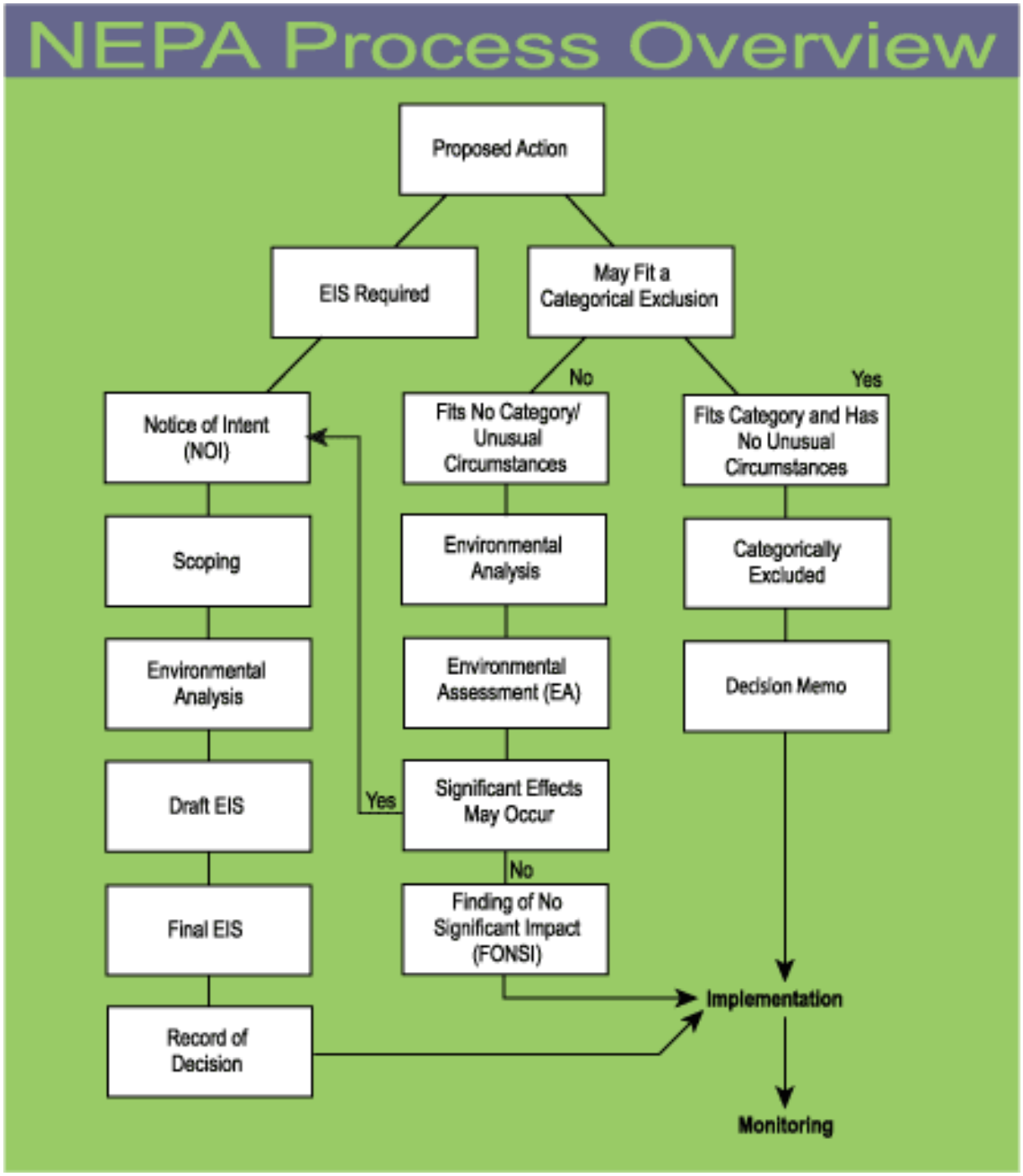


TABLE 2
ANTICIPATED PERMITS NEEDED FOR DEVELOPMENT

Permitting Authority*	Permit	Trigger
NPUC	Application for Certification	Thermal power plant
USF&WS	Fish & Wildlife Service Section 7 Biological Assessment	Construction
USACE	Corps of Engineers Section 404 Permit	Construction
BLM	Planned Area Development Plan	Any action on BLM lands.
	Water Use Permit	Any action on BLM lands.
	Building Permit	Any action on BLM lands.
	Approved ground lease	Any action on BLM lands.
	Property appraisal	Any action on BLM lands.
	Hazardous materials Phase I Site Assessment	Any action on BLM lands.
	Concurrence with ground lease	Any action on BLM lands.
	NEPA Compliance Record of Decision (ROD) for Environmental Impact Statement (EIS)	Any action on BLM lands.
	NHPA Section 106 Compliance	Any action on BLM lands.

Best Management Practices will be followed to limit soil erosion and water quality impacts from storm water runoff and dust control methods will be used to limit fugitive dust emissions. In accordance with the hydrology report recommendations, onsite drainage facilities, including storm water detention, will be constructed to provide flood control and erosion protection**.**

4.2.3 Cultural Resources

The Cultural Resources evaluation will address the need for both federal and state compliance with laws and regulations under NEPA, the National Historic Preservation Act (NHPA), and state laws.

Cultural resources include both historic and prehistoric archaeological resources, as well as the built environment in the form of historic structures. Prehistoric resources likely to be encountered in the area include flaked stone scatters from the manufacture of stone tools, hunting stands, the remains of campsites and small seasonal villages, trails, and geoglyphs.

Historic resources include the remains of homesteader settlements, historic trash scatters, roads and trails and the remains of railroad camps. In addition, traditional cultural properties may be identified through consultation with concerned Native American organizations and individuals.

Under NEPA and state regulations, federal and state agencies are required to consider the effects of their actions on cultural resources in order to avoid unnecessary impacts to cultural resources as a result of federal or state undertakings.

In some cases, determination of a resource's eligibility or its uniqueness to the National Register of Historic Places (NRHP) can be made only through extensive research, archaeological testing, and other costly and time consuming methods. To the maximum extent possible, cultural resources will be avoided. If a resource meets the criteria of eligibility to the NRHP, it will be formally addressed (where appropriate) under Section 106 procedures as set forth under NHPA.

4.2.4 Biological Resources

As a first step, detailed baseline information regarding biological resources will be compiled to assess potential project impacts to special-status species, and will serve in a support capacity to the federal and state lead agencies by facilitating the permitting processes described below.

Appropriate mitigation will be proposed as necessary to minimize impacts on plants and animals on the site.

4.2.5 Geological Hazards

Available geologic and geotechnical information will be collected and reviewed to characterize the geology, seismicity and general subsurface conditions at the site. Data from the following sources will be used:

- Published geologic information available from various regional maps and reports, including the United States Geologic Survey;
- Readily available aerial photographs of the project area and surrounding vicinity; and
- Geotechnical information available from other relevant projects, and other recent projects in the vicinity of the study area.

Based upon this data, a field exploration program will be conducted to identify site-specific subsurface conditions. The results will be used to characterize the site as follows:

- Soil and groundwater conditions encountered;

- Site geology, faulting and seismicity;
- Potential for geologic hazards to impact the project (such as, seismic shaking, liquefaction, slope instability and lateral spreading, and landslides), and
- A discussion of suitable deep foundation types including estimated tip elevations and sizes for foundation types considered.

4.2.6 Visual Resources

Potential view blockage from sensitive viewpoints and the visual change to an overall industrial matrix viewshed will need to be addressed. Photo simulations will be produced that show the revised landscape in the project vicinity. Each simulation will be evaluated relative to distinct criteria to determine whether a potentially significant visual impact is possible. Impacts are typically mitigated through contrast-minimizing color treatment of major structures, landscaping and, in unusual circumstances, architectural screening.

Since Bureau of Land Management lands have a major view of the proposed project site, the *U.S. Bureau of Land Management Manual H-8410-1 - Visual Resource Inventory* will likely be the aesthetic methodology utilized for this analysis.

4.2.7 Water Resources

A flooding hydrology assessment will address baseline information pertaining to the drainage patterns, flood history, floodplain characterization, and existing flood protection infrastructure within the setting of the proposed project. The report will include geo-referenced base maps depicting floodplain features and flood stage data including available FEMA information, and existing human constructed features.

Ground water resources will be inventoried from the perspectives of water use and impacts on existing ground water resources.

4.2.8 Traffic and Transportation

A complete analysis will be done to quantify the impacts of power plant construction related traffic on all roads and highways within the surrounding area. The affected environment will be established and discussed in both a regional and local context. The regional setting includes the existing and planned public and private roads, rail lines, and pipelines considered in the transportation impact analysis.

Specific mitigation methods needed for both facility construction and operation will be proposed based upon observed field conditions, such potential for dust storms, traffic choke points and transition areas where changes in roadway geometrics will have effects on roadway speed or driver behavior, identify roadway terrain and the presence of sharp curves,

steep downgrades or inclines. Any sight distance issues presented in blind curves and intersections will be noted. Information on roadway profiles susceptible to flash flooding will be identified including potential alternate routes during roadway closures.

4.2.9 Socioeconomics Effects (Including Impacts on Rural Lifestyles)

The socioeconomic analysis will include a comprehensive description of the regional and local socioeconomic setting of the proposed project area. This will include a discussion of population, growth trends and demographic characteristics as obtained from local documents, and the U.S. Census Bureau. Employment and labor data will be based on regional statistics and projections provided from federal and state agencies. An assessment of potential project impacts and recommended mitigation measures will be developed.

4.2.10 Waste Management/Hazardous Materials

A Phase I ESA will be conducted on the project site and along the transmission corridor, in order to review past and present land use practices, current site operations and conditions, and nearby offsite land uses to evaluate the potential for environmental impairment (ex. buried hazardous materials, previous operations having the potential to contaminate the soil, etc.) that may be present on the existing site. The Phase I ESA will be performed in accordance with ASTM Practice E 1527-00.

The following outlines a summary of procedures for the proper management of hazardous materials and hazardous waste that are expected to be used and generated during the Project construction and operation. The Project will handle, store, and dispose of hazardous materials and waste in a safe and environmentally sound manner and in compliance with applicable Federal, State, and local laws and regulations.

SUMMARY OF HAZARDOUS WASTE REQUIREMENTS

- Hazardous Waste Characterization
- Waste Accumulation
- Waste Transport and Disposal
- Training
- Recordkeeping and Reporting

SUMMARY OF HAZARDOUS MATERIALS MANAGEMENT PROCEDURES

- Permit Requirements
- Hazardous Materials Release Business Emergency/Contingency Plan (Business Plan/Release

There are three basic elements in the solar thermal power plant: The **solar field**, the **power block**, and the **HTF** (heat transfer fluid) system which connects between the first two elements. Each element has a different construction process.

- Solar Field: After the civil work and earth is completed for the solar field, the foundations for the solar collector assembly legs (SCA) are dug and filled. The SCAs are parabolic shaped metal structures supporting mirrors and glass tubes which absorb the sun's energy as it is reflected off of the mirrors. The metal is hot-dip galvanized steel, and all the parts, including the mirrors and tubes, are assembled using pins or screws.
- Power Block: The power block, which itself is comprised of large machines (turbine, generator, cooling towers), a controller system and DSC (distributed system control), is integrated on site although the various sub-elements are, to the extent possible, constructed off-site.
- HTF system: This element is primarily a network of tubes which channel the heated fluid from the solar field through a series of heat exchangers to a steam boiler. The construction of the HTF system involves the assembly and installation and integration on site of its many tubes and its process equipment (pumps, heaters, controllers).

5.1 SCHEDULE

A construction schedule is anticipated to be approximately 1,021 days and is included in the Appendix.

Significant milestones for the 500 MW project are:

- Permitting and Conceptual Design — May 2009-November 2010
- Engineering and Procurement — November 2009-December 2011
- Construction — June 2011-December 2012
- Commissioning — March 2013

5.2 WORK FORCE

The construction work force requirements have not been finalized, although we anticipate the construction would be spread out over approximately 26 months, beginning with civil works and grading, continuing with solar field construction, and ending with the construction of the power blocks. The peak labor requirements will occur during months 15 through 20 when most of the tasks will overlap. Peak labor requirements for a 500 MWe facility would be approximately 800 workers, with daily averages of approximately 300 workers.

5.3 MAJOR AND ANCILLARY FACILITIES

Major facilities include the Power Block and Cooling Towers. The type of cooling towers to be employed has not yet been determined. Ancillary buildings include steam generators, steam super-heaters, re-heaters (all per module), and a control room (likely one control room for the entire facility).

5.4 CLEARING, GRADING, AND DRAINAGE

Existing topography of the project area has slopes that range from 0 to 5 percent. In order to provide optimum efficiency for the solar collectors, the project site will be terraced so that each row of solar collectors has a slope of 0 to 2 percent. Site grading will rely on native soils; no aggregate will be brought in from offsite.

Drainage improvements will be constructed to handle onsite and offsite drainage in accordance with the hydrology report recommendations. Included will be a retention pond for the drainage from the power block facilities. Access roads will be constructed to provide maintenance access to the power block and solar collectors as well as along the transmission line corridor.

5.5 FOUNDATIONS

The types of foundation for the solar field would be dependent on the presence or absence of ground water in the site. As there is no high ground water, it will be possible to create the foundations through boring piles, about 13-14 feet deep, with a shaft of two feet and a foundation cap of 3 feet. A 500 MWe facility would require approximately 5,000 foundation piles to support the solar collector assemblies.

5.6 CONSTRUCTION PROCESS

Most of the materials will be freighted by rail to Jean, about 90 miles away from the construction site. Transport of materials to the site will be via truck. The materials will include mirror panels, metal works, HCE, and solar glass vacuum tubes.

5.6.1 Staging Area

The staging area for materials will be within the site boundaries. The construction schedule is staggered to enable delivery and construction in stages.

5.6.2 Solar Field Assembly Procedure

The basic construction procedure would be as follows:

- Civil work, rough grading, grading

- Earth work
- Road construction
- Foundations
- Flood protection, drainage
- Solar field elements: metals, legs, glass tubes
- Piping
- Power block foundations and assembly
- Security fence (could be earlier)

5.6.3 Power Block Assembly Procedure

The power blocks will be delivered to the site in pieces. Final assembly will occur on site.

5.6.4 Administration

Approximately 40 trailers will be required on site for various functions including administration, accounting, contractor offices, project management, quality control and a test lab. A mess hall facility will also be required.

5.7 SOIL STABILIZATION/EROSION CONTROL

Once construction is complete, site soil stability and erosion control will be provided by revegetating disturbed areas with native seed mixes, including the areas under the solar collectors. Site terracing and drainage improvements will provide slope stability and flood control in accordance with the hydrology report recommendations.

The plant is designed to maximize revenues by efficiently combining the use of solar energy and natural gas to keep the Heat Transfer Fluid warm during night time hours. Plant operation hours will be 24-hours per day, 365 days per year, however, power generation hours will coincide with sunlight hours.

Maintenance for the power block is similar to that required for other gas-fired power plants. However, the solar field requires additional maintenance, primarily to keep the mirrors clean and operating at maximum design reflectivity. Mirror washing requires labor, equipment and demineralized water. A typical washing method involves using a tractor-pulled trailer containing a water tank and water pumps that spray water at a high pressure.

6.1 STAFF

The number of personnel required to operate a 500 MWe facility would be approximately 120.

6.2 OPERATING SCHEDULE

The facility's operating schedule is largely determined by the time of the year, i.e., sunrise and sunset times. At sunrise, the site operator begins the mirror collector's tracking of the sun and commences the warming up of the power block. The heat fluid begins to circulate, and upon reaching threshold temperatures, steam is created, the turbine begins its operation, and the system is connected to the electricity grid. At sundown, the operator shuts off the system. The site operator schedules various maintenance activities (mirror washing, tube and connection replacements, visual checks of the solar tube vacuum, etc.) at regular intervals, for example, all mirrors are washed once or twice a week, depending on the season. The power block requires periodic shut down and overhaul – these activities are generally performed in the winter.

6.3 HEALTH AND SAFETY

A Health and Safety plan will be created that is in accordance with the guidelines of the Occupational Safety and Health Administration (OSHA) and other regulatory agencies. This is accomplished by conducting a health and safety assessment of the site and using this information to create a site-specific safety manual for the project. Subcontractor safety programs will be reviewed to verify they fully respond to safety regulations and contain provisions for the immediate detection and rectification of safety violations.

An emergency response plan will also be implemented that outlines procedures to be followed in the event of an accident. Regular site safety meetings will also be conducted to review strategies to improve site safety.

7.1 REMOVAL OF STRUCTURES

When the plant is decommissioned, all project facilities above ground level will be removed, including solar field equipment, power block, and ancillary facilities. Foundations for the solar field will be removed to a depth of one foot beneath the surface.

7.2 RE-VEGETATION OF DISTURBED AREAS

The installation of the solar park and associated infrastructure including transmission facilities and permanent access and maintenance roads will result in the complete removal of all vegetation. No revegetation plan is applicable to permanently disturbed areas; however, a revegetation plan will be developed in conjunction with the site drainage management plan for the purpose of erosion control through the use of native plant species revegetation and installation of hard- and soft-structure drainage management structures and techniques. Revegetation will likely follow lessons-learned and guidelines established for desert revegetation that are available from several sources including mine restoration projects, highway improvement projects, and BLM trail-closure projects. Elements of the project revegetation plan will likely include: (1) native seed collection (including topsoil lift techniques) and planting for establishment of perennial herb and shrub species; (2) and procurement and planting of seeds, cuttings, and stem segments (e.g., cactus), as applicable, for establishment of desert wash species and natural landscaping species (such as around facilities). The revegetation plan will not employ the use of non-native species (e.g., salt cedar, oleander), soil augmentation with fertilizer, or long-term artificial water irrigation. Details of the project revegetation plan will become more specific when project siting and construction plans are developed. Currently, there is no proposal for off-site land purchase for mitigation; as such, there is no proposal for a revegetation plan for restoring and/or enhancing off-site areas.

Appendix A-2: Site Photo