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Subject: **PALEN SOLAR HOLDINGS, LLC'S WASTEWATER DISCHARGE REQUIREMENTS**
PALEN SOLAR ELECTRIC GENERATING SYSTEM
DOCKET NO. (09-AFC-7C)

Enclosed for filing with the California Energy Commission is the electronic version of **PALEN SOLAR HOLDINGS, LLC'S WASTEWATER DISCHARGE REQUIREMENTS**, for Palen Solar Electric Generating System (09-AFC-7C).

Sincerely,

Marie Fleming

SOIL AND WATER
APPENDIX B

Waste Discharge Requirement
Facts for Waste Discharge

SOIL AND WATER RESOURCES – APPENDIX B

FACTS FOR WASTE DISCHARGE— Palen Solar ~~I~~Holdings, LLC, Owner/Operator, Palen Solar ~~Power Project~~ Electric Generating System, Riverside County

1. ~~Solar Millennium~~Palen Solar Holdings, LLC, (the Discharger) is proposing to construct, own and operate a concentrated solar power tower (CSP) electric generating facility and evaporation ponds ~~and a land treatment unit (LTU)~~ on land owned by the Bureau of Land Management (BLM). The solar power tower project is proposed by Palen Solar ~~I~~Holdings, LLC (~~PSI~~PSH) a ~~wholly~~ company jointly owned ~~subsidiary of Solar Millennium, LLC~~ by BrightSource Energy and Abengoa Solar, LLC. The project is located in the Chuckwalla Valley along the Interstate 10 corridor (I-10), east of Desert Center and west of the City of Blythe. The facility is referred to as the Palen Solar ~~Power Project~~ Electric Generating System (~~PSPP~~PSEGS or Project). A site map (**Figure 1**), as incorporated here in and made a part of these requirements for waste discharge (Waste Discharge Requirements, or WDRs). The address for~~, Solar Millennium, LLC 1625 Shattuck Ave. Ste 270, Berkeley, Ca 94709-1161~~ PSH is 1999 Harrison Street, Suite 2150, Oakland, CA 94612.

2. These WDRs regulate the Facility's ~~four~~ two evaporation ponds ~~and two LTUs~~. The evaporation ponds are designated as Class II Surface Impoundments Waste Management Units (WMU) and must meet the requirements of the California Code of Regulations (CCRs), Title 27, CCR §20200 et seq. The boundaries of the ~~Palen Solar Project~~ PSEGS are shown on **(Figure 2**), as incorporated here~~-~~in and made a part of these WDRs.

3. The Discharger submitted ~~two~~ one Report~~s~~ of Waste Discharge (ROWD), ~~January 6, 2010 for the LTU and~~ on May 25, 2010 for the evaporation ponds~~.~~ for the ~~Palen Solar Project~~ PSEGS.

4. Definition of terms used in these WDRs:

    a. **Facility** – The entire parcel of property where the proposed ~~Palen Solar Project~~ PSEGS industrial operation or related solar industrial activities are conducted.

    b. **Waste Management Units (WMUs)** – The area of land, or the portions of the Facility where wastes are discharged. The ~~LTU and the~~ evaporation ponds are WMUs.

    c. **Discharger** – The term Discharger means any person who discharges waste that could affect the quality of the waters of the State, and includes any person who owns the land, WMU or who is responsible for the operation of a WMU. Specifically, the terms "discharger" or "dischargers" in these WDRs means ~~Palen Solar I, LLC~~ PSH.

Facility Location

5. The ~~The Project~~ Facility site is located approximately 0.5 mile north of I-10 and approximately 10 miles east of Desert Center, in an unincorporated area of eastern Riverside County, California **(Figure 1)**. Desert Center (population 125) is located along I-10 approximately halfway between the cities of Indio and Blythe, California, and is approximately three miles east of the southeast end of Joshua Tree National Park. The area inside the Project's security fence, the footprint within which all Project facilities will be located, will occupy approximately 2,970 acres of Federal land managed by the BLM.

Surrounding Land Use

6. The Project site lies on 2,970 acres of vacant undeveloped desert located approximately 0.5 mile north of I-10 and 12 miles east of the small rural community of Desert Center. The Project site is not located in a designated wilderness area; however, it is located near lands that are designated as wilderness lands or Areas of Critical Environmental Concern (ACEC) (NECO Maps 2-38 and 2-4). The nearest Federal wilderness areas are located in mountainous land to the northeast and south of the Project site and referred to as the Palen/McCoy and Chuckwalla Mountains, respectively. The Chuckwalla Mountains are also designated by BLM as a Desert Wildlife Management Areas (DWMA); the Chuckwalla DWMA is located less than one mile south of the site and south of I-10. The Palen Dry Lake and dunes, located to the northeast of the Project site, are designated as ACEC. The edge of designated desert tortoise critical habitat extends into approximately 180 acres of the southwestern portion of the Facility.

7. South of I-10 is undeveloped public and private desert land. Undeveloped and irrigated desert is located west of the site where several large parcels are actively farmed. The nearest residence is located approximately 25 feet north of the Project's ROW boundary and approximately 1,000 feet from Unit #2. One other residence is located approximately 3,500 feet north of the Project boundary. No other residences are known to exist within the one-mile radius of the Project site.

8. The Project site is vegetated with desert scrub throughout and includes some sand dunes in the northeast. Several dirt roads and transmission lines cross the Project site, as well as four desert northeast-southwest trending washes. Based on information in Northern and Eastern Colorado Desert (NECO) Plan, the Project site has not been leased for grazing by BLM. The nearest grazing lands are the Ford Dry Lake grazing allotment approximately 10 miles east of the site and north of I-10.

9. The site is currently undeveloped and few off-highway vehicle tracks were observed. The site does not appear to be frequented as a recreational area. No portion of the Facility is known to be an active recreational area.

10. The NECO Plan does not identify any scenic resources in the Project Study Area. The County of Riverside has identified the I-10 corridor as eligible for county designation as a scenic corridor. The I-10 corridor between Palm Springs and Blythe is not designated by the State of California as a scenic corridor.

Facility Description

11. The~~ PSPP~~ PSEGS is comprised of two, nominally rated 250 MW power blocks. The performance of each power block will vary with solar radiation and ambient temperature levels. At optimal solar radiation and low air cooled condenser back pressure (low ambient temperatures), the steam turbine-generator can produce 272 MW gross. As ambient temperature increases, the cooling effectiveness of the air cooled condenser decreases, causing the back pressure on the steam turbine to rise and, correspondingly, lowering steam turbine output. Parasitic loads also vary in relation to ambient temperature, due to the increasing power requirement for the large air cooled condenser and cooling plant auxiliary equipment. At an ambient temperature of 96°F, the steam turbine generator will produce 264 MW and plant parasitic load will be approximately 29 MW providing a net-to-grid power block rating of approximately 235 MW. Conversely, on a cool winter day with optimal solar radiation, the steam turbine-generator will produce 272 MW, plant parasitic load will be approximately 28 MW and the net-to-grid power block rating will be approximately 244 MW.

12. The Project proposes to use dry cooling condenser for power plant cooling. Water for cooling tower makeup, process water makeup, and other industrial uses such as mirror washing will be supplied ~~U~~up to ten onsite wells. This source will also be used to supply water for employee use (e.g., drinking, showers, sinks, and toilets). Water received from the on-site wells will be pumped directly to a reverse osmosis (RO) treatment unit to meet the requirements of the California Department of Health Services for potable water supplies. Power cycle makeup, mirror washing water, and cooling of ancillary equipment will require on-site treatment for reduction of dissolved solids, and this treatment varies according to the quality required for each of these uses.

13. The power generation cycle will not produce cooling tower blow down because the plant will be dry cooled. A small auxiliary cooling tower will generate a small amount of blow down, which will be reused on site. No off-site backup cooling water supply is planned at this time.

14. The main waste stream at the site consists of industrial wastewater generated in the various processes associated with power generation. Industrial wastewater is treated via a high pH reverse osmosis at each of the two Power Units. At each Unit, the treated water is recycled to the ~~1,0~~800,000-gallon Service/Fire Water tank for reuse in the process. The concentrate from the RO system is discharged to lined evaporation ponds (~~two~~one per Unit). The~~ PSPP~~ PSEGS Facility therefore includes~~ four~~ two proposed evaporation ponds for waste storage and disposal. Sanitary wastewater generated at each Unit is disposed of via septic systems.

15. The project will include evaporation ponds for the evaporation of brine waste from the RO plant and other industrial wastes. There will be four ponds, four acres in size and, two within each power block **(Figure 2**). The evaporation ponds will be designed in accordance with Colorado River Basin Regional Water Quality Control Board (Regional Board) requirements.

~~16. The Project will include two LTUs to treat soil contaminated with HTF. Based on the release history from the NextEra LLC Kramer Junction Facility, which is a parabolic trough solar power plant that employs HTF in the same fashion as proposed for the PSPP and which also has LTUs, the PSPP LTUs have been designed in accordance with CCR Title 27 requirements and to receive about 1,666 cubic yards of impacted soil on an annual basis. There are two LTUs proposed for the Project. Each will cover an area of approximately 800 feet by 220 feet (4 acres) in the southern portion of the Project site **(Figure 2**). The LTUs will use indigenous bacteria and amendments to the soil to bioremediate HTF-affected soils to levels acceptable for reuse on site. Characterization of the hazardous characteristics of HTF-affected soil will be established by the Department of Toxic Substances Control (DTSC) prior to operation and remediation. Soils in excess of the criterion established by the DTSC will be removed from the site and transported to an appropriate treatment storage and disposal facility. Soil with HTF at concentrations below this criterion will be managed in the LTUs and remediated to acceptable levels for reuse as fill on site~~.

~~17~~16. The estimated project life for the Project is 30 years. Personnel will staff the Project 24 hours per day/seven days per week. Even when the solar power plant is not operating, personnel will be present as necessary for maintenance, to prepare the Project for startup, and/or for site security.

~~18~~17. A sanitary septic system and on-site leach field will be used to dispose of sanitary wastewater within each power block.

Climate

~~19~~18. The Project is located in an arid desert climate; therefore, there are extreme daily temperature changes, low annual precipitation, strong seasonal winds and mostly clear skies. Evaporation rates are higher than precipitation rates. Based on 60 years of data from Blythe Airport, the mean maximum temperatures in June to September exceed 100°F. Winter months are more moderate with mean maximum temperatures of high 60's to low 70's °F and minimum temperatures in the low to mid 40's °F. Although there are no average minimal temperatures below freezing point (32°F), the temperature has historically dropped below freezing point between November and March.

2019. Average annual evaporation in the Facility area, based on published data at the Indio Fire Station 70 miles west of the Project site, is 105 inches, of which 87 percent of that evaporation occurs between March and October. Average annual precipitation in the Project area, based on the gauging station at Blythe Airport, is 3.55 inches, with August recording the highest monthly average of 0.63 inches and June recording the lowest monthly average of 0.02 inches. Per the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 for the Southern California area, 3.51 inches of rainfall shall fall in the 100 year, 24 hour storm event.

2120. Winds in the Project area are generally south to southwest with a less frequent component of northerly winds (north through northwest). Calm conditions occur approximately 16.43% of the time, with the annual average wind speed being approximately 7.62 miles per hour (mph) (3.41 m/s).

Regional Topography and Drainage

2221. The Project Ssite is located on the alluvial sediments of the Chuckwalla Valley, and is 2 to 3 miles northeast of the Chuckwalla Mountains and approximately two miles southwest of the Palen Mountains. Surface water in the Chuckwalla Valley drains from the surrounding mountains toward Palen or Ford Dry Lakes (playas), the topographic low points within the valley.

2322. Site topography slopes gently to the northeast at grades of 1.4 percent or less. The general storm water flow pattern is from the higher elevations in the Chuckwalla Mountains, located approximately 6 miles southwest of the site, to the lower elevations in Chuckwalla Valley to the northeast. The site is mostly flat, with elevation ranging on United States Geological Survey (USGS) topographical maps from a high of about 625 feet above sea level at the southwestern limits of the site to a low of about 425 feet above sea level along the eastern site boundary. Storm water from the Project site flows to the northeast across the site and then southeast to a dry lake bed (Ford Dry Lake), which also receives overland flow from the Palen Mountains and the area toward I-10.

2423. The major watercourse in the Project area is Corn Springs Wash, which drains approximately 31 square miles of the Chuckwalla Mountains and flows northeast toward the Project site. Storm water flows and discharge from springs in the Chuckwalla Mountains travel through Corn Springs Wash and adjacent unnamed washes northeastward before being cut off by I-10. Storm water flows are intercepted by dikes located south of I-10 and conveyed to three box culverts that cut beneath the roadway of I-10, south (upgradient) of the Project site. These structures were constructed during construction of I-10 and are dikes and culverts that re-concentrate the flows back to three discrete discharge points on the north side of I-10. From these discharge points, storm water flows continue across the Project site flowing northeast towards Palen Mountains.

~~25~~24. Impacts to the ephemeral washes within the Project site will be mitigated by routing the washes in two new channels around the east and west sides of the facility and one through the center of the site (between Units #1 and #2). The new channels will be designed to be wildlife friendly, and drainage downstream of the site maintained as close as practicable to the pre-existing conditions. Storm Water Pollution Prevention Plans (SWPPP) and a CEC- mandated Drainage, Erosion, and Sediment Control Plan (DESCP) were provided in the August 2009 PSPP Application for Certification and contain Best Management Practices (BMPs), which will be implemented to avoid significant drainage/stormwater runoff and water quality impacts.

Flood Hazard

~~26~~25. According to FEMA, no flood insurance rate maps have been created for the Project site and adjacent areas. Reviews of flood zone maps generated by the Riverside County Flood Control District also did not identify any flood zone maps for this area of Riverside County.

Regional Geology

~~27~~26. The Facility is located in the northwestern Colorado Desert, in the alluvial-filled basin of the Palo Verde Mesa, which is part of the greater Colorado Desert Geomorphic Province. The basin is bound by the McCoy Mountains to the west, the Little Maria Mountains to the northwest, and the Big Maria Mountains to the northeast. This area has a generally low relief until near the surrounding mountains. In the region, the Palo Verde Valley is roughly equivalent to the recent historic floodplain of the Colorado River. Surficial deposits of late Miocene to Holocene age form most of the land surface in the area. Most of these deposits are composed of Quaternary Alluvium, underlain by the Pliocene Bouse Formation, which is in turn unconformably underlain by the Miocene Fanglomerate. These deposits are all underlain by bedrock consisting of metamorphic and igneous intrusive rocks of pre-Tertiary age, including Proterozoic schist and gneiss, Paleozoic sedimentary rocks, and Mesozoic sedimentary and metavolcanic rock sequences.

Site Specific Geology

~~28~~27. The Project is located in the alluvial-filled basin of the Chuckwalla Valley. Regionally, this valley formed as a structural depression or a pull-apart basin and is composed of two broad geologic units: consolidated rocks and unconsolidated alluvium (DWR 1963, 1979). The consolidated rocks consist of pre-Tertiary age igneous and metamorphic rocks, which form the basement complex, and in some locations, Tertiary-age volcanic rocks that overlie the basement complex. The consolidated rocks are nearly impermeable except for areas where fracturing or weathering has occurred. It is uncertain the extent that these rocks yield water to the alluvium. Some literature indicates that the fractured bedrock is in communication with the alluvium and there are wells that groundwater into and out of the bedrock is unknown.

Seismicity

~~29~~28. The Project site is located in seismically active Southern California, a region that has experienced numerous earthquakes in the past. A review of the Alquist Priolo (AP) Earthquake Fault Maps and the Riverside County AP Earthquake Hazard Zone Map indicate that there are no AP fault zones present within the Project boundaries (California Division of Mines and Geology 2000, California Geological Survey 2003, 2007). In addition, no active fault zones are present within one mile of the Project site; however, the site is approximately 2.5 miles southwest of an unnamed fault located at the southern end of the Palen Mountains. This fault has not been mapped by the USGS as a Quaternary (sufficiently active) fault, and is not listed by the EQFAULT program as a fault potentially affecting the site (Blake 2000).

~~30~~29. Regardless of whether there are faults across the site, because the Project is located in a seismically active area, all Project structures must be designed to comply with the California Building Code (CBC) and Universal Building Code (UBC) Zone 4 requirements. The CBC and UBC are considered to be standard safeguards against major structural failures and loss of life. The goals of the codes are to provide structures that will:

a. Resist minor earthquakes without damage;

b. Resist moderate earthquakes without structural damage but with some non-structural damage; and

c. Resist major earthquakes without collapse but with some structural and non-structural damage.

~~31~~30. The CBC and UBC base seismic design on minimum lateral seismic forces ("ground shaking"). The CBC and UBC requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes.

~~32~~31. The Project site is located in seismically active Southern California, a region that has experienced numerous earthquakes in the past. A review of the Alquist Priolo (AP) Earthquake Fault Maps and the Riverside County AP Earthquake Hazard Zone Map indicate that there are no AP fault zones present within the Project boundaries (California Division of Mines and Geology 2000, California Geological Survey 2003, 2007).

Ground Rupture

~~33~~32. The Project site is not located within a State of California Earthquake Fault Zone designated by the Alquist-Priolo Special Studies Zone Act of 1972 (formerly known as a Special Studies Zone), an area where the potential for fault rupture is considered probable (Riverside County, 2008). In addition, no Quaternary, Sufficiently Active, or Well Defined Faults are located under or near the Site. Based on this information and engineering judgment, earthquake-induced ground rupture is not considered to be a significant hazard at the Site.

Slope Stability

~~34~~33. The Project ~~S~~site is not considered to be an area with the potential for permanent ground displacement due to earthquake-induced landslides because surface topography at and near the site is relatively flat (Riverside County, 2008). A review of the Riverside County General Plan, Safety Element, did indicate areas considered susceptible to earthquake induced landslides and rock falls in the McCoy Mountains; however, these areas are several miles from the Site and are not expected to impact the Project. Based on this information and engineering judgment, slope instability is not considered to be a significant hazard at the Site.

Erosion

~~35~~34. Erosion is the displacement of solids (soil, mud, rock, and other particles) by wind, water, or ice and by downward or down-slope movement in response to gravity. Due to generally flat terrain, the Project site is not prone to significant mass wasting (gravity-driven erosion and non-fluvial sediment transport) at present. The Riverside County General Plan, Safety Element (Riverside County, 2008), indicates the Site is in an area with moderate potential for wind erosion, the off-site linears are in areas with moderate to high potential for wind erosion. Soil characteristics at the Project site allow for the potential for wind and water erosion, and significant sediment transport currently occurs across the valley axial drainage that crosses the majority of the proposed plant site. As indicated above, these valley axial deposits are characterized by subdued bar and swale topography and ongoing deposition from sheet floods. Limited sand and aeolian erosion also occurs between depositional episodes.

~~36~~35. To address the management of sediment transport, erosion and sedimentation during operation, the project design will incorporate diversion berms, channels, and dispersion structures. The final design for these features will be developed during detailed design, and will include industry-standard calculations and modeling to reduce the potential for erosion or sedimentation, and to reduce the need for ongoing maintenance. Dirt roads and exposed surfaces will be periodically treated with dust palliatives as needed to reduce wind erosion. Construction and maintenance of the proposed drainage and sediment management system at the Site is expected to reduce water and wind erosion at and downstream of the Site to less than significant levels.

Liquefaction

~~37~~36. Liquefaction is a soil condition in which seismically induced ground motion causes an increase in soil water pressure in saturated, loose, uniformly-graded sands, resulting in loss of soil shear strength. As a result, the effects of liquefaction can include loss of bearing strength, differential settlement, ground oscillations, lateral spreading, and flow failures or slumping. Liquefaction occurs primarily in areas where the groundwater table is within approximately 50 feet of the surface (Riverside County, 2008). The depth to water beneath the Site is estimated to be approximately 195 feet bgs. In addition, the sandy soils encountered in the upper 100 feet beneath the Project site during geotechnical drilling are generally dense and well graded. Dense, well-graded sands are not generally considered susceptible to liquefaction. Based on this information and engineering judgment, the potential for liquefaction hazard at the Project site is considered to be low. The potential for liquefaction will be further evaluated as part of the Final Geotechnical Investigation for the Project, and if necessary, design parameters to address identified conditions will be incorporated into the detailed project design.

Differential Settlement

~~38~~37. Seismically induced settlement can occur during moderate and large earthquakes in soft or loose, natural or fill soils that are located above the ground water table, resulting in differential settlement. The settlement can cause damage to surface and near-surface structures. The most susceptible soils are clean loose granular soils. Due to the expected dense to very dense nature of the near surface soils, the potential for damage due to seismically induced settlement is considered to be low at the Project site. The potential for seismically-induced settlement will be further evaluated as part of the Final Geotechnical Investigation for the Project, and if necessary, design parameters to address identified conditions will be incorporated into the detailed project design.

Collapsible Soil Conditions

~~39~~38. Alluvial soils in arid and semi-arid environments can have characteristics that make them prone to collapse with increase in moisture content and without increase in external loads. Soils that are especially susceptible to collapse or hydrocompaction in a desert environment are loose dry sands and silts, and soils that contain a significant fraction of water soluble salts. Overall soil gradation observed at the Facility site trended from coarser- to finer-grained alluvial deposits as distance from the McCoy Mountains increased. The ground surface in the western portion of the Project site is dominated by areas of desert pavement with layers of flat-lying gravel overlying finer-grained sandy materials. East toward Black Creek road, the surface becomes less dominated by desert pavement and becomes sandier. Soils observed at the Facility site have a low permeability and high runoff potential. Based on this data and engineering judgment, the site soils do not have a significant potential for hydrocompaction or collapse. The potential for hydrocompaction and soil collapse will be further evaluated as part of the Final Geotechnical Investigation for the Project, and if necessary, design parameters to address identified conditions will be incorporated into the detailed project design.

Expansive Soil

~~40~~39. Expansive soil is predominantly fine grained and contains clay minerals capable of absorbing water in their crystal structure. It is often found in areas that were historically a flood plain or lake area, but can also be associated with some types of shale, volcanic ash or other deposits, and can occur in hillside areas also. Expansive soil is subject to swelling and shrinkage, varying in proportion to the amount of moisture present in the soil. As water is initially introduced into the soil (by rainfall or watering) expansion takes place. If dried out, the soil will contract, often leaving small fissures or cracks. Excessive drying and wetting of the soil can progressively deteriorate structures that are not designed to resist this effect, and can lead to differential settlement under buildings and other improvements. The surficial soils at the site generally consist of predominantly granular soils that do not contain much clay and are not subject to significant expansion hazards. The potential for expansive soils will be further evaluated as part of the Final Geotechnical Investigation for the Project, and if necessary, design parameters to address identified conditions will be incorporated into the detailed project design.

~~41~~40. Based on the above information, the cut and fill slope dimensions and earthwork requirements will be adequate to address the stability of the evaporation ponds ~~and LTU~~ for the life of the ~~p~~Project and no further analysis is warranted.

Regional Hydrogeology

~~42~~41. The Recent-age (~11,000 years) younger alluvium consists of poorly-sorted gravel, sand, silt, and clay. The younger alluvium overlies the older geologic units as a thin veneer and is believed to be mostly above the water table. The Recent-age playa deposits consist mainly of clay, silt, and sand and occur in Ford and Palen Lakes and Hayfield Reservoir. During recent history, groundwater levels were shallower and groundwater likely discharged to Palen Dry Lake. Regional water level data suggests that water is possibly shallower than 25 feet below Palen Dry Lake, a depth which would suggest water may be lost or discharged through evapotranspiration. Recent groundwater levels below Ford Dry Lake show the water to be about 50 feet below the surface of the lake. At this depth, it is unlikely that water is lost through evapotranspiration. The dune sand deposits occur on the lower elevations of the valley from the northwest end of Chuckwalla Valley to the eastern end of the valley, and just northeast of the Project site.

~~43~~42. The older alluvium generally consists of fine to coarse sand inter-bedded with gravel, silt, and clay. The color ranges from dark brown to red, with abundant small white caliche nodules. This unit is assumed to be extensive, readily yields water to wells, and is considered the most important aquifer in the Chuckwalla Valley Groundwater Basin. It is believed that saturated sediments below the side to a depth of about 500 feet are older alluvial deposits.

Hydrostratigraphy

~~44~~43. The Pinto Formation consists of coarse fanglomerate and lacustrine clay with interbedded basalt. The DWR suggests (2004) that this unit yields limited quantities of water. Below the Pinto Formation, the PlioPleistocene Bouse Formation is comprised predominantly of coarse-grained fanglomerate deposits.

~~45~~44. Well logs were located through reports published by the DWR and through information provided in various reports. There are two wells on the Project site and one has a boring log with lithologic information available in a reported prepared by the DWR. The log for well 5S/17E-33N001 indicated surficial sands were encountered from the ground surface to 102 feet bgs; 18 feet of clay, sand and gravel were encountered from 102 feet to 120 feet bgs; clay was encountered between 120 and 208 feet bgs, sand and gravel were encountered from 208 to 216 feet bgs; clay streaks and sand were encountered from 216 feet to 556 feet bgs; and sand streaks and “sandstone cappings” were encountered within predominantly fine-grained materials between 556 feet and 758 feet bgs. It is possible that sediments encountered to a depth of 556feet bgs area older alluvial deposits. The log of well 5S/17E-33N001 does not have sufficient detail to readily discern the contact between the units reported for the Chuckwalla Valley Groundwater Basin.

~~46~~45. Boring logs could be found for only approximately 10 percent of the wells that were identified from an online database and literature within the basin. Available information provided in these logs was used to provide an understanding of subsurface conditions and develop a generalized geologic cross section for the Chuckwalla Valley Groundwater Basin. The limited geologic data revealed general variations in the sediments from the west to the east. In general, very few wells were drilled to the top of the basement or base of the fresh water in the Chuckwalla Valley Groundwater Basin. One well located on the eastern edge of the basin, due west of the gap to the Palo Verde Groundwater Basin, was drilled to a depth of about 1,200 feet bgs, where it encountered bedrock.

~~47~~46. In general, sediments on the western and eastern portions of the valley, and along the fringes of the basin are comprised of a higher percentage of coarse-grained sediments. These deposits are the proximal facies of coalescing alluvial fans. In the central portion of the valley and below the Project, sediments are generally composed of a much higher percentage of clay with subordinate amount of sand that occurs as layered inter-beds. These deposits have been interpreted as lacustrine deposits in the central portion of the basin. The wells located along the central portion of the valley and shown on the axial cross section through the valley appear to be completed within an inter-bedded sequence of alluvial fan and lacustrine deposits. Shallow sediment encountered below the Project consisted of very fine-grained silty sand and sand, suggesting distal fan facies. Interbedded clay with these sediments is probably lacustrine deposits. While the data is not conclusive these deposits to a depth of 538 feet are probably in the older alluvium.

~~48~~47. The basal portion of may be upper portions of the Bouse Formation. The deeper Fanglomerate was not encountered and it is likely that the Pinto Formation was also not found below the Project site based on the absence of interbedded basalt deposits.

On-site Drainage

~~49~~48. On-site storm water management for the completed facility will be provided through the use of source control techniques, site design and treatment control. The storm flows from the solar collector arrays will be treated through the use of swales, and ditches.

~~50~~49. Locations within the power block for the potential of chemical or oil releases will be fully contained. Rainfall within the containment areas will be allowed to evaporate or will be drained through an oil water separator. Locations within the power block where "contact" storm water may occur will be contained within a system of curbs or trenches. Drains from these curbed areas or containment trenches will be directed to an oil water separator. The oil separated and captured within the oil water separator will be trucked off-site to a licensed disposal/recycling facility. Clean water discharged from the oil water separator will be used on Project site by discharging it to the cooling tower or to the raw water storage tank. The water discharge from the oil water separator will not be discharged to the storm water system.

Facility Operational Water

~~51~~50. The Project will be dry cooled. The Project's various water uses include water for solar collector mirror washing, makeup for the SSG feed water, dust control, water for cooling plant auxiliary equipment, potable water and fire protection. Water needs for the Project will be met by use of groundwater pumped from wells on the Project site. The estimated water supply need for the Project operation is approximately 300 acre-feet per year.

Evaporation Ponds (Design and Installation Sequence)

~~52~~51. The containment strategy for the evaporation ponds is summarized as follows:

a. Meet or exceed regulatory requirements for containment of waste fluids;

b. Select materials that are compatible with the physical, chemical and thermal characteristics of the water and contaminated soils being contained;

c. Protect against physical damage to the containment layers by including protective layers into the designs of each containment facility;

d. Allow for occasional removal of contained media without otherwise damaging the integrity of the containment systems; and

e. Include the ability to monitor the integrity of the containment system, to transfer fluids out of permeable layers on a continuous basis, and to transfer fluids from one evaporation pond to another.

5352. Each 42.0 acre evaporation pond has a proposed design depth of seven feet which incorporates:

a. Drying each pond at alternating four year intervals;

b. 3 feet of operational depth;

c. 2 foot of sludge build up over 4 years; and

d. 2 feet of freeboard.

5453. The containment design for the evaporation ponds, from the surface of the evaporation ponds downwards, consists of the following:

a. A hard surface / protective layer;

b. A primary 60 mil high density polyethylene (HDPE) liner;

c. An interstitial leak detection system (LDS) comprising a drainage layer and piping;

d. A secondary 40 mil HDPE liner; and

e. A 2 foot thick compacted silty-sand base.; and

f. A moisture detection system.

5554. The hard surface / protective layer provides protection against accidental damage to the HDPE liners which could be caused by burrowing animals, falling objects, varying climatic conditions and worker activities. Second, the hard surface / protective layer will allow for occasional removal of the precipitated solids within the evaporation ponds. Various hard surface media such as reinforced concrete, roller compacted concrete, revetments, or combinations of these media will be assessed prior to the selection of the preferred option.

5655. High density polyethylene (HDPE) was selected as the preferred fabric for the primary and secondary liners for the following reasons:

a. It is chemically resistant to potentially high concentrations of dissolved salts;

b. It is very durable during installation;

c. It is strong and possesses desirable stress-strain characteristics; and

d. It is the most common synthetic liner material and as such there is a broad base of practical experience associated with the installation of HDPE amongst construction contractors.

5756. A 60 mil upper liner was selected to provide appropriate balance between strength and ductility characteristics, which is very important during liner installation. A non-woven geotextile will be installed on top of the 60 mil liner to act primarily as a protective layer. A 40 mil lower liner was selected for the lower and secondary liner to provide slightly better ductility and handling characteristics during installation, as strength is of lesser importance for the secondary liner. HDPE possesses large thermal expansion and contraction characteristics, and exhibits stress when liner temperature exceeds 122 ^{o}F. The temperature of the blowdown water is not expected to exceed 122^{o}F.

5857. A 2 foot thick basal layer of compacted silty sand is included in the design profile to protect the underlying groundwater in the unlikely event that both synthetic liner materials are punctured during construction or operation of the evaporation ponds. This base layer also serves to provide a smooth, competent surface to support the overlying synthetic liners and leak detection system layers.

Leak Detection System

5958. A drainage layer is included in the design profile for the evaporation ponds which consists of a granular drainage layer with perforated piping to collect and convey fluids to an extraction riser in a leak detection sump (LDS). Geocomposite drainage materials, consisting of HDPE geonet and nonwoven geotextiles heat bonded to one or both sides, may be used in conjunction with or as a substitute for the granular drainage layer on slopes.

6059. The water collected in the LDS will drain by gravity to a unique monitoring well that is constructed for each of the leak collection layer. Automated pneumatic, solar-powered pumping systems are included in the design of each of these monitoring wells to automatically return water to that pond, which in turn minimizes the hydraulic pressures across the secondary liners and therefore the risk of impact to groundwater quality.

6160. The base of the evaporation pond leak detection and collection layer will slope at a minimum inclination of 1 percent to a leak collection trench. The trench will contain screened sand (with no fines) and a perforated pipe that will slope at a minimum inclination of 3/4 percent towards a leak detection and collection sump, located at the lowest point in the pond. The water in the collection sump will drain by gravity to a monitoring well that is constructed for each evaporation pond (one well per pond). Automated pneumatic pumping systems in the monitoring wells will automatically return water collected in the sump to that evaporation pond, which in turn minimizes the hydraulic pressures across the secondary liners and, therefore, minimizes the risk of leakage through the secondary liner. Leakage rates will be measured using a flow totalizer.

~~62~~61. The collection sump, pipe, and monitoring well, will include prefabricated and field-fabricated HDPE components with water tight, extrusion welded and wedge-welded seams and penetrations. The liner system will be installed in accordance with current practices. Destructive and non-destructive testing procedures will be used to verify sump and penetration tightness and continuity.

~~63~~62. This design is consistent with CCR Title 27, Section 20340, which requires an LDRS between the liners for the evaporation ponds.

~~64~~63. The side slopes around the evaporation ponds will contain the same liner system as the base of the ponds, except that leak collection pipes will not be located on the pond side slopes.

~~65~~64. The berms shall be covered with a minimum 6-inch thick road base or approved equivalent. The top of the berms will be a minimum of 2 feet above the surrounding grade to prevent potential inflow of stormwater.

~~66~~65. The wastewater will come into contact with the hard surface/protective layer. The media for this layer will either be roller-compacted concrete or an approved equivalent alternate. All final media selection will be compatible with the wastewater by using quality concrete with maximum chemical resistance (specifications will be provided to the concrete manufacturer to ensure proper mix selection).

~~67~~66. If there is leakage in the evaporation pond, the wastewater will come into contact with the primary/secondary liner. HDPE is chemically resistant to saline solutions and long-term contact between the wastewater in the evaporation ponds and the HDPE liner system will not compromise liner integrity.

~~68~~67. The hard surface/protective layers, liner system, and base layer will have the ability to withstand the dissolved solids content of the water without degradation. These systems will not fail due to pressure gradients from physical contact with the wastewater and residue or undergo chemical reactions or degradation.

~~69~~68. The containment construction process will follow these general steps:

a. Prior to construction, the topsoil and subsoil covering the area will be stripped and stockpiled.

b. Placement and compaction of the silty sand base material;

c. Installation of the carrier pipe for the moisture detection (neutron probe) system beneath the base of the ponds;

d. Construction of finish grading to sub grade, as needed, and excavation of the leak collection trench and detection/collection sumps.

e. Scarification, moisture conditioning, compaction, proof rolling and testing of subgrade materials;

f. Installation of secondary HDPE liner;

g. Installation of leak detection layer, sump, and leak extraction risers;

h. Installation of primary HDPE liner;

i. Installation of the non-woven geomembrane liner;

j. Installation of granular fill;

k. Installation of liner protection layers; and l. Hard surface placement.

Waste Classification

7069. Wastewater from several processes within the Facility will be piped to two one 42.0- acre evaporation ponds per Unit (total combined area of 8 acres per Unit) for disposal. The pond area provides sufficient evaporative capacity to dispose of the anticipated wastewater stream, and allows for one pond to be taken out of service for up to approximately eight months for cleaning, potential future maintenance, and repair without impacting the operation of the plant. Raw water for the Facility is supplied from groundwater wells. Discharge into the evaporation ponds is from two one sources:

a. High pH RO (Reverse Osmosis Concentrate); and.

Wastewater Discharge

7170. The estimated concentrations of chemical constituents in the wastewater discharge to the evaporation ponds are provided in the **Table 1**, Raw Water Quality and Estimated Chemistry of Wastewater Flows. The total concentrations of chemical constituents estimated in the evaporation pond residue that will accumulate in the ponds during operation are provided in **Table 2**.

7271. Classification of wastewater and evaporation pond residue is summarized in the Classification of Wastewater and Evaporation Pond Residue **Table 3** below.

7372. Testing of this material will be conducted as part of the facility monitoring program to verify this characterization. The evaporation pond residue accumulated in the ponds is non hazardous; however, it does contain pollutants which could exceed water quality objectives if released, or that could be expected to affect the beneficial uses of waters of the state. Therefore, the evaporation pond residue is classified as a "designated waste."

Evaporation Residue

~~74~~73. During the 30-year operating life of the Project, about 6,400 tons of evaporites will accumulate in the ponds. However, because it is anticipated that wind- blown silt will accumulate in the ponds at a rate of perhaps 6 inches per year, it will be necessary to clean out the ponds on approximately four-year intervals. Assuming 2 feet of silt accumulation, the sludge removed from the ponds will be approximately nine percent evaporate and 91 percent silt. The predicted chemical makeup of the evaporite, based on information about the raw water chemistry and knowledge of the water use and treatment processes at the Project, is summarized in **Table 3**.

~~**Land Treatment Unit**~~

~~75. In compliance with Table 2.1 in CCR Title 27, Chapter 3, Subchapter 2, Article 2, Section 20210, solid designated wastes will be managed in full containment in a Class II LTU with a single liner system. The LTUs will be constructed to be above the level of a 100-year storm event and designed to meet seismic hazard criteria. In addition, the base of the LTUs will have a greater than 5-foot separation to the underlying groundwater. The location of the east and west LTUs are shown on **Figure 2**.~~

~~76. The LTU will not incorporate a liner containment system or leak detection and removal system, but will be constructed with a prepared base consisting of 2 feet of compacted, low permeability, lime-treated material. This base will serve as a competent platform for land treatment activities, and will serve to slow the rate of surface water infiltration in the treatment area. The compacted lime-treated and native soil beneath the LTU is designated as a "treatment zone" to a depth of 5 feet. Although the LTU will be taking vehicle traffic, no hard surface will be required, as there is no liner system to protect. A staging area is allocated in the LTU for storage of HTF-impacted soils while they are being characterized. Soil characterized as hazardous will be removed from the site; therefore, no additional liner system is required in the LTU to cater for the hazardous waste.~~

~~77. The LTU will be surrounded on all sides by a 2-foot high compacted earthen berm with side slopes of approximately 3:1 (horizontal: vertical). These berms will control and prevent potential inflow (run on) of surface storm water into the LTU or runoff of storm water from the unit.~~

~~78. The LTUs are sized based on data from an existing solar farm that uses an LTU to bioremediate HTFimpacted soil and the following basis:~~

a. ~~HTF-impacted soil is generated at a rate consistent with existing solar farm experience. Kramer Junction is a 150 MW facility that generates an average of 500 cubic yards (cyd) of HTF-impacted soil per year (DTSC correspondence, 1995). This rate is approximately 3.3 cyd/year/MW.~~

b. ~~Applying the Kramer Junction experience to the 500 MW Palen facility, the Palen facility is estimated to generate ~1,666 cyd/year of HTF-impacted soil.~~

c. ~~HTF-impacted soil is treated in 6-inches thicknesses, so, on average, 90,000 square feet or 2.1 acres is needed for HTF-impacted generated per year.~~

d. ~~The LTU will be used for either placement of HTF-impacted soil or treatment of HTF-impacted soil. That is at any one time the LTU is used to place material to be treated as it is generated or being used for soil treatment. HTF-impacted soil treatment is estimate to take 1 to 4 months to complete bio remediation; however the design of the LTU will allow soil placed at the beginning of the year to have up to twelve months to complete bioremediation and removal.~~

e. ~~To address above average spill events, Kramer Junction has additional capacity in the LTU or a factor of safety for HTF-impacted soil treatment. Kramer Junction has a capacity to treat 1,944 cyd/year and generates an average of 500 cyd/year of HTF-impacted soil, so the facility has ~ a 3.9 factor of safety. Applying this factor of safety to Palen, the total area estimated for LTU is approximately 350,000 square feet or 8 acres~~

79. ~~Treatment of HTF-impacted soil in the LTU will involve moisture conditioning and may involve addition of nitrogen and phosphorous nutrients (i.e., fertilizers) as needed to stimulate consumption of HTF by the indigenous bacteria. The HTF-impacted soil will be moisture conditioned and turned periodically as needed to enhance aeration, promote breakdown of HTF by the indigenous bacteria and/or to control dust emissions. Permanent or portable irrigation sprinklers will supply water to the area for dust control and to assist in treatment.~~

80. ~~Treatment piles may be covered by plastic sheeting as needed to enhance temperature and moisture retention characteristics, and as needed to control storm water contact, odors and dust emissions.~~

81. ~~The base layer construction process will follow these general steps:~~

a. ~~Prior to construction, the LTU will be stripped, grubbed and cleared of topsoil;~~

b. ~~General excavation and grading to sub grade will take place as needed;~~

~~c. Scarification and moisture conditioning of sub grade materials will take place; and~~

~~d. Placement, moisture conditioning, lime treatment, and compaction of native clayey silt material to form the base and perimeter berms will be completed before proof rolling after finish grading.~~

~~82. The LTU pad and berm construction will use standard cut and fill techniques. Native clayey silt material will be used to construct the pad and berms. The clayey silt material will be moisture conditioned and treated with at least 2 percent quicklime to achieve an R-Value of at least 40 to 50. Treatment and compaction of the material will be conducted using standard commercial lime treatment methods and equipment and compacted in lifts using a sheeps foot roller. The lime treated layer will be compacted to a minimum of 95 percent of the maximum dry density as determined by American Standard for Testing and Materials (ASTM) D1557. Field testing of the density of the soil will be performed at regular intervals. Compaction results will be recorded. After finish grading, the surface of the LTU pad and berms will be proof rolled.~~

~~Waste Classification~~

~~83. The HTF-affected soils will be characterized as hazardous or non hazardous waste prior to determination of whether the material can be treated at the LTU or must be removed for off-site disposal. Therefore, HTF affected soils will be relocated to a temporary staging area in the LTU and characterized consistent with U.S. Environmental Protection Agency (EPA) protocols. Soil sample of excavated HTF-affected soil will be collected in accordance with the EPA's current version of the manual "Test Methods for Evaluating Solid Waste" (SW-846) and the waste material will be characterized in accordance with State and Federal requirements. Soil samples will be analyzed for HTF constituents (Biphenyl and Diphenyl Ether) using modified EPA Method Modified 8015.~~

~~84. Prior to operation of the LTU and initiation of any on-site remediation of HTF, the waste stream will be characterized and a waste classification determination rendered by the DTSC. Initially, in addition to sampling for HTF, soil samples will also be analyzed for ignitability and toxicity using appropriate State and Federal methods to characterize the waste as hazardous or non-hazardous. Once a sufficient data set has been accumulated to allow characterization of the material as hazardous or non-hazardous waste based on HTF content and generator knowledge, the DTSC will be petitioned for a determination of waste classification for HTF-affected soils generated at the facility. Following this determination, subsequent samples will only be analyzed for HTF to determine disposition of the waste either for remediation or for transportation and disposal off site. If the soil is characterized as a hazardous waste, the impacted soils will be transported from the site by a licensed hazardous waste hauler for disposal at a licensed hazardous waste landfill or treatment storage and disposal facility (TSDF).~~

85. Based on the classification practice and management of similar waste stream at the Kramer Junction Solar Electric Generating System (SEGS) facility in Kern County, it is anticipated that soil containing 10,000 mg/kg HTF or more will be managed as hazardous waste, and that soil containing less than 10,000 mg/kg HTF will be non-hazardous waste and can be managed at the site. At the Kramer Junction facility, the DTSC issued a letter dated April 4, 1995, stating that soil contaminated with HTF "poses an insignificant hazard" and classifies the waste as non-hazardous for soils with a concentration of less than 10,000 mg/kg HTF pursuant to CCR Title 22, Section 66260.200(f). Given that the formulation of HTF has not changed significantly since this determination, it is anticipated that future waste characterization at PSPP will yield a similar result although the DTSC has indicated that this decision will be made on a project specific basis and the Kramer Junction classification does not necessarily ensure the same classification for the PSPP.

86. All HTF-affected soil classified as a hazardous waste will be removed for the site for proper off-site disposal; therefore the material in the LTU will be managed as a non-hazardous "designated waste" as defined in CCR Title 23, Chapter 15, Section 2522. Based on waste discharge requirements for similar sites, soil containing HTF in concentrations less than 100 mg/kg will not be regulated as a waste and could be reused as fill on site.

Waste Management

87. The LTU will be used to treat HTF-affected soil at various concentrations. Spills of HTF will be cleaned up within 48 hours and affected soil will be moved to a temporary staging area in the LTU where it will be placed on 60-mil plastic and covered with plastic sheeting pending receipt of analytical results and characterization of the waste material. As possible, free liquids will be removed using a vacuum truck. The liquids will be filtered and reused to the extent possible and reintroduced into the process. Filtrate that cannot be reused will be characterized, as appropriate though will likely be managed as hazardous waste, as the concentration in the filtrate will likely be more than 10,000 mg/kg HTF.

88. No HTF-affected soils characterized as hazardous waste will be disposed or treated on site. As stated previously, it is anticipated that soil containing 10,000 mg/kg HTF or more will be managed as hazardous waste, and that soil containing less than 10,000 mg/kg HTF will be managed at the site as non-hazardous waste. If the soil is characterized as a non-hazardous waste, it will be spread in the LTU for bioremediation treatment. In general, within the LTU, more highly contaminated soil will be covered with plastic sheeting to prevent contact with storm water and to control potential odors and emissions, as well as for moisture and temperature retention. Once the soil has been treated to a concentration of less than 100 mg/kg HTF, it will be moved from the LTU to another portion of the site until it is reused at the Project site as fill material.

89. Based on available operation data from other sites, it is anticipated that approximately 1,666 cubic yards (on average) of HTF-affected soil may be treated per year. Larger or smaller quantities could be generated during some years, depending on the frequency and size of leaks and spills.

9074. A Spill Prevention, Control, and Countermeasure (SPCC) Plan will be developed for the Project (refer to Section 13.4 for details). Periodically, equipment failures in and around mirror fields are expected at the Project that may result in spills of HTF onto soil.

91. Excess wastewater or rain fall may occasionally accumulate in the LTU. The LTU has been constructed with 2-foot high berms such that storm water will not drain into or from the LTU. Based on the frequency of storms in the area, it is anticipated accumulation of rainwater within the containment would occur on a yearly basis. Water that accumulates within the LTU will be sampled for HTF and amendments. If HTF is not detected above the practical quantitation limit (PQL) and amendment concentrations (i.e., nitrate, phosphate, TDS) are at or near background groundwater concentrations and below State of California primary or secondary maximum contaminant levels the water may be reused in the plant process. If HTF is detected and amendment concentrations exceed background or drinking water standards the waste will be properly disposed of at a licensed TSDF.

Hazardous Waste

9275. There will be a variety of chemicals stored and used during construction and operation of the project. The storage, handling, and use of all chemicals will be conducted in accordance with applicable laws, ordinances, regulations, and standards.

9376. Hazardous materials will be stored in proper containers in material yards and designated construction areas. Cleanup materials (spill kits) will also be stored in these areas. Fuel, oil, and hydraulic fluids used in on-site vehicles will be transferred directly from a service truck to construction equipment and will not otherwise be stored on site.

9477. Designated, trained service personnel will perform fueling either prior to the start of the workday or at completion of the workday. Service personnel and construction contractors will follow SOPs for filling and servicing construction equipment and vehicles.

9578. Any HTF impacted soil classified as hazardous will be removed from the LTU staging area after the initial characterization. The evaporation ponds will not contain hazardous wastewater or sludge as it is illegal to discharge hazardous waste into surface impoundments under the Toxic Pits Cleanup Act of 1984.

Basin Plan

~~96~~79. The Water Quality Control Plan for the Colorado River Basin Region of California (Basin Plan) was adopted on November 17, 1993, and designates the beneficial uses of ground and surface water in this Region.

~~97~~80. The Basin Plan designates beneficial uses for surface waters in each watershed of the Colorado River Basin region. Beneficial uses of surface waters within the Facility area and vicinity that could be impacted by the Facility include:

a. Agricultural use

b. Municipal use

c. Industrial use

d. Recreational use

e. Groundwater recharge

f. Wildlife habitat

g. Preservation of Rare, Threatened, or Endangered Species

~~98~~81. The beneficial uses of ground water in the Imperial Hydrological Unit are:

a. Municipal Supply (MUN)

b. Industrial Supply (IND)

c. Agricultural supply

Monitoring Parameters

~~99~~82. Based on the chemical characteristics of the projected discharges to the evaporation ponds from wastewater, the following list of monitoring parameters are required. These specific parameters are selected because they provide the best distinction between the wastewater and the groundwater in the Project area that can be used to differentiate a potential release that could change the chemical composition of the groundwater.

a. Cations: Antimony, Arsenic, Barium, Cadmium, Calcium, Total Chromium, Cobalt, Copper, Lead, Mercury, Nickel, Selenium, Zinc;

b. Anions: Chloride and Sulfate; and

c. Other: ~~HTF,~~ Total Dissolved Solids, Specific Conductivity, and pH.

California Environmental Quality Act (CEQA)

~~100~~83. The California Energy Commission (CEC) is the lead agency under the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) for all thermal power plants with power ratings of 50 MW or more. The CEC's power plant licensing process is a CEQA-equivalent process. The CEC will coordinate reviews and approvals with the regulatory agencies to ensure that the proposed project meets CEQA requirements. This includes obtaining these WDRs from the staff of the Regional Board. The CEC will certify this project and will include these WDRs as conditions of certification in accordance with the Warren-Alquist Act.[1]

Monitoring and Reporting Program

~~101~~84. The monitoring and reporting requirements in the Monitoring and Reporting Program (Appendix D), and the requirement to install groundwater monitoring wells, are necessary to determine compliance with these WDRs, and to determine the Facility's impacts, if any, on receiving water.

[1] The Warren-Alquist State Energy Resources Conservation and Development Act is the authorizing legislation for the California Energy Commission. The Act is codified at Public Resources Code (PRC) Section 25000 et seq.. PRC Section 25500 establishes the Commission's authority to certify all sites and related facilities for thermal power plants with power ratings of 50 megawatts or more. The section further declares that "the issuance of a certificate by the commission shall be in lieu of any permit, certificate, or similar document required by any state, local or regional agency, or federal agency to the extent permitted by federal law, for such use of the site and related facilities, and shall supersede any applicable statute, ordinance, or regulation of any state, local, or regional agency, or federal agency to the extent permitted by federal law."

Table 1
Raw Water Quality and Estimated Chemistry of Wastewater Streams

	Supply Water[1]	Wastewater to Evaporation Pond[2]	STCL[3]	TCLP[4]
24-Average Flow Rate (GPM)	63	8.748	---	---
Peak Operation Flow Rate (GPM)	97	14.636	---	---
Constituent	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Cations				
Calcium	31	48	---	---
Magnesium	4.7	12	---	---
Sodium	352	5,968	---	---
Potassium	4	10	---	---
Ammonia	<0.1	0		
Anions				
M-Alkinity			---	---
Sulfate	380	658	---	---
Chloride	200	3385	---	---
Nitrate	0.7	2	---	---
Silicon Dioxide			---	---
General Water Quality				
Bicarbonate	149	499	---	---
Carbonate	ND	121	---	---
OH				---
P-Alkalinity				
pH				---
Spec Cond			---	---
TDS	1010	10,725	---	---
Total Hardness (CaC0$_3$)	830	172		
Turbidity				
Total Phosphate	<0.31	0	---	---
Fluoride	6.1	4	180	---
Barium	31	0	---	---
Iron	<100	0	---	---
Total Suspended Solids	1960	12	---	---
Biological Oxygen Demand	<1		---	---

Table 1 Cont.
Raw Water Quality and Estimated Chemistry of Wastewater Streams

	Supply Water[1]	Wastewater to Evaporation Pond[2]	STCL[3]	TCLP[4]
Trace Metals				
Boron	1.8	4	--	--
Copper	<5	0	25	--
Molybdenum	73	176	350	--
Vanadium	<5	0	24	--
Zinc	22	0.17	250	--

1 - Water quality data from AFC Table Water 4, AECOM, 2009
2 - Water Quality data from AECOM Evaporation Pond Preliminary Design, Operations and Maintenance Plan, April 2010
3 - STLC = Soluble Threshold Limit Concentration, Regulated by CCR Title 22, Division 4.5, Article 3, Section 66261.24
4 - TCLP = Toxicity Characteristics Leaching Procedure; Regulate under 40 CFR Section 261.24

Source: AECOM ROWD May 25, 2010

Table 2:
Estimated Chemistry of Evaporation Pond Residue

	Concentration in Evaporation Pond Discharge	Total Residue Mass After 1 Years	Concentration in 50% dry solids	Concentration with silt, 50% dry	STLC	TTLC	TCLP
	mg/L	lbs	mg/kg	mg/kg	mg/L	mg/kg	mg/L
Aluminum	121	4.6	11	1	-	-	-
Arsenic	39	1.48	3-	0-	5.0	500	5.0
Barium	115	0.0	0	0	-	-	-
Boron	18	0.0	975	88	-	-	-
Calcium	48	1,849	4,328	389	-	-	-
Chloride	3,385	129,719	303,636	27,327	-	-	-
Copper	<5	0	0	0	-	-	-
Fluoride	4	166	389	35	180	18000	-
Iron	0	0	0	0	-	-	-
Magnesium	12	462	1,082	97	-	-	-
M-Alkalinity	-	-	-	-	-	-	-
Molybdenum	176	6.75	16	1	-	-	-
Nitrate	2	65	151	14	-	-	-
Phosphate	0	-	-	-	-	-	-
Potassium	10	396	928	84	-	-	-
Selenium	-	-	-	-	1.0	100	1.0
Silica	17	654	1,530	138	-	-	-
Sodium	5,968	228,711	535,350	48,181	-	-	-
Sulfate	658	25,232	59,061	5,315	-	-	-
Total Phosphate					-	-	-
Vanadium	0	-	-	-	-	-	-
Zinc	0.17	0	0	0	250	5000	-
TDS	7,932	--	-	-	-	-	-

Notes: Where a constituent was reported as "ND" the amount in the supply water was assumed to be zero (0) ppm. Reporting those constituents at their lower detection limit would change the results above.

Source: AECOM ROWD May 25, 2010

Table 3
Classification of Wastewater and Evaporation Pond Residue

Waste Stream	Waste Stream Compared To	Regulation	Waste Stream Characteristic	State & Federal Classification	CWC Section 13173 Classification[1]
Wastewater	Soluble Threshold Limit Concentration (STLC)	CCR Title 22, Chapter 11, Division 4.5, Article 3, Section 66261.24 “Characteristics of Toxicity”	<STLC	Non-hazardous	Designated waste
	Toxicity Characteristic Leaching Procedure (TCLP)	Code of Federal Regulations (CFR) Part 261, Section 261.24	<TCLP	Non-hazardous	Designated waste
Evaporation Pond Residue	STLC	CCR, Title 22, Chapter 11, Division 4.5, Article 3, Section 66261.24 “Characteristics of Toxicity”	<STLC	Non-hazardous	Designated waste
	Total Threshold Limit Concentration (TTLC)	CCR, Title 22, Chapter 11, Division 4.5, Article 3, Section 66261.24 “Characteristics of Toxicity”	<TTLC	Non-hazardous	Designated waste
	TCLP	Code of Federal Regulations (CFR) Part 261, Section 261.24	<TCLP	Non-hazardous	Designated waste

Source: AECOM ROWD May 25, 2010

SOIL AND WATER
APPENDIX C

Waste Discharge Requirement
Requirements for Waste Discharge

SOIL AND WATER RESOURCES – APPENDIX C

REQUIREMENTS FOR WASTE DISCHARGE—Palen Solar ~~1~~ Holdings, LLC, Owner/Operator, Palen Solar ~~Power Project~~ Electric Generating System, Riverside County

A. Discharge Specifications

1. The treatment or disposal of wastes at this Facility shall not cause pollution or nuisance as defined in Sections 13050 of Division 7 of the California Water Code (CWC).

2. The Discharger will maintain the monitoring wells in good working order at all times. Well maintenance may include periodic well re-development to remove sediments.

3. Thirty (30) days prior to introduction of a new waste stream into the evaporation ponds, the Discharger must receive approval from the Regional Board's Executive Officer.

4. Waste material shall be confined or discharged to the evaporation ponds ~~and LTU~~.

5. Prior to drilling a new well or abandoning a well at the Facility, the Discharger shall notify, in writing, the Regional Board's Executive Officer of the proposed change.

6. Containment of waste shall be limited to the areas designated for such activities. Any revision or modification of the designated waste containment area, or any proposed change in operation at the Facility that changes the nature and constituents of the waste produced must be submitted in writing to the Regional Board's Executive Officer for review and approval before the proposed change in operations or modification of the designated area is implemented.

7. Any substantial increase or change in the annual average volume of material to be discharged under this order at the Facility must be submitted in writing to the Regional Board's Executive Officer for review and approval.

8. If any portions of the evaporation ponds are to be closed, the Discharger shall notify the Regional Board's Executive Officer at least 180 days prior to beginning any partial or final closure activities.

9. Fluids and/or materials discharged to and/or contained in the evaporation ponds shall not overflow the ponds.

10. Prior to the use of new chemicals for the purposes of adjustment or control of microbes, pH, scale, and corrosion of the cooling tower water and wastewater, the Discharger shall notify the Regional Board's Executive Officer in writing.

11. For the liquids in the evaporation ponds, a minimum freeboard of two (2) feet shall be maintained at all times.

12. Final disposal of residual waste from cleanup of the evaporation ponds shall be accomplished to the satisfaction of the Regional Board's Executive Officer upon abandonment or closure of operations.

13. —The evaporation ponds shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods having a predicted frequency of once in 100 years.

14. Prior to removal of solid material that has accumulated in the evaporation ponds, an analysis of the material must be conducted and the material must be disposed of in a manner consistent with that analysis and applicable laws and regulations.

15. Conveyance systems throughout the Facility area shall be cleaned out at least every 90 days to prevent the buildup of solids.

16. Pipe maintenance and de-scaling activities that include hydroblasting and/or sandblasting shall be performed within a designated area that minimizes the potential for release to the environment. Waste generated as a result of these activities shall be disposed of in accordance with applicable laws and regulations. Water from the hydroblasting process shall be conveyed to the evaporation ponds.

17. Public contact with wastewater shall be precluded through such means as fences, signs, or other acceptable alternatives.

18. The evaporations ponds shall be managed and maintained to ensure their effectiveness, in particular,

19. Implementation of erosion control measures shall assure that small coves and irregularities are not created.

20. The liner beneath the evaporation ponds shall be appropriately maintained to ensure its proper functioning.

21. Solid material shall be removed from the evaporation ponds in a manner that minimizes the likelihood of damage to the liner.

22. Ninety (90) days prior to the cessation of discharge operations at the Facility, the Discharger shall submit a workplan, subject to approval of the Regional Board's

Executive Officer, for assessing the extent, if any, of contamination of natural geological materials and waters of the Chuckwalla Valley Groundwater Basin by the waste. One hundred twenty (120) days following workplan approval, the Discharger shall submit a technical report presenting results of the contamination assessment. A California Registered Civil Engineer or Certified Engineering Geologist must prepare the workplan, contamination assessment, and engineering report.

23. Upon ceasing operation at the Facility, all waste, all natural geologic material contaminated by waste, and all surplus or unprocessed material shall be removed from the site and disposed of in accordance with applicable laws and regulations.

24. The Discharger shall establish an irrevocable bond for closure in an amount acceptable to the Regional Board's Executive Officer or provide other means to ensure financial security for closure if closure is needed at the discharging site. The closure fund shall be established (or evidence of an existing closure fund shall be provided) within six (6) months of the adoption of this Order.

25. Surface drainage from tributary areas or subsurface sources, shall not contact or percolate through the waste discharged at this site.

26. The Discharger shall implement the attached Monitoring and Reporting Program, Appendix D, and revisions thereto, in order to detect, at the earliest opportunity, any unauthorized discharge of waste constituents from the Facility, or any impairment of beneficial uses associated with (caused by) discharges of waste to the brine pond.

27. The Discharger shall use the constituents listed in the attached Monitoring and Reporting Program, Appendix D, and revisions thereto, as "Monitoring Parameters".

28. The Discharger shall follow the Water Quality Protection Standard (WQPS) for detection monitoring established by the Regional Board. The following are parts of WQPS as established by the Regional Board's Executive Officer:

  a. The Discharger shall test for the monitoring parameters and the Constituents of Concern (COCs) listed in the Monitoring and Reporting R7-2010-0xxx and revisions thereto.

  b. Concentration Limits – The concentration limit for each monitoring parameter and constituents of concern for each monitoring point (as stated in the Detection Monitoring Program), shall be its statically determined background value or method detection limit, whichever is higher as obtained during that reporting period.

29. All current, revised, and/or proposed monitoring points must be approved by the Region Board's Executive Officer.

30. Water used for the process and site maintenance shall be limited to the amount necessary in the process, for dust control, and for Facility cleanup and maintenance.

31. The Discharger shall not cause or permit the release of pollutants, or waste constituents, in a manner which could cause or contribute to a condition of contamination, nuisance, or pollution to occur.

32. The Discharger must develop and implement a Hazardous Materials Business Plan (HMBP), which will include, at a minimum, procedures for:

    a. Hazardous materials handling, use, and storage;
    b. Emergency response;
    c. Spill control and prevention;
    d. Employee training; and
    e. Reporting and record keeping.

33. Hazardous materials expected to be used during construction include: unleaded gasoline, diesel fuel, oil, lubricants (i.e., motor oil, transmission fluid, and hydraulic fluid), solvents, adhesives, and paint materials. There are no feasible alternatives to these materials for construction or operation of construction vehicles and equipment, or for painting and caulking buildings and equipment.

34. The construction contractor will be responsible for assuring that the use, storage and handling of these materials will comply with applicable federal, state, and local laws, ordinances, regulations and standards (LORS), including licensing, personnel training, accumulation limits, reporting requirements, and recordkeeping.

35. During Facility operations, chemicals will be stored in chemical storage areas appropriately designed for their individual characteristics. Bulk chemicals will be stored outdoors on impervious surfaces in aboveground storage tanks with secondary containment. Secondary containment areas for bulk storage tanks will not have drains. Any chemical spills in these areas will be removed with portable equipment and reused or disposed of properly. Other chemicals will be stored and used in their delivery containers.

36. A portable storage trailer may be on site for storage of maintenance lube oils, chemicals, paints, and other construction materials, as needed. All drains and vent piping for volatile chemicals will be trapped and isolated from other drains to eliminate noxious vapors. The storage, containment, handling, and use of these chemicals will be managed in accordance with applicable laws, ordinances, regulations, and standards.

37. Small quantities of hazardous wastes will be generated over the course of construction. These may include paint, spent solvents, and spent welding materials. Some hazardous wastes will be recycled, including used oils from equipment maintenance, and oil-contaminated materials such as spent oil filters, rags, or other cleanup materials. Used oil must be recycled, and oil or heavy metal contaminated materials (e.g., filters) requiring disposal must be disposed of in a Class I waste disposal facility. Scale from pipe and equipment cleaning operations, and solids from the evaporation pond, will be disposed of in a similar manner.

38. All hazardous wastes generated during facility construction and operation must be handled and disposed of in accordance with applicable laws, ordinances, regulations, and standards. Any hazardous wastes generated during construction must be collected in hazardous waste accumulation containers near the point of generation and moved daily to the contractor's 90-day hazardous waste storage area located on site. The accumulated waste must subsequently be delivered to an authorized waste management facility. Hazardous wastes must be either recycled or managed and disposed of properly in a licensed Class I waste disposal facility authorized to accept the waste.

39. The Discharger shall monitor the evaporation ponds in conformance with applicable CCR Title 27 requirements for Class II surface impoundment waste management units.

40. The leachate collection and removal system must be used to provide preliminary detection monitoring of leaks through the top liner of the double- lined evaporation ponds. Physical evidence of leachate beneath the upper concrete liner shall be interpreted as a warning that containment of the evaporation pond contents may be compromised.

41. Groundwater monitoring wells must be constructed adjacent to and both up gradient and down gradient of the evaporation ponds to provide background and detection monitoring for any potential release from the evaporation ponds containment. The Point of Compliance to be used for the detection monitoring must be the uppermost groundwater beneath the evaporation pond. The groundwater monitoring wells must be constructed in conformance with Title 27 CCR Section 20415 requirements. The monitoring wells must be designed to meet the background and detection monitoring requirements in conformance with Title 27 CCR Section 20415(b)(1)(B) as applicable, including:

a. Providing a sufficient number of monitoring points to yield ground water samples from the uppermost aquifer that represent the quality of ground water passing the Point of Compliance and to allow for the detection of a release from the evaporation ponds;

b. Providing a sufficient number of monitoring points and background monitoring points installed at appropriate locations and depths to yield ground water samples from the uppermost aquifer to provide the best assurance of the earliest possible detection of a release from the evaporation ponds; and

c. Selecting monitoring point locations and depths that include the zone(s) of highest hydraulic conductivity in the ground water body monitored.

42. The detection monitoring wells shall be constructed to meet the well performance standards set forth in Title 27 CCR Section 20415(b)(4), as applicable, including:

43. All monitoring wells shall be cased and constructed in a manner that maintains the integrity of the monitoring well bore hole and prevents the bore hole from acting as a conduit for contaminant transport.

44. The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative ground water samples.

45. For each monitoring well, the annular space (i.e., the space between the bore hole and well casing) above and below the sampling interval shall be appropriately sealed to prevent entry of contaminants from the ground surface, entry of contaminants from the unsaturated zone, cross contamination between portions of the zone of saturation, and contamination of samples.

46. All monitoring wells shall be adequately developed to enable collection of representative ground water samples.

47. The monitoring program must also meet the general requirements set forth in Title 27 CCR Section 20415(e), which require that all monitoring systems be designed and certified by a registered geologist or a registered civil engineer. The applicable general requirements set forth for boring logs, quality assurance/quality control, sampling and analytical methods used, background sampling, data analysis, and other reporting as applicable will be implemented.

48. Baseline samples of the groundwater must be collected from each of the monitoring wells and analyzed prior to discharging wastewater to the evaporation ponds. The groundwater must be initially sampled for each of the proposed monitoring parameters listed in the attached Monitoring and Reporting Program, Appendix D, and any additional Constituents of Concern (COC) identified by the Regional Board.

B. Prohibitions

1. The discharge or deposit of solid waste to the evaporation ponds as a final form of disposal is prohibited, unless authorized by the Regional Board's Executive Officer.

2. The Discharger is prohibited from discharging, treating or composting at this site the following wastes:

   a. Municipal solid waste;

   b. Sludge (including sewage sludge, water treatment sludge, and industrial sludge);

   c. Septage;

   d. Liquid waste, unless specifically allowed by these WDRs or approved by the Regional Board's Executive Officer;

   e. Oily and greasy liquid waste; unless specifically allowed by these WDRs or approved by the Regional Board's Executive Officer;

   f. Hot, burning waste materials or ash.

3. The Discharger shall not cause degradation of any groundwater aquifer or water supply.

4. The discharge of waste to land not owned or controlled by the Discharger is prohibited.

5. Use of wastewater or cooling tower liquids on access roads, well pads, or other developed project locations for dust control is prohibited.

6. The discharge of hazardous or designated wastes to other than a waste management unit authorized to receive such waste is prohibited.

7. Any hazardous waste generated or stored at the facility will be contained and disposed in a manner that complies with federal and state regulations.

8. Wastewater or any fluids in the evaporation ponds shall not enter any canal, drainage, or drains (including subsurface drainage systems) which could provide flow to the Waters of the State.

9. The Discharger shall appropriately dispose of any materials, including fluids and sediments removed from the evaporation ponds.

10. The Discharger shall neither cause nor contribute to the contamination or pollution of ground water via the release of waste constituents in either liquid or gaseous phase.

11. Direct or indirect discharge of any waste to any surface water or surface drainage courses is prohibited.

12. The Discharger shall not cause the concentration of any Constituent of Concern or Monitoring Parameter to exceed its respective background value in any monitored medium at any Monitoring Point assigned for Detection Monitoring pursuant to the attached Monitoring and Reporting, Appendix D, and future revisions thereto.

C. Provisions

1. The Discharger shall comply with the attached Monitoring and Reporting Program, Appendix D, and future revisions thereto, as specified by the Regional Board's Executive Officer.

2. Unless otherwise approved by Regional Board's Executive Officer, all analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health. All analyses shall be conducted in accordance with the latest edition of "Guideline Establishing Test Procedures for Analysis of Pollutants", promulgated by the United States Environmental Protection Agency.

3. The laboratory shall use detection limits less than or equal to Environmental Protection Agency (EPA) Action Level/Maximum Contaminate Levels (MCLs) or California Department of Public Health (CDPH) Notification Level/MCL for all samples analyzed. The lowest concentration, whether EPA or CDPH, of the two agencies must be used for the analysis.

4. Prior to any change in ownership of this operation, the Discharger shall transmit a copy of the Board Order to the succeeding owner/operator, and forward a copy of the transmittal letter to the Regional Board.

5. Prior to any modification in this facility that would result in material change in the quality or quantity of discharge, or any material change in the location of discharge, the Discharger shall report all pertinent information in writing to the Regional Board's Executive Officer and obtain revised waste discharge requirements before any modification is implemented.

6. All permanent containment structures and erosion and drainage control systems shall be certified by a California Registered Civil Engineer or Certified Engineering Geologist as meeting the prescriptive standards and performance goals.

7. The Discharger shall ensure that all site-operating personnel are familiar with the content of these WDRs, and shall maintain a copy of these WDRs at the site.

8. These WDRs do not authorize violation of any federal, state, or local laws or regulations.

9. The Discharger shall allow the Regional Board, or an authorized representative, upon presentation of credential and other documents as may be required by law, to:

   a. Enter upon the premises regulated by these WDRs, or the place where records must be kept under the conditions of these WDRs;

   b. Have access to and copy, at reasonable times, any records that shall be kept under the condition of these WDRs;

   c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under these WDRs; and

   d. Sample or monitor at reasonable times, for the purpose of assuring compliance with these WDRs or as otherwise authorized by the CWC or California Code of Regulations, any substances or parameters at this location.

10. The Discharger shall comply with all of the conditions of these WDRs. Any noncompliance with these WDRs constitutes a violation of the Porter-Cologne Water Quality Act and may be grounds for enforcement action.

11. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with these WDRs. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.

12. These WDRs do not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

13. The Discharger shall comply with the following:

    a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

    b. The Discharger shall retain records of all monitoring information, copies of all reports required by these WDRs, and records of all data used to complete the application for these WDRs, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Board's Executive Officer at any time.

c. Records of monitoring information shall include:

   i. The date, exact places, and time of sampling or measurements.
   ii. The individual(s) who performed the sampling or measurements.
   iii. The date(s) analyses were performed.
   iv. The individual(s) responsible for reviewing the analyses.
   v. The results of such analyses.

d. Monitoring must be conducted according to test procedures described in the attached Monitoring and Reporting Program, Appendix D, unless other test procedures have been specified in these WDRs or approved by the Regional Board's Executive Officer.

14. All monitoring systems shall be readily accessible for sampling and inspection.

15. The Discharger is the responsible party for the WDRs, and the monitoring and reporting program for the Facility. The Discharger shall comply with all conditions of these WDRs. Violations may result in enforcement actions, requiring corrective action or imposing civil monetary liability.

16. The Discharger shall furnish, under penalty of perjury, technical monitoring program reports, and such reports shall be submitted in accordance with the specifications prepared by the Regional Board's Executive Officer. Such specifications are subject to periodic revisions as may be warranted.

17. The Discharger may be required to submit technical reports as directed by the Regional Board's Executive Officer.

18. The procedure for preparing samples for the analyses shall be consistent with the attached Monitoring and Reporting Program, Appendix D, and any future revisions thereto. The Monitoring Reports shall be certified to be true and correct, and signed, under penalty of perjury, by an authorized official of the company. All technical reports require the signature of a California Registered Professional Engineer or Professional Geologist.

19. All monitoring shall be done as described in Title 27 of the CCRs.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
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PALEN SOLAR ELECTRIC GENERATING SYSTEM AMENDMENT

Docket No. 09-AFC-07C
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(Revised 07/09/2013)

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Commissioners' Technical
Adviser for Facility Siting

DECLARATION OF SERVICE

I, Marie Fleming, declare that on July 25, 2013, I served and filed copies of PALEN SOLAR HOLDINGS, LLC'S WASTEWATER DISCHARGE REQUIREMENTS dated July 25, 2013. The most recent Proof of Service List, which I copied from the web page for this project at: http://www.energy.ca.gov, is attached to this Declaration.

(*Check one*)

For service to all other parties and filing with the Docket Unit at the Energy Commission:

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I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, and that I am over the age of 18 years.

Dated: July 25, 2013

Marie Fleming