Plan of Development

06/20/11

Imperial Valley Solar Project

Imperial Valley Solar, LLC

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Plan of Development

IMPERIAL VALLEY SOLAR PROJECT
IMPERIAL COUNTY, CALIFORNIA

Prepared for:

Bureau of Land Management

El Centro Field Office

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June 20, 2011

Table of Contents

List of Tables ..... **iii**

List of Figures ..... **iv**

List of Acronyms ..... **iv**

1. Project Description **1**

1.1 Introduction 1

1.1.1 Type of Facility 2

1.1.2 Planned Uses 4

1.1.3 Generation Output 4

1.1.4 Project Schedule 4

1.2 Proponent's Purpose and Need for the Project 5

1.3 Generating Facility Description, Design, and Operation 6

1.3.1 Project Location, Land Ownership, and Jurisdiction 6

1.3.2 Legal Land Description of Facility (Federal & Non-Federal Lands) 6

1.3.3 Total Acreage and General Dimensions of All Facilities and Components 6

1.3.4 Power Plant Facilities - Overview 9

1.3.5 Power Plant Facilities - Details 11

1.3.6 Temporary Construction Workspace, Yards, and Staging Areas 15

1.3.7 Geotechnical Studies and Data Needs—Including Solar Insolation Testing 16

1.3.8 Ancillary Facilities (Administrative and Maintenance Facilities and Storage Sites) 18

1.3.9 Water Usage, Amounts, Sources (During Construction and Operations) 19

1.3.10 Erosion Control and Stormwater Drainage 21

1.3.11 Vegetation Treatment and Weed Management 23

1.3.12 Waste and Hazardous Materials Management 23

1.3.13 Fire Protection 29

1.3.14 Site Security and Fencing (During Construction and Operations) 32

1.3.15 Spill Prevention and Containment for Construction and Operation of Facility 33

1.3.16 Health and Safety Program 34

1.4 Alternatives Considered by Applicant 40

1.5 Other Federal, State and Local Agency Permit Requirements 40

1.6 Financial and Technical Capability of Applicant 41

2. Construction of Facilities 41

2.1 Solar Field Design, Layout, Installation, and Construction Processes - Including Timetable and Sequence of Construction 41

2.2 Approach to Construction and Operations 43

2.3 Access and Transportation System, Component Delivery, Worker Access 46

2.4 Construction Work Force Numbers, Vehicles, Equipment, Timeframes 46

2.5 Site Preparation, Surveying and Staking, and Site Surveys 46

2.6 Site Preparation, Vegetation Removal and Treatment 46

2.7 Site Clearing, Grading, and Excavation 50

2.8 Solar Array Assembly and Construction 52

2.9 Power Plant Construction 56

2.10 Gravel, Aggregate, Concrete Needs, and Sources 56

2.11 Aviation Lighting 57

2.12 Site Stabilization, Protection, and Reclamation Practices 57

3. Related Facilities and Systems 59

3.1 Transmission System Interconnect 59

3.1.1 Existing and Proposed Transmission System 59

3.1.2 Status of Power Purchase Agreements 59

3.1.3 Status of Interconnect Agreement 59

3.1.4 General Design and Construction Standards 59

3.2 Gas Supply System 59

3.3 Other Related Systems 59

3.3.1 Communications System Requirements (Microwave, Fiber Optics, Hard Wire, Wireless) During Construction and Operation 59

4. Operations and Maintenance 60

4.1 Operation and Facility Maintenance Needs 60

4.2 Maintenance Activities, Including Panel Washing and Road Maintenance 61

4.3 Operations Workforce and Equipment 62

5. Environmental Considerations 62

6. Supplemental Information 65

6.1 Engineering and Civil Design 65

6.1.1 Facility Survey and Design Drawing Standards 65
6.1.2 Final Engineering and Civil Design Packages 68
6.1.3 Watershed and Drainage Analysis and Calculations 68
6.1.4 Watershed Protection and Erosion Control Design Drawings 68
6.1.5 Final Site Grading Plans 68
6.1.6 Cadastral Survey Monuments 68
6.2 Stormwater Pollution Prevention and Protection Plan 69
6.3 Hazardous Materials Safety Management/Business Plan 69
6.4 Waste Management Plan 69
6.5 Non-Native Invasive Weed Management Plan 69
6.6 Construction Health and Safety Program 69
6.7 Facility Decommissioning 70

List of Tables

Table 1. Project Acreage by Phase 5
Table 2. Insolation Data at Project Site (2 Years) 16
Table 3. Geologic Conditions 18
Table 4. Water Usage Rates for Operation 19
Table 5. Summary of Construction Waste Streams 23
Table 6. List of Inorganic Persistent and Bioaccumulative Toxic Substance 25
Table 7. Maximum Concentration of Contaminants for the Characteristic in Non-Solid Waste 26
Table 8. Business Listings of Specific Hazardous Waste Handlers 28
Table 9. Summary of Water Treatment Materials Usage and Storage 29
Table 10. Summary of Non-Water Treatment Materials Usage and Storage 29
Table 11: Fire Protection Systems 32
Table 12. Basic Protective Equipment 36
Table 13. Potential Worker Hazards during Project Construction and Operation 37
Table 14. Location of Potential Worker Hazards 38
Table 15. Sample Emergency Action Plan Outline 38
Table 16. Construction Trade Projection 47
Table 17. Estimated Daily Construction Traffic 48
Table 18. Estimated Construction Equipment Usage Schedule 49
Table 19: Projected Operations and Maintenance Personnel Requirements 50
Table 20. Major Equipment List 52
Table 21. Significant Structures and Equipment 55

List of Figures

Figure 1. Site Plan 3
Figure 2. Project Boundary Comparison 7
Figure 3. Transmission Line Alignment 8
Figure 4. Solar Field Arrangement 42

List of Acronyms

AC – alternating current
ACHP - Advisory Council on Historic Preservation
ACI – American Concrete Institution
AFC – Application for Certification
AFY – Acre Feet per Year
AI – Asphalt Institute
AISA – American Iron and Steel Institute
AISC – American Institute of Steel Construction Code
ANSI – American National Standards Institute
APE –Area of Potential Effect
AQCMP - Air Quality Construction Mitigation Plan
AQMP – Air Quality Management District
ASNT-TC-1A – American Society of Nondestructive Testing
AST – Aboveground Storage Tank
ASTM – American Society for Testing and Materials
ATC – Applied Technology Council
AWS – American Welding Society
AWWA – American Water Works Association
BA – Biological Assessment
BACT – Best Available Control Technology
BLM – Bureau of Land Management
BMP – Best Management Practices
BOMMP - Burrowing Owl Mitigation and Monitoring Plan
BO - Biological Opinion
BOP - Balance of Plant
BOS - Balance of System
CAISO – California Independent System Operator
Cal-OSHA – California Occupational Safety and Health Administration
Caltrans – California Department of Transportation
CBC – California Building Code
CCR – California Code Regulations
CDCA – California Desert Conservation Area
CDD – California Desert District

CDFG – California Department of Fish and Game
CEC – California Energy Commission
CEQA – California Environmental Quality Act
CERCLA – Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR – Code of Federal Regulations
CHSP - Construction Health and Safety Program
CNDDB – California Natural Diversity Database
CNPS – California Native Plant Society
CRHR - California Register of Historical Resources
CRWQCB – California Regional Water Quality Control Board
CWMP - Construction/Operation Waste Management Plan
CO_2 - Carbon Dioxide
CPM – Compliance project Manager
CPV – Concentrated Photovoltaic
CRSI – Concrete Reinforcing Steel Institute
CUP - Conditional Use Permit
CUPA – Certified Unified Program Agency
CWA – Clean Water Act
DBWC – Dan Boyer Water Company
DC – Direct Current
DESCP – Drainage Erosion and Sediment Control Plan
DIR – Department of Industrial Relations
DOSH – Division of Occupational Safety and Health
DTSC – Department of Toxic Substances Control
EA – Environmental Assessment
EAP/FPP - Emergency Action Plan/Fire Prevention Plan
EIS/SSA – Environmental Impact Statement/Supplemental Staff Assessment
ERDC – Engineer Research and Development Center
FAA – Federal Aviation Administration
FEIS - Final Environmental Impact Statement
FEMA – Federal Emergency Management Agency
FESA – Federal Endangered Species Act
FTHL - Flat Tail Horned Lizard
GDHS – Geometric Design of Highways and Streets
GHG – Greenhouse Gas
gpd – Gallons per Day
GSU – Generator Step-Up Unit
HMBP – Hazardous Materials Business Plan
HMMP – Hazardous Materials Management Program
Hz – Hertz
ICC – International Code Council
IID - Imperial Irrigation District
IIPP – Injury and Illness Prevention
IVSL – Imperial Valley Solar, LLC
IVSP – Imperial Valley Solar Project

JHAs – Job Hazard Analyses
kV – Kilovolt
kWe – Kilowatt-electrical
LEDPA - Least Environmentally Damaging Practical Alternative
LGIA – Large Generator Interconnection Agreement
LID – Low Impact Development
LORS – Laws, Ordinances, Regulations, and Standards
LUO – Land Use Ordinance
LWCF – Land and Water Conservation
LV – Low Voltage
MIA – Masonry Institute of America
MOU – Memorandum of Understanding
mg/L – Milligram per liter
msl – Mean sea level
MVA – Megavolt-Amperes
MV – Medium Voltage
MW – Megawatts
MW_{AC} – Megawatts Alternating Current
MW_{AC} – Megawatts Direct Current
NAAMM – National Association of Architectural Metals Manufacturers
NACE – National Association for Corrosion Engineers
NAHC – Native American Heritage Commission
NEPA – National Environmental Policy Act
NFPA – National Fire Protection Association
NHPA – National Historic Preservation Act
NPDES - National Pollutant Discharge Elimination System
NRHR - National Register of Historic Places
OHV – off-highway vehicle
OSHA – Occupational Safety and Health Administration
OSSF – On-Site Sewage Facility
PA - Programmatic Agreement
PBHS - Peninsular Big Horn Sheep
PCU – Power Conversion Unit
PMPD - Presiding Members Proposed Decision
POD – Plan of Development
PPA – Power Purchase Agreement
PPE – Personal Protective Equipment
PV - Photovoltaic
RFO - Request for Offers
RMMCP - Raven Monitoring, Management, and Control Plan
RMP – Risk Management Plan
RO – Reverse Osmosis
ROD – Record of Decision
ROW – Right-of-Way
ROWG – Right-of-Way Grant

RPS – Renewable Portfolio Standard
SC – Sediment Control
SCADA – Supervisory Control and Data Acquisition
SA/DEIS - Staff Assessment and Draft Environmental Impact Statement
SCWD - Seeley County Water District
SDG&E – San Diego Gas & Electric
SES – Stirling Energy Systems
SHPO - State Historic Preservation Officer
SIS – System Impact Study
SLF – Sacred Lands Files
SA – Staff Assessment
SDMTS - San Diego Metropolitan Transit System
SPCC - Spill Prevention, Control, and Countermeasures
SS – Soil Stabilization
SSA - Supplemental Staff Assessment
SSC – Species of Special Concern
SSPC – Steel Structures Painting Council
SWDMRP - Storm Water Damage Monitoring and Response Plan
SWPPP – Storm Water Pollution Prevention Plan
SWRCB – State Water Resource Control Board
SWWTF – Seeley Wastewater Treatment Facility
TC – Tracking Control
TDS – Total Dissolved Solids
UBC – Uniform Building Code
UPRR - Union Pacific Railroad
UPS – Uninterruptible Power Supply
USACE - United States Army Corps of Engineers
USDOT - US Department of Transportation
USFWS – US Fish and Wildlife Services
UST – Underground Storage Tank
V_{AC} – Volts Alternating Current
V_{DC} – Volts Direct Current
W – Watts
W_{DC} – Watts Direct Current
W/m^2 – Watts Per Meter Squared
WE – Wind Erosion
WEAP - Worker Environmental Awareness Program
WSA – Wilderness Study Area
WUS – Waters of the United States

1. Project Description

1.1 Introduction

Imperial Valley Solar, LLC (IVSL) is a private enterprise that is a wholly owned subsidiary of AES Solar Power, LLC (AES Solar). AES Solar is a joint venture between The AES Corporation and Riverstone Holdings, LLC that was formed to develop, own and operate utility-scale photovoltaic solar installations around the world. AES Solar's non-US operations currently have 119 Megawatts (MW) in operations, with substantial development activity in other countries. The IVSL technical and financial capability was provided to the Bureau of Land Management (BLM) under separate cover in March 2011. BLM has determined that IVSL has the sufficient technical and financial capability required to construct, operate, and maintain the approved facility.

The Imperial Valley Solar Project (IVSP) was initially a solar thermal project designed to use the Stirling Energy System SunCatcher technology on both private lands and public lands managed by the BLM in Imperial County, California. The BLM completed the National Environmental Policy Act (NEPA) process for the Right-of-Way application and issued a Right-of-Way Grant (ROWG) in October 2010 (CACA-47740). Since that time IVSP has been reconfigured, and the proposed action evaluated within this POD is the construction and operation of a 350 to 400 megawatt alternating current (MW_{AC}) photovoltaic (PV) solar generation facility located on both private lands and public lands managed by the BLM in Imperial County, California, as shown in Figure 1.

Because the proposed project is located on public lands managed by the BLM, the BLM is the lead federal agency for evaluating environmental impacts of the proposed ROWG under NEPA. Until the present time, the California Energy Commission (CEC) was the lead agency for permitting under the California Environmental Quality Act (CEQA). However IVSL will likely pursue a Conditional Use Permit (CUP) though Imperial County for the new project configuration, whereby Imperial County would be the new CEQA lead agency. The Final Environmental Impact Statement (FEIS) prepared by the BLM in July 2010 will need to be amended to account for the reconfigured project. The previous preferred BLM action alternative was the United States Army Corps of Engineers (USACE) Least Environmentally Damaging Practical Alternative (LEDPA) (i.e., 709MW). The LEDPA will need to be once again determined through a new Section 404(B)(1) Alternatives Analysis in coordination with the USACE.

The CEC has jurisdiction over solar thermal projects, but it currently does not have jurisdiction over solar PV projects. Now that the project will be configured to use PV modules instead of the Stirling Energy Systems SunCatcher dish technology, Imperial County will likely have regulatory oversight over non-federal portions of the project instead of the CEC. Imperial County and the BLM executed a Memorandum of Understanding (MOU) agreeing on a method to process the CEQA and NEPA documents for PV projects developed in Imperial County.

The USACE is also a cooperating agency with the BLM pursuant to the Clean Water Act (CWA) which authorizes the Secretary of the Army, acting through the USACE, to issue permits regulating the discharge of dredged or fill material into Waters of the United States (WUS).

The analyses contained in this POD are based upon the remaining applicable portions of the following documents from the previously configured project:

1. Supplementary information from local, state, and federal agencies; interested organizations; and individuals.
2. The CEC Application for Certification (AFC) - June 2008.
3. The CEC/BLM Staff Assessment and Draft Environmental Impact Statement (SA/DEIS) - February 2010.
4. The Supplemental Staff Assessment (SSA) - July 2010
5. The BLM FEIS - July 2010
6. The CEC Presiding Members Proposed Decision (PMPD) - August 2010
7. The US Fish and Wildlife Service (USFWS) Biological Opinion (BO) – September 2010
8. The USACE 404(B)(1) Alternatives Analysis - September 2010.
9. The USACE Individual Permit – October 2010
10. The California Regional Water Quality Control Board (CRWQCB) 401 Water Quality Certification – October 2010
11. Preliminary engineering for a PV facility

1.1.1 Type of Facility

IVSP is proposed to be a three hundred fifty (350) to four hundred (400) MW_{AC} photovoltaic solar power generating facility comprised of three hundred fifty (350) to four hundred (400) 1 MW_{AC} blocks. Each 1 MW_{AC} block includes the associated inverters, transformers, communication equipment and switchgear.

The project will use polycrystalline PV modules, thin-film PV modules, concentrated photovoltaic modules, or a combination of these types. The PV modules will be mounted on horizontal single-axis trackers supported on columns and aligned in a north-south row configuration. The tracker rotates the PV modules about the horizontal axis in an east to west motion, following the sun throughout the day. CPV uses a two-axis tracking mechanism that rotates the CPV module to face the sun directly through its arc across the sky. There will be four (4) 0.25 MW_{AC} tracker assemblies per each 1 MW_{AC} block. Each of the PV technologies will have a differing number of panels and dimensions.

The low voltage (LV) 400 V_{DC} power sent to the inverters will be stepped up to the 34.5 kV medium voltage (MV) collection system. The MV power will be collected and stepped up to 230 kV at the main transformer located at the IVSP substations. A 230 kV gen-tie transmission line will transmit the power to the Imperial Valley Substation operated by San Diego Gas & Electric (SDG&E).

Figure 1. Site Plan

IVS BLM POD
06/21/11 Figure 1

N L A N D S

COYOTE WASH

SUNRISE TRANSMISSION LINE 200' R.O.W.

EXISTING MIGUEL TRANSMISSION LINE 200' R.O.W.

MAIN ENTRANCE

PHASE 1

GUARD HOUSE

LAYDOWN AREA 1

PROPOSED WATER LINE

INDUSTRIAL AREA

Plaster City

Sewage Disposal

Gravel Pit

Mountain

BM 122

BM 39

BM 23

SAN DIEGO AND

PRIVATE PARCEL

MAIN SERVICES COMPLEX

LAYDOWN AREA 2

SUB. #1

ALTERNATE LAYDOWN AREA 1

PROPOSED TRANSMISSION LINE

PHASE 1

SUB. #2

LAYDOWN AREA 3

Evan Hewes Hwy

INTERSTATE 8

CHAMPAGNE DESERT

RECREATION LANDS

SITE LOCATION

ID NV UT CA AZ

Project Site

LEGEND

- MAXIMUM PROJECT BOUNDARY (4,655 ACRES)
- P.V. DEVELOPMENT BOUNDARY (3,560 ACRES)
- PROPOSED PHASE 1 BOUNDARY (100 MW PLACED EAST OF LINE)
- UNGROUPED 1/4 MW BLOCK
- 1/4 MW BLOCK INTERSECTING ESA
- MAIN ENTRANCE ROAD
- FEEDER ROAD
- PROPOSED TRANSMISSION LINE
- PROPOSED WATER LINE
- POTENTIAL LAYDOWN AREA
- PRIMARY ACOE DRAINAGE
- SECONDARY ACOE DRAINAGE
- SECONDARY/ISOLATED ACOE DRAINAGE (OK TO DISTURB)
- ENVIRONMENTALLY SENSITIVE AREA (MAY 2011)
- ENVIRONMENTALLY SENSITIVE AREA (MAY 2011) OK TO DISTURB
- YUHA BASIN DISTRIC AREAS (SEPT. 2009)
- FEMA ZONE A (100-YEAR FLOOD ZONE)
- PRIVATELY OWNED PARCELS

NOTES:

1. BASE MAP FROM U.S. GEOLOGICAL SURVEY 7.5 MINUTE QUADRANGLES. COUNTY MOSAICS OBTAINED FROM U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE.
2. MAP PROJECTION AND GRID COORDINATES ARE NAD83 STATE PLANE CALIFORNIA, ZONE VI, U.S. SURVEY FEET.

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SCALE IN FEET

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NO.	DATE	REVISION	BY	CHKD	APVD
D	06/21/11	SITE LAYOUT UPDATES	JJDP		
C	06/17/11	NEW DEV. AREA AND BLOCK LAYOUT	JJDP		
B	05/19/11	BOUNDARY AND CONSTRAINT UPDATES	JJDP		
A	05/17/11	ORIGINAL ISSUE	JJDP		

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AES - IMPERIAL VALLEY SOLAR PROJECT IMPERIAL COUNTY, CALIFORNIA

SITE PLAN
(6/21/2011)

SCALE:	PROJ. NO.	DWG. NAME	SHT. NO.
AS NOTED	06657.01.001	06657.01.07.mxd	

Drawing Name / Location: D:\06657\01\06657.01.07.mxd
Cartographer: PKING J
Date Printed: 06/21/2011

1.1.2 Planned Uses

The IVSL business model includes the development and deployment of PV and concentrated photovoltaic (CPV) technologies. IVSL previously formed the limited liability corporation for the purpose of filing the ROW application (SF-299 dated March 2006) with the BLM for the use of public land in order to deploy the Stirling Energy Systems SunCatcher technology. However, IVSL is updating its ROW application (SF-299) to include the PV and CPV technologies mentioned above, and will be filing for a CUP with Imperial County. IVSL has executed a Large Generation Interconnection Agreement (LGIA) with SDG&E to deliver up to 600 MW of electricity to the California market and is currently working on obtaining Purchase Power Agreements (PPA) for all or part of this capacity.

The existing ROWG provides for use of the BLM administered public land for a term of 30 years. Upon receipt of the amended ROWG, IVSP general land uses on BLM land would include:

- Solar PV Field
- 230 kV Transmission Line
- Electrical substations
- Water Pipeline
- Data communication system in support of the solar project and transmission system
- Other ancillary facilities required for development of the proposed project (e.g., main services complex, water treatment equipment, access roads)
- Temporary water supply - Dan Boyer Water Company

1.1.3 Generation Output

At full build-out, IVSP will consist of between 1.6 million and 1.9 million 280 W_{DC} PV modules (or an equivalent number of thin-film modules) for a total generating capacity of 350 to 400 MW_{AC}.

1.1.4 Project Schedule

IVSP will be constructed in three phases, the MW size of each phase is approximate, and the actual MW size of each phase will be adjusted in consideration of the accepted bid by the project proponent to the electric utility that is purchasing the power in the particular phase. For purposes of the Plan of Development, Phase I is assumed to consist of 100 MW_{AC} of PV generation, includes the transmission line, water pipeline, and other necessary facilities, and is scheduled to start construction by first quarter 2013. Phase II would consist of approximately 150 MW_{AC} and would begin construction approximately 2 years after start of construction of Phase 1. Phase III would consist of approximately 100 to 150 MW_{AC} and would begin construction approximately 2 years after start of construction of Phase II. Key short term target dates for the Phases are as follows:

- Permits completed – Fourth quarter 2012
- Begin construction Phase I – First quarter 2013
- Project transmission line energized – First Quarter 2014
- First 10 MW block online – First quarter 2014

- Complete Phase I – Second quarter 2014
- Begin construction of Phase II – First quarter 2015
- Complete Phase II – Second quarter 2017
- Begin Phase III – First quarter 2017
- Complete phase III – Second quarter 2019

Phase I of IVSP will consist of approximately 470,000 PV modules (or an equivalent generating capacity of thin-film modules) configured in one-hundred (100) 1 MW_{AC} blocks with a net nominal generating capacity of 100 MW_{AC}. Each phase would include the appropriate number of inverters to reach the desired MW_{AC} capacity. IVSP will be connected to the grid at the SDG&E Imperial Valley Substation via an 11 mile long, 230 kV interconnection transmission line that will be constructed as part of IVSP in a corridor parallel to the existing Southwest Powerlink transmission line. A breakdown of acreage required for each phase of IVSP is located in Table 1, below.

The approximately 150 MW_{AC} Phase II will add approximately 700,000 PV modules (or an equivalent generating capacity of thin-film modules), or a mixture of this range of PV modules and CPV panels. The approximately 100 to 150 MW_{AC} Phase III will add approximately 500,000 to 700,000 PV modules (or an equivalent generating capacity of thin-film modules), or a mixture of this range of PV modules and CPV panels, expanding IVSP to a total of 350 to 400 MW_{AC}.

Table 1. Project Acreage by Phase

Parcel	Phase I	Phase II	Phase III	Totals
BLM	1,460	1,500	1,695	4,655
Private	80	0	0	80
Total	**1,600**	**1,500**	**1,635**	**4,735**

Please note the acreage calculations are preliminary estimates. Actual compensatory mitigation payment will be based upon actual acreage associated with each phase and will be confirmed prior to the start of ground disturbance.

1.2 Proponent's Purpose and Need for the Project

The applicant's project objectives are set forth below. The fundamental objective is to build a cost effective and economically feasible solar power project that generates 350 to 400 MW_{AC} of renewable solar energy that will help the State meet its Renewable Portfolio Standard (RPS) goals for new renewable electric generation. To assist in meeting the requirement for additional generating capacity, IVSL will pursue power purchase agreements to provide solar power into the California Independent System Operator (CAISO) system. The proponent's purpose and need for the IVSP are to:

- Provide up to 350 to 400 MW_{AC} of cost effective and economically feasible renewable electric generation under a power purchase agreement to SDG&E, PG&E, SCE or other California utilities,
- Interconnect and deliver the electric energy to the existing Imperial Valley Substation, which in turn delivers the energy to the power purchaser,

- Contribute to the 33 percent renewables RPS target set by California's governor and legislature,
- Assist in reducing greenhouse gas (GHG) emissions from the electricity sector,
- Contribute to California's future electric power needs, and
- Assist the CAISO in meeting its strategic goals for the integration of renewable resources, as listed in its Five-Year Strategic Plan for 2008-2012 (CAISO 2007).

1.3 Generating Facility Description, Design, and Operation

1.3.1 Project Location, Land Ownership, and Jurisdiction

The IVSP site is located in Imperial County in Southern California approximately 110 miles east of San Diego, 14 miles west of El Centro, and 4 miles east of Ocotillo, as shown in Figure 1.

A breakdown in Project acreage by phase and land ownership is shown in Table 1. The private parcels which are a part of the project are under the jurisdiction of Imperial County. The following is a description of the major facilities and associated acres.

1.3.2 Legal Land Description of Facility (Federal & Non-Federal Lands)

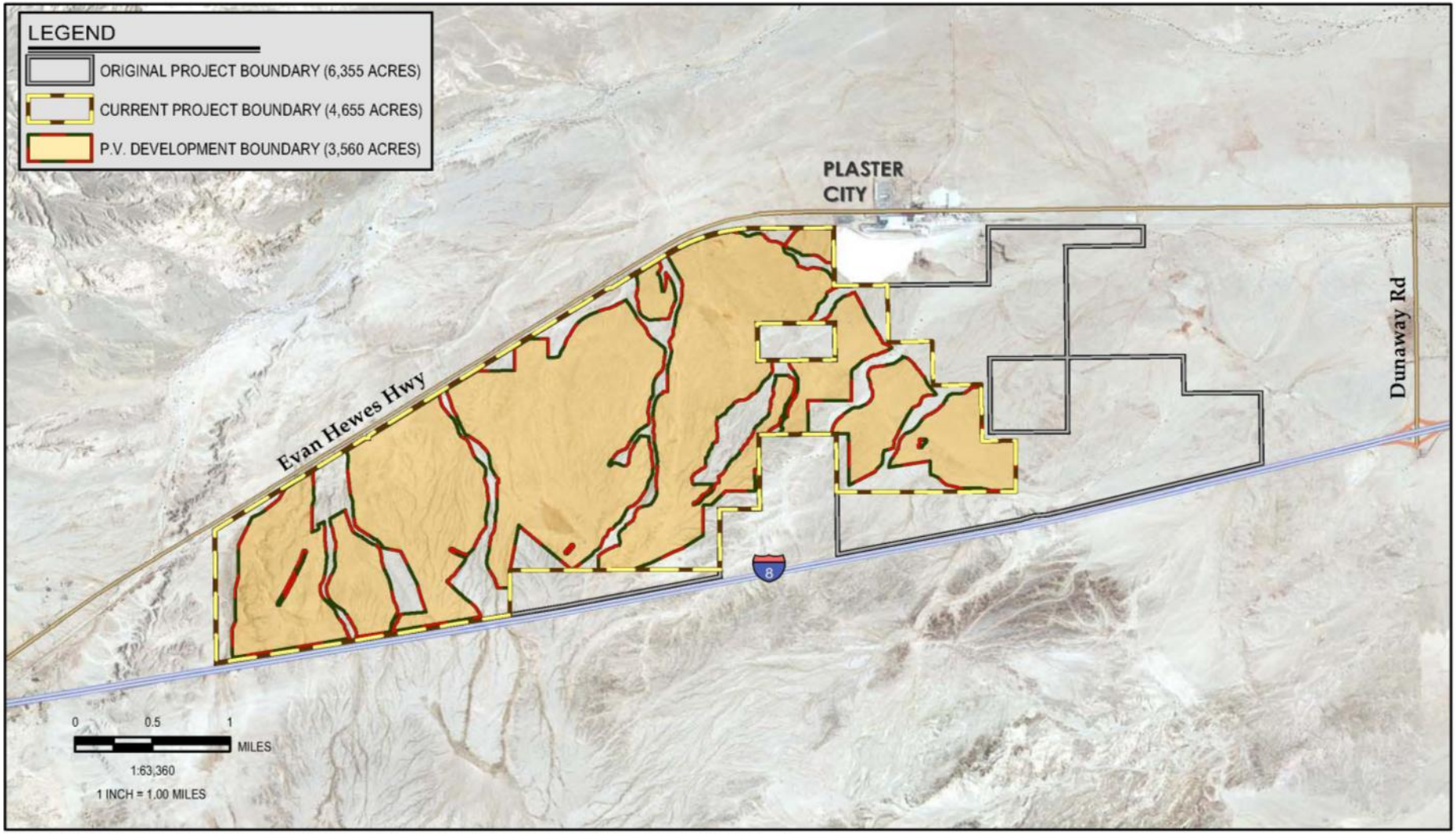
The Project boundary is described as all or part of Sections 13, 14, 22, 23, 24, 26, and 27 from T16S R10E and Sections 7, 17 , 18, 19, 20, and 21 of T16S R11E, and it will be updated as the project phases are further defined. As noted above, the previous project has been reconfigured to cover a smaller area. The project boundary comparison is shown on Figure 2. The transmission line right-of-way remains unchanged from the previous project configuration to the new configuration. It consists of a 100-foot wide corridor that parallels the Southwest Powerlink transmission line on the southwest side until just north of the Imperial Valley Substation, then crosses underneath the Southwest Powerlink transmission line and enters the Imperial Valley Substation from the north. The transmission line legal description is on file with the BLM, and the alignment is shown on Figure 3.

1.3.3 Total Acreage and General Dimensions of All Facilities and Components

The general layout of the tract of the facility structures and features are shown in Figure 1. A breakdown of project acreage by phase and land ownership is shown in Table 1. The power plant facilities, solar arrays, project substations, transmission line, access roads, support facilities, buildings, and parking areas are described in more detail in the following sections.

Generally, the proposed site boundary consists of the Union Pacific Railroad (UPRR) and San Diego Metropolitan Transit System (SDMTS) line on the north and Interstate 8 (I-8) on the south. The eastern boundary is approximately 2½ miles west of Dunaway Road and generally along the transmission line ROW; and the western boundary is the westerly section line in Section 22 in Township 16 South, Range 10 East.

Figure 2. Project Boundary Comparison



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AES - IMPERIAL VALLEY SOLAR PROJECT
IMPERIAL COUNTY, CALIFORNIA

PROJECT BOUNDARY COMPARISON

DRAWN BY:	PAPEZ J
APPROVED BY:	
PROJ. NO.:	06657.01.001
FILE NO.:	06657.01.08.mxd
DATE:	June 2011

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IVS BLM POD
06/21/11 Figure 2

Figure 3. Transmission Line Alignment

EVAN HEWES HWY

EVAN HEWES HWY

NORTH-SOUTH ARTERIAL ROAD

See new project configuration in Figure 1 from 06/21/11 IVS PM POD

PROPOSED MAIN SERVICES COMPLEX

N.A.P.

EAST-WEST ARTERIAL ROAD

DUNAWAY ROAD

N.A.P.

INTERSTATE 8

SUBSTATION LOCATION

N.A.P.

INTERSTATE 8

PROJECT LIMITS

PROPOSED 230 KV TRANSMISSION LINE

EXISTING 500 kV TRANSMISSION LINE

N.A.P.

EXISTING SDG&E IMPERIAL VALLEY SUBSTATION

IVS BLM POD 06/21/11 Figure 3

LEGEND

PROJECT LIMITS

EXISTING 500 kV TRANSMISSION LINE

PROPOSED 230 kV TRANSMISSION LINE

PROPOSED 230 kV TRANSMISSION LINE STRUCTURE

0 2000 4000 6000 8000

SCALE IN FEET

NO.	DATE	REVISION	BY	CHK'D	APV'D
B	06/04/10	ISSUED FOR REVIEW	SRC	NHV	NHV
A	06/03/10	ISSUED FOR REVIEW	SRC	NHV	NHV

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Fax: 608-831-3334

IMPERIAL VALLEY SOLAR PROJECT — IMPERIAL COUNTY, CALIFORNIA

PROPOSED 230 KV TRANSMISSION LINE

SCALE:	PROJ. NO.	DWG. NAME	FIGURE
AS SHOWN	8118.02	230 kV T-LINE.dwg	

J:\08163\0312_Civil\Permits\POD for BLM\230 kV T-LINE.dwg, 6/10/2010 11:02:28 AM, CUMMINGS

1.3.4 Power Plant Facilities - Overview

Project Description

The proposed IVSP would be a nominal 350 to 400 MW_{AC} PV and CPV solar project, consisting of a three phases. The first phase would consist of single-axis tracker PV modules, and each subsequent phase would consist of single-axis tracker PV modules or a combination of single-axis tracker PV and double-axis CPV panels. The primary equipment for the generating facility will include the PV modules, the CPV pedestals and panels (if CPV is included), tracker mechanisms, DC to AC inverters, pad mounted AC transformers, LV (1,000 volt or less) and MV (34.5 kV) electrical system, the associated data communication system, and the support infrastructure, gravel roads, the 34.5 kV to 230 kV electrical substations, a Main Services Complex with a building and parking area, and water treatment and storage equipment.

The 230 kV gen-tie transmission line would parallel SDG&E's existing Southwest Powerlink transmission line within the designated ROW. Two project water supplies are being considered. The Dan Boyer Water Company (DBWC) well will supply temporary water during construction until the Seeley Waste Water Treatment Facility (SWWTF) can supply permanent construction and operation water via a 6-inch to 8-inch diameter pipeline. More information on these water sources is provided in Section 1.3.9 below.

Photovoltaic (PV) System Components

The following provides an overview of the three major PV system components: the tracker supports, the tracker assembly, and the photovoltaic panel modules.

Tracker Supports

The horizontal tracker assembly is supported by a grid of 4-inch and 6-inch diameter metal posts. The posts will be rammed or vibrationally driven into the ground using post driving equipment. Driving posts is a preferred construction method because no concrete footings are required, no spoils are generated, site disturbance is minimized, and the posts/foundations can be completely removed when IVSP is decommissioned. When soil conditions are not conducive to the use of the metal posts, a foundation would consist of rebar-reinforced concrete constructed below grade.

The posts, on which the tracker assemblies are supported, are approximately 42" to 72" in height above the ground surface, depending on terrain variations. This technique allows the trackers and PV panels to maintain horizontal consistency when the terrain elevations vary along each tracker string. When the terrain variation exceeds the ability of the varying lengths of posts to compensate, the site must be graded to level the areas under the trackers.

Tracker Assembly

The tracker assembly is fitted with a torque tube that attaches to the support posts. Each tracker assembly consists of a 189-foot-long 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. 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 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. The tracker support assembly is designed to withstand wind gusts of at least 85 miles per hour.

Photovoltaic Module

The solar PV modules or panels convert the solar energy into direct current. 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. IVSP will use polycrystalline, thin film, or concentrating photovoltaic panels that range in wattage from 80 W_{DC} to 285 W_{DC} each. While the number of panels will vary, the total acreage needed for the panels and the total amount of square footage of the PV panels will be approximately the same for all PV panel types, within a 35% range. The strings of PV modules are combined using cables and junction boxes, and are connected to a specific inverter in the 1 MW_{AC} block. Each 1 MW_{AC} block includes between 2 and 4 inverters and the associated transformers where the voltage is stepped up from the low voltage (LV) to 34.5 kV (MV).

Concentrated Photovoltaic (CPV) System Components

The following provides an overview of the three major CPV system components: the foundation/mast, the tracker assembly, and the CPV modules.

Foundation/Mast

The solar CPV support structure and panels would typically be mounted on a foundation consisting of metal pipes that are vibrationally-driven into the ground, or mounted on concrete footings. When conditions are not conducive to the use of the metal pipe foundation, the foundation would consist of rebar-reinforced concrete constructed below grade. Both foundation types create a small amount of ground disturbance, typically less than 5% of the area within the PV array footprint. In addition, the area around the mast is cleared, and gravel applied to facilitate maintenance, reduce the impact of vegetation, and provide all-weather access to the tracking mechanism and electrical components in the module. The mast, on which the tracker assembly is secured, is approximately 14 feet in height above the ground surface, and is driven approximately 12 to 15 feet into the ground.

Tracker Assembly

The tracker assembly consists of a tracker table that is approximately 24 feet high by 48 feet wide and is fitted with a trunnion that attaches to the mast. Each tracker assembly consists of two motorized drives that adjust the tracker table for elevation and azimuth, so that it can track the sun in all directions

through its arc across the sky. Each tracker table is capable of supporting between 8 and 16 CPV modules.

Dual-axis tracker systems employ algorithms to track the sun. This system aligns the solar CPV modules to the sun by controlling the elevation and azimuth drives, and executes startup, shutdown, and high wind stowing positions. The tracking algorithms allow the solar modules to "wake up" from the night-stow position in the morning to focus the CPV modules toward the sun, and then to track the sun during the daylight operating time of the project. The tracker control system also communicates with, and receives instructions from, the central control room via the SCADA system. The system is designed to place the CPV modules into a "wind stow" position when sustained winds exceed 33 miles per hour to protect the system from wind damage. The tracker assembly can withstand wind gust of up to 90 miles per hour.

CPV modules

Each CPV module consists of thousands of high efficiency solar cells, each equipped with an optical focusing system that concentrates the sunlight onto the photoelectric cells, thereby increasing the efficiency of the panels, compared to conventional PV panels. Different manufacturers of CPV systems use different module sizes and configurations; however they have in common that they use special high efficiency photoelectric cells and optical focusing systems to increase their operating efficiency and the amount of electricity generated. For example, the Concentrix brand of CPV modules are each capable of generating 2,050 W_{DC}, with projected tracker capable of generating up to 36.15 kW_{DC} or a nominal 30.00 kW_{AC} of grid-quality electricity. These tracker assemblies are then aggregated in groups of 42 in order to form approximate 1.26 MW_{AC} uniform building blocks.

1.3.5 Power Plant Facilities - Details

Project Site Arrangement

The basic building blocks for IVSP are 1 MW_{AC} solar groups consisting of 4,752 modules for PV and 1.26 MW_{AC} solar groups consisting of approximately 42 tracker assemblies, in the example of Concentrix CPV modules. The typical solar groups would be arranged as necessary to fit the contours and shape of the developable areas within the site.

The entire project would be fenced for security, and a large north-south corridor allowing unrestricted pass-through of the site by wildlife and recreational users is provided near the center of the site, along one of the primary drainages. The fenced areas would mainly consist of 8-foot high chain-link fence with barbed wire on top to secure the facilities. The main entrance and entrances from unsecured areas to the site roads would be gated and locked. In addition, areas at the Main Services Complex and the substations would also be chain-link fenced with barbed wire on top to provide additional levels of security and safety in the event of trespass. Per the guidance from the USACE Individual Permit and the USFWS BO, the fence will be designed to limit PBHS access, yet facilitate drainage and sediment transport within WUS, while also providing security.

Access Roads

During project construction and operation, the main access to the IVSP site would be from the north, off the Evan Hewes Highway. The road network within the IVSP site includes the following:

- Approximately 1 miles of compacted, graveled and surface treated main road (24 feet wide)
- Approximately 20 to 24 miles of unpaved perimeter and internal feeder roads (12 feet wide)
- Approximately 100 to 150 miles of unpaved maintenance roads (10 feet wide)

The main access road will be the most heavily traveled, so it would be compacted, covered with 6" to 8" of gravel, and treated with a dust suppressant to reduce dust contamination of the solar panels. The internal feeder roads would allow full access to all PV and CPV trackers, inverters and infrastructure. Polymeric stabilizers may be used in lieu of traditional road construction materials to stabilize unpaved roads, and reduce dust and erosion. Both legal and physical access to private parcels surrounded by the project would be provided as well.

Site Grading and Drainage

Brush trimming will be conducted during construction to reduce fire ignition potential and to provide safe construction conditions. Brush trimming will consist of cutting the top of the existing brush while leaving the existing native plant root system in place to minimize soil erosion. It is anticipated that trimming will be limited to individual or groups of shrubs (no grasses or forbs) that occur along the utility trenches, at tracker locations and along project area road networks, to the extent practical. Areas of the main road and internal feeder roads will be cleared, grubbed and compacted, however the unpaved maintenance roads will not be cleared and grubbed, but instead will be trimmed, smoothed where necessary, compacted in areas where soil is loose, and stabilized. Except where road or utility crossings in the primary WUS occur, the primary drainages will not be graded, compacted, cleared nor grubbed. Within defined bed and bank areas of WUS where crossings occur, during the operation phase mowing will be limited to the occasional removal of shrubs that occur within the road crossing of a wash. Across drainages, some vegetation will be trampled or uprooted during trenching (for electrical lines) activities in these areas. No mowing would occur within primary washes I, K, A, C, D, E and F. During operation and to minimize shading on trackers and prevent potential fire hazards, vegetation trimming would occur by a vehicle-mounted mower. Vegetation trimming by hand will be used around electrical equipment and in areas where vehicles could not be used without causing significant soil erosion.

After brush has been trimmed, blading and compaction for main roads and perimeter and internal feeder roads would be conducted in order to provide access to individual rows of PV trackers or individual CPV trackers and to the inverters. No grading or site disturbance will occur in the vast majority of Environmentally Sensitive Areas, and these areas will be marked so that maintenance and construction personnel do not disturb these resources. In the very few areas within and immediately adjacent to Environmentally Sensitive Areas where site disturbance is allowed, the minimum grading necessary to install and maintain the equipment will be performed. In areas outside any Environmentally Sensitive Area and where there are no specific reasons to limit grading, the site will be graded and compacted to reduce slopes and to facilitate installation, maintenance and operation of the PV arrays and ancillary equipment. Although ground disturbance would be minimized wherever possible, the applicant proposes that localized rises or depressions within the individual 1 MW solar

groups would be removed to provide for proper alignment and operation of the rows of PV trackers or individual CPV trackers. Main access and feeder roads would be constructed as close to the existing topography as possible, with limited cut-and-fill operations to maintain roadway design slope to within a maximum of 10 percent.

The layout of the proposed IVSP would maintain the local pre-development drainage patterns where feasible, and water discharge into and from the site would remain at the existing locations at the project boundaries. The surface treated roadways would have unpaved swale crossings at the WUS or roadway dip crossings as needed to maintain nuisance runoff to existing drainage channels/swales. For all weather roadways it is expected that stormwater runoff would flow over the crown of the roadways, typically less than 6 inches from swale flow line to centerline of roadway, thus maintaining existing local drainage patterns during storms.

The applicant has proposed localized channel grading on a limited basis to improve channel hydraulics within the dry washes and to control flow direction where buildings and all weather access roadways are proposed. At grade crossings would be used along the roadways. These designs would be based on Best Management Practices (BMPs) for erosion and sediment control.

The existing BLM roadway currently used to access the site will be used as a temporary construction access road until the permanent entrance road can be constructed. After the main permanent entrance road is constructed, the existing BLM road will remain as a secondary emergency access, should the main access road become temporarily unusable because of erosion or flooding, however this road would only be used on a temporary basis until the emergency has abated.

It is anticipated that roadway maintenance may be required after rainfall events. For minor storm events, it is anticipated that the road sections may need to be bladed and smoothed to remove soil deposition, along with sediment removal. For major storm events, in addition to the aforementioned maintenance, road repairs may be required due to possible damage to surface treatment where the roadways cross the primary and secondary channels.

Building sites would be developed per county drainage criteria, with provision for soft bottom stormwater detention basins. Rainfall from paved areas and building roofs would be collected and directed to the stormwater detention basins. The detention basin volume is based on the 100-year 24-hour storm event. Volume can be considered by a combination of basin size and additional detention volume provided within stabilized permeable areas.

The detention basins would be designed so that the retained flows would empty within 72 hours after the storm to provide mosquito abatement. This design can be accomplished by draining, evaporation, infiltration, or a combination thereof.

The post-development flow rates released from the IVSP site are expected to be equal or less than the pre-development flow rates, in compliance with BMPs. The expected flow reduction is based on the following factors:

1. Except for the building sites and evaporation ponds, the majority of the IVSP site would remain pervious, as only a negligible portion of the site would be affected by pavement and tracker foundations.
2. The increased runoff expected from the building sites would be mitigated by capturing the difference between the pre- and post-development runoff in a detention basin, where the storm runoff would be infiltrated and/or evaporated to the atmosphere.

Transmission System Interconnection and Upgrades

This section describes the on-site substations and the transmission interconnection between the IVSP and the existing electric grid.

The IVSP would include the construction of two new 230 kV project substations centrally located in the site, which would step up the 34.5 kV collection voltage to the 230 kV transmission voltage. The proposed project substations would consist of open air bus sections, each rated 34.5 kV or 230 kV, with multiple 34.5 kV collection feeder circuit breakers. Each feeder circuit breaker would be connected to the overhead or underground collection lines. Additional 34.5 kV circuit breakers would connect to power factor correction capacitor banks also located in the substation yard. An 11-mile long double-circuit 230 kV line will connect the two internal substations to the existing SDG&E Imperial Valley Substation. Other than the internal and interconnection transmission line, no new transmission lines or off-site substations would be required.

The off-site portion of the 230 kV interconnect transmission line would be routed in a 100 foot ROW parallel to and on the southwest side of the existing SDG&E 500 kV Southwest Powerlink transmission line. It would cross under the existing 500 kV transmission line approximately by the fourth tower from the SDG&E Imperial Valley Substation, where it will continue due east and then due south to the point of interconnection. The transmission circuits are “rolled” between this tower and the SDG&E Imperial Valley Substation, which reduces overhead clearances for the crossing. The Transmission Line preliminary engineering plans are on file with the BLM.

This route and crossing point was chosen to minimize effects on the flat-tailed horned lizard management area and avoid sensitive cultural resources south of I-8 by using the existing access roads for the existing transmission line and by placing the disturbance for the interconnect transmission line immediately adjacent to an existing disturbance.

An alternative route considered crossing between the dead-end tower adjacent to the SDG&E Imperial Valley Substation and the SDG&E Imperial Valley Substation fence; however, a SDG&E anticipated a future 230 kV generator interconnect and they requested that the project design an alternative route to reserve this area for the future transmission line.

The transmission line towers would consist of steel poles approximately ranging between 110 and 150 feet in height spaced 750 to 900 feet apart. The overhead 230 kV transmission line would be constructed with one or two (bundled) aluminum steel-reinforced conductors, one to two inches in diameter per phase, each thermally rated to efficiently carry the full project output. Two fiber optic cables are provided for communication with SDG&E and the CAISO.

Dead-end structure 85 to 100 foot lattice steel transmission towers and/or steel poles would be installed at the IVSP's substations and the connection to the Imperial Valley Substation.

Buildings

The permanent buildings and structures located in the Main Services Complex are the Administration/Maintenance Building, Water Treatment Shade Structure, and the Control Building. As feasible, buildings and tanks will be painted with BLM Carlsbad Canyon color.

The Administration/Maintenance Building will contain the control room, equipment room, offices and maintenance and storage rooms. A water pump for fire-fighting supply will be powered by a diesel emergency generator and located adjacent to the Administration/Maintenance Building. The control room will contain the plant monitoring and control system, the equipment room will contain the main electrical equipment, the maintenance room will contain the maintenance shop and storage of cleaning and maintenance supplies, and the storage room will contain spare parts.

The Water Treatment Shade Structure will contain water treatment equipment and supplies storage, and the equipment and pumps motor control center. Two wastewater treatment evaporative containment ponds will be located just adjacent to the water treatment structure. The water treatment facility including the yard tanks will be described further in the Water Usage section below.

The IVSP Substations will include control buildings which contain the substation relays, SCADA and control systems.

Electric service for the Main Services Complex will be provided by IID from back feed power from the project substations and the Imperial Valley Substation. A diesel emergency generator will provide backup power in the event of substation or grid power failure.

1.3.6 Temporary Construction Workspace, Yards, and Staging Areas

Construction Laydown Areas

IVSP will have three 2-acre laydown areas, one within each phase.

Upon mobilization, up to five temporary construction trailers, project facilities and amenities will be established during the first two months of construction. The majority of these will be located in the Main Service Complex area, and will include site offices, restroom facilities, meal rooms, vehicle marshalling areas/traffic staging, construction material/equipment storage areas, and a temporary fueling station for the construction equipment. All fuels will be located on secondary containment to contain spills. Construction power to the project site facilities will be provided by up to four diesel generators and/or temporary service(s) from IID. Construction parking would be provided at the laydown area and Main Services Complex.

The laydown areas will require grading to create a level area, and will be graveled to control dust and erosion. Pads will be prepared for setting the trailers, which will house the temporary construction facilities.

1.3.7 Geotechnical Studies and Data Needs—Including Solar Insolation Testing

Geotechnical studies were completed in 2010 and were performed by RMT (General Contractor for the Applicant). They are on file with the BLM.

The following Table 2 describes solar insolation data collected at the IVSP site over the past two years.

Table 2. Insolation Data at Project Site (2 Years)

Year	Month	Imperial Valley Met Station Average DNI W/m^2/hour	Imperial Valley Met Station Daily DNI kW/m^2/day	Imperial Valley Met Station Number of Days in Sample
2008	6	356.04	8.55	1
2008	7	332.12	7.97	31
2008	8	288.33	6.92	17
2008	9	-	-	-
2008	10	300.01	7.20	26
2008	11	241.89	5.81	30
2008	12	184.57	4.43	31
2008	2008	267.15	6.41	136
2009	1	216.31	5.19	5
2009	2	-	-	-
2009	3	330.61	7.93	30
2009	4	317.01	7.61	30
2009	5	328.50	7.88	31
2009	6	323.02	7.75	30
2009	7	331.66	7.96	31
2009	8	307.42	7.38	31
2009	9	291.62	7.00	30
2009	10	241.30	5.79	31
2009	11	189.40	4.55	30
2009	12	130.31	3.13	31
2009	2009	278.08	6.67	310
2010	1	114.32	2.74	31
2010	2	202.26	4.85	28
2010	3	316.91	7.61	31

2010	4	348.03	8.35	30
2010	5	420.56	10.09	31
2010	6	389.15	9.34	7.5
2010	2010	286.67	6.88	158.5

Physiographic Setting

The project is within the western portion of the Salton Trough, a topographic and structural depression within the Colorado Desert physiographic province. It is bounded by Coachella Valley, by the Gulf of California to the south, and by mountain ranges to the east and west. The Salton Trough is a structural basin filled of marine and poorly classic fluvial sediments up to 15,000 feet in thickness (Dibblee 1954) overlaying the basement rock. The Salton Trough has filled with sediment due to erosion off the surrounding mountains and Colorado River deposits. It has been inundated by sea level changes and the Colorado River. Ancient Lake Cahuilla formed in the Salton Trough during the last 1,000 years and evaporated completely nearly 300 years ago (Sieh 1986). The project site is near the eastern shoreline of the former Lake Cahuilla within the Yuha Desert basin. The lowest portion of the Salton Trough is currently occupied by the Salton Sea, an artificial inland lake with no natural outlet.

The ground surface at the project site generally slopes gradually down to the northeast, ranging from about sea level (elevation 0) near the northeastern corner of the site within the construction laydown area, to elevation 345 feet near the southwestern corner of the site development area.

Local Geology

The project site is east of Ocotillo, California, approximately 23 miles southwest of the Salton Sea and 100 miles northwest of the Gulf of California. The site is located in the western margin of the Salton Trough within the Yuha Desert geomorphic sub-province. The area within a 2 mile radius of the project is underlain by marine and non-marine, fine and coarse-grained deposits of the Yuha Desert.

The Yuha Desert region has been uplifted exposing what were once basin sediments. The area lays at a complex intersection of the northwest-trending right-slip Elsinore and Laguna Salada Faults, and the Yuha Wells Fault Zone. The local topography is low to moderate-relief, with significant erosion expressed as badlands. The localized badlands topography consists of the Pliocene and Pleistocene-age Palm Spring Formation overlying the Miocene-Pliocene-age Imperial Formation (Todd 2004). Deformation along the northeast-striking Yuha Wells fault system has locally sheared the sediments. Many faults and fractures exposed in the badlands contain a distinctive pinkish-brown colored clay gouge (Thomas and Stinson 1990).

Erosion of the mountains to the west and northwest, and within the local badlands, deposited unconsolidated older alluvium of poorly sorted silt and clay, sand and gravel around the surrounding region.

The immediate project site is chiefly underlain by the reddish mudstones and yellow well-indurated concretionary sandstones of the Palm Spring Formation, and Holocene and Late Pleistocene-age alluvial deposits. The younger Holocene-age alluvial deposits and the ancient Lake Cahuilla lacustrine deposits

dominate the eastern part of the project site. Evidence of Lake Cahuilla's last shoreline is still present around Imperial County and can be seen as beach berms near the eastern part of the project. In general, these lakebed sediments of interbedded fine-grained sand, silts and clays in the Imperial County region are estimated to be generally 110 to 300 feet thick (Kovach et al. 1962) near the center of the former lake. Table 3 describes geologic conditions within the project area.

Table 3. Geologic Conditions

Geologic Map Unit	Unit or Formation Name	Description/Comments
Qal	Young Alluvium	Holocene; unconsolidated gravel, sand, silt and clay; primarily as valley fill and streamwash deposits.
Qc	Colluvium	Holocene; unconsolidated loose clay, silt, sand, and gravel of slopewash, grades locally into younger and older alluvium.
Ql	Lake Beds	Holocene; tan and gray fossiliferous clay, silt, sand and gravel; sediments of ancient Lake Cahuilla and playa lakes.
Qoa	Older Alluvium	Late Pleistocene to Holocene; partly dissected largely unconsolidated poorly sorted sand and gravel of alluvial fans, terraces, and valley fill deposits.
QPlps	Palm Springs	Pleistocene and Pliocene; interbedded non-marine sandstone, siltstone, and claystone locally containing pebble and cobble interbeds.

Source: Geologic unit abbreviations modified from Morton, 1966.

1.3.8 Ancillary Facilities (Administrative and Maintenance Facilities and Storage Sites)

See previous description of ancillary facilities in Section 1.3.5. Electric service for the Main Services Complex will be provided by IID from back feed power from the Imperial Valley Solar Substation. Communications service will be provided by L3 Communications from underground service from existing underground communications lines on the north side of the railroad, south of the Evan Hewes Highway.

Paint and Surface Treatment

The proposed project would treat, where feasible, major project structures and buildings visible to the public such that (a) their colors minimize visual intrusion and contrast by blending with the existing tan and brown color of the surrounding landscape, (b) their colors and finishes do not create excessive glare, and (c) their colors and finishes are consistent with local policies and ordinances. The transmission line conductors shall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive. The PV panels will be dark colored to provide maximum light absorption. The inverters, buildings and structures will be finished with BLM Carlsbad Canyon.

1.3.9 Water Usage, Amounts, Sources (During Construction and Operations)

Water Requirement

The following types and quantities of water will be required for IVSP:

- PV and CPV panel washing: Maintenance will use approximately 15 acre-feet per year (AFY) of wash water to clean the PV modules and CPV panels to maintain peak performance. This amount of annual water consumptions is approximately equal to the same amount of water that 30 homes in Imperial County would use per year. The modules are washed more frequently in the late spring through fall months.
- Water Treatment System Discharge: The water treatment process will create 7 AFY that is evaporated in the evaporation ponds
- Potable Water: Operations will use approximately 1 AFY of potable water for drinking and sanitary use. Potable water will be obtained from local water vendors (e.g., Sparklettes)
- Dust Control Water: During construction, water trucks will spray for dust control in disturbed areas. Based on the construction schedule, the annual average construction dust control for each phase is 156 acre-feet. During operations however, the dust control water requirement is estimated to be much less - only 6 AFY. As discussed above, a polymeric sealant will be used to seal unpaved and paved roads to minimize the need for dust control water.

Altogether, during operation the facility will use approximately 29 AFY. Table 4 (below) shows the average annual water supply requirements in AFY.

While it is not listed above as a regular water use, the Main Services Complex will store fire protection water in sufficient volume to meet El Centro Fire Department and Imperial County Fire Department requirements as discussed below in the Fire Protection section.

Should water supply from SWWTF be delayed or disrupted, IVSP will truck in water from the DBWC well in Ocotillo, California as discussed previously. If SWWTF water were to become available prior to the completion of the water pipe line, SWWTF water will be trucked to the IVSP site.

Table 4. Water Usage Rates for Operation

Water Use	Annual Usage (acre-feet)
PV and CPV panel washing	15
Brine to evaporation ponds	7
For drinking and sanitary water requirements	1
Raw water for dust control during operations	6
Totals	**29**

Seeley Waste Water Treatment Facility

The original AFC filing stated that the Imperial Irrigation District (IID) would provide water to the Imperial Valley Solar Project. In June 2009, after extensive research of five water supply options, the Applicant filed a Supplement to the AFC proposing the use and conveyance of water from the SWWTF as

IVSP's primary water source. The SWWTF is located at 1898 West Main Street in Seeley, California, approximately 11 miles east of the IVSP site. It is operated by the Seeley County Water District (SCWD) and is designed to produce secondary treated water at the rate of 250,000 gallons per day (gpd) (224 AFY).

The SWWTF, located at 1898 West Main Street in Seeley, California, is the proposed long-term water source for the IVSP. IVSL is considering an approximately an 11.8 mile long 6 to 8 inch diameter water pipeline to supply this water. The vast majority of this pipeline would be buried within the existing county ROW of Evan Hewes Highway approximately 4 feet below the existing grade within a 10 foot ROW. The line would enter the IVSP site at approximately 1,000 yards east of Plaster City, and then run due south then west to the main services complex. The water pipeline preliminary engineering plans are on file with the BLM.

It may be necessary for the applicant to finance an upgrade to the existing facility to allow it to meet Title 22 water quality standards and would fund the training of operators for the new facility. These upgrades may also necessary for SWWTF to comply with its existing National Pollutant Discharge Elimination System (NPDES) permit and avoid future violations of its permits. The SCWD would provide as much treated effluent water as needed to the proposed IVSP. The current plant capacity is 250,000 gpd (280 AFY), even though the current influent flow rate is approximately 150,000 gpd (168 AFY). Improvements to the treatment facility will provide the Title 22 water quality effluent. Any surplus water not needed by the IVSP, will be controlled by SCWD and may be discharged into the New River or used for other reclaimed water uses such as irrigation.

The water from SWWTF is characterized as secondary treated water and will require treatment to remove dissolved solids and minerals for panel wash water applications.

Dan Boyer Water Company

If the SWWTF water supply is not available at the start of construction of the IVSP, water would be available through the DBWC in Ocotillo, California. The DBWC is a private water purveyor located at 1108 Imperial Avenue, Ocotillo, California 92259, approximately 3.5 miles southwest of the IVSP site and seven miles by road. The company operates State well #16S/9E-36G4 with a current permitted pumping rate of 40 AFY. The water source is permitted for use by construction or personal consumption. IVSL has negotiated a purchase agreement with the DBWC. It is expected that the IVSP would require water from the DBWC for approximately six months to three years. The water would be transported to the IVSP site by 7,000 gallon water trucks. If the water supply would be used during project operations, a maximum of 7 truck trips per day would be required to supply the approximate 29 AFY demand. Once onsite, the water would be stored for construction and/or operations use. Should water supply from SWWTF be delayed or disrupted, IVSP will truck in water from the DBWC well in Ocotillo, California as discussed previously. If SWWTF water were to become available prior to the completion of the water pipe line, SWWTF water will be trucked to the IVSP site.

Water Storage and Treatment System

As described above in the Ancillary Facilities Section, the water treatment facility is centrally located adjacent to the Administration/Maintenance Building, and is covered by a shade structure. There will be

a 200,000 to 300,000 gallon Aboveground Storage Tank (AST) to store reclaimed water from SWWTF (Raw Water Tank).

Water will be pumped from the Raw Water Tank through a reverse osmosis (RO) demineralization water treatment system to fiberglass ASTs (Demineralized Water Tanks). The RO process will reduce the Total Dissolved Solids (TDS) to less than 20 mg/L. The Demineralized Water Tanks supply the panel wash water. The Discharge water from the RO process is sent to the evaporation ponds.

Dust control water will be drawn directly from the Raw Water Tank into dust control trucks. Fire protection water will be drawn from the Raw Water Tank through a fire pump.

Potable water will be trucked in from off-site from local water vendors (e.g., Sparkletts), and will be stored in one (1) 5,000 gallon fiberglass AST. There will be one (1) fiberglass 10,000 gallon Underground Storage Tank (UST) for the sanitary sewer system.

There will also be one (1) concrete 5,000 gallon fuel AST for maintenance equipment fueling, and several smaller chemical storage tanks for the water treatment system.

Steel storage tanks will be vertical, round, field-erected steel tanks with suitable stem wall foundations and interior reinforced-concrete mats with coatings and grounding corrosion control. All tanks, foundations, and piping connections will be designed and constructed to the appropriate standards for contents and seismic zone considerations. Anchor bolts will be used as required.

Chemical storage tanks will be of shop-fabricated, double-walled construction that meets all applicable Laws, Ordinances, Regulations, and Standards (LORS). These tanks, as well as any portable drums, will be provided with appropriate anchors or cradles and placed within spill containment basins.

1.3.10 Erosion Control and Stormwater Drainage

A Drainage Erosion and Sediment Control Plan (DESCP) and a Storm Water Pollution Prevention Plan (SWPPP) have been developed for IVSP and are on file with the BLM. Likewise, Hydrological Assessments and Sedimentation Studies were completed in May 2010, and are on file with the BLM. The following sections summarize key components of these studies.

The IVSP site lies within the Imperial Subregion of the Colorado River Basin of the CRWQCB. There are no perennial or intermittent drainages on the project site. The closest perennial drainage to the project site is the New River, created in the early 1900's when the Colorado River overflowed a dike, and with the Alamo River further east, flowed through the Imperial Valley to form the Salton Sea. Currently, the highly polluted New River obtains its flow primarily from agricultural irrigation return.

Primary ephemeral drainages traverse the project site from the south to north in the western portion of the site and toward the northeast in the eastern half of the site. Some of these drainageways have been identified as wildlife corridors and will be avoided. Specifically primary drainages I, K, A, C, D, E, and F will not have PV modules or CPV panels installed within them. Headwaters for these drainages are gently sloping upland areas located to the south and west. Existing culverts under the I-8 Freeway allow flows from primary drainages south of the freeway to flow across and into the site. Some large secondary drainages that have large watersheds south of the interstate have been effectively

intercepted by the interstate and as a consequence had their flows diverted by Caltrans to the culverts feeding the primary washes.

Ephemeral drainages in the project area provide beneficial functions and services typical of high quality, low disturbance desert scrub systems. Riverine functions are generally categorized into hydrologic, physical, and biologic. Functions performed include, but are not limited to, groundwater recharge, flood peak attenuation, floodwater storage, sediment trapping and transport, nutrient trapping, and maintenance of wildlife corridors and habitat. These functions could be impaired by construction and operation of the project.

Stormwater Design Considerations

Please see the IVSP Hydrological Study for more detail related to stormwater considerations. Overall, project grading will generally maintain existing site drainage patterns through the use of existing dry washes, swales, ditches, and site grading (Dr. Chang Sediment Study, May 2010, on file with the BLM). Consequently, construction was not found to have a significant impact on the existing site hydrological and hydraulic conditions.

The stormwater designs for the Main Service Complex, the IVSP substations, the solar field, and the project roads are described below.

The Main Services Complex is located outside of the flood plain and drainageways and stormwater from its impervious areas will be directed to two adjacent detention basins.

The IVSP substations are located outside of the flood plain and will consist of gravel cover and contain various electrical equipment including main power transformers. The small amount of runoff adjacent to the substations will be diverted around the substations.

All project maintenance roads (10 feet wide) will be constructed at grade to minimize their impact on site hydrology. The maintenance roads, outside of WUS, will be constructed by mixing a polymer compound with the native fill and compacting to provide a durable surface for project construction and maintenance use. Maintenance roads will consist of compacted native fill at grade, and are expected to have no impact on hydrologic conditions.

In addition to the standard construction erosion control measures described below, the Hydrology Report specifically described the following erosion control measures to protect the structures, both during and after construction, particularly from high-intensity short-duration storm events.

- During operations, monitor the tracker assembly foundations for scour development after major storm events, and provide erosion control measures at the tracker assembly foundation pedestals if scour is found to present a risk to structure stability. Pay particular attention to locations within the floodplain and alluvial fans where new channels may develop.
- Use at-grade Arizona Crossings with a concrete cut-off wall to prevent erosion of major arterial life line roads.
- Locate electrical collection equipment outside the flood plain. If equipment must be placed within the floodplain, provide protection from the predicted flood flow depth and scour.

- Plan for ongoing road and structure scour repairs after a major rainfall event as part of operations.

Construction Erosion Control Measures

Construction erosion and sedimentation control measures will be implemented to retain sediment on-site and to prevent violations of water quality standards. These measures will be taken in accordance with the BMPs and the SWPPP prepared to conform to State Water Resource Control Board Order Number 99-08-DWQ, General Permit Number CAS000002.

Before construction, BMPs such as a silt fence and rows of hay bales will be installed along the perimeter of the project, where minor runoff to off-site areas could occur. The silt fence will filter sediments from construction runoff. Berms with perforated risers will be used at road crossings and other locations as needed to control sediment transportation. During construction, the extent of earth disturbances will be minimized as much as is practical.

Diversion ditches and/or berms will be constructed as necessary to divert runoff from off-site areas around the construction site. Temporary BMP measures will be maintained as necessary throughout the construction period.

1.3.11 Vegetation Treatment and Weed Management

Operations will maintain the native existing brush to the extent possible by trimming the top while leaving the root system in place to minimize soil erosion.

A Non-Native Invasive Weed Management Plan was last updated in January 2011 and is on file with the BLM. This document is intended to provide: (1) monitoring, preventative avoidance, and management strategies for invasive weed control during construction activities at the project, (2) control and management of non-native weeds in areas temporarily disturbed during construction where native seed will aid in site revegetation, and (3), a long-term strategy for non-native weed control and management during the operation of the project.

1.3.12 Waste and Hazardous Materials Management

IVSP will generate a variety of non-hazardous and hazardous wastes during construction and operation as described in the following Table 5. The water treatment and sanitary sewer waste streams are discussed first. The remaining solid and liquid hazardous and non-hazardous waste streams are then outlined, followed by the hazardous waste material management.

Table 5. Summary of Construction Waste Streams

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	On-Site Treatment	Waste Management Method
Construction waste – non-hazardous recyclable	Scrap wood, steel, glass, plastic, and paper	100 cubic yards per week	Intermittent	Segregation into composition type; store for less than 30	Recycling facility

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	On-Site Treatment	Waste Management Method
				days	
Construction waste – hazardous	Empty hazardous material containers	2 cubic yards per week	Intermittent	Store for less than 90 days	Return to vendor or to hazardous waste disposal facility
Construction waste – hazardous	Solvents, used oils, paint, oily rags, cleaners, and adhesives	200 gallons	Every 90 days	Store for less than 90 days	Dispose to hazardous waste disposal facility or recycle
Construction vehicles – hazardous	Waste oil including used motor oil, transmission fluid, hydraulic fluid, and antifreeze	226 gallons	Every 90 days	Store for less than 90 days	Dispose to hazardous waste disposal facility or recycle
Spent batteries – hazardous	Lead acid and alkaline	20 per year during construction	Intermittent	Store for less than 90 days	Dispose to recycling facility
Stormwater from construction – non-hazardous	Surface runoff (water, inert material, dirt, and concrete particles)	17 gallons per day	Intermittent	None	Water will percolate into on-site soils
Sanitary waste – non-hazardous	Portable chemical toilets sanitary waste	452 gallons per day	Periodically pumped to tanker truck by licensed contractor	None	Ship to sanitary water treatment plant
Sanitary wastewater solids – non-hazardous	Rest rooms and sanitary waste	5,650 gallons per month	Intermittent	On-site septic tank	Dispose to sanitary leach field
Spent batteries – hazardous, recyclable	Lead acid, alkaline, gel cell, nickel, and cadmium	20 units per week during operation	Intermittent	Store for less than 60 days	Dispose to authorized waste recycling facility
De-mineralized water treatment wastewater salt cake – non-hazardous or designated waste	Zero discharge system; naturally occurring salt compounds	68,000 pounds per year	Intermittent	Evaporative pond containment	Non-hazardous waste disposal facility

Source: AES Solar, 2011.

Water Treatment System - Liquid Water

The wastewater generated by the demineralization system equipment contains relatively high concentrations of total dissolved solids (TDS). Wastewater or brine generated by the treatment process will be discharged to one of two concrete-lined evaporation ponds. Each 0.5-acre pond contains one year of discharge flow, approximately 2 million gallons. A minimum of one year is required for the water treatment waste to evaporate. The two-pond design will allow one pond to operate (receive waste water) while the other evaporates. The two ponds will alternate their functions annually.

The brine constituents in the ponds include those from the water source. The assumed TDS concentration of the reject water may be up to four to five times those of the raw water source. The TDS concentration anticipated in the brine when treating to less than 20 mg/L is approximately 3,600 mg/L based on the assumed source TDS level of 810 mg/L.

After the brine has gone through the evaporation process, the solids that settle at the bottom of the evaporation pond will be tested by the Applicant and disposed of in an appropriate non-hazardous waste disposal facility. The solids will be scheduled for removal during the summer months, when the concentration of solids is at its greatest due to an increase in evaporation rates, in order to achieve maximum solids removal.

Water Treatment System - Solid Wastes

Solid waste from the project water treatment system will be trucked off-site from the evaporation ponds as a low-moisture cake. An estimated 60,000 pounds per year of salt cake (non-hazardous waste) will be trucked off-site to an appropriate landfill or recycled. The full 60,000 pounds will be scheduled for removal at the end of the evaporation process. The type of vehicle proposed for use in hauling the solids off-site has a capacity of 20 tons. Therefore, approximately one-and-a-half (1.5) loads will be required per year.

Currently, an active landfill, the Calexico Solid Waste Site, is located approximately 30 miles from the IVSP site, in the City of Calexico at New River and Highway 98. The main roadways for travel to the landfill are I-8, CA-111, and CA-98. The landfill is currently permitted until January 2022. The landfill accepts a maximum of 150 tons per day. An alternative landfill location for future use will be the Mesquite Regional Landfill. This facility is currently going through the permitting process. The Mesquite Regional Landfill will be located in Brawley, approximately 45 miles from the IVSP Site, at 6502 East Highway 78. The main roadways for travel to the landfill are I-8, CA-111, and CA-78. Table 6 lists information related to toxic substances and Table 7 describes contaminants associated with IVSP.

Table 6. List of Inorganic Persistent and Bioaccumulative Toxic Substance

Substance	STLC Wet-weight (mg/L)	TTLC (mg/kg)	Estimated Maximum Concentration in Solid Product, Dry Basis (mg/kg)
Arsenic and/or arsenic compounds	5	500	2.74
Chromium and/or chromium compounds	5	2,500	Not detected in source stream
Copper and/or copper compounds	25	2,500	Not detected in source stream
Lead and/or lead compounds	5	1,000	Not detected in source stream
Selenium and/or selenium compounds	1	110	Not detected in source stream
Zinc and/or zinc compounds	250	5,000	Not detected in source stream

Notes:
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
STLC = soluble threshold limit concentration

TTLC = total threshold limit concentration
Source: Title 22 CCR Section 6626124.

Table 7. Maximum Concentration of Contaminants for the Characteristic in Non-Solid Waste

Contaminant	Chemical Abstract Service Number	Regulatory Level (mg/L)	Maximum Concentration in Brine (mg/L)
Arsenic	7440-38-2	5.0	0.0098
Chromium	7440-47-3	5.0	Not detected in source stream
Selenium	778-49-2	1.0	Not detected in source stream

Notes:
EPA = United States Environmental Protection Agency
mg/L = milligrams per liter
Source: Title 22 CCR Section 66261.24.

Sanitary Sewer Waste Water

Wastewater generated at the Main Services Complex will be discharged into a septic system with sanitary leach fields, and will be designed in accordance with applicable LORS, including those of Imperial County, the CRWQCB, and the California Department of Health Services. The septic tank will be located at the Main Services Complex; the leach fields will be located adjacent to the Main Services Complex.

The leach field system will consist of two independent leach fields, each sized to dispose of 110 percent of clear liquid from the sanitary sewer. The installation of two independent leach trenches will allow for a redundant system that could be used by cycling the flows (through valving for clear liquid disposal) in one leach field at a time. This design will minimize the possibility of a long-term leach field failure. A healthy leach field gets a regular flow of bacteria from the fluids exiting the septic tank. These bacteria create organic slimes in the soil, which clog the soil pores and cut down enormously on the absorption capacity of the soils. With parallel leach trenches, one trench of the leach system will be used for a period of 2 years and then the valve will be closed. The valve to the second leach field will then be opened so that this field will serve as the leach field for the next 2 years. The original field, having been closed down, will lie fallow and recover from the bacterial loading it had received. This drying out by switching field every 2 years could enable the leach fields to last indefinitely. Therefore, disposal of clear liquids will be conveyed to on-site sanitary leach fields, and sewer sludge will be pumped and disposed of by trucks to an approved off-site disposal facility.

Non-Hazardous Construction Solid Wastes

Inert solid wastes resulting from construction activities may include recyclable items such as paper, cardboard, solid concrete and block, metals, wire, glass, Type 1 to 4 plastics, drywall, and wood. Non-recyclable items include insulation, other plastics, food waste, roofing materials, vinyl flooring and base, carpeting, paint containers, packing materials, and other construction wastes. Management of these wastes will be the responsibility of the construction contractors. Typical management practices required

for contractor waste include recycling when possible, proper storage of waste and debris to prevent wind dispersion, and weekly pickup of waste with disposal at a local approved landfill.

It is expected that a 40-cubic-yard container will need to be emptied on a weekly basis during the construction of the buildings and once a month thereafter. Recyclable materials will be separated into labeled bins and removed from the site as needed. This construction waste is not expected to have a significant effect on public health or cause adverse effects on local landfill capacity. Table 5 provides an overview of the waste streams anticipated for the construction phase of the project.

Any wastes classified as hazardous, such as solvents, degreasing agents, concrete curing compounds, paints, adhesives, chemicals, or chemical containers, will be stored and disposed of as required by local and state regulations. Material quantities of hazardous wastes are not expected. Lubricating oils generated from the construction vehicles will be recycled at local approved recycling facilities.

Non-Hazardous Operation Solid Wastes

Inert solid wastes generated at the project during operation will be predominantly office wastes and routine maintenance wastes, such as scrap metal, wood, and plastic from surplus and deactivated equipment and parts. Scrap materials such as paper, packing materials, glass, metals, and plastics will be segregated and managed for recycling. Non-recyclable inert wastes will be stored in covered trash bins in accordance with local ordinances and picked up by an authorized local trash hauler on a regular basis for transport and disposal in a suitable landfill area.

Non-Hazardous Liquid Waste

Non-hazardous liquid wastes such as skim oil collected from oil/water interceptor and other liquids from equipment maintenance will be transported by an authorized carrier to a certified recycling facility.

Hazardous Waste

The Applicant developed and updated the Hazardous Materials Safety Management Plan in June 2010 and the Hazardous Materials Business Plan (HMBP) in November 2010. These are on file with the BLM.

The program will be revised and updated as required in a timely manner, and employees will be trained accordingly. The following guidelines outline how chemicals will be used, handled, and stored on-site during project operations in accordance with applicable LORS.

- If applicable thresholds are expected to be exceeded, Applicant will secure an EPA Hazardous Waste Generator ID number before turnover of site management from the construction contractor to the operating company.
- Chemical storage areas and feed/transfer areas will be equipped with secondary containment sufficient to contain the volume of the largest container or tank including an allowance for rainwater.
- All hazardous wastes will be stored in appropriate bulk storage containers or in labeled 55-gallon drums equipped with secondary containment and closed tops with bungs for liquid wastes or in secured open-top drums for solid wastes.

- Small-quantity chemicals used for maintenance tasks will be kept in appropriate flammable material or corrosive material storage lockers per all applicable LORS.
- All waste drums will be stored in accordance with good practice and applicable LORS, and will be protected from environmental conditions; including rain, wind, and direct heat; and physical hazards such as vehicle traffic and sources of heat and impact.
- Periodic inspections will ensure that all containers are secure and properly marked.
- Storage of hazardous waste will at no time exceed 90 days from the date of initial accumulation of a total of 55 gallons of hazardous waste or more on-site.
- Used tracker gearbox oil will be stored in 55-gallon drums on-site in accordance with good engineering practices and applicable LORS.
- Waste lubricating oils will be recovered and reclaimed by a waste oil-recycling contractor.
- Batteries will be reclaimed and recycled by authorized facilities.
- California-authorized and certified hazardous waste haulers will transport hazardous wastes to registered waste treatment, storage, disposal, and recycling facilities.
- Hazardous waste generation, handling, and storage areas will be inspected and monitored on a regular basis.
- Emergency response and reporting will be performed per written procedures that follow government and industry requirements and standards.
- Workers will be trained to handle hazardous wastes generated at the site. AES of Fontana, located at 13579 Whitram Avenue, Fontana, California, has been identified as a business that specializes in transporting, disposing, and recycling of hazardous waste. AES works in accordance with EPA and either recycles or treats all hazardous waste by distributing different types of materials to appropriate companies in the area. Table 8 lists the appropriate businesses that address the specific types of hazardous waste.

Table 8. Business Listings of Specific Hazardous Waste Handlers

Hazardous Material Type	AES Distribution List	Contact Information and Location
All fluids and wastes from trucks (motor oil, coolant, hydraulic fluid, etc.)	D-K Environmental Refinery	323-268-3387 Los Angeles, CA
Spent alkaline batteries and spent lamps from lighting fixtures	Lighting Resources, LLC Universal Waste	800-572-9253 Ontario, CA
Absorbent automotive waste (plus contaminated dirt and gravel)	Siemens Carbon Regeneration Facility	866-372-9378 Colorado River Indian Reservation, Near Parker, AZ
Spent lead-acid or nickel-cadmium batteries	Exide Technologies	818-252-2022 Arleta, CA

Source: Stirling Energy Systems, Inc., 2008.

Table 9 and Table 10 list the chemicals to be used, handled, and stored at the project site during project operation.

Table 9. Summary of Water Treatment Materials Usage and Storage

Chemical	Application	Expected Storage Quantity (gallons – average)
Sodium hypochlorite 12.5 percent solution (bleach)	Disinfectant for potable water	4

Source: Stirling Energy Systems, Inc., 2010.

Table 10. Summary of Non-Water Treatment Materials Usage and Storage

Chemical	Application	Storage Location	Storage or Usage Quantity	
			Average	Maximum
Insulating oil (heat transfer)	Electric equipment	Not stored on-site, initial fill quantity is brought to site at the time of replacement	75,000	
Lubricating oil	Tracker drives	Maintenance buildings	Initial fill with usage of 46 gallons per month	300-gallon recycle tank located in the Maintenance Building
Propylene glycol	Inlet air chiller loop – alternating	Maintenance buildings	Initial fill, with usage of 46 gallons per month	Initial fill
Various solvents, detergents, paints, and other cleaners	Building maintenance and equipment cleaning	Maintenance buildings	Three 55-gallon drums, commercial 1-gallon containers	Ten 55-gallon drums, commercial 1-gallon containers
Gasoline	Maintenance vehicles	Two double-wall 5,000 gallon refueling station with containment	2,500 to 5,000 gallon refueling stations	Full tank of 5,000 gallons
Diesel fuel	Emergency Generator	Generator skid double-wall 1,500 gallon refueling station with containment	200 gallons for initial fill, 1,500 gallon day supply	Maintain full diesel tank of 1,500 gallons

Source: Stirling Energy Systems, Inc., 2010.

1.3.13 Fire Protection

Fire Hazard and Explosion Risks

The project site is located in a moderate fire hazard zone, outside of regions where the risk of wildland fires is considered significant. To minimize risk, the design and construction of all building and support

areas will be free of asbestos and will meet all code and risk management requirements for low toxicity and particulate expulsion during combustion.

Two types of hazardous, highly flammable, or explosive materials will be used at the project Site during operations: acetylene welding gases and gasoline fuel for the operations vehicles. Two other flammable materials that are difficult to ignite will also be used at the site during project operations: transformer insulating oil and diesel fuels for the operations vehicles. While the potential fire hazards from these materials are addressed in the following sections, the hazards associated with a potential accidental release or spill of these materials are considered low. The Spill Prevention, Control, and Countermeasures (SPCC) for these materials are covered in the SPCC Section below.

Fire Protection Program

The Imperial County Fire Department may provide primary fire protection, firefighting, and emergency response services to the project site. Located at 900 South Dogwood, El Centro, California, the Fire Department has an estimated response time of 20 to 30 minutes.

Upon construction and regularly thereafter, the Fire Department will perform fire safety inspections and conduct training on operating and emergency response procedures. Training will include instructions in fire prevention, the use of portable fire extinguishers and hose stations, and the reporting of fires to the local fire department. Employees will only attempt to suppress fires in their incipient phase. Fire drills will be conducted at least twice each year for each work area.

Fire Protection Prevention Plan

Fire protection at the project Site will include measures relating to safeguarding human life, preventing personnel injury, preserving property, and minimizing downtime due to fire or explosion (National Safety Council 1992). Fire protection also involves physical arrangements, such as sprinkler systems, water supplies, and fire extinguishers. Fire protection measures include fire prevention measures for preventing the inception of fires. Topics of concern include adequate exits, fire-safe construction, reduction of ignition sources, and control of fuel sources.

The Emergency Action Plan/Fire Prevention Plan (EAP/FPP) was developed and updated in November 2011, and is on file with the BLM. The EAP/FPP provides for fire protection practices, including routine inspections of the project by the designated safety representative. The plan requires prompt action to correct situations deemed to be a fire hazard, and it identifies firefighting equipment and systems at the project site as well as methods to safely store flammable and combustible materials.

Project facilities have been designed by a California-registered Fire Protection Engineer and fire protection equipment will be installed and maintained in accordance with all applicable NFPA standards and recommendations (NFPA 1994). A fire reporting protocol (depending on the size of the fire) and an investigation protocol are detailed in the Fire Protection and Prevention Plan.

Fire Protection Systems

The project fire protection and safety systems will be designed to limit personnel injury, property loss, and project downtime as a result of fire or other event. The project will include both portable and fixed fire suppression equipment and systems along with detection and monitoring systems.

The fixed wet, water-based sprinkler fire-suppression system will provide coverage and protection for the Water Treatment Area and Administration/Maintenance Building per UBC/IBC Type II-N construction requirements and all applicable LORS. The fixed system will include standpipe and hose fire protection.

The a Raw Water Tank fed by the SWWTF supplies water for dust control, fire protection, and the demineralized water tanks through the RO treatment process. The fire protection system consists of the Raw Water Tank, fire water pump, jockey pump, yard hydrants, fire risers, and fire sprinkler systems. The water in fire protection system will be chlorinated and circulated to keep it fresh and flushed periodically to prevent algae growth.

The fire protection system will be designed to store the required sufficient volume for building fire-suppression. The design of the Raw Water Tank piping will prevent other water needs from drawing down the water to a level below the minimum requirement for the project's fire protection system.

The jockey pump will maintain water pressure in the fire sprinkler system within the project facilities and support areas under normal conditions. The jockey pump will start automatically if the pressure in the fire water loop drops below a given set point. Automatic valves will open to draw water from the fire-suppression water storage tank if pressure falls below the lower set point.

In the event of a fire, the jockey pump will switch over to the fire water pump and will run until manually stopped. It will be powered by the emergency generator in the event of a power outage and will be designed with the tank to handle the specific demands in accordance with NFPA 20. The pump and controller will be interfaced with the building fire alarms and fire sprinkler systems to run on reduced pressure during fire flow events.

Portable fire extinguishers (e.g., carbon dioxide and dry-chemical) will be placed throughout the project buildings and support areas in accordance with the requirements and guidelines of NFPA 10.

Permanently installed heat and smoke fire-alarm detectors and pull-stations with audible and visible annunciation will be provided into a zone addressable system in accordance with the National Electrical Code (NFPA 70 and NFPA 72). The main pre-action fire suppression monitoring and control system will be located in the project control rooms.

Table 11 provides a summary of the project's fire protection systems.

Table 11: Fire Protection Systems

Location	Type of System
Buildings	Automatic Clean Agent System per NFPA 2001 for Control Room, wet/dry/pre-action sprinkler system for administrative areas, maintenance area, assembly bays, and offices. Fire water supply will be from the Raw Water Tank at the Main Services Complex.
	Note: The fixed fire systems, hose-stations and portable extinguishers, and detection system and fire alarm pull stations will be provided as required by local jurisdiction or the UBC.
Solar Field	PV and CPV tracker assemblies are constructed of non-combustible material so they do not require fire protection.
Water Treatment Area	The Water treatment area will contain an automatic wet-pipe sprinkler system, hose-reel stations with 100-foot hose, and portable "BC" rated fire extinguishers.
Main Service Complex	Wet-barrel type fire hydrants will be installed per NFPA 24 and local jurisdiction requirements. The hydrants will be spaced less than 300 feet apart as required by code.

Source: Stirling Energy Systems, 2008.

Notes:

CO2 = carbon dioxide
NFPA = National Fire Protection Association
UBC = Uniform Building Code

Fire Protection System Design

The systems will be designed in accordance with the following items:

- Federal, state, and local fire codes, occupational health and safety regulations, and other jurisdictional requirements
- California Building Code (CBC)
- National Fire Protection Association (NFPA) standard practices
- NFPA 13, Standard for the Installation of Sprinkler Systems (2007 Edition)
- NFPA 14, Standard for the Installation of Standpipe and Hose Systems (2007 Edition)
- NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection
- NFPA 22, Standard for Water Tanks for Private Fire Protection
- NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances
- NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
- NFPA 30A, Code for Motor Fuel Dispensing Facilities and Repair Garages
- NFPA 55, Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks

1.3.14 Site Security and Fencing (During Construction and Operations)

The IVSP security system will consist of a perimeter fence, substation fences, Main Service Complex fence, regular site security vehicular patrols, an intercom system, and twenty-four hour security

monitoring cameras. The fencing will have reflective warning signage and controlled gated access. The cameras will be displayed on a real-time and recorded basis on a closed-circuit television system.

During construction, the laydown and staging areas will additionally be fenced with a temporary chain-link fence. As described above, during project construction, the main truck traffic entry to the site will be the BLM road from Evan Hewes Highway. Site access will be provided to off-site emergency response teams that respond to an after-hours emergency via manual override by 24-hour security officers stationed at both entrances.

1.3.15 Spill Prevention and Containment for Construction and Operation of Facility

Two types of hazardous materials will be used at the IVSP Site during operations: acetylene welding gas for incidental repair work, and gasoline fuel for the operations vehicles. Three other flammable materials that are more difficult to ignite will be used at the site during project operations: oil for the transformer cooling, oil/grease for tracker mechanisms, standby pumps and generators, and diesel fuels for the operations vehicles and standby generators.

Acetylene Welding Gas

Acetylene welding gas may be used and stored for minor maintenance and repair activities. The potential effects of the use of these gases at the project site do not appear to be significant based on the following items:

- A maximum of 6 bottles of welding gas will be stored at project in under US Department of Transportation (US DOT) rules and regulations in US DOT-approved safety cylinders and will be secured to prevent upset and physical damage and to facilitate inventory control
- The gases will be stored in standard-sized portable cylinders (in contrast to larger cylinders), generally limiting the quantity of gas released from an individual cylinder failure to less than 200 cubic feet

Transformer Oil Release

As transformer oil is not stored on-site except in the transformers, there is a minor risk of a transformer oil accidental spill. Large transformers with more than 300 gallons will utilize secondary containment pads designed to contain all the oil in the event of a leak. Risk of transformer oil fires is very rare, and clearance between oil cooled transformers is provided to reduce the chances that a fire would spread to other facilities. The IVSP substations transformers contain approximately 12,000 gallons of insulating oil. Each pad mounted transformer contains approximately 530 gallons of oil. The total transformer oil contained in all of the transformers amounts to approximately 400,000 gallons. An SPCC will be prepared to address spill events, including all of the oil and hazardous fluids.

The IVSP substations transformers will be delivered to the site without the oil. The oil will be inserted into the transformer tanks from delivery tankers on-site. Precautions will be taken during oil transfer to prevent spills. Adsorbent materials will be carried on the supply truck for quick response to an inadvertent oil spill. Any soil contaminated by a spill will be removed to an off-site oil waste disposal

facility. Substation transformer pads will be designed for containment of the transformer oil in the event the tank is breached.

Pad-mounted transformers will be filled with oil when they are delivered to the IVSP site. Twice yearly inspections of transformers will be conducted to detect leaks, when they are small. Oil will be removed from the tank for maintenance on intervals of 10 to 15 years.

Diesel Fuel Release

The 1,500-gallon diesel fuel tank for the emergency generator will be located away from potential ignition sources and provided with a dike and/or containment wall capable of containing the maximum volume of fuel. The tank exterior surface including the tank bottom and connection piping will be visible for direct monitoring for spill prevention. The diesel tank will be protected from vehicular and other impacts by steel pipe bollards filled with concrete.

The most likely cause of an accidental release of diesel fuel would be a collision or a spill during refueling operations. The following are protective and active measures in the event of a gasoline or diesel fuel accidental release:

- Eliminate all ignition sources in the vicinity of the spill or released vapor
- If the material is released into the work area, evacuate the area immediately and monitor the area with a combustible gas indicator
- Stop the source of the release if it can be done without safely
- Contain the release to prevent further contamination of the surrounding soil, surface water, or groundwater
- Clean up the spill as soon as possible, observing exposure precautions and using personal protection equipment (PPE)
- Use appropriate absorption techniques such as applying non-combustible absorbent materials or pumping
- Ensure that all equipment used is grounded when handling the product
- Use vapor-suppressing foam to reduce vapors
- Use clean, non-sparking tools to collect the absorbed material
- As feasible and appropriate, remove any contaminated soil. Place contaminated material in disposable containers and dispose of in a manner consistent with applicable LORS.
- Report gasoline spills to local authorities as appropriate or required. This material is covered under the EPA-administered Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) Petroleum Exclusion.

1.3.16 Health and Safety Program

The Construction Health and Safety Program (CHSP) was developed in September 2010, and is on file with the BLM. To protect the health and safety of workers during construction, the Applicant (or construction contractor) will ensure compliance with the CHSP, and all federal, state, and local health standards that pertain to worker health and safety. The Construction Health and Safety Program will meet the California Occupational Safety and Health Administration (Cal-OSHA) Injury and Illness Prevention (IIP) requirements. The CHSP includes:

- A written Code of Safe Practices that relates to construction activities
- Identification of the person or persons responsible for implementing the program
- Posting of the Code of Safe Practices at a conspicuous location at each job site office or providing it to each supervisor, who shall have it readily available
- A system for identifying workplace hazards, including inspections
- A system of ensuring employee and subcontractor compliance
- "Toolbox" or "tailgate" meetings conducted by supervisors with employees to discuss job hazards and mitigation measures
- Methods of communicating with employees that encourage employees to expose unsafe activities
- Procedures for correcting unsafe conditions

When workers are first employed, they will be given instruction regarding the hazards and safety precautions applicable to the type of work in question; workers will also be directed to read the Code of Safe Practices. When employees are required to work near known job site hazards, they will be instructed in the recognition of the hazard, the procedures for protecting themselves from injury, and the first aid procedures in the event of injury.

Operational Safety Training Programs

All project workers will be given instructions regarding their responsibility for the safe conduct of their work at the time the employee is first hired and as an ongoing training program of hazard recognition and avoidance.

Workers will be instructed in the safety regulations pertinent to their employment tasks. Safe working conditions, work practices, and protective equipment requirements will be communicated in the following manner.

- New, promoted, or transferred employees receive safety training orientation
- Weekly safety meetings are held with employees
- Toolbox/tailgate safety meetings are conducted periodically for each crew. General safety topics and specific hazards that may be encountered will be discussed. Comments and suggestions from all employees will be encouraged.
- A regularly scheduled safety meeting will be held for supervisors
- Hazard communication training—including California Proposition 65 warnings and discharge prohibitions—will be conducted as new hazardous materials are introduced to the workplace.
- Material Safety Data Sheets will be provided for all appropriate chemicals
- A bulletin board with required postings and other information will be maintained at the project site
- Warning signs will be posted in hazardous areas

Safety training will be provided to each new employee as described below.

- A list of safe work rules for the project will be explained to each new employee

- A copy of the applicable Safe Work Practices will be given to each new employee. The provisions will be incorporated into training for the qualifications programs so that employees may fully understand what the protective provisions mean.
- The Hazard Communication Program and other applicable training and requirements for personal protection for the types of hazards that may be encountered at the project Site will be explained to employees. This training will be documented.
- Unusual hazards that are found on-site will be explained in detail to each new employee, including any specific requirements for personal protection
- Safety requirements for the new employee's specific job assignment will be explained by the foreman on initial assignment and on any reassignment

Safety Fixtures

Safety showers and emergency eye wash stations will be provided at all project buildings and support areas that store or use chemicals, including the Administration/Maintenance building, the water treatment structure, the vehicle fueling area, and the hydrogen storage area. A first aid station, complete with all emergency medical supplies, will be provided in the operation and administration building near the break room. Also, all project construction and operation and maintenance vehicles will be equipped with complete first aid kits and two-way radios.

Construction Personal Protective Equipment Program

Employees will be instructed to use the required PPE during construction activities. Required PPE will be approved for use, distinctly marked to facilitate identification, and be used in accordance with the manufacturer's instructions. The PPE will be of such design, fit, and durability as to provide adequate protection against the hazards for which it is designed. The type of PPE required for each job task will be described in the job safety procedures for that task. The use of PPE for site activities includes, but is not limited to, the items specifically described in Table 12 and will comply with Cal-OSHA requirements. When protective insulating equipment is used, it will comply with the Electrical Safety Codes.

Table 12. Basic Protective Equipment

Body Area	Hazards	Recommended Protection
Eyes/face	Low-velocity flying particles	Safety glasses with side shields
	High-velocity chips and sparks	Impact goggles or safety glasses with full face shield
	Corrosive liquid splash during transfer	Splash-proof goggles and face shield
	Welding – injurious light rays	Welding hood with appropriate eye filter lenses
Head/ears	General wear, overhead rigging, material handling, maintenance, and general construction processes	Hardhat
	High noise level	Earplugs or muff
Respiratory system	Low-hazard inert dusts.	Dust mask.
	Low concentration solvent vapors	Cartridge-type organic vapor respirator

Body Area	Hazards	Recommended Protection
	High-concentration dusts or vapors	Airline respirator
	Oxygen deficiencies or gases	Self-contained breathing apparatus
Hands and arms	Handling rough or sharp objects	Leather gloves
	Handling hot objects	Insulated gloves
	Using solvents	Impervious synthetic gloves
Feet and legs	General wear for light handling	Safety-toe shoes
	Handling heavy objects	Metatarsal safety shoes
	Underground work	Safety-toe synthetic boots
Trunk and full body	Punctures, impact, or cuts Canvas or leather kickback apron or metal mesh apron	
Fall protection/rescue	Working from elevated structure or platform without standard railings	Safety belt and lanyard
	Vessel entry	Harness and lifeline or wristlets and lifeline
	Suspended scaffolds	Lifeline, safety belt/lanyard

Source: California Department of Industrial Relations, 2008.

Hazard Types and Locations

Tables 13 and 14 describe the potential hazards and their locations during construction and operations.

Table 13. Potential Worker Hazards during Project Construction and Operation

Activity	Potential Hazard
Project Construction	
Elevated work	Slips/trips/falls
Welding	Flash burns, explosion, thermal burns, toxic welding fumes
Excavations	Excavation/trench wall collapse, spoil movement, oxygen deficiency, buildup of toxic, gases, fumes, vapors, dusts or mists, wet exposures, crushing hazards, confined spaces, potentially contaminated soil/waste
Cement/forms work	Slips/trips/falls, protruding objects, caustics, punctures, and lacerations
Equipment operation	Noise exposure, vehicle accidents, load hazards, induced current
Transmission lines/ transformer station	Slips/trips/falls, electrocution, flash burns
Painting	Paint solvents, paint vapors, chemical burns, fire/explosion, and slips/trips/falls
Abrasive blasting	Dust, flying particles, pressure vessels, noise
Powered hand tools	Noise, dust, flying particles, cuts, amputation, crushing
Fueling	Fire, explosion, environmental contamination

Activity	Potential Hazard
Project Operation	
Generation enclosure	High voltage
Operations building	High voltage, repetitive trauma
Transformer	Electrocution, flash burns
Compressor	Fire, noise, temperature, rotating equipment, pressure
Chemical storage	Chemical splashes, burns, reactions, gases, vapors, fumes
Machinery, general	Noise, temperature extremes, rotating equipment, electrocution

Source: California Department of Industrial Relations, 2008.

Table 14. Location of Potential Worker Hazards

	Maintenance Shop/Warehouse	Switchyards/Substation	Solar Field
Flammable Material	X		
Hazardous Material	X		
High Voltage		X	X
Noise	X		
Pressure Vessel			
Pressurized Cylinders	X		
Rotating Equipment	X		X
High/Low Temperature			X

Operational Emergency Action Plan

In addition to incorporating various safety and environmental features and design measures to minimize emergencies and their effects on public and worker safety, IVSP will develop a site-specific Operational Emergency Action Plan (EAP)/Emergency Response Plan prior to operations. A typical plan outline is provided in Table 5. Additionally, the Operational EAP should be similar to the Construction EAP on file with the BLM. The plan is designed to address potential emergencies, including hazardous material releases, fires, bomb threats, pressure vessel ruptures, and other catastrophic events. This plan describes evacuation routes, warning devices, and points of contact, assembly areas, responsibilities, and other actions to be taken in the event of an emergency. The plan has a layout map and a fire extinguisher list, and describes arrangements with local emergency response agencies for responding to emergencies.

Table 15. Sample Emergency Action Plan Outline

Section Number	Description
1.0	**Introduction**
1.1	Purpose
1.2	Scope

Section Number	Description
2.0	**Responsibilities**
2.1	Incident Command System
	Emergency Response Coordinator
	Emergency Evacuation Coordinator
	Alternate Safety Coordinator
2.2	Position Description Assignments
	Project Manager
	Project Supervisor
	Operators
	Health and Safety Manager
	Security
3.0	**Response and Notification Plan (Points of Contact)**
3.1	Supervisor/Emergency Coordinator
3.2	Health and Safety Manager
4.0	**Response Procedures**
4.1	Evacuation Routes and Procedures
4.2	Accidents Involving Serious Injury and/or Death
4.3	Fire
4.4	Hazardous Waste or Chemical Spills
4.5	Earthquake
4.6	Bomb Threat
4.7	Emergency Project Shutdown
4.8	Site Security
4.9	Emergency Medical Treatment and First Aid
4.10	Decontamination
4.11	Documentation and Recordkeeping
4.12	News Media
4.13	Emergency Notification List
4.14	Emergency Telephone Numbers List
5.0	**Reference Procedures**
5.1	Evacuation Plan
5.2	Emergency Equipment Locations
5.3	Fire Extinguisher Locations
5.4	Security
5.5	Accident Reporting and Investigation
5.6	Lockout/Tagout
5.7	Hazard Communication

Section Number	Description
5.8	Spill Containment and Reporting
5.9	First Aid and Medical Response
5.10	Respiratory Protection
5.11	Personal Protective Equipment
5.12	Sanitation
5.13	Work Site Inspections

Source: California Department of Industrial Relations, 2008.

1.4 Alternatives Considered by Applicant

As described in Section 2 of the July 2010 FEIS, the February 2010 SA/DEIS evaluated seven alternatives (the proposed action, three Build Alternatives, and three No-Action Alternatives). As the consultation process continued, the applicant proposed four modifications/refinements to IVSP and the other Build Alternatives. These included changes to the transmission line and water line alignments to better avoid WUS and environmentally sensitive areas. The BLM and the USACE continued to coordinate and consult to reduce effects to aquatic resources, biological resources, and cultural resources. The proposed action was revised to a reduced 709 MW Alternative, and that ultimately became BLM Preferred Alternative and the USACE LEDPA.

1.5 Other Federal, State and Local Agency Permit Requirements

As the prior project configuration included solar thermal technology, the CEC retained jurisdiction over IVSP, and was the lead agency for the CEQA process. The BLM was the lead agency for the NEPA process for the prior project configuration. Per an August 2008 MOU, the BLM and the CEC agreed to a join environmental review process. A joint SA/DEIS was issued in February 2010.

The CEC continued the CEQA process and subsequently issued Part I of the SSA in July 2010 and Part II in August 2010. The PMPD was issued in August 2010, and the Final Decision was issued in September 2010. The BLM continued the NEPA process and issued the FEIS in July 2010 and the Record of Decision (ROD) in October 2010.

As the new project configuration includes PV technology, Imperial County will likely have regulatory oversight over the project instead of the CEC, and IVSL plans to obtain a CUP though Imperial County for the new project configuration. The FEIS will need to be amended to account for the reconfigured project. The Section 106 historical property consultation process will continue to between the BLM and the cultural agencies to ensure that adverse impacts to cultural resources are properly avoided and mitigated. The previous preferred BLM action alternative was the USACE LEDPA.

The USACE will make a new LEDPA determination in conjunction with a new Section 404(B)(1) Alternatives Analysis through the permitting process. The USACE will consult with the California Department of Fish and Game (CDFG) and the USFWS to ensure the current Biological Opinion remains applicable. The CRWQCB will likewise amend the 401 Water Quality Certification issued in October 2010.

1.6 Financial and Technical Capability of Applicant

Financial and Due Diligence performance of AES Solar has been provided to BLM under separate cover, and is on file with BLM.

2. Construction of Facilities

2.1 Solar Field Design, Layout, Installation, and Construction Processes - Including Timetable and Sequence of Construction

The basic building block for the project is a 1.0 MW_{AC} solar block. For polycrystalline PV panels the typical 1 MW block consisting of approximately four tracker subgroups and 4,752 polycrystalline photovoltaic modules (or six tracker subgroups with an equivalent global number of thin film modules) with a capacity of approximately 280 W_{DC} each (DC/AC ratio of 1.33 to 1.00). The subgroups will be arranged as necessary to fit the contours of the site. Figure 4 illustrates the location, arrangement, and size of the generation equipment for the project. The project will have three laydown areas for each phase of construction, as shown in Figure 1.

Construction Lighting

Pole or wall-mounted light fixtures will be used at the laydown yard and mobile light plants will be used in the solar field during construction. To minimize the impact on the observation of the night sky, the fixtures selected will be directionally shielded and aimed so that light is confined to the area to be illuminated.

The pole or wall-mounted light fixtures installed at the laydown will use “cutoff” fixtures. A “cutoff” fixture is one whose light distribution is not more than 2.5 percent of the luminaire's lumen output at or above 90 degrees vertical from nadir and not more than 10 percent of a luminaire's lumen output at or above 80 degrees vertical from nadir.

Mobile lights will be used during construction and operations. These mobile lights consist of a series of floodlights mounted to a telescoping mast which is itself mounted to a trailer—all floodlights shall be fitted with internal or external shielding and/or louvers. Operational guidance provided with the mobile plants will instruct that floodlights shall be aimed so that the area illuminated is confined within the project boundaries. The use of the mobile lights will be restricted to illuminating equipment and material storage areas, truck loading bays (docks) and outdoor work areas, assembly areas, and other areas where permanent lighting would restrict the function or compromise safety.

Figure 4. Solar Field Arrangement

2.2 Approach to Construction and Operations

Photovoltaic Modules

The project will use polycrystalline or thin film PV modules manufactured by one of several potential manufacturers, including First Solar, Yingli, Suntech, Hanwha Solarone, Trina, LG, Jinko, Sanyo, Solon, and Kyocera. Modules from different vendors may be used within each phase. Module choices will be focused on those units that already have a history of producing and successfully deployment on other large solar projects and will not focus on new prototypes that are not yet proven. AES Solar intends to use polycrystalline modules with nominal peak power in the range 225 to 280 W_{DC}, and/or thin film modules with nominal peak power around 80 W_{DC}. The cut-sheets for several of these modules are included in Exhibit B.

Balance of System

The Balance of System (BOS) includes the primary components associated with PV power generation, including the structure on which the modules are mounted, the components that convert the PV module electrical output from DC to AC power, components that transmit the energy to the electrical grid, the associated cabling between the modules and the inverters and pad-mounted transformers. The various BOS elements are described further below:

- Mounting Structure: The PV modules are planned to be mounted on horizontal single-axis trackers supported on a columns or posts, and aligned in a north-south row configuration. The tracker rotates the PV modules with a gear drive or hydraulic system about the horizontal axis in an east to west motion, following the sun throughout the day. The modules are mounted on horizontal beams that in turn are mounted on vertical posts driven into the ground. The mounting structure is made of HDG, high-strength steel, or anodized aluminum to prevent corrosion and sized based on soil conditions and applicable wind loads and seismic criteria.

- Inverters: Large centralized inverters convert the DC power produced by the PV modules into AC power. These inverters are typically 500 kilowatts (kW) to 1 MW in size, and will be included in each 1 – 2 MW inverter/transformer/switch gear block. The inverters will be of the latest generation type with automated functions and MPPT functionality to control operations and maximize efficiency. The design includes remote monitoring and control with isolation detection systems.

- Pad-mounted Transformers: The transformers will be reduced-loss transformers properly sized for the selected inverter and manufactured for a low-failure rate and high-performance (yield) during their useful life.

- Inverter Package: The inverters, pad-mounted transformers and associated electrical equipment (the Inverter Package) will be supplied and installed in coordinated 1 - 2 MW packages, and mounted on skids or pad foundations for ease of installation.

- LV Cabling: All low-voltage cables will be sized for maximum continuous and short-circuit current and voltage drop during the transient period of actuation of protections. All cables will have required insulation ratings and comply with all applicable codes and regulations. LV DC cables will be laid along trays above ground to the ends of the mounting structures and then buried underground running to the field junction boxes and inverters. Where necessary for mechanical protection, underground cabling will be run through conduit.

Balance of Plant

The Balance of Plant (BOP) includes remaining components of the PV plant other than the modules and BOS. BOP includes MV switchgear, MV cabling, civil works and the many plant systems. The different BOP elements are described below:

- Medium Voltage Switchgear: The MV equipment will include the MV cables connections, switchgear and MV/LV transformer for the auxiliary system and associated equipment. The units will have all necessary grounding systems and interlocks to prevent erroneous switching that could compromise equipment reliability and efficiency or safety of personnel.

- Auxiliary Service: Auxiliary power will be provided for operations in the case of a failure or during times when power is not being generated on-site.

- MV Cabling: The MV cabling used to collect the AC power from the Inverter/Transformer/Local Switchgear and transmit it to the project substations will be sized for maximum continuous and short-circuit current and voltage drop during the transient period of actuation of protections. All cables will have required level of isolation. The MV cabling will be directly buried and, where necessary for mechanical protection, run through underground conduit.

- Energy Metering Equipment: The facility will include necessary meters for measuring electric power produced and consumed. Meters will be placed in easily accessible location for remote external reading and will be accessed by the monitoring and control system.

- Protection: The project will incorporate all required protection systems to prevent damage to equipment and injury to personnel.

- Civil Works: The project civil works will include required drainage systems and trenches for buried electrical cable and cable ducts, perimeter roads, fences, site buildings and skids or pad foundations for inverter packages.

- Meteorological Station: Multiple meteorological stations will be installed to monitor incident radiation and meteorological conditions at the project.

- Security System/Plant Lighting: The project security system will include 8’ perimeter chain link fencing with barbed wire on top, CCTV cameras and perimeter microwave or infrared barriers, and an alarm system monitored by a professional security company.

- O&M Building: The project will include an operations and maintenance building housing plant operations personnel, plant monitoring equipment, spare parts, etc.

Workforce

During operations, virtually all of the staff will be locally sourced and will include skilled and semi-skilled plant operations personnel and solar field maintenance and cleaning workers operating from the project site. The facilities will operate seven days per week—generating electricity during normal daylight hours when the solar energy is available. Maintenance activities will occur seven days a week, 24 hours a day to ensure solar field operation when optimal solar energy is available.

There are anticipated to be 200 to 400 during construction periods at the project site. The project intends to use, to the maximum extent possible—locally based employees and subcontractors during all phases of the project from construction to operations. The project will utilize appropriate local programs to identify potential employees to meet its needs—ensuring local residents are provided opportunities for employment.

Quality Control

It is the policy of AES Solar to ensure that its contractors meet all contractual obligations regarding quality, so that the facility is constructed in accordance with all applicable environmental, design, construction, regulatory and legal requirements.

Quality is a fundamental part of AES Solar's PV plant design, starting with the requirement that the facility be designed for a 25 year life. Contractor final design documents will be reviewed thoroughly to ensure compliance with all applicable requirements.

Each contractor working on the project will be required to submit a quality control plan for approval by AES Solar. The plan will identify the procedures, controls and documentation to be used for each element of the work. Major suppliers and subcontractors will also be subject to AES Solar's approval, to ensure that they are capable of performing at the levels required.

During construction, the following field activities will be conducted:

- Inspections of equipment/components as they are received
- Construction/installation of equipment
- System/component testing
- Project startup and commissioning

The construction contractors will be contractually responsible for performing their work in accordance with all safety, environmental and quality requirements specified by applicable project requirements. Contractor compliance with the project quality requirements will be monitored through inspections, audits and independent testing.

2.3 Access and Transportation System, Component Delivery, Worker Access

Heavy Equipment Delivery

Heavy construction equipment will be moved to the project site by road—using road transport suitable for the size and weight of that equipment. Primary equipment such as the 34.5 kV to 230 kV power transformers will be delivered to the project site by special conveyance due to their weight and size. Typically, deliveries of material and equipment to the site will be made by truck. The majority of equipment may either be trucked from Phoenix or Los Angeles.

Construction Traffic

Construction of each phase will typically take between 14 and 24 months. Construction traffic should be spread throughout the construction period, however it typically should peak during the first two quarters of each construction phase.

In addition to local personnel, it is anticipated during construction that contractor, subcontractor and specialized construction personnel will commute to the project site on a weekly basis and stay in temporary housing or apartments during the week for the duration of the construction phase.

2.4 Construction Work Force Numbers, Vehicles, Equipment, Timeframes

Construction Workforce

Table 16 shows a typical breakdown of construction personnel by trade for a work force of 350 people. During construction, the average salary range per employee is expected to be approximately $20 to $60 per hour, including benefits. Tables 17 and 18 will summarize the estimated construction traffic construction equipment in subsequent POD revisions. Table 19 provides projected operations and maintenance personnel requirements.

2.5 Site Preparation, Surveying and Staking, and Site Surveys

A topographic survey was performed that will be used to establish the site's grading and drainage plans and to determine final placement of solar field, roadways, and other project features. A geotechnical report was performed to evaluate general surface conditions, subsurface conditions, seismicity, and the other geological information necessary to develop recommendations for the design and construction of foundations, aboveground structures, and equipment.

2.6 Site Preparation, Vegetation Removal and Treatment

All site preparation, vegetation removal and treatment will be performed in accordance with all applicable LORS and as indicated throughout this document.

Table 16. Construction Trade Projection

Trade	Peak Construction Personnel
Civil	15
Trackers	
Ramming	25
Premounting	20
Mounting	60
Modules	
Sorting	45
Installation	140
Cabling	20
Inverters	15
Commissioning	10
Total	**350**

Table 17. Estimated Daily Construction Traffic

Table 18. Estimated Construction Equipment Usage Schedule

Table 19: Projected Operations and Maintenance Personnel Requirements

Trade	O&M Personnel
General & Administration	2
Operations Manager	
OH&S Supervisor	
Engineering	3
Controls Engineer	
Electrical Engineer	
Maintenance & Mechanical Engineer	
Technicians	4
Operating Technicians	
Instrumentation & Control Technician	
Electrician Technician	
Mechanical Technician	
Contract Staff	6
Security/Housekeeping	
Module Washing	
High-Voltage Maintenance	
Total	15

2.7 Site Clearing, Grading, and Excavation

Site Grading and Drainage

The project Site will be developed utilizing four different techniques, determined by the site conditions. The first category consists of areas where sensitive environmental features or resources occur, and are designated "Environmentally Sensitive Area" on the Site Plan. The majority of these areas is outside the PV Development Boundary and are not proposed for grading or disturbance. The second category occurring on site lies within the PV Development Boundary, and setbacks, generally 50 feet, are observed wherein disturbance and grading in these areas is minimized or avoided completely, depending on the resource, soil conditions, topography, drainage, and location of the nearest site facilities. The third category is designated on the Site Plan as "¼ MW Block intersecting ESA". In these areas there are less critical environmental resources where grading is allowed and changes in topography will primarily be addressed by using varying support post lengths and soil stabilization, disturbance is reduced to the extent practical, but disturbance and grading are permitted. The fourth category is designated "Ungrouped ¼ MW Block". Within these areas clearing, grubbing, grading, slope stabilization, compaction and drainage stabilization will occur.

Natural vegetation will be cleared for construction access, the Main Access road, internal feeder roads, perimeter feeder roads, graded areas within the PV Development Boundary, Main Services Complex, substations, and underground utilities. The unpaved maintenance roads within the arrays will generally

be trimmed, compacted in spots where soils are too loose to support low levels of access, and soils stabilized to control erosion, but these will not be graveled, paved or fully graded except in limited areas where steeper topography occurs over a limited area or where drainage crosses the road. . In addition, to the extent areas in the solar field are not graded, brush will be trimmed for the solar arrays to prevent potential brush fire hazards. Brush trimming will include leaving the existing native plant root system in place to minimize soil erosion.

Graded areas will be compacted and designed to maintain a 10 percent maximum road grade. Localized rises or depressions within the individual 1/4 MW solar groups will be graded to provide for proper tracker alignment and operation. Ground disturbance will be minimized and cut/fill material will be handled in the immediate area, without large amounts of cross-site soil hauling. Cut and fill slopes will be used in these areas to adjust for terrain and to keep the grade within limits preferred for the tracker mechanisms.

Heavy construction equipment including motor graders, bulldozers, elevating scrapers, hydraulic excavators, rubber tire loaders, backhoes, compacting rollers, and dump trucks will be used to grade the substations, Main Services Complex building foundations, evaporation ponds, parking areas, laydown areas, and where no limits on grading apply. Localized limited channel grading will improve dry wash channel hydraulics and redirect flow around the Main Service Complex to protect it from erosion.

It is anticipated that roadway maintenance will be required after rainfall events. After storm events, unpaved and paved roadway sections may need to be bladed to remove soil deposition at the roadway crossings.

The project site layout will maintain the local pre-development drainage patterns where feasible. Drainage swales will be constructed to intercept and convey the surface low-flows from undisturbed natural areas to existing drainage channels. Off-site flows will be accepted and conveyed throughout the site, with discharge following the existing drainage patterns.

Roadway stormwater run-off will be conveyed in unpaved swales or roadway dips to existing and/or proposed drainage channels. At-grade crossings will convey water across roadways when needed (where north-south running drainage channels cross the ease-west roadways) to maintain existing local drainage patterns.

The main access road will be a designated evacuation route. As such, roadway crossings will be protected from heavy erosion and will be designed to convey sufficient flow to keep the roadway from flooding more than six inches during a projected 100 year rainfall event.

Soft-bottom stormwater detention basins will be constructed to mitigate the increased runoff from the proposed building sites. Rainfall from paved areas and building roofs will be collected and directed to the stormwater basins. The basin will be sized to detain the 100 year, 24 hour storm and to discharge within 72 hours after the storm to provide mosquito control. This basin design incorporates evaporation and/or infiltration.

The post-development flow rates released from the project site will be equal or less than the pre-development flow rates—thus complying with BMP. The expected flow reduction is based on the following factors.

- Except for the building sites, the majority of the project site will remain pervious, as only a negligible portion of the site will be affected by pavement and tracker assembly foundations
- The increased runoff expected from the building sites will be mitigated by capturing 100 percent of the difference between pre- and post-development runoff in detention basins, where the stormwater runoff will be infiltrated and/or evaporated to the atmosphere

2.8 Solar Array Assembly and Construction

Major Equipment

Table 20 lists the major equipment and Table 21 lists significant structures required for the project. All equipment listed below is required for Phase I of the project and will be in place for the construction of Phase II.

Table 20. Major Equipment List

Description	Approximate Quantity (per 1 MW_{AC} Solar Group)	Approximate Quantity (per 100 MW_{AC} Plant)	Approximate Size/Capacity	Remarks
PV power generating system	4,752	475,200	280 W_{DC}	Polycrystalline photovoltaic solar panel capable of generating a peak power of 280 W_{DC} at Standard Conditions (STC: Irradiance = 1,000 W/m^2, module temperature = 77 ºF, AM = 1.5).
Main Field Junction Box; distribution panel, 9 or 12 circuits, with circuit breakers in a weatherproof enclosure	24	2,400	200 A, 900 V	Collects the output from 9 or 12 solar panel strings (3 or four tracker rows). Each string connects to a 20-A, two-pole DC circuit breaker
Inverter Package Main Cabinet, , distribution switchboard with twenty four 200 A circuit breakers	1	100	2,500 A Bus, 900 V	Collects output from the Main Field Junction Boxes of four tracker subgroups forming 1 MW_{AC} Solar Group
Power Inverter	2	200	500 kW, 900 V_{DC} to 265-480 V_{AC}	DC/AC transformation
Pad-mounted	1	100	1,00 KVA, 265-480	LV to MV transformer for

Description	Approximate Quantity (per 1 MW_{AC} Solar Group)	Approximate Quantity (per 100 MW_{AC} Plant)	Approximate Size/Capacity	Remarks
Transformer			V_{AC} to 34.5 kV_{AC}	the output of 1 MW_{AC} Solar Group.
Open bus switch rack, four 1,200 A feeder breakers, 40 kA INT, with switches, insulators, and bus work	-	1	34.5 kV, 2,000A	Each switch rack lineup collects 100 MW at 34.5 KVA
Shunt capacitor bank, switched in five 15 MVAR steps	-	1	34.5 kV, 75 MVAR	Provides power factor correction at the 100 MW solar group level
Dynamic VAR (DVAR) compensation system in coordination with shunt capacitor banks; size to be determined by studies	-	1	34.5 kV, size to be determined	Provides active VAR compensation to maintain required power factor profile and to aid in meeting low-voltage ride-through requirements
Disconnect switch, 35 kV, 200 kVBIL, group-operated	-	2	35 kV, 2,000 A	Provides capability to isolate power transformer from the 34.5 kV collection system
Power transformer, three-phase, oil filled	-	1	80/100/120 MVA, 230/132.8 to 134.5/19.9 kV, 709 kV BIL	Step up power from 34.5 kV collection voltage to 230-kV transmission voltage
Power circuit breaker	-	2	242 kV, 2,000 A, 40 kA interrupting capacity	Transformer and line protection
Coupling capacitor voltage transformer	-	2	242 kV, 900 kV BIL, 60 Hz, PT Ratio 1,200/2,000:1	Voltage source for protection and control
Disconnect switch, 242 kV, 900 kV BIL, group operated	-	2	242 kV, 2,000 A	For isolation of the power transformers, breakers and for isolating the substation from the interconnect transmission lines
Diesel power generator set	-	1	250 kW, 480 V	Installed at Main Services Complex
Fire water pump, electric	-	1	26 HP	Installed at Main Services Complex
Water Treatment	-	1	64,000 gpd	Automatic reverse osmosis system

Description	Approximate Quantity (per 1 MW_{AC} Solar Group)	Approximate Quantity (per 100 MW_{AC} Plant)	Approximate Size/Capacity	Remarks

Notes:

A	=	ampere (amp)
BIL	=	basic impulse level
gpd	=	gallons per day
HP	=	horsepower
Hz	=	hertz
INT	=	international
kA	=	kilo amps
kV	=	kilovolt
kVA	=	kilovolt amps
KVAR	=	kilovolt amp reactive
kWe	=	kilowatt-electric
MVA	=	mega volt amps
MVAR	=	mega volt amp reactive
MW	=	megawatts
V	=	volts
VAR	=	volt amp reactive
W	=	watts

Table 21. Significant Structures and Equipment

Description	Quantity	Length (feet)	Width (feet)	Height (feet)
PV power generating system tracker subgroup	400	420	190	7
Main Services Complex Administration/Maintenance building	1	60	70	14
Raw water storage tank, 200,000 to 300,000 gallons	1	40 to 60		20 to 30
Demineralized water tank	2	20		20
Potable Water Tank, 5,000 gallons	1	18		10
230-kV transmission line towers, double-circuit with upswept arms	85 to 100	—	32	90 to 110
Main Field Junction Box; distribution panel, 9 or 12 circuits, with circuit breakers in a weatherproof enclosure.	2,400	3	1.5	4
Inverter Package Main Cabinet, , distribution switchboard with twenty four 200 A circuit breakers	100	5	2	5
Power Inverter	200	12.8	4.5	8.5
Pad-mounted Transformer	100	8	8	7
Open bus switch rack, 35 kV, with four 35 kV, 1,200 A, 40 kVA INT, circuit breakers, insulators, switches, and bus work	1	90	20	30
Shunt capacitor bank, 34.5 kV, 75 MVAR switched in five each 15 MVAR steps	1	15	8	20*
Dynamic VAR (DVAR) compensation system in coordination with shunt capacitor banks (size to be determined by studies)	1	60	12	16
Disconnect switch, 35 kV, 2,000 A, 200 kV BIL, group-operated	1	3	11	16*
Power transformer, three phase, 100/150/350 MVA, 230/132.8-34.5/19.9 kV, 709 kV BIL, oil filled	1	15	35	23
Power circuit breaker, 242 kV, 2,000A, 40 kilo amp interrupting capacity	2	12	20	16
Coupling capacitor transformer for metering, 242 kV, 900 kV BIL, 60 Hertz, Potential Transformer ratio 1,200/2,000:1	1	1	1	25*
Disconnect switch, 242 kV, 2000A	2	10	25	25*

Notes:

*Includes structure height to provide electrical safety clearances to ground.

— = not applicable

A = ampere (amp)

BIL = basic impulse level

INT = international

kV = kilovolt

kVA = kilovolt amp

kVAR = kilovolt amp reactive

MVAR = mega volt amp reactive

V = volts

Source: Imperial Valley Solar, LLC, 2008.

2.9 Power Plant Construction

Construction Schedule

The project will be developed in three phases: Phase I (100 MW_{AC}), Phase II (150 MW_{AC}), and Phase III (100 to 150 MW_{AC}). Construction is anticipated to begin in the first quarter of 2013, concluding in the second quarter of 2014, followed thereafter with construction of Phase II, which is anticipated to be completed by the second quarter of 2017, and Phase III, which is anticipated to be completed by the second quarter of 2019. The actual schedule will depend on the terms of the PPA's secured.

2.10 Gravel, Aggregate, Concrete Needs, and Sources

Site Arrangement

During project construction and operations, the main access to the project site will be a gravel paved and polymeric (or equivalent) stabilized 24-foot wide main access road from Evan Hewes Highway, just west of Plaster City. It will provide access from the Evan Hewes Highway to the Main Services Complex, project substations, the solar fields, and the support facilities. The interior and perimeter feeder roads that will experience heavier traffic, that have steeper grades or which occur in drainages will be graveled and stabilized. Main Services Complex, the substations, the water treatment area, and parking areas will use polymeric stabilizers and gravel to improve access and minimize fugitive dust generation.

All other perimeter roads, solar field maintenance roads, temporary trailer storage areas, and roads for underground trenches will not be graveled except in very limited areas where steeper slopes or surface runoff requires gravel stabilization or dust control. Electrical Construction Activities

Construction of the high voltage system includes the substations, transmission line from the project site to the existing Imperial Valley Substation, and the supporting equipment and facilities. The new substations would be connected to the existing SDG&E Imperial Valley Substation via an approximately 11-mile, double-circuit, 230 kV transmission line. Other than this interconnection transmission line, no new transmission lines or off-site substations would be required. The transmission system is further described in section 1.3.5. The project first phase would include the construction new on-site 230 kV substations near the center of the project site, which would step up the 34.5 kV collection voltage to the 230 kV transmission voltage. The proposed project substations would consist of open air buses with multiple 35 kV collection feeder circuit breakers.

The MV system includes cabling, underground direct bury 34.5 kV lines, switches, disconnects, meters, transformers, riser poles, breakers, and similar equipment. The power control and power quality equipment, such as the capacitor banks and Dynamic VAR equipment will be located within the substation areas. Underground cables will be installed by trencher and cable trailer, or using automated underground cable installation equipment, or using buried conduit in limited locations. Each feeder breaker would be connected to one of the MV collector lines. In the majority of instances MV lines will be underground, but in a limited number of cases, overhead collection lines will be used where surface runoff or difficult topography makes overhead pole lines more feasible and less disruptive. Installation of these facilities will occur during the second month through the 80% complete portions of the construction phase.

Electrical Grounding

The electrical system may experience potential ground rise due to ground faults, lightning strikes, or switching surges. A grounding system will be installed to permit ground fault current dissipation.

The project substations' grounding-grid will consist of bare conductors installed below grade in a grid pattern. Grid spacing will be designed to maintain safe voltage gradients. Ground resistivity testing and calculations will be performed to determine the number and type of grounding electrodes and grid spacing necessary to ensure safe step and touch potentials under fault conditions. Each grid junction will be bonded together by an exothermic welding process or mechanical connectors.

Each PV tracking assembly within the solar field will be bonded to the foundation to provide localized grounding. Within project buildings, grounding conductors will bond to building structural steel, metallic piping, and non-energized electrical equipment metallic parts to the building grounding systems. Isolated grounding conductors will connect sensitive control systems to the building grounding systems.

Cathodic and Lightning Protection

The cathodic protection system will be designed and installed to control electrochemical corrosion of exterior surfaces of underground carbon steel, copper, aluminum, and stainless steel. Bottoms of - steel tanks and exterior surfaces of underground ductile or cast-iron pipe in contact with soil will be protected against corrosion. The type of cathodic protection system (galvanic or impressed current) will be based on soil characteristics, the amount of material to be protected, and the interference effects of any nearby cathodic protection systems.

Lightning protection will follow the NFPA 780 guidelines and will be provided where required for project structures and pumps.

2.11 Aviation Lighting

The Code of Federal Regulations Part 77 authorizes the FAA to establish the standard for determining obstruction in navigation space and sets forth requirements for notification of proposed construction. These regulations require notification for construction over a threshold height above ground level. Notification is also required if the obstruction is less than specified heights but falls within the restricted airspace in the approach to airports. The project is not located near an airport.

For this project, supporting structures for the proposed 230 kV transmission line will be shorter than the threshold height and will not encroach into restricted space. Therefore, no Notice of Construction or Alteration filing with the FAA is required, and no FAA lighting is anticipated.

2.12 Site Stabilization, Protection, and Reclamation Practices

Site stabilization, protection, and reclamation practices will be accomplished through erosion and dust control practices, as well as vegetation treatment.

Foundations

From the preliminary geotechnical investigation, all buildings and structures other than the PV arrays poles, pad-mounted transformers, and inverters will be supported on shallow spread footings. This includes the equipment pads (including project substation pads, fire water pump, standby generator pads, support structures (including the water treatment plant), and similar facilities taller than approximately 8 feet above the ground surface. Shorter facilities such as equipment cabinets, junction boxes, lightweight facilities, structures not subject to overturning forces, and pad-mounted transformers will use concrete or pre-cast pads or skids that spread the load.

The transmission line steel towers will require concrete footings that are between 20 feet and 30 feet below the surface. Deep foundations will be required for heavy items—such as the power transformers at the project substations and corner poles in the transmission line.

The tracker assemblies will be supported by metal pipes or masts that are hydraulically driven into the ground, so in the majority of instances no foundation will be required. These driven pipes are expected to be on average 10 feet long and 4 to 6 inches in diameter. In areas where the ground conditions are too rocky to drive in the pipe foundations, shallow drilled pier concrete foundations will be used.

Groundwater

A recent geotechnical investigation conducted for the project indicated that on-site depth to groundwater is greater than 45 feet. The deepest project excavations/penetrations are anticipated to be 20 feet deep for the transmission tower foundations. Therefore, it is not anticipated that groundwater will be encountered during construction. If groundwater is encountered and dewatering is required, then approved BMPs, such as those described in the State of California Stormwater BMP Handbook NS-2, dated January 2003, will be employed.

3. Related Facilities and Systems

3.1 Transmission System Interconnect

3.1.1 Existing and Proposed Transmission System

The project will be connected to the existing off-site Imperial Valley Substation via a new 11 mile 230 kV project transmission line. Energy from the project will be transmitted from the Imperial Valley Substation via the existing operating 500 kV Southwest Powerlink transmission line or the 500 kV Sunrise Powerlink transmission line currently under construction. Other than the project transmission line to be constructed by the Applicant and modifications to the Imperial Valley Substation, no new transmission line or off-site substation improvements will be required for the project.

3.1.2 Status of Power Purchase Agreements

IVSL is submitting bids to PG&E, SCE, and SDG&E for the 2011 California Utility Renewable Request for Offers (RFO) in June and July 2011. Bids will be for a capacity amount that would result in a build out of the site over a period of time. Some of the proposed terms are as follows.

- The initial contract term is 25 years.
- Utility commits to purchase all the output of IVSP.
- IVSP will be constructed on 4,750 acres of BLM managed land in Imperial County, California.

3.1.3 Status of Interconnect Agreement

The Applicant currently possesses an interconnection agreement executed on August 5, 2009 with CAISO and SDG&E for 600 MW.

3.1.4 General Design and Construction Standards

The project will meet all applicable design and construction standards and all applicable LORS.

3.2 Gas Supply System

A natural gas supply system is not used for this system—this section is not applicable.

3.3 Other Related Systems

3.3.1 Communications System Requirements (Microwave, Fiber Optics, Hard Wire, Wireless) During Construction and Operation

An underground and above-ground fiber optic communications cables will be installed to monitor the operating status and control the project. The various components of the SCADA system and the onboard controllers on each group of PV tracker assemblies will be interconnected with a system of underground and above-ground fiber optic cables that will generally be routed together with or adjacent to the

electrical collection system cables. One fiber optic cable, a microwave dish, and tower will be provided for communication with SDG&E and the CAISO.

Electric service for the main services complex will be provided by IID by backfeed from the Imperial Valley Substation. Data communications service will be provided by L3 Communications from existing underground communications lines on the north side of the railroad, south of the Evan Hewes Highway. This line will be extended onto the site adjacent to the main access road.

4. Operations and Maintenance

4.1 Operation and Facility Maintenance Needs

Plant operations and maintenance for the facility once in commercial operation will be managed by AES Solar using AES staff along with various contractors to perform specialized and general maintenance. The work will include maintenance and repair of the facility, including the PV modules, BOS and BOP, site security, and general maintenance such as groundskeeping.

AES Solar will perform preventive, predictive and corrective maintenance on the facility, including the PV generating systems, cabling systems, ancillary systems, plant buildings and infrastructure, substations, transmission line, etc.

AES Solar's operations and maintenance approach is to optimize plant availability and performance, consistent with safety and regulatory requirements. To achieve the desired performance levels, reliability, availability and maintainability have been designed into the facility systems with careful attention to minimizing system failure rates and ease of maintenance, coupled with the ability to exploit the modularity of the design for reduced planned and unplanned outage hours.

The PV generating, BOS and BOP systems are connected to the plant monitoring and control system from which all systems are monitored and operated, and maintenance actions are initiated.

The following features of the power plant help minimize O&M costs:

- Modular design for ease of maintenance
- 1.0 MW groups provide high availability
- Quick repair and replacement with "rotatable" spares minimizes "down-time"
- The ability to perform maintenance activities at night or in low light conditions when power generation is not affected

Project Operation

The project will be an "as-available" resource—it will operate anywhere between a minimum of approximately 25 MW_{AC} net when the first units are interconnected to the grid during the construction period to its maximum build-out upon completion of construction. The capability for independent operation of all 1.0 MW_{AC} blocks will provide maximum flexibility to operations.

The project will be dispatched by the CAISO, through day-ahead, hour-ahead, and real-time scheduling, as required to meet the demands of the Southern California market. The market will dictate unit operations and total power requirements.

The project will generate electric energy approximately 2,200 hours per annum and is expected to have an overall availability of 98 percent or higher. The trackers will track the sun from sunrise to sunset based on an internal preset clock. However, the number of available operating hours is determined by the availability of the sun's energy to start the invereters when the sun produces at least 100 watts per square meter (W/m^2). The PV tracker assemblies are designed for Imperial County Class C wind speeds of 85 miles per hour. Because of the geographical size of the IVSP, cloud cover and/or wind conditions may only affect a portion of IVSP at any given time.

It is expected that the project will be operated with a staff of approximately 15 full-time employees. The project will operate seven days per week, generating electricity during normal daylight hours when the solar energy is available. Regularly scheduled maintenance will occur 6 days a week, during early morning and late afternoon through evening hours. Occasionally maintenance activities will occur seven days a week, or may occasionally occur 24 hours a day to ensure availability when solar energy is available. Table 19 provides a projection of the breakdown of operating, maintenance, engineering, contract, and administration staffing by 3-month periods for the first 10 years of operation.

4.2 Maintenance Activities, Including Panel Washing and Road Maintenance

PV Plant Maintenance

PV plant maintenance is designed to minimize O&M costs and maximize facility performance. An integral component of the solar field is the PV modules, which are connected in groups called arrays. The plant performance monitoring system will be used to continuously monitor the performance of the PV arrays. When abnormal array performance is detected, an analysis will be done to identify modules that are performing poorly. This could be the result of a loose connection, a broken module or an underperforming module. Based on the diagnosis, the connection will be tightened or the broken module will be replaced. It is anticipated that for every 200 PV modules, one (1) spare PV module will be kept on-site in a rotating spare inventory for replacement purposes as necessary. It is anticipated that each PV module will have a service life of 25 years or more.

Other generation components require periodic predictive, preventive and corrective maintenance (e.g., tracker structures, inverters, electrical components, etc.) A routine schedule of periodic visual, mechanical and electrical inspections will be employed to identify potential maintenance issues and implement corrective actions. A stock of spare parts recommended by the equipment manufacturers will be maintained on site for use in maintaining high plant availability.

PV Panel Washing

The PV modules will be washed periodically throughout the life of the project, but will generally follow an annual cycle. Washing will occur prior to the peak generation months of the year (summer months) and periodically when another washing would sufficiently increase PV module efficiency to be economical.

Road Maintenance

As discussed elsewhere in the POD, road maintenance will occur periodically throughout the life of the project, but will be focused primarily on erosion in the soft areas of the roadway.

General Maintenance

Groundskeeping will be performed as required to keep vegetation from interfering with PV production, and general housekeeping will be performed to keep the site buildings, fencing, etc. in proper repair.

4.3 Operations Workforce and Equipment

Table 19 shows the projected maintenance and operations personnel requirements.

5. Environmental Considerations

Regulatory Environmental Review

As the prior project configuration included solar thermal technology, the CEC retained jurisdiction over IVSP, and was the lead agency for the CEQA process.

The BLM was the lead agency for the NEPA process for the prior project configuration. Per an August 2008 MOU, the BLM and the CEC agreed to a join environmental review process. A joint SA/DEIS was issued in February 2010.

The CEC continued the CEQA process and subsequently issued Part I of the SSA in July 2010 and Part II in August 2010. The PMPD was issued in August 2010, and the Final Decision was issued in September 2010.

The BLM continued the NEPA process and issued the FEIS in July 2010 and the Record of Decision (ROD) in October 2010.

The following adverse impacts that may still apply to the reconfigured reduced project are summarized in Section 4.21 of the FEIS.

- **Air Quality** - The project would not result in adverse air quality impacts after including mitigation measures that would reduce emissions through Best Available Control Technology (BACT), minimizing employee trips, and using lower emitting vehicles.
- **Biological** - Other than the Flat Tail Horned Lizard (FTHL), biological mitigation measures would reduce the severity of impacts to less than adverse. The FTHL would be impacted on the project site and within the transmission corridor. The environmental review process also determined that there would be impacts to the Peninsular Big Horn Sheep (PBHS) due to reduction of potential foraging habitat in the washes contained within the project site.
- **Climate Change** - The project would not result in adverse GHG emission impacts.

- **Cultural** – The FEIS determined that the project would result in unavoidable adverse impacts to cultural resources. For background, a Class III cultural resource surveys have been performed. Additionally, an eligibility assessment has recommended eligibility of resources for the California Register of Historical Resources (CRHR) and the National Register of Historic Places (NRHP). The Section 106 consultation process is currently still underway.

  A Programmatic Agreement (PA) was executed between several parties in September 2010 to provide a processes for the BLM and the USACE, in consultation with the California State Historic Preservation Officer (SHPO), Advisory Council on Historic Preservation (ACHP), Indian Tribes and other consulting parties, to take into account the effects of the project on historic properties and provide the ACHP a reasonable opportunity to comment as required by Section 106 of the National Historic Preservation Act. The CEC used this Agreement to satisfy the requirements of CEQA.

  The BLM, in consultation with the consulting parties to this Agreement, considered and incorporated within the Section 106 consultation process the performance standards (desired future condition), range of mitigation measures and commitment to mitigate, and monitoring requirements of the project.

- **Fire Management** - The project would not result in adverse fire management impacts.

- **Geology and Soils** - The design and construction of the project would not result in adverse geology and soils impacts.

- **Grazing** - The project would not result in adverse grazing impacts.

- **Land Use** – The conversion of land would disrupt recreational activities and reduce off-highway vehicle (OHV) access routes.

- **Noise** – While the previous project configuration had noise impacts mitigated by measures, it is not expected that the new PV project configuration will have impacts because PV technology does not produce noise.

- **Public Health and Safety/Hazardous Materials** - The project would not result in adverse public health and safety impacts. After implementing mitigation measures, the project would not result in adversely hazardous materials impacts.

- **Recreation** – As described in Land Use above, the conversion of land would disrupt recreational activities and reduce off-highway vehicle (OHV) access routes.

- **Socioeconomics** – The project would not result in adverse socioeconomic impacts.

- **Special Designations** – The project would not result in adverse wilderness area impacts.

- **Traffic** – The project would not result in adverse traffic impacts after implementing mitigation measures.

- **Visual** – While the previous project configuration had adverse visual impacts, it is expected that the new PV project configuration would greatly reduce those impacts as the height and visibility of the equipment is greatly reduced.

- **Water Use and Quality** – The project would not result in adverse water use and quality impacts after implementing mitigation measures.

- **Irreversible Commitment of Resources** – It was assumed that the project would irreversibly commit undeveloped lands to a solar project. However, the project would generate solar energy to reduce reliance on fossil fuels, so the commitment would be a positive effect.

- **Growth-Inducing Impacts** – Because the majority of the construction and operation workforces would reside in the local area, the project would have little impact on inducing population growth.

- **Short-term vs Long-term Productivity of the Environment** – The short-term impacts of construction activities include effects to the natural environment, cultural resources, and recreation resources. These can be compared to the long-term benefits of the project associated with clean, renewable energy production for a growing regional population and economy.

The following plans were developed for the compliance effort for the previous project configuration and are on file with the BLM. They continue to generally apply to the new project configuration, and will be updated accordingly.

- Air Quality Construction Mitigation Plan (AQCMP)
- Storm Water Pollution Prevention Plan (SWPPP)
- Biological, Cultural, and Paleontological Worker Environmental Awareness Program (WEAP)
- Raven Monitoring, Management, and Control Plan (RMMCP)
- Burrowing Owl Mitigation and Monitoring Plan (BOMMP)
- Weed Management Plan
- Decommissioning and Reclamation Plan
- Frac-Out Contingency Plan
- Hazardous Materials Business Plan (HMBP)
- Construction Health and Safety Program (CHSP)
- Drainage, Erosion, and Sedimentation Control Plan (DESCP)
- Noise Control Program
- Construction/Operation Waste Management Plan (CWMP)
- Reuse/Recycling Plan
- Storm Water Damage Monitoring and Response Plan (SWDMRP)
- Geotech Study
- Hydrological Study
- Sedimentation Study

6. Supplemental Information

6.1 Engineering and Civil Design

6.1.1 Facility Survey and Design Drawing Standards

The design and specification of work shall be in accordance with applicable laws and regulations of the federal government, the State of California, and with the applicable local codes and ordinances. The following LORS have been identified as applying to structural engineering design and construction. The edition and/or addenda to LORS that has been adopted and is in place at time of plant design and construction, shall apply to work performed for this facility.

Federal

Title 29 "Labor," Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health Standards. (29CFR1910).

State

- Business and Professional Code Chapter 7 "Professional Engineers" Sections 6700-6799. Requires state registration to practice as a Civil Engineer or Structural Engineer in California
- Labor Code Section 6500-6510, requires a permit for construction of trenches or excavations 5 feet or deeper where personnel have to descend. This also applies to construction or demolition of any building, structure, false work or scaffolding which is more than three stories high or equivalent
- Title 24, California Codes or Regulations (CCR) Section 2-111, et seq.; Sections 3-100, et seq.; Section 4-106 et seq.; Section 5-102, et seq.; Section 6-TS-769, et seq.; Section 6-T8-3233, et seq.; Section ST8-3270, et seq.; Section 6-T8-5138, et seq.; Section 6-T8-5465, et seq.; Section 6-T8-5531, et seq.; and Section 6-T8-5545, et seq. Adopts current edition of UBC as minimum legal building standards
- State of California Department of Transportation (Caltrans), Standard Specifications
- State of California Occupational Safety and Health Administration (CALOSHA) standards

County

Imperial County Development Services information can be found on the following website: http://www.icpds.com/.

Structural Engineering Design Criteria Industry Codes and Standards

General Design Requirements and Procedures

The following general design requirements and procedures will be followed in development of project specifications regarding the use of Codes and Industry Standards.

- Specifications for materials will generally follow the standard specifications of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI)

- Field and laboratory testing procedures for materials will follow standard ASTM specifications
- Design and placement of structural concrete will follow the recommended practices and the latest version of the American Concrete Institute (ACI), the International Code Council (ICC), CBC and the Concrete Reinforcing Steel Institute (CRSI)
- Design, fabrication, and erection of structural steel will follow the recommended practices and the latest version of the American Institute of Steel Construction Code (AISC) and CBC
- Steel components for metal wall panels and roof decking will conform to the American Iron and Steel Institute (AISI) North American Specification for Design of Cold-Formed Steel Structural Members
- Welding procedures and qualifications for welders will follow the recommended practices and codes of the American Welding Society (AWS)
- Preparation of metal surfaces for coating systems will follow the specifications and standard practices of the Steel Structures Painting Council (SSPC), National Association for Corrosion Engineers (NACE) and the specific instructions of the coatings manufacturer
- Fabrication and erection of grating will follow applicable standards of the National Association of Architectural Metals Manufacturers (NAAMM)
- Design and erection of masonry materials will follow the recommended practices and codes of the latest revision of the ACI Concrete Masonry Structures Design and Construction Manual, the CBC
- Plumbing will conform to the California Plumbing Code
- Design will conform to the requirements of the Federal and California Occupational Safety and Health Administration (OSHA and CALOSHA)
- Design of roof coverings will conform to the requirements of the NFPA

Codes and Industry Standards

The following Codes and Industry Standards shall be used:

- CEC, “Recommended Seismic Design Criteria for Non Nuclear Power Generating Facilities in California”
- CBC
- Structural Engineers Association of California, “Recommended Lateral Force Requirements and Tentative Commentary”
- Applied Technology Council, “Tentative Provision for the Development of Seismic Regulations for Buildings,” (ATC-3-06)
- American Institute of Steel Construction (AISC).
    - S335 - “Specification for Structural Steel Buildings-Allowable Stress Design and Commentary”
    - S303 - “Code of Standard Practice for Steel Buildings and Bridges”
    - S329 - “Allowable Stress Design Specifications for Structural joints using ASTM A325 or A490 Bolts”
    - S341 Seismic Provisions for Structural Steel Buildings

- M016 - "Manual of Steel Construction Allowable Stress Design"
- "Specification for Design, Fabrication and Erection of Structural Steel for Buildings"

- American Iron and Steel Institute (AISI)
  - Specification for the Design of Cold-Formed Steel Structural Members, Edition Cold-Formed Steel Design Manual Parts I-VII
  - North American Specifications for Design of Cold-Formed Steel Structural Members" All other members will be hot rolled shapes conforming to AISC
- AWS D1.1 American Welding Society (AWS) "Structural Welding Code-Steel"
- American Concrete Institute (ACI)
  - ACI 318/318R "Building Code Requirements for Structural Concrete (ACI 318) and Commentary (ACI 318R)"
  - ACI 318.1 and Commentary - ACI 318.IR
  - ACI 530 "Building Code Requirements for Concrete Masonry Structures and Commentary (ASCE 5) (TN4S 402)"
  - ACI 212.3R "Chemical Admixtures for Concrete"
  - ACI 302.lR "Guide for Concrete Floor and Slab Construction"
  - ACI 350/350R "Environmental Engineering Concrete Structures"
- Structural and Miscellaneous Steel
  - ASTM A569/A569M – "Standard Specifications for Steel Carbon (0.15 m maximum percent) Hot-Rolled Sheet and Strip, Commercial Quality"
  - ASME/ANSI STS-1 – "Steel stacks", except for circumferential stiffening which shall be in accordance with British Standard 4076 and except that seismic design shall be in accordance with LTBC
- American Society for Testing and Materials (ASTM). The following codes and standards shall be included as a minimum:
  - ASTM A36/A36M "Standard Specification for Structural Steel"
  - ASTM A53 "Standard Specification for Pipe, Steel Black and Hot-Dipped, Zinc Coated, Welded and Seamless"
  - ASTM A276 "Standard Specification for Stainless and Heat Resisting Steel Bars and Shapes"
  - ASTM A500 "Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes"
  - ASTM A695 "Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel'

- ASTM A307 “Standard Specification for Carbon Steel Bolts and Studs – 60000 psi Tensile Strength”
- ASTM A153/Al53 “Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware”
- ASTM A82 “Standard Specification for Steel Wire, Plain, for Concrete Reinforcement”
- ASTM A185 “Standard Specification for Welded Steel Wire Fabric, Plain, for Concrete Reinforcement”
- ASTM A615/A615 “Standard Specification Deformed and Plain Billet-Steel Bars for Concrete Reinforcement”

- Masonry Institute of America (MIA), “Reinforced Masonry Engineering Handbook”
- American Water Works Association (AWWA)
  - AWWA D100 - “Welded Steel Tanks for Water Storage, (AWS D5.2) “Addendum D100A (AWS D5.2-84A)”
  - AWWA C301 “Pre-stressed Concrete Pressure Pipe, Steel Cylinder Type for Water and Other Liquids”
  - AWWA C302 “Standards for Reinforced Concrete Water Pipe Non-cylinder Type, Not Pre-stressed”
- National Fire Protection Association Standards (NFPA)
- Steel Structures Painting Council Standards (SSPC)
- American Society of Nondestructive Testing (ASNT-TC-lA)
- Asphalt Institute (AI)
- Concrete Reinforcing Steel Institute (CRSI)

6.1.2 Final Engineering and Civil Design Packages

To be determined.

6.1.3 Watershed and Drainage Analysis and Calculations

To be determined.

6.1.4 Watershed Protection and Erosion Control Design Drawings

To be determined.

6.1.5 Final Site Grading Plans

To be determined.

6.1.6 Cadastral Survey Monuments

The applicant shall protect all survey monuments found within the right-of-way. Survey monuments include, but are not limited to, General Land Office and BLM Cadastral Survey Corners, reference corners, witness points, U.S. Coastal and Geodetic benchmarks and triangulation stations, military

control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any of the above, the applicant shall immediately report the incident, in writing, to the authorized officer and the respective installing authority if known. Where General Land Office or BLM right-of-way monuments or references are obliterated during operations, the applicant shall secure the services of a registered land surveyor or a Bureau cadastral surveyor to restore the disturbed monuments and references using surveying procedures found in the Manual of Surveying Instructions for the Survey of the Public Lands in the United States, latest edition. The applicant shall record such survey in the appropriate county and send a copy to the authorized officer. If the BLM cadastral surveyors or other Federal surveyors are used to restore the disturbed survey monument, the holder shall be responsible for the survey cost.

6.2 Stormwater Pollution Prevention and Protection Plan

The SWPPP was developed and updated in September 2010, and is on file with the BLM. This document will be edited to accommodate differences between the SES project and the PV project.

6.3 Hazardous Materials Safety Management/Business Plan

Hazardous Materials Safety Management Plan

The Hazardous Materials Safety Management Plan was developed in June 2010, and is on file with the BLM. This document will be edited to accommodate differences between the SES project and the PV project.

Hazardous Materials Business Plan

The Hazardous Materials Business Plan was developed and updated in November 2010, and is on file with the BLM. This document will be edited to accommodate differences between the SES project and the PV project.

6.4 Waste Management Plan

A Waste Management Plan was developed in June 2010 and is on file with the BLM. This document will be edited to accommodate differences between the SES project and the PV project.

6.5 Non-Native Invasive Weed Management Plan

A Non-Native Invasive Weed Management Plan was developed and updated in January 2011, and is on file with the BLM.

6.6 Construction Health and Safety Program

The Construction Health and Safety Program (CHSP) was developed in September 2010, and is on file with the BLM.

6.7 Facility Decommissioning

A Decommissioning Plan was developed and updated in December 2010, and is on file with the BLM. This will be further updated to reflect the new project configuration with PV technology and the reduced project acreage.