DATE: July 10, 2010

TO: Mike Monasmith

FROM: Michael P. Donovan, P.G., C.Hg.

RE: Genesis Solar Energy Project - Changes to Conditions of Certification SOIL&WATER-3, 6, 8,11, Appendix B and parts of Conditions of Certification-2 and 20; Rejecting Applicant Changes to SOIL&WATER-4, 19, and parts of Conditions of Certification-2 and 20; and Proposing Changes to SOIL&WATER-17

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In its opening testimony, the applicant proposed some changes to staff's soil and water conditions of certification. The conditions included below reflect staff's partial acceptance of changes proposed to the soil and water conditions. The Conditions of Certification are as follows:

S&W-2: changes in A.1 are acceptable; changes in A.2 are not acceptable.

S&W-3: changes are acceptable

S&W-4: changes are not acceptable

S&W-6: changes are acceptable

S&W-8: changes are acceptable

S&W-11: changes are acceptable

S&W-17: changes are not acceptable, although staff would consider a program of reduced scope with dry cooling, and would agree to change the requirement to cease pumping from immediate cessation to within 30 days.

S&W-19: changes are not acceptable

S&W-20: Changes in the first paragraph are acceptable; changes in D.1. are acceptable, changes in D.2. are not acceptable, changes in E are acceptable, changes in E.1. are not acceptable, changes in E.3. are acceptable, changes in E.4. are acceptable, and changes to the verification are acceptable.

Appendix B: changes are acceptable

These changes are reflected in underline/strikeout in the following selected Conditions of Certification for the BSEP.

GROUNDWATER LEVEL MONITORING, MITIGATION, AND REPORTING

SOIL&WATER-2 The Project owner shall submit a Groundwater Level Monitoring and Reporting Plan to the CPM for review and approval. The Groundwater Level Monitoring and Reporting Plan shall provide detailed methodology for monitoring background and site groundwater levels. Monitoring shall include pre-construction, construction, and Project operation water use. The primary objective for the monitoring is to establish pre-construction and Project related groundwater level trends that can be quantitatively compared against observed and simulated trends near the Project pumping wells and near potentially impacted existing wells.

The Project owner shall:

A. Prior to Project Construction

1. A well reconnaissance shall be conducted to investigate and document the condition of existing water supply wells located within 10 miles of the project site for a wet-cooled project and within 2 miles of the project site for a dry-cooled project, provided that access is granted by the well owners. The reconnaissance will include sending notices by registered mail to all property owners within a 10 mile radius of the project ~~area~~site for a wet-cooled project and within 2 miles of the project site for a dry-cooled project.

2. Monitor to establish preconstruction conditions. The monitoring plan and network of monitoring wells will make use of the two test wells and observation wells installed during the Groundwater Resources Investigation completed by the applicant (WPAR, 2010) and any monitoring wells that are installed to comply with Waste Discharge Requirements issued by the RWQCB for the evaporation ponds and land treatment unit associated with the Project. In addition, up to four additional existing wells in the basin that are located up to 10 miles from the Project site (if wet cooling is utilized) or 2 miles (if dry cooling is utilized) will be incorporated into the program, provided access is granted by the owners and that the wells are deemed to be of suitable location and construction to satisfy the requirements for the monitoring program. The off-site wells incorporated in the program will include both shallower wells completed above the pumped interval and deeper wells completed within the pumped interval. The monitoring plan shall also include the identification of any seeps and or springs within one mile of the perimeter of the project site. The seeps and or springs shall be included in the groundwater level monitoring network.

3. Collect groundwater levels from the off-site and on-site wells, seeps and or springs to provide initial groundwater levels for both on-site and off-site wells.

4. Map groundwater levels within the CVGB within 10 miles of the site from the groundwater data collected prior to construction. Update trend plots and statistical analyses, as data is available.

B. During Construction:

1. Collect water levels within the monitoring network and seeps and or springs on a quarterly basis throughout the construction period and at the end of the construction period. In addition, collect continuous water level measurements from two shallow (water table) wells at the site using recording pressure transducers. Perform statistical trend analysis for water levels data. Assess the significance of an apparent trend and estimate the magnitude of that trend. Use pressure transducer data to characterize seasonal and diurnal fluctuations in groundwater levels.

C. During Operation:

1. On a quarterly basis for the first year of operation and semi-annually thereafter for the following four years, collect water level measurements from any wells and seeps and or springs identified in the groundwater monitoring program to evaluate operational influence from the Project. In addition, collect continuous water level measurements from two shallow (water table) wells at the site using recording pressure transducers. Quarterly operational parameters (i.e., pumping rate) of the water supply wells shall be monitored. Additionally, quarterly groundwater-use in the eastern CVGB shall be estimated based on available data.

2. On an annual basis, perform statistical trend analysis for water levels and comparison to predicted water level declines due to project pumping. Analysis of the significance of an apparent trend shall be determined and the magnitude of that trend estimated. Use the pressure transducer data to characterize seasonal and diurnal fluctuations in groundwater levels. Based on the results of the statistical trend analyses and comparison to predicted water level declines due to Project pumping, the Project owner shall determine the area where the Project pumping has induced a drawdown in the water supply at a level of 5 feet or more below the baseline trend.

3. If water levels have been lowered more than 5 feet below pre-site operational trends, and monitoring data provided by the Project owner show these water level changes are different from background trends or influences by other groundwater pumpers and are caused by Project pumping, then the Project owner shall provide mitigation to the well owner(s) if impacted. Mitigation shall be provided to the impacted well owners that experience 5 feet or more of Project-induced drawdown if the CPM's inspection of the well monitoring data confirms the drawdown (or a portion thereof) is the result of Project-related changes to water levels and water level trends relative to measured pre-project

water levels, and the well yield or performance has been significantly affected by Project pumping. The type and extent of mitigation shall be determined by the amount of water level decline induced by the Project, the type of impact, and site specific well construction and water use characteristics. If an impact is determined to be caused by drawdown from more than one source, the level of mitigation provided shall be proportional to the amount of drawdown induced by the Project relative to other sources. In order to be eligible, a well owner must provide documentation of the well location and construction, including pump intake depth, and that the well was constructed and usable before Project pumping was initiated. The mitigation of impacts shall be determined as follows:

a. If Project pumping has lowered water levels and increased pumping lifts, increased energy costs shall be calculated. Payment or reimbursement for the increased costs shall be provided at the option of the affected well owner on an annual basis. In the absence of specific electrical use data supplied by the well owner, the Project owner shall use **SOIL&WATER-3** to calculate increased energy costs.

b. If groundwater monitoring data indicate Project pumping has lowered water levels below the top of the well screen, and the well yield is shown to have decreased by 10 percent or more of the initial yield, compensation shall be provided for the diagnosis and maintenance to treat and remove encrustation from the well screen. Reimbursement shall be provided at an amount equal to the customary local cost of performing the necessary diagnosis and maintenance for well screen encrustation. Should well yield reductions be reoccurring, the Project owner shall provide payment or reimbursement for either periodic maintenance throughout the life of the Project or, if treatment is anticipated to be required more frequently than every 3-5 years, replacement of the well.

c. If Project pumping has lowered water levels to significantly impact well yield so that it can no longer meet its intended purpose, causes the well to go dry, or cause casing collapse, payment or reimbursement of an amount equal to the cost of deepening or replacing the well shall be provided to accommodate these effects. Payment or reimbursement shall be at an amount equal to the customary local cost of deepening the existing well or constructing a new well of comparable design and yield (only deeper). The demand for water, which determines the required well yield, shall be determined on a per well basis using well owner interviews and field verification of property conditions and water requirements compiled as part of the pre-project well reconnaissance. Well yield shall be considered significantly impacted if it is incapable of

meeting 110 percent of the well owner's maximum daily demand, dry-season demand, or annual demand – assuming the pre-project well yield documented by the initial well reconnaissance met or exceeded these yield levels. For already low-yielding wells identified prior to Project construction, a reduction due solely to Project pumping of 10 percent or more below the pre-project yield shall be considered a significant impact. The contribution of Project pumping to observed decreases in observed well yield shall be determined by interpretation of the groundwater monitoring data collected and shall take into consideration the effect of other nearby pumping and the condition of the well prior to the commencement of project pumping.

d. The Project owner shall notify any owners of the impacted wells within one month of CPM approval of the compensation analysis for increased energy costs.

e. Pump lowering – In the event that groundwater is lowered as a result of Project pumping to an extent where pumps are exposed but well screens remain submerged the pumps shall be lowered to maintain production in the well. The Project shall reimburse the impacted well owner for the costs associated with lowering pumps in proportion to the Project's contribution to the lowering of the groundwater table that resulted in the impact..

f. Deepening of wells – If the groundwater is lowered enough as a result of Project pumping that well screens and/or pump intakes are exposed, and pump lowering is not an option such affected wells shall be deepened or new wells constructed. The Project shall reimburse the impacted well owner for all costs associated with deepening existing wells or constructing new wells in proportion to the Project's contribution to the lowering of the water table that resulted in the impact.

4. After the first five-year operational and monitoring period the CPM shall evaluate the data and determine if the monitoring program water level measurement frequencies should be revised or eliminated. Revision or elimination of any monitoring program elements shall be based on the consistency of the data collected. The determination of whether the monitoring program should be revised or eliminated shall be made by the CPM.

5. At the end of every subsequent five-year monitoring period, the collected data shall be evaluated by the CPM and they shall determine if the sampling frequency should be revised or eliminated.

6. During the life of the Project, the Project owner shall provide to the CPM all monitoring reports, complaints, studies and other relevant data within ten (10) days of being received by the Project owner.

Verification: The Project owner shall do all of the following:

1. At least thirty (30) days prior to Project construction, the Project owner shall submit to the CPM, a comprehensive report presenting all the data and information required in item A above.

2. The Project owner shall submit to the CPM all calculations and assumptions made in development of the report data and interpretations.

3. During Project construction, the Project owner shall submit to the CPM quarterly reports presenting all the data and information required in item B above.

4. The Project owner shall submit to the CPM all calculations and assumptions made in development of the report data and interpretations.

5. No later than sixty (60) days after commencing Project operation, the Project owner shall provide to the CPM for review and approval, documentation showing that any mitigation to private well owners during Project construction was satisfied, based on the requirements of the property owner as determined by the CPM.

6. During Project operation, the Project owner shall submit to the CPM, applicable quarterly, semi-annual and annual reports presenting all the data and information required in item C above. Quarterly reports shall be submitted to the CPM thirty (30) days following the end of the quarter. The 4th quarter report shall serve as the annual report, and will be provided on January 31 in the following year.

7. The Project owner shall submit to the both the CPM all calculations and assumptions made in development of report data and interpretations, calculations, and assumptions used in development of any reports.

8. The Project owner shall provide mitigation as described in item 3.c above, if the CPM's inspection of the monitoring information confirms Project-induced changes to water levels and water level trends relative to measured pre-project water levels, and well yield has been lowered by Project pumping. The type and extent of mitigation shall be determined by the amount of water level decline and site specific well construction and water use characteristics. The mitigation of impacts will be determined as set forth in item 3.c above.

9. If mitigation includes monetary compensation, the Project owner shall provide documentation to the CPM that compensation payments have been made by March 31 of each year of Project operation or, if lump-sum payment are made, payment is made by March 31 following the first year of operation only. Within thirty (30) days after compensation is paid, the Project owner shall submit to the CPM a compliance report describing compensation for increased energy costs necessary to comply with the provisions of this condition.

10. After the first five year operational and monitoring period, the Project owner shall submit a 5-year monitoring report to the CPM that submits all monitoring data collected and provides a summary of the findings. The CPM will determine if the water level measurement frequencies should be revised or eliminated.

SOIL&WATER-3: Where it is determined that the Project owner shall reimburse a private well owner for increased energy costs identified as a result of analysis performed in Condition of Certification **SOIL&WATER-2~~5~~,** the Project owner shall calculate the compensation owed to any owner of an impacted well as described below.

Increased cost for energy	= change in lift/total system head x total energy consumption x costs/unit of energy

Where:

change in lift (ft)	= calculated change in water level in the well resulting from project
total system head (ft)	= elevation head + discharge pressure head
elevation head (ft)	= difference in elevation between wellhead discharge pressure gauge and water level in well during pumping.
discharge pressure head (ft)	= pressure at wellhead discharge gauge (psi) X 2.31

The Project owner shall submit to the CPM for review and approval the documentation showing which well owners must be compensated for increased energy costs and that the proposed amount is sufficient compensation to comply with the provisions of this condition.

- Any reimbursements (either lump sum or annual) to impacted well owners shall be only to those well owners whose wells were in service within six months of the Commission decision and ~~within a 3-mile radius of the project site~~that experience more than 5 feet of project-induced drawdown.
- The Project owner shall notify all owners of the impacted wells within one month of the CPM approval of the compensation analysis for increase energy costs.
- Compensation shall be provided on either a one-time lump-sum basis, or on an annual basis, as described below.

Annual Compensation: Compensation provided on an annual basis shall be calculated prospectively for each year by estimating energy costs that will be incurred to provide the additional lift required as a result of the project. With the permission of the impacted well owner, the Project owner shall provide energy meters for each well or well field affected by the project. The impacted well owner to receive compensation must provide documentation of energy consumption in the form of meter readings, calculations based on pump characteristics and volumes pumped, or other verification of fuel consumption. For each year after the first year of operation, the Project owner shall include an adjustment for any deviations between projected and actual energy costs for the previous calendar year.

One-Time Lump-Sum Compensation: Compensation provided on a one-time lump-sum basis shall be based on a well-interference analysis, assuming the maximum projected project-pumping rates ~~of 600 afy~~for a wet-cooled or

dry-cooled project, as applicable. Compensation associated with increased pumping lift for the life of the project shall be estimated as a lump sum payment as follows:

- The current cost of energy to the affected party considering time of use or tiers of energy cost applicable to the party's billing of electricity from the utility providing electric service, or a reasonable equivalent if the party independently generates their electricity;
- An annual inflation factor for energy cost of 3 percent; and
- A net present value determination assuming a term of 30 years and a discount rate of 9 percent;

Verification: The Project owner shall do all of the following:

1. No later than thirty (30) days after CPM approval of the well drawdown analysis, the Project owner shall submit to the CPM for review and approval all documentation and calculations describing necessary compensation for energy costs associated with additional lift requirements.
2. The Project owner shall submit to the CPM all calculations, along with any letters signed by the well owners indicating agreement with the calculations, and the name and phone numbers of those well owners that do not agree with the calculations.

Compensation payments shall be made by March 31 of each year of project operation or, if lump-sum payment is selected, payment shall be made by March 31 of the first year of operation only. Within thirty (30) days after compensation is paid, the Project owner shall submit to the CPM a compliance report describing compensation for increased energy costs necessary to comply with the provisions of this condition.

WASTE DISCHARGE REQUIREMENTS

SOIL&WATER-6: The Project owner shall comply with the requirements specified in Appendix B, C, and D. These requirements relate to discharges, or potential discharges, of waste that could affect the quality of waters of the state, and were developed in consultation with staff of the State Water Resources Control Board and/or the applicable California Regional Water Quality Control Board (hereafter "Water Boards"). It is the Commission's intent that these requirements be enforceable by both the Commission and the Water Boards. In furtherance of that objective, the Commission hereby delegates the enforcement of these requirements, and associated monitoring, inspection and annual fee collection authority, to the Water Boards. Accordingly, the Commission and the Water Board shall confer with each other and coordinate, as needed, in the enforcement of the requirements. The Project owner shall pay the annual waste discharge permit fee associated with this facility to the Water Boards. In addition, the Water Boards may "prescribe" these requirements as waste discharge requirements pursuant to Water Code Section 13263 solely for the purposes of enforcement, monitoring, inspection,

and the assessment of annual fees, consistent with Public Resources Code Section 25531, subdivision (c)

Verification: No later than sixty (60) days prior to any wastewater ~~or storm water~~ discharge or use of land treatment units, the Project owner shall provide documentation to the CPM, with copies to the CRBWQCB, demonstrating compliance with the WDRs established in Appendices B, C, ~~D,~~ and D~~E~~. Any changes to the design, construction, or operation of the evaporation basins, treatment units, or associated storm water system shall be requested in writing to the CPM, with copies to the CRBWQCB, and approved by the CPM, in consultation with the CRBWQCB, prior to initiation of any changes. The Project owner shall provide to the CPM, with copies to the CRBWQCB, all monitoring reports required by the WDRs, and fully explain any violations, exceedances, enforcement actions, or corrective actions related to construction or operation of the evaporation basins, treatment units, or storm water system.

REVISED PROJECT DRAINAGE REPORT AND PLANS

SOIL&WATER-8 The Project owner shall provide a revised Drainage Report which includes the following additional information:

A. Calculations for all the collector/conveyance channels and onsite drainage channels showing adequate depth and non-erosive velocities. Data provided shall include depth, velocity, Froude number and other relevant hydraulic parameters.

B. Detailed scour calculations to justify toe-down depths for all soil cement segments, drop structures, slope protection, and any other features where scour is an issue.

C. Post development onsite drainage maps, calculations and discussion which include a delineation of all onsite watersheds with basin areas, points of concentration, and peak discharge values where the smaller onsite channels discharge into the larger collector and conveyance channels. The maps should also show peak flow values at all downstream points of discharge from the Project.

D. A discussion and associated calculations documenting the methods to be used for erosion control at outlet locations along the southern property boundary where flow is released to existing ground.

E. A specific discussion of how the proposed onsite drainage design will protect the facility from erosion and the possible failure of the facilities resulting in a release of HTF.

F. Stage-discharge rating calculations for all outlet structures (i.e. pipes and weirs) used to outlet water along the southern project boundary.

G. Digital copies of all hydrologic and hydraulic analysis.

The Project owner shall also provide the 30 percent Grading and Drainage Plans which include the design based on information provided in the revised Drainage Report outlined above.

Verification: The Project owner shall submit a Revised Project Drainage Report with the 30 percent Grading and Drainage Plans to the CPM for their review and comments a minimum of sixty (60) days before project mobilization. The owner will address comments provided by the CPM until approval of the report is issued. All comments and concepts presented in the approved Revised Project Drainage Report with the 30 percent Grading and Drainage Plans will be included in the final Grading and Drainage Plans.

CHANNEL EROSION PROTECTION

SOIL&WATER–11 The Project owner must provide revised preliminary Grading and Drainage Plans which incorporate the items and information as listed below for the channels designated as A, B, C, D, E, B/C, D/E on the Conceptual Grading Plans (GSEP 2010a).

A. Soil cement bank protection must be provided such that the channels are protected from bank erosion and lateral headcutting. The extents of the proposed bank protection must be shown on the revised Grading and Drainage Plans. Typical sections for these channels must show the layout of the bank protection including thickness, width and toe-down location and depth consistent with the scour calculation provided in the revised Drainage Report.

B. Soil cement bank protection shall be provided on both channel banks wherever 10-year channel flow velocity exceeds 5 ft/s. It shall be provided on the outer channel bank wherever offsite topography and a detailed FLO-2D analysis indicate surface flow would enter the collector channels.

C. Soil cement bank protection shall be provided at all channel confluences of otherwise unlined channels where the result of the detailed hydraulic analysis presented in the revised Drainage Report indicate the increased potential for erosion due to adverse angles of confluence. Detailed plans for each confluence showing the extents of the soil cement based on specific hydraulic conditions shall be provided in the formal Grading and Drainage Plans.

D. Other methods of channel stabilization, such as dumped riprap or gabions, will not be permitted. Bio-stabilization measures are not permitted.

E. Earthen berms used on the outside of collector channels to guide flow to discreet points of discharge into a channel shall not be utilized in lieu of soil cement on the outside bank of collector channels. Offsite flows shall discharge directly into collector channels.

F. The plans shall include reference to regionally accepted specifications for soil cement production and construction. A copy of the specification must be submitted with the revised plans.

G. A soils report indicating the suitability of the Project soils for use in the production of soil cement to the Project specifications shall be submitted with the revised Grading and Drainage Plans.

H. The bottom of engineered collector channels may be left earthen or fully lined at the discretion of the engineer. Fully lined channels will have higher allowable velocities and Froude numbers assuming hydraulic jumps are modeled and considered in the channel design.

I. If modifications to the existing drainages to allow construction of and future access to linear facilities require stabilization of the channel in the vicinity of those modifications, location of disturbance to the existing drainages shall be stabilized consistent with best engineering practice to eliminate future negative impacts to those drainages upstream and downstream of the linear facility in the form of downcutting, erosion and headcutting. The use of "non-engineered" culvert crossings shall not be allowed. All structures to be utilized in existing drainages along linear facilities shall be documented in the project drainage report and reflected in the project improvement plans. Channel erosion mitigation measures along linear facilities shall be subject to all the requirements of this Condition of Certification where applicable.

Verification: The required information and criteria shall be incorporated into the Grading and Drainage Plans and with all subsequent submittals as required in **SOIL&WATER-8** through **SOIL&WATER-10**. The drainage report associated with the linears identified in "I" above may be submitted separately from the site Grading and Drainage Plans. The Project owner will update and modify the design as necessary to obtain CPM approval.

GROUNDWATER QUALITY MONITORING AND REPORTING PLAN

SOIL&WATER-20 The Project owner shall submit a Groundwater Quality Monitoring and Reporting Plan to the CPM for review and approval. The Groundwater Quality Monitoring and Reporting Plan shall provide a description of the methodology for monitoring background and site groundwater levels and quality. The sampling required for the water quality monitoring program shall be implemented during groundwater level monitoring events using the well identified to comply with **SOIL&WATER-25**. Prior to project construction, monitoring shall commence to establish pre-construction groundwater quality conditions in the well proposed for the program. Monitoring shall continue during ~~and shall include pre-construction,~~ construction~~,~~ and project operation ~~water use~~. The primary objectives for the water quality monitoring program are to identify potential changes in the existing water quality of the proposed water supply resulting from Project pumping, if any, in concert with Condition

of Certification **SOIL&WATER–25,** establish pre-construction and project related groundwater quality data ~~that can be quantitatively compared against observed from the project pumping well and near potentially impacted existing wells,~~ and to avoid, minimize, or mitigate significant impacts to sensitive receptors (springs and groundwater-dependent vegetation, and groundwater supply users).

A. The Plan shall include a scaled map showing the site and vicinity, existing well locations, and proposed monitoring locations (both existing wells and new monitoring wells proposed for construction). Additional monitoring wells to be installed include wells required under Waste Discharge Requirements issued by the CRBRWQCB for the evaporation ponds and land treatment unit proposed for the project. The map shall also include relevant natural and man-made features (existing and proposed as part of this project). The plan also shall provide: (1) well construction information and borehole lithology for each existing well proposed for use as a monitoring well; (2) description of proposed drilling and well installation methods; (3) proposed monitoring well design; and, (4) schedule for completion of the work.

B. At least four (4) weeks prior to construction, a Well Monitoring Installation and Groundwater Quality Network Report shall be submitted to the CPM for review and approval in conjunction with Condition of Certification **SOIL&WATER-25**. The report shall include a scaled map showing the final monitoring well network. It shall document the drilling methods employed, provide individual well construction as-builds, borehole lithology recorded from the drill cuttings, well development, and well survey results. The well survey shall measure the location and elevation of the top of the well casing and reference point for all water level measurements, and shall include the coordinate system and datum for the survey measurements.

C. As part of the monitoring well network development, all newly constructed monitoring wells shall be constructed consistent with State and Riverside County specifications.

D. At least four (4) weeks prior to use of any groundwater for construction, all groundwater quality and groundwater level monitoring data shall be reported to the CPM. The report shall include the following:

   1. An assessment of pre-project groundwater levels, a summary of available climatic information (monthly average temperature and rainfall records from the nearest weather station)~~, and a comparison and assessment of water level data relative to the assumptions and spatial trends simulated by the applicant's groundwater model~~.

   2. As assessment of pre-project groundwater quality with groundwater samples analyzed for TDS, chloride, nitrates, major cations and anions, oxygen-18 and deuterium isotopes, and any other constituents the CPM deem critical in protecting existing water supply quality.

   3. The data shall be tabulated, summarized, and submitted to the CPM. The data summary shall include the estimated range (minimum and maximum

values), average, and median for each constituent analyzed. If a sufficient number of data points are available, the data shall also be analyzed using the Mann-Kendall test for trend at 90 percent confidence to assess whether pre-project water quality trends, if any, are statistically significant.

E. During project construction and during the first five years of project operations, the Project owner shall semi-annually monitor the quality of groundwater and changes in groundwater elevation and submit data semi-annually to the CPM. After five years of project operations, the frequency and scope of the monitoring program shall be reassessed by the CPM. The summary report shall document water level and quality monitoring methods, the water level and quality data, water level and quality plots and trend evaluation, and a comparison between pre- and post-project start-up water level trends as itemized below. The report shall also include a summary of actual water use conditions, monthly climatic information (temperature and rainfall) from the nearest meteorological monitoring station, and a comparison and assessment of water level data relative to the assumptions and simulated spatial trends predicted by the applicant's groundwater model.

1. Groundwater samples from all wells in the monitoring well network shall be analyzed and reported semi-annually for TDS, chloride, nitrates, cations and anions, oxygen-18 and deuterium isotopes. These analyses, and particularly the stable isotope data, can be useful for identifying water sources and assessing their contributions to the quality of water produced by wells.

2. For analysis purposes, pre-project water quality shall be defined by samples collected prior to project construction as specified above, and compliance data shall be defined by samples collected after the construction start date. The compliance data shall be analyzed for both trends and for contrast with the pre-project data.

3. Trends shall be analyzed using the Mann-Kendall test for trend at the 90 percent confidence, once a statistically significant number of sample data are available. Trends in the compliance data shall be compared and contrasted to pre-project trends, if any.

4. The contrast between pre-project and compliance mean or median concentrations shall be compared using an Analysis of Variance (ANOVA) or other appropriate statistical method approved by the RWQCB for evaluation of water quality impacts. A parametric ANOVA (for example, an F-test) can be conducted on the two data sets if the residuals between observed and expected values are normally distributed and have equal variance, or the data can be transformed to an approximately normal distribution. If the data cannot be represented by a normal distribution, then a nonparametric ANOVA shall be conducted (for example, the Kruskal-Wallis test). If a statistically significant difference is identified at 90 percent confidence between the two data sets, the monitoring data are inconsistent with random differences between the pre-project and baseline

data indicating a ~~significant~~ water quality impact from project pumping may be occurring.

5. If compliance data indicate that the water supply quality has deteriorated (exceeds pre-project constituent concentrations in TDS, sodium, chloride, or other constituents identified as part of the monitoring plan and applicable Water Quality Objectives are exceeded for the applicable beneficial uses of the water supply) for three consecutive years, the Project owner shall provide treatment or a new water supply to either meet or exceed pre-project water quality conditions to any impacted water supply wells.

Verification: The Project owner shall complete the following:

At least six (6) weeks prior to the start of construction activities, a Groundwater Level and Quality Monitoring and Reporting Plan shall be submitted to the CPM for review and approval ~~before completion of Condition of Certification **SOIL&WATER-2**~~.

SOIL AND WATER
APPENDIX B

Waste Discharge Requirement
Facts for Waste Discharge

SOIL AND WATER RESOURCES – APPENDIX B

FACTS FOR WASTE DISCHARGE—Genesis Solar LLC, Owner/Operator, Genesis Solar Power Project, Riverside County

1. Genesis Solar, LLC, (the Discharger) is proposing to construct, own and operate a concentrated solar power (CSP) electric generating facility and a land treatment unit (LTU) on land owned by the Bureau of Land Management (BLM). The Facility referred to as the Genesis Solar Power Project is located near Ford Dry Lake in Riverside County, California. A site map is included as **Figure 1**, as incorporated here in and made a part of these requirements for waste discharge (Waste Discharge Requirements, or WDRs). The address for Genesis Solar, LLC is 700 Universe Blvd, FED/JB, Juno Beach, FL 33408. The address for the land owner (BLM) is 1201 Bird Center Drive, Palm Springs, CA 92258.

2. These WDRs regulate the Facility's three evaporation ponds and the LTU. 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 Genesis Solar Power Project are shown on **Figure 2**, as incorporated here in and made a part of these WDRs.

3. The Discharger submitted a Report of Waste Discharge dated August 27, 2009 for the Genesis Solar Power Project.

4. Definition of terms used in these WDRs:

    a. **Facility** – The entire parcel of property where the proposed Genesis Solar Power Project 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 Genesis Solar, LLC.

Facility Location

5. The Facility will be located in the Colorado Desert in Chuckwalla Valley between the communities of Blythe, CA (approximately 24 miles east) and Desert Center, CA (approximately 27 miles west). Ford Dry Lake is located approximately 1 mile south west of the Project. The Facility is located in Township 6S, Range 19E San Bernardino Base and Meridian. The Facility covers approximately 1,800 acres of Federal land managed by the BLM.

Surrounding Land Use

6. Current land uses around the Facility include I-10 to the south, the Palen McCoy Wilderness to the north, the Palen Dry Lake Area of Critical Environmental Concern (ACEC) to the west and open (unrestricted access) lands to the east. Most of the land near the Facility is managed by BLM. However, there are also private holdings in the area.

Facility Description

7. The Discharger is proposing to develop a 250-megawatt (MW) solar thermal power generating project, using concentrated solar trough technology. There will be two independent 125 MW units on site to provide a total net electrical output of 250 MW. Commercial operation is planned to commence July 2014.

8. The process to produce 125 MW of electrical power in each module is as follows:

    a. 650 to 800 acres of solar fields containing Parabolic Mirrors to collect the Sun's energy (field is oversized to ensure 125MW can still be generated when there is less sun);

    b. HTF absorbs the Sun's energy from the mirrors;

    c. HTF creates Steam in the Solar Steam Generator (SSG);

    d. Steam drives the Steam Turbine Generator (STG); then STG produces Electrical Power.

    e. Solar Arrays;

    f. Wet Cooling area;

    g. Power Block (161-230 KV substation);

h. Evaporation Ponds (24 acres per unit, for a total of 48 acres);

i. Bioremediation LTU (5 acres); and

j. Stormwater Detention Pond.

9. The solar thermal technology will provide 100 percent of the power generated by the Project; no supplementary energy source (e.g. natural gas to generate electricity at night) is proposed to be used for electric energy production. The Project will utilize a natural gas fired auxiliary boilers to reduce start up time and for HTF freeze protection. Freeze protection shall maintain HTF at a minimum 100 degrees Fahrenheit [°F]

10. The Discharger proposes to use a wet cooling tower for power plant cooling. Water for cooling tower makeup, process water makeup, and other industrial uses such as mirror washing will be supplied from on-site groundwater wells, which also will be used to supply water for employee use (e.g., drinking, showers, sinks, and toilets). A package water treatment system will be used to treat the water to meet potable standards. A sanitary septic system and on-site leach field will be used to dispose of sanitary wastewater.

11. Project cooling water blow down from each unit will be piped to lined, on-site evaporation ponds, which are designated as Class II Surface Impoundments. There evaporation ponds are allocated to each unit for a total of six evaporation ponds. For safety and operational purposes, accumulated precipitated solids will be removed from the base of the evaporation ponds when they reach a depth of 3 feet. It is estimated that 3 feet of solids will accumulate approximately every 7 years when using groundwater containing 5,000 mg/l of total dissolved solids (TDS) as a water supply. Dewatered residues from the ponds will be sent to an appropriate off-site landfill for disposal. No off-site backup cooling water supply is planned at this time; the use of multiple on-site water supply wells and redundancy in the well equipment will provide an inherent backup in the event of outages affecting one of the on-site supply wells.

12. The Project will include a LTU to treat soil contaminated with HTF. The unit will be designed in accordance with Colorado River Basin Regional Water Quality Control Board (Regional Board) requirements.

Climate

13. 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.

14. 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.

15. 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

16. The general topography in the area of the Facility consists of mountain ranges surrounded by extensive alluvial fans coalesced into bajadas that slope toward the topographic low-points of the valley, Ford Dry Lake and Palen Lake. The Project site is situated within the Chuckwalla Valley and is relatively flat. The Project site generally slopes from north to south with elevations of approximately 400 to 370 feet above mean sea level. There are no perennial streams in Chuckwalla Valley and a vast majority of the time, the area is dry and devoid of any surface flow anywhere. Water runoff occurs only in response to infrequent intense rain storms. Much of the area is subject to inundation either by sheet flow or flow confined to an expansive network of ephemeral washes, Palen and Ford Dry Lakes, and other local topographic low-points. The entire area drains first to these two dry lakes, and then to evaporation or groundwater.

Flood Hazard

17. The Facility is within "RIVERSIDE COUNTY AND INCORPORATED AREAS" as designated by the Federal Emergency Management Agency (FEMA); however, there are no flood insurance maps provided for this

area. The Site is not located in a flood hazard area identified in the Riverside County General Plan Safety Element.

Regional Geology

18. The region has undergone a complex geologic history that includes sedimentation, volcanic activity, folding, faulting, uplift and erosion. The Project area is underlain by Holocene to Miocene basin fill deposits (Stone, 2006). These deposits include younger alluvium, older (Pleistocene) alluvium, the Pliocene Bouse Formation and the Miocene fanglomerate. The uppermost alluvium in the basin consists of Holocene to Pleistocene alluvial fan, fluvial, playa, and aeolian (wind blown) deposits. In general, coarser alluvial fan deposits are found near the valley edges and grade into finer distal fan, valley axial (fluvial) and playa deposits near the low points of the basin. Holocene-age playa deposits are found in the Ford Dry Lake area and consist mainly of clay, silt, and sand above the water table (DWR 1963).The older alluvium (Pleistocene age) consists of fine to coarse sand interbedded with gravel, silt, and clay (DWR 1963). The Pleistocene alluvium likely comprises the most important aquifer in the area (DWR 1963). The Pliocene-age Bouse Formation is a marine to brackish-water sequence that is composed of a basal limestone overlain by interbedded clay, silt, sand, and tufa. Near the southeastern portion of the basin the Bouse Formation occurs at a depth between approximately 100 to 800 feet below ground surface (bgs) (Wilson and Owens-Joyce 1994).The fanglomerate lies unconformably below the Bouse Formation and is composed chiefly of angular to subrounded and poorly sorted partially to fully cemented pebbles with a sandy matrix (Metzger 1973). The fanglomerate is likely Miocene age; however, it may in part be Pliocene age (Metzer 1973). Near the southeastern portion of the basin the fanglomerate occurs at a depth between approximately 800 to 5,000 feet bgs (Wilson and Owens-Joyce 1994).

Site Specific Geology

19. Geologic units near the project area consist of the recent dune sand, recent alluvium, and non-marine sedimentary deposits. The unconsolidated alluvial fan, river channel, and stream deposits consist of silt, sand, clay, and gravel. These also include recent floodplain deposits of the Colorado River including silt, sand, and clay. The nonmarine sedimentary deposits consist of older alluvium and fanglomerate, dissected with well-developed desert pavement and desert varnish in some areas. These consist mostly of clay, siltstone, sand, and gravel.

Seismicity

20. The Project site lies within the eastern part of Riverside County in a part of California considered not to be very seismically active. Although there are several bedrock faults off site in the mountains surrounding Chuckwalla Valley, these do no exhibit recent activity and are presumed to be Tertiary or pre-Tertiary in age (Stone, 2006). In addition, gravity anomalies suggest the presence of several subsurface faults beneath Chuckwalla Valley in the vicinity of the project area (Stone, 2006; Rotstein, et al., 1976). The gravity anomalies reflect abrupt changes in basement elevation strongly suggestive of dip-slip movements. In addition, some of these faults may have undergone right-lateral strike slip movements. These faults are presumed Tertiary and likely inactive with very low chance of earthquakes.

21. The active faults considered most likely to produce large earthquakes potentially affecting the Project site are located at a considerable distance to the west and southwest and include the San Andreas, Imperial, and San Jacinto-Anza faults. Other smaller faults are located within approximately 100 kilometers (km) of the Site. These faults are believed to be capable of producing ground shaking with peak ground accelerations exceeding 0.10 times the force of gravity (0.10 g).

Seismic Shaking

22. A preliminary estimate of ground motions expected at the site was prepared using source and attenuation models developed by the USGS National Seismic Hazard Mapping Project (NSHMP, 2009). For design of important facility structures, a site-specific Probabilistic Seismic Hazard Assessment is being completed as part of an ongoing Geotechnical Investigation and will be made available to the CEC. The preliminary results indicate that peak ground acceleration (PGA) with a probability of exceedance of 10 percent in 50 years (475 Year Return Period) is 0.14 g. The deaggregation information indicates that the mean moment magnitude is 6.8 at a mean distance of 68 km. The PGA with a probability of exceedance of 2 percent in 50 years (2475 Year Return Period) is 0.23 g. The mean moment magnitude is 6.7 at a mean distance of 48 km.

Ground Rupture

23. 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

24. The 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 rockfalls in the Palen and 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

25. 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.

26. To address the management of sediment transport, erosion and sedimentation during operation, the project design will incorporate diversion berms, channels, detention basins 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

27. 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 Riverside County General Plan Safety Element (Riverside County, 2008) indicates that the majority of Chuckwalla Valley, including the soils beneath the Project site and associated Project off-site linears, is mapped as having deep groundwater but underlain by soils with an otherwise moderate susceptibility to liquefaction. The depth to water beneath the Site is estimated to range from approximately 61 to 94 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

28. 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

29. 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. In the Site vicinity, this would include aeolian sand, playa evaporite deposits, and potential loose flash flood deposits. Based on surface reconnaissance, review of geologic mapping, and review of aerial photographs, although there are aeolian deposits south of the Site near Ford Dry Lake, but no significant aeolian or playa deposits are located within the Site. There do not appear to be near surface evaporite deposits associated with Ford Dry Lake (Stone, 2006). The near surface soils at the Site are composed primarily of alluvial soils which appear to have been deposited in relatively thin sheet flood and fluvial deposits have a low potential for hydrocompaction. 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

30. 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.

31. 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 project and no further analysis is warranted.

Regional Hydrogeology

32. The site is located in the eastern half of the Chuckwalla Valley Groundwater Basin which encompasses approximately 605,000 acres. The basin generally trends east-southeast and is bounded by consolidated rocks of the Chuckwalla, Little Chuckwalla, and Mule Mountains on the south, of the Eagle Mountains on the west, and of the Mule and McCoy Mountains on the east. Groundwater flow is directed southward from the basin's boundary with the Cadiz Valley Basin and east-southeastward from its boundary with the Pinto Valley Basin, toward the eastern basin boundary where it flows into the adjacent Palo Verde Mesa Basin. Beneath the Site, groundwater occurs at depths ranging from approximately 70 to 90 feet bgs (approximately 298 to 315 feet msl).

33. There are three water-bearing sedimentary units overly non-water bearing bedrock in the Chuckwalla Valley Groundwater Basin; Quaternary Alluvium., Pliocene Bouse Formation and Miocene Fanglomerate (DWR, 2004; DWR, 1963). DWR reports the maximum thickness of these deposits as about 1,200 feet in the Chuckwalla Valley Basin (DWR 1979). Gravity studies performed by USGS near the narrows between the McCoy and Mule Mountains on the southeastern portion of the basin suggests the depth to non-water bearing bedrock ranges from approximately 6,500 feet bgs to 1,000 feet bgs (Wilson and Owens-Joyce 1994).

34. Groundwater quality varies markedly in the basin. The best groundwater quality is located in the western portion of the basin near Desert Center and the worst water quality is located in the southeastern portion of the basin near Ford Dry Lake (Steinemann, 1989). Groundwater to the south and west of Palen Lake is typically sodium chloride to sodium sulfate-chloride in character (DWR 2004). The detected concentrations of TDS in the basin range from 274 milligrams per liter (mg/L) to 8,150 mg/L with an average concentration of 2,100 mg/L (Steinemann 1989). Generally, the dissolved-solids concentrations increase moving further downgradient from Desert Center (to the southeast) and are highest in the central and eastern parts of the basin (Steinemann 1989). In general, the groundwater in the basin has concentrations of sulfate, chloride, fluoride, and dissolved solids too high for domestic use and concentrations of sodium, boron and dissolved solids too high for irrigation use (DWR 1975). Several of the wells sampled in the basin contain high levels of fluoride and boron.

Site Specific Hydrogeology

35. Site-specific investigation indicates the water quality in the study area varies laterally and vertically. Generally, water quality improves vertically with depth and laterally to the south. Vertically, water quality is generally the worst in the alluvium followed by the Bouse Formation and finally by the Fanglomerate. Calculated TDS concentrations from borehole geophysical logging indicate TDS concentrations as high as 30,500 mg/L within finer grained units (silt and clay) in the alluvium decreasing to less than 5,000 mg/L TDS in more transmissive sediments in the Bouse Formation at depths of 800 to 900 feet bgs. Laterally, water quality is generally better south and southeast of the Site within all three water bearing units in the basin. The best water quality in the study area is generally in the vicinity of and south of I-10.

On-site Drainage

36. 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, ditches and detention ponds. Minimum preliminary volumes required for the detention basins are 66 acre-feet for Unit 1, and 49 acre-feet for Unit 2. These volumes are based on the detention ponds receiving the 100 year, 24 hour event post-development runoff from the Project site, and then discharging the run-off at the pre-developed rate into the existing drainage system. The Riverside County Best Management Practice (BMP) Manual requires extended detention basins to release runoff over a 48 hour draw down period, and the outlet sized to retain the first half of the design volume for a minimum of 24 hours.

37. 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

38. Water to supply the project will be derived from a minimum of two new groundwater supply wells located near each unit’s power block area.

The wells will pump groundwater from the Bouse Formation below a depth of 780 feet bgs. Two wells at each units power block will provide redundancy in the event of outages or maintenance.

39. The average total annual water usage for each 125 MW unit is estimated to be about 822 acre-feet per year (afpy), or 1644 afpy for the Project, which corresponds to an average daily flow rate of about 1000 gallons per minute (gpm). Usage rates will vary during the year and will be higher in the summer months when the peak maximum flow rate (instantaneous daytime maximum rate) could be as high as about 2,013 gpm for each 125 MW power plant, or 4,026 gpm for The Project. Equipment sizing will be consistent with peak daily rates to ensure adequate design margin.

40. The TDS concentration of the proposed groundwater supply is 5000 mg/L. The groundwater is not considered a potential source for municipal or domestic water supply under Resolution 88-63 of the State Water Resources Control Board as the TDS exceeds 3000 mg/L.

Evaporation Ponds (Design and Installation Sequence)

41. The six 8-acre evaporation ponds (three per unit) have a proposed average design depth of 8 feet across each pond which incorporates:

    a. 3 feet of sludge buildup;

    b. 3 feet of operational depth; and

    c. 2 feet of freeboard.

42. The sub grade under the liner system will be scarified, moisture conditioned, compacted, and proof-rolled with a smooth drum roller to form a competent working surface. The subgrade beneath the Geosynthetic Clay Layer (GCL) needs to have an adequate moisture content to ensure effectiveness of the GCL layer. Therefore, additional moisture conditioning will be specified immediately prior to installation of the GCL layer. The purpose of this is to add additional moisture beneath the GCL to provide moisture for hydration of the GCL material.

43. The GCL liner will be installed in accordance with current practices and will employ the use of proper installation requirements, following manufacturer requirements for the GCL and proper QA/QC during installation to ensure proper continuity of the base layer.

44. The secondary liner or lower liner will consist of a 40 mil thick HDPE geomembrane liner. This liner will be installed in accordance with

current practices and will employ the use of wedge welding and extrusion welding procedures. In addition, destructive and non-destructive testing procedures will be used to ensure liner quality and continuity.

45. A HDPE geonet drainage layer, with an option for non-woven geotextile heat bonded to one side or both sides, will be used in the leak detection and collection layer between the primary and secondary liners. HDPE geonet used in combination with geotextile materials has been selected because polyethylene is not reactive with the fluids and provides a highly conductive layer, it is readily available, and is easily installed with minimal potential for damage to the liner system during installation.

46. The base of the evaporation pond leak detection and collection layer will slope at a minimum inclination of 1% to a leak collection trench. The trench will contain screened coarse sand (with no fines) and a perforated pipe that will slope at a minimum inclination of ¾% 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 the risk of leakage through the secondary liner. Leakage rates will be measured using a flow totalizer.

47. 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.

48. This design is consistent with CCR, Title 27, Section 20340, which requires a Leachate Collection and Removal System (LCRS) between the liners for surface impoundments.

49. The upper or primary liner will consist of a 60 mil thick HDPE geomembrane liner. Consistent with installation of the secondary 40 mil HDPE liner, current installation, quality control monitoring, testing, and quality assurance measures and techniques will be employed to ensure liner quality and continuity. The primary liner will be protected by a non-woven geotextile that will be installed directly on top of the liner.

50. The moisture detection system below the liner system consists of continuous carrier pipes installed at the sides and low point of each pond (one carrier pipe per pond) at a depth of approximately 5 feet below the

secondary liner. The carrier pipes will be terminated at the surface on each side of the pond and will be equipped with a pull cable system for conveyance of a neutron probe for moisture detection.

51. Prior to the placement of the hard surfacing, a 1 foot thick sub-base layer consisting of granular fill with a maximum particle size of ½" shall be placed and spread over the non-woven geotextile. The sub-based layer will be spread carefully and sequentially to avoid damage to the underlying liner system. After placement, the granular layer will be proof rolled using light compaction equipment.

52. A hard surface / protective layer will be constructed on the non-woven geotextile that covers the primary liner. The hard surface will allow for vehicular traffic during unscheduled or emergency maintenance or cleanout. Hard surface types to be considered and assessed include roller compacted concrete, or an approved equivalent (formed concrete, gunite, or other alternates, all of which must be submitted for approval).

53. An aggregate road base material will be placed along the top of each berm to provide an all weather access location for maintenance vehicles. The material will conform to the Department of Transportation Specifications for Class II Aggregate Base. This will be installed to a minimum thickness of 6 inches and will be placed and compacted in accordance with the Department of Transportation requirements.

Action Leakage Rate

54. The action leakage rate (ALR) is the allowable leakage from the primary liner system above which contingency actions are triggered. According to CFR Title 40, Section 264.222, the ALR is defined as "…the maximum design flow rate that the leak detection system can remove without the fluid head on the bottom liner exceeding 1 foot". The ALR must also include an adequate safety margin to allow for variability in the containment system design (e.g. liner and collection pipe slope, interstitial fill hydraulic conductivity, thickness of drainage material).

55. The estimated ALR for the evaporation ponds is 2,750 gallons per acre per day. This is based on one standard hole per acre, a drainage layer geonet with hydraulic conductivity of 0.06 m/s and a 50% safety factor. The assumption underlying this ALR calculation will be verified in the actual constructed ponds. Based on an 8 acre pond, each evaporation pond would have an ALR of 2,200 gallons per day. However, the ALR will need to have field verification as this rate will vary depending on actual drainage material used and its hydraulic conductivity. A final ALR will be submitted to the Regional Board within six months of the effective date of these WDRs based on field analysis.

56. A large hole in the geomembrane may cause a rapid large leakage rate (RLLR) of approximately 9,500 gallons per acre per day. This would equate to a RLLR of 76,000 gallons per day per pond. The RLLR is provided herein for informational purposes only.

57. The recording flow totalizer at each sump will be monitored at least weekly to determine the leakage rate through the primary liner. If the leakage rate exceeds the ALR, then the appropriate actions in the Contingency Plan will be implemented.

Waste Classification

58. Wastewater from several processes within each 125MW Unit will be piped to three 8-acre evaporation ponds (total combined pond top area of 24 acres) for disposal. Therefore there is a total of 48 acres (top pond area) of evaporation ponds on the Project site. Discharge into the evaporation ponds is derived from three primary and one occasional source:

    a. Pre-cooling tower water treatment multi media filter (MMF) waste stream;

    b. Post-cooling tower water treatment MMF waste stream;

    c. Post-cooling tower water treatment 2nd Stage revises osmosis (RO) waste stream; and

    d. Occasionally, stormwater accumulated in the proposed LTU that will be used to treat soil affected by spills of HTF.

59. Raw water and pre-treated water are used to supply various plant needs, including cooling tower circulating water, solar steam generator makeup water, and various plant service needs. All these water streams eventually discharge into the evaporation ponds.

Wastewater Discharge

60. The combined estimated rate of wastewater discharge into the evaporation ponds is 214 gpm for peak conditions and 182 gpm under annual average conditions. The peak flow rates occur in the summer months, between May and August, when solar energy production is at a peak.

61. The modeled water chemistry of the blowdown from the cooling tower after 15 COC indicates that chloride, sodium and sulfate will be the

primary species, along with smaller concentrations of scale forming species (i.e., calcium, magnesium and silica) that were not removed during pre-treatment. Therefore post-treatment is needed to recover most of the wastewater for reuse to minimize the quantity of makeup water required, and to minimize the size of the waste management units (evaporation ponds). Post-treatment will consist of an MMF and Reverse Osmosis (RO) unit, where similar to the pre-treatment process, the MMF will remove solids from the cooling tower blowdown that may damage or reduce the efficiency of the RO membranes. Treated water through the RO units will be returned to the cooling tower for recycling, and the waste stream from the MMF and second RO unit will be discharged into onsite evaporation ponds.

62. The estimated rate of wastewater discharge into the evaporation ponds from the post-treatment MMF unit is 13 gpm for peak conditions and 11 gpm under annual average conditions. Similar to the pre-treatment MMF system, this discharge will occur only when the MMF system is backwashed to remove the build up of residue.

63. The estimated rate of wastewater discharge into the evaporation ponds from the post-treatment RO unit is 161 gpm for peak conditions and 137 gpm under annual average conditions.

Evaporation Residue

64. During the 30-year operating life of the Facility, it is estimated that up to 13 ft of sludge may accumulate in the bottoms of the evaporation ponds that consists of precipitated solids from the evaporated wastewater. For operational and safety purposes, the ponds will be cleaned when 3 feet of precipitated solids are accumulated in the base of the ponds, which is estimated to be every 7 years when using groundwater with a TDS of 5,000 mg/L. Approximately 7,150 tons of evaporative residues will be accumulated yearly, which equates to approximately 50,000 tons of evaporative residue being removed during each cleanout. The total amount of accumulated sludge is estimated to be approximately 215,000 tons over 30 years.

65. The predicted concentrations of chemical constituents in the evaporation residue in the ponds are less than the Total Threshold Limit Concentrations (TTLCs) for all reported parameters. The predicted concentrations of chemical constituents in the evaporation residue in the ponds is also less than 10 times the Soluble Threshold Limit Concentrations (STLCs) for reported parameters; therefore, further analysis of the residue using the Waste Extraction Test (WET) would not be required and the waste may be classified as non-hazardous under

CCR Title 22, Division 4.5. In addition, the total concentrations of chemical constituents in the evaporation residue in the ponds is less than the Toxicity Characteristic Leaching Procedure (TCLP) for all reported parameters; therefore, further analysis of the residue using the TCLP method would not be required and the waste may be considered a non-hazardous waste under federal regulations. Testing of this material will be conducted as part of the facility monitoring program to verify this characterization. The evaporation 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 residue is classified as a "designated waste." This classification is consistent with CCR Title 27, Chapter 3, Subchapter 2, Article 2, Section 20210.

Land Treatment Unit

66. The proposed design for the LTU has been selected to optimize performance based on the operating requirements. The location of the LTU is shown in Attachment B, as incorporated here in and made a part of these WDRs. The LTU will not incorporate a liner containment system or LCRS, 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 farming activities, and will serve to slow the rate of surface water infiltration in the treatment area. The compacted 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.

67. 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 stormwater from the LTU.

68. The LTU will be used to treat HTF-affected soil at various concentrations. HTF (Therminol VP-1 or equivalent) is an oil that consists of a mixture of biphenyl and diphenyl oxide that is solid at temperatures below 54 degrees Fahrenheit, is relatively insoluble in water (solubility of approximately 25 milligrams per liter), combustible, and has relatively low volatility (Solutia, 2006). The components of HTF are reported to biodegrade relatively rapidly in the environment, have slight toxicity to

tested terrestrial species, higher toxicity to tested aquatic species, and a potential to bio-accumulate (IPCS, 1999; JECFA, 2003; SOCMA Biphenyl Working Group, 2003).

69. Spills of HTF will be cleaned up within 48 hours and affected soil will be moved to a staging area in the LTU where it will be placed on plastic sheeting pending receipt of analytical results and characterization of the waste material. Samples of excavated HTF-affected soil will be collected in accordance with the Environmental Protection Agency's (EPA's) current version of the manual – "Test Methods for Evaluating Solid Waste" (SW-846) and the waste material characterized in accordance with State and Federal requirements.

70. 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. No HTF-impacted soils characterized as hazardous waste will be disposed or treated on site. Based on past experience, it is anticipated that soil containing 10,000 milligrams per kilogram (mg/kg) HTF or more will be managed as hazardous waste, and that soil containing less than 10,000 mg/kg HTF will be a non-hazardous waste and managed at the Project site. If the soil is characterized as a non-hazardous waste, it will be spread in the LTU for bioremediation treatment. In general, more highly contaminated soil will be covered with plastic sheeting to prevent contact with stormwater 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 facility as fill material.

71. Based on available operation data from other sites, it is anticipated that approximately 750 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.

72. A spill prevention, control and countermeasure (SPCC) plan will be undertaken for this site. The SPCC will include:

    a. Secondary containment around the tanks storing HTF, capable of containing the 110% of the storage tank capacity and/or sufficient freeboard to contain precipitation from a 25-year, 24-hour storm event.

    b. It is not practicable to provide secondary containment around HTF product piping, therefore will have daily inspections of all infrastructure containing HTF.

c. If leaks are identified, the affected area will be isolated and spills cleaned up within 48 hours.

Heat Transfer Fluid Treatment Process

73. Treatment of HTF-impacted soil in the LTU will involve moisture conditioning and 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.

74. 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.

75. Representative soil samples will be collected for every batch of HTF contaminated soil undergoing treatment in the LTU and composited according to methods specified in EPA SW-846. It is expected that treatment times will vary between one to four months, depending on initial concentrations, and the ambient air and soil temperature.

Hazardous Waste

76. 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.

77. 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.

78. 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.

79. 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

80. 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.

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

    a. Municipal Supply (MUN)
    b. Industrial Supply (IND)

82. The beneficial uses of nearby surface waters are as follows:

    a. Ford Dry Lake:
        i. Wildlife Habitat (WILD)
        ii. Preservation of Rare, Threatened, or Endangered Species (RARE)

    b. Palen Dry Lake
        i. Wildlife Habitat (WILD)
        ii. Preservation of Rare, Threatened, or Endangered Species (RARE)

Monitoring Parameters

83. 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.

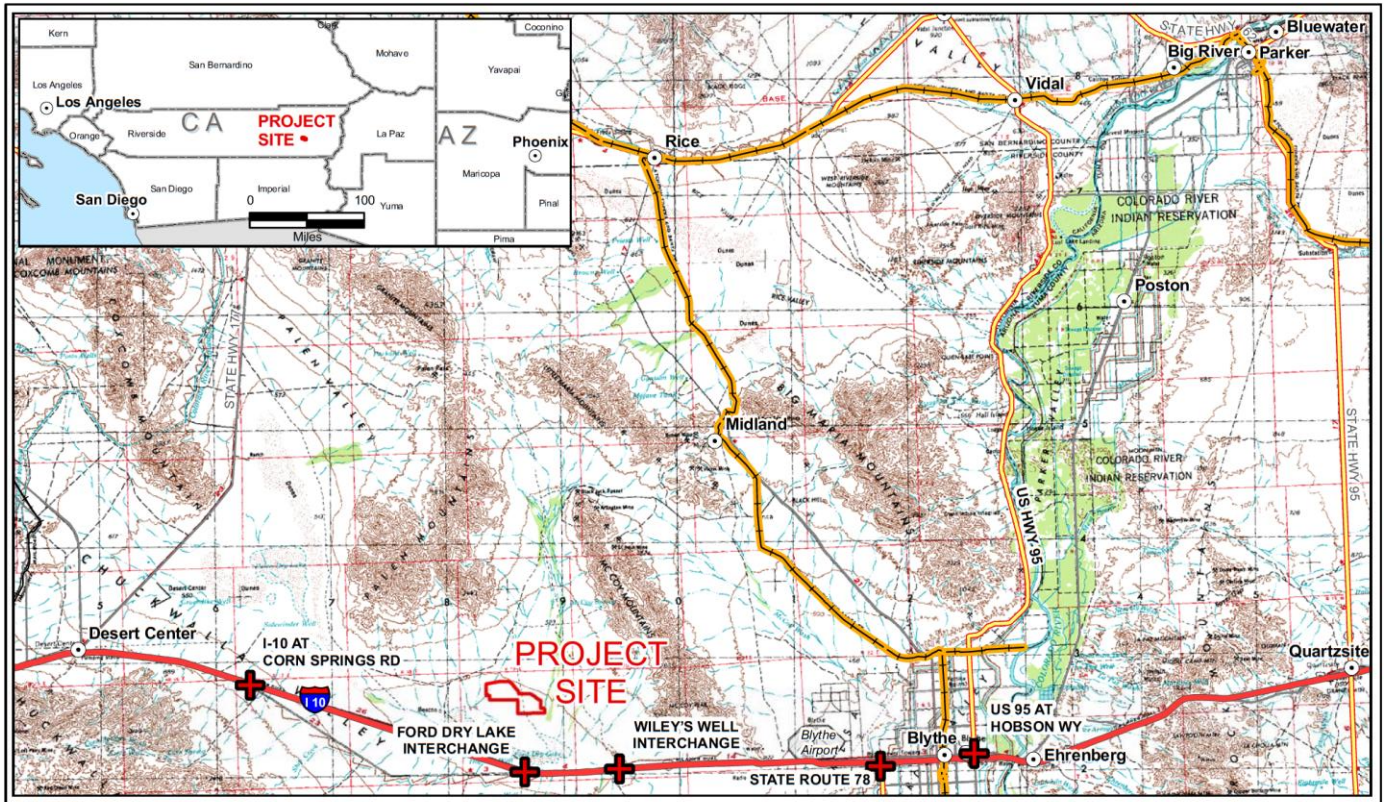
California Environmental Quality Act (CEQA)

84. 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

85. 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."


Kern
San Bernardino
Mohave
Coconino
Yavapai
Los Angeles
Los Angeles
CA
PROJECT SITE
Orange
Riverside
La Paz
AZ
Phoenix
Maricopa
San Diego
San Diego
Imperial
Yuma
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Bluewater
Big River
Parker
Vidal
Rice
COLORADO RIVER INDIAN RESERVATION
Poston
Midland
STATE HWY 95
US HWY 95
Desert Center
I-10 AT CORN SPRINGS RD
PROJECT SITE
Quartzsite
FORD DRY LAKE INTERCHANGE
WILEY'S WELL INTERCHANGE
Blythe Airport
Blythe
US 95 AT HOBSON WY
Ehrenberg
STATE ROUTE 78
SOURCE:
USGS 250K Quad Sheet, Salton Sea, Needles
ESRI Cities, SDC Major Roads, Tiger Railroad
All locations approximate
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GENESIS SOLAR ENERGY PROJECT
WorleyParsons
resources & energy
LOCATION MAP
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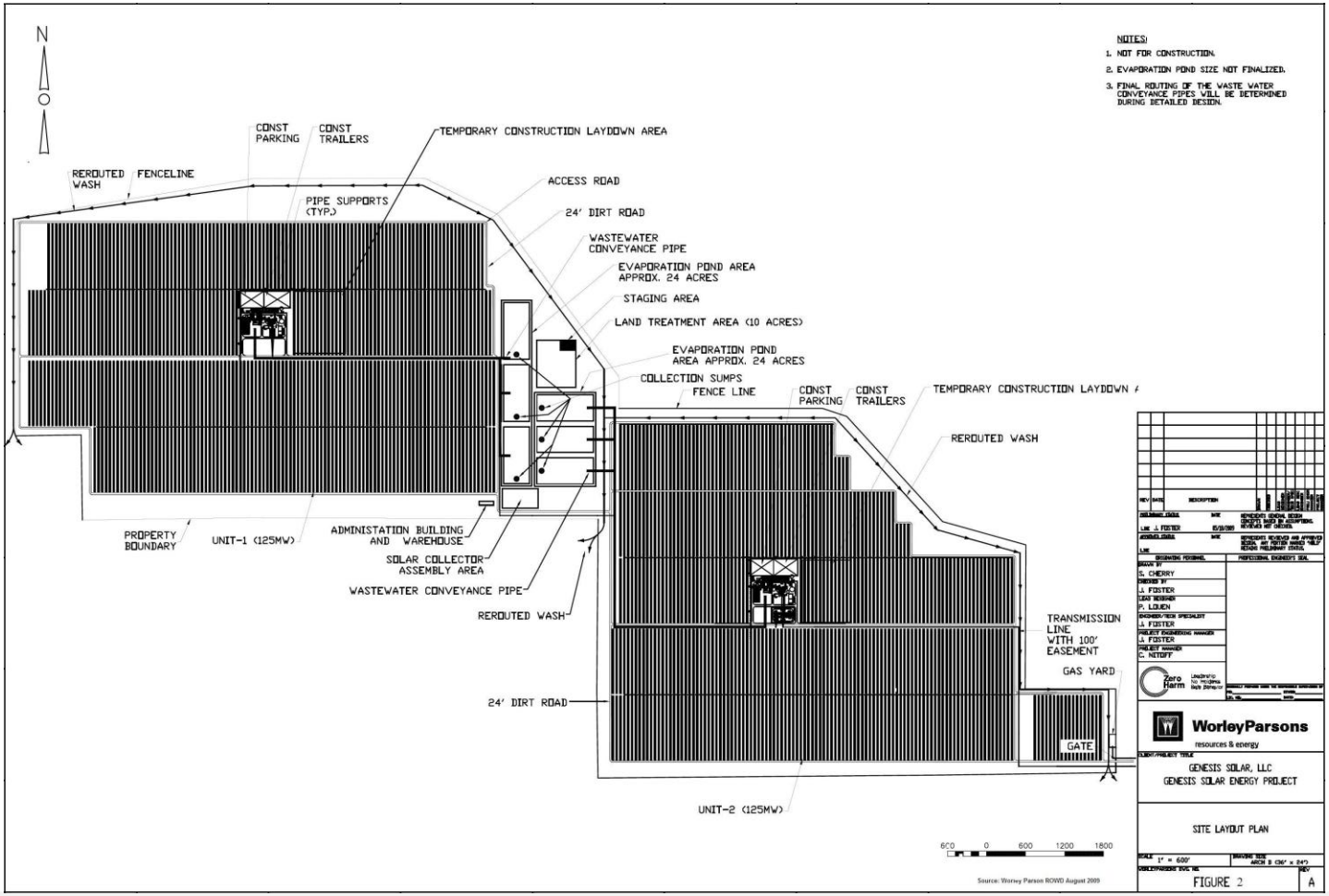
NOTES:
1. NOT FOR CONSTRUCTION.
2. EVAPORATION POND SIZE NOT FINALIZED.
3. FINAL ROUTING OF THE WASTE WATER CONVEYANCE PIPES WILL BE DETERMINED DURING DETAILED DESIGN.
N
CONST PARKING
CONST TRAILERS
TEMPORARY CONSTRUCTION LAYDOWN AREA
REROUTED WASH
FENCELINE
ACCESS ROAD
PIPE SUPPORTS (TYP.)
24' DIRT ROAD
WASTEWATER CONVEYANCE PIPE
EVAPORATION POND AREA APPROX. 24 ACRES
STAGING AREA
LAND TREATMENT AREA (10 ACRES)
EVAPORATION POND AREA APPROX. 24 ACRES
COLLECTION SUMPS
FENCE LINE
CONST PARKING
CONST TRAILERS
TEMPORARY CONSTRUCTION LAYDOWN A
REROUTED WASH
PROPERTY BOUNDARY
UNIT-1 (125MW)
ADMINISTATION BUILDING AND WAREHOUSE
SOLAR COLLECTOR ASSEMBLY AREA
WASTEWATER CONVEYANCE PIPE
REROUTED WASH
TRANSMISSION LINE WITH 100' EASEMENT
GAS YARD
24' DIRT ROAD
GATE
UNIT-2 (125MW)
600 0 600 1200 1800
Source: Worley Parson ROWD August 2009
WorleyParsons
resources & energy
GENESIS SOLAR, LLC
GENESIS SOLAR ENERGY PROJECT
SITE LAYOUT PLAN
FIGURE 2
A