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California Energy Commission
Docket Unit
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: **GENESIS SOLAR, LLC'S PROPOSED SOIL AND WATER
CONDITIONS OF CERTIFICATION
DOCKET NO. (09-AFC-8)**

Enclosed for filing with the California Energy Commission is the original copy of **GENESIS SOLAR, LLC'S PROPOSED SOIL AND WATER CONDITIONS OF CERTIFICATION**, for the Genesis Solar Energy Project (09-AFC-8).

Sincerely,

Marie Mills

C.9.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

This section presents the mitigation, monitoring, compliance, and reporting measures for Soil and Water Resources. For a summary of all proposed Project impacts and their respective mitigation measures, please see the Impact Summary Tables provided at the end of the Executive Summary.

DRAINAGE EROSION AND SEDIMENTATION CONTROL PLAN (DESCP)

SOIL&WATER-1 Prior to site mobilization, the Project owner shall obtain both the BLM's Authorized Officer (AO) and Compliance Project Manager (CPM) approval of the Drainage Erosion and Sedimentation Control Plan (DESCP) for managing stormwater during Project construction and operations as normally administered by the County of Riverside. The DESCP must ensure proper protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, include provisions for sediment and stormwater retention from both the power block, solar fields and transmission right of way to meet [any](#) Riverside County requirements, address exposed soil treatments in the solar fields for both road and non-road surfaces, and identify all monitoring and maintenance activities. The DESCP shall contain, at minimum, the elements presented below that outline site management activities and erosion and sediment-control BMPs to be implemented during site mobilization, excavation, construction, and post construction (operating) activities.

- A. Vicinity Map** – A map(s), at a minimum scale 1 inch=~~5~~400 feet, shall be provided indicating the location of all Project elements (construction sites, laydown area, pipelines) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.
- B. Site Delineation** – All areas subject to soil disturbance for the proposed Project (Project phases, laydown area, all linear facilities, landscaping areas, and any other Project elements) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.
- C. Watercourses and Critical Areas** – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. It shall indicate the proximity of those features to the proposed Project construction, laydown, and landscape areas and all transmission and pipeline construction corridors.
 - a. The DESCP shall describe how the project will avoid or minimize impacts to Palen-McCoy Valley sand corridor,

- b. All proposed linear features (with the exception of Power Pylons) shall be constructed flush with the surrounding ground surface and without ground level obstructions.

D. Drainage Map – The DESCPC shall provide a topographic site map(s), at a minimum scale of 1 inch=2400 feet, showing existing, interim, and proposed drainage swales and drainage systems and drainage-area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet.

E. Drainage of Project Site Narrative – The DESCPC shall include a narrative of the drainage measures necessary to protect the site and potentially affected soil and water resources within the drainage downstream of the site. The narrative shall include the summary pages from the hydraulic analysis prepared by a professional engineer and erosion control specialist. The narrative shall state the watershed size(s) in acres that was used in the calculation of drainage features.

F. Clearing and Grading Plans – The DESCPC shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections, or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography shall be illustrated by tying in proposed contours with existing topography.

G. Clearing and Grading Narrative – The DESCPC shall include a table with the estimated quantities of material excavated or filled for the site and all Project elements (Project site, laydown area, transmission and pipeline corridors, roadways, and bridges) whether such excavation or fill is temporary or permanent, and the amount of such material to be imported or exported.

H. Soil Wind and Water Erosion Control – The plan shall address exposed soil treatments to be used during construction and operation of the proposed Project for both road and non-road surfaces including specifically identifying all chemical based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed Project site that would not cause adverse effects to vegetation. BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. All dust palliatives, soil binders, and weighting agents shall be approved by both the AO and CPM prior to use.

I. Best Management Practices Plan – The DESCPC shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading, Project element excavation and construction, and final grading/stabilization).

BMPs shall include measures designed to control dust, stabilize construction access roads and entrances, and control storm water runoff and sediment transport.

- J. Best Management Practices Narrative** – The DESCPC shall show the location (as identified in (I) above), timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during all Project element (site, pipelines) excavations and construction, final grading/stabilization, and operation. Separate BMP implementation schedules shall be provided for each Project element for each phase of construction. The maintenance schedule shall include post-construction maintenance of structural-control BMPs, or a statement provided about when such information would be available.
- K. Project Schedule** – The DESCPC shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, Project element construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each Project element for each phase of construction.
- L. Erosion Control Drawings** – The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion control specialist.
- M. Agency Comments** – The DESCPC shall include copies of recommendations, conditions, and provisions from the County of Riverside, California Department of Fish and Game (CDFG), and CRBRWQCB.
- N. Monitoring Plan:** Monitoring activities shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches, and storm water diversions. The monitoring plan shall be part of the Channel Monitoring and Maintenance Plan, **SOIL&WATER-13**.

Verification: No later than 390 days prior to start of site mobilization, the Project owner shall submit a copy of the final DESCPC to the County of Riverside, the CRBRWQCB, and to both the AO and CPM for review and comment and to the County of Riverside and the CRBRWQB if required. ~~No later than 1560 days prior to start of site mobilization, the Project owner shall submit the DESCPC with the County's and CRBRWQCB's comments to the both the AO and CPM for review and approval. Both the AO and CPM shall consider comments if received by the county and CRBRWQCB before approval of the DESCPC.~~

The DESCPC shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and relevant portions of the DESCPC shall clearly show approval by the chief building official. The DESCPC shall be a separate plan from the SWPPP developed in conjunction with any NPDES permit for Construction Activity. The Project owner shall provide in the monthly compliance report with a narrative on the effectiveness of the drainage, erosion, and sediment-control

measures and the results of monitoring and maintenance activities. Once operational, the Project owner shall update and maintain the DESCOP for the life of the Project and shall provide in the annual compliance report information on the results of monitoring and maintenance activities.

Justification for Change: Five Changes to this Condition:

1. Requiring a minimum scale of 1 inch=100 feet for a vicinity map is overly burdensome. Propose to do a minimum scale of 1 inch=500 feet, which will be suitable to show the noted required level detail for the vicinity map.
2. Requiring a minimum scale of 1 inch=100 feet for the drainage map is overly burdensome. Propose to do a minimum scale of 1 inch=200 feet which will be at a legible scale to see all the required items on the drainage plans.
3. The quantities of material to be excavated or filled have been estimated for the project and can be included in the DESCOP. The final quantities of material to be excavated and filled may change during construction as field modifications arise, to ensure the earthwork quantities are balanced. Therefore it is proposed to insert the word "estimate" into this condition.
4. Verification requires submission of grading and drainage plans within the DESCOP, approved by the chief building officer (CBO) as per CIVIL-1. However the CBO approvals will not be undertaken until at least 15 days prior to commencement of site grading, therefore CBO approved plans will not be available for submission with the DESCOP (which needs to be submitted 60 days prior to site mobilization). Amendments to SOIL&WATER-8 to -10 are to provide 30% grading and drainage drawings to the AO and CPM 30 before submission of civil drawings (CIVIL-1). Therefore it is proposed to require submission of the DESCOP 30 days prior to site mobilization, so the drawings can be consistent with the 30% grading and drawings.
5. Riverside County is not likely to be involved in the review or commenting of the DESCOP. We have removed reference to providing them with a copy for review and comment.

NPDES STORMWATER PERMIT-CONSTRUCTION ACTIVITY

SOIL&WATER-2 In the event it is determined the project will discharge to water of the US, the Project owner shall comply with the requirements of the general National Pollutant Discharge Elimination System (NPDES) permit for discharge of stormwater associated with construction activity. The Project owner shall develop, obtain both the AO and CPM approval of, and implement a Storm Water Pollution Prevention Plan (SWPPP) for the construction of the GSEP phases, laydown area, and all linear facilities.

Verification: At least 360 days prior to site mobilization, the Project owner shall submit to both the AO and CPM a copy of the final construction SWPPP for review and approval prior to site mobilization. The Project owner shall retain a copy at the Project site. The Project owner shall submit copies to the both the AO and CPM all correspondence between the Project owner and the CRBRWQCB regarding the NPDES permit for the discharge of stormwater associated with construction activity within 10 days of its receipt or submittal. Copies of correspondence shall include the notice of intent sent to the SWRCB, and the SWRCB confirmation letter indicating receipt and acceptance of the notice of intent.

Justification for Change: Since the SWPPP may be integrated with the DESCP, the submittal times should be the same for both.

PROJECT GROUNDWATER WELLS, PRE-WELL INSTALLATION

SOIL&WATER-3 The Project owner proposes to construct and operate up to two or more onsite groundwater production wells ~~and additional backup wells~~ that produce water from the CVGB. The Project owner shall ensure that the wells are completed in accordance with all applicable state and local water well construction permits (see C.9.9.2) and requirements. Prior to initiation of well construction activities, the Project owner shall submit for review and comment a well construction packet to the County of Riverside and fees normally required for the county's well permit, with copies to both the AO and CPM. The Project shall not construct a well or extract and use groundwater until both the AO and CPM provide approval to construct and operate the well.

Post-Well Installation. The Project owner shall provide documentation to both the AO and CPM that the well has been properly completed. In accordance with California's Water Code section 13754, the driller of the well shall submit to the DWR a Well Completion Report for each well installed. The Project owner shall ensure the Well Completion reports are submitted. The Project owner shall ensure compliance with all county water well standards and requirements for the life of the wells and shall provide the AO and CPM with two (2) copies each of all monitoring or other reports required for compliance with the County of Riverside water well standards and operation requirements, as well as any changes made to the operation of the well.

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

- A. No later than sixty (60) days prior to the construction of the onsite groundwater production wells, the Project owner shall submit to both the AO and CPM a copy of the water well construction packet submitted to the County of Riverside.
- B. No later than thirty (30) days prior to the construction of the onsite groundwater production wells, the Project owner shall submit a copy of written concurrence received from the County of Riverside that the proposed well construction activities comply with all county well requirements and meet the requirements established by the county's water well permit program.
- C. No later than sixty (60) days after installation of each well at the Project site, the Project owner shall ensure that the well driller submits a Well Completion Report to the DWR with a copy provided to both the AO and CPM. The Project owner shall submit to both the AO and the CPM, together with the Well Completion Report, a copy of well drilling logs, water quality analyses, and any inspection reports.
- D. During well construction and for the operational life of the well, the Project owner shall submit two (2) copies each to the AO and CPM of any proposed well construction or operation permit changes within ten (10) days of submittal to or receipt from the County of Riverside.

- E. No later than fifteen (15) days after completion of the onsite groundwater production wells, the Project owner shall submit documentation to BLM's Authorized Officer, the CPM, and the CRBRWQCB that well drilling activities were conducted in compliance with Title 23, California Code of Regulations, Chapter 15, Discharges of Hazardous Wastes to Land, (23 CCR, sections 2510 et seq.) requirements and that any onsite drilling sumps used for Project drilling activities were removed in compliance with 23 CCR section 2511(c).

CONSTRUCTION AND OPERATION WATER USE

SOIL&WATER-4 The Project owner proposes to use groundwater for water supply during construction and during operation. The proposed Project's use of groundwater during construction shall not exceed an annual average of 1,368 afy during the entire 37 months of construction period (X-MG) and an annual average of 1605-1,644 afy during operation for wet cooling and 202 afy for dry cooling. Water quality used for project construction and operation will be reported in accordance with Condition of Certification **SOIL&WATER-20** to ensure compliance with this condition.

Prior to the use of groundwater for construction, the Project owner shall install and maintain metering devices as part of the water supply and distribution system to document Project water use and to monitor and record in gallons per day the total volume(s) of water supplied to the Project from this water source. The metering devices shall be operational for the life of the Project.

Verification: At least thirty ~~sixty (3060)~~ days prior to the start of construction of the proposed Project, the Project owner shall submit to both the AO and CPM a copy of evidence that metering devices have been installed and are operational.

Beginning six (6) months after the start of construction, the Project owner shall prepare a semi-annual summary of amount of water used for construction purposes. The summary shall include the monthly range and monthly average of daily water usage in gallons per day.

The Project owner shall prepare an annual summary, which will include ~~daily usage,~~ monthly range and monthly average of ~~daily-water usage~~ in gallons per day month, and total water used on an ~~monthly and~~ annual basis in acre-feet. For years subsequent to the initial year of operation, the annual summary will also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal.

GROUNDWATER LEVEL MONITORING, MITIGATION, AND REPORTING

SOIL&WATER-5 The Project owner shall submit a Groundwater Level Monitoring and Reporting Plan to both the AO and 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, provided that access is granted by the well owners.

Justification for Change: The condition of and use of existing wells should be documented prior to implementation of a monitoring and mitigation program.

2. Monitor to establish preconstruction ~~base-line~~ conditions. The monitoring plan and network of monitoring wells ~~may~~ 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 will be incorporated into the program if wet cooling is utilized, provided access is granted by the owners and that the wells are deemed to be of suitable location and construction to ~~would~~ satisfy the requirements for the monitoring program. If possible, 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.

Justification for Change: Monitoring should be conducted in an envelope around that site that incorporates the area where potentially significant impacts could reasonably occur. 10 miles provides a suitable envelope around the predicted area of project drawdown impact for a wet-cooled project. Drawdown from a dry cooled project can be adequately monitored using shallow and deep test and monitoring wells associated with the project.

3. Collect groundwater levels from the off-site and on-site wells, seeps and or springs to provide ~~baseline~~ 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~~ during the first year of the construction period, semi-annually during the remainder of 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 ~~and the water quality data.~~ Assess the significance of an apparent trend and estimate the magnitude of that trend. Use the pressure transducer data to characterize seasonal and diurnal fluctuations in groundwater levels.

C. During Operation:

1. On a quarterly basis for the first ~~five~~ years of operation and semi-annually thereafter for the first five years, collect water level measurements from any the 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 eastern the CVGB shall be estimated based on available data.

Justification for Change: Quarterly monitoring for five years is unduly burdensome and will not result in additional certainty regarding recognition and evaluation of Project impacts. The proposed amended monitoring program includes more frequent measurements during the periods of rapid groundwater level change when pumping is initiated and then transitions to semi-annual monitoring, which is the typical frequency utilized by water management agencies to support management decisions. Water table impacts are predicted to be negligible and impacts will be better recognized through the use of recording pressure transducers in water table wells. Water levels in deeper water bearing zones are unlikely to display seasonal shorter term fluctuations. Seasonal fluctuations are not evident deeper based on review of well hydrographs in the basin.

2. On an annual basis, perform statistical trend 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 ~~if~~ 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 impacted well owners that experience 5 feet or more of Project-induced drawdown if the both the AO and CPM's inspection of the well monitoring data confirms the drawdown 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 effected yields outside the Project have been lowered 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. In the absence of specific electrical use data supplied by the well owner, the following formula shall be used to calculate the additional electrical usage (CEC, 2005):

$$\frac{\text{KWhr/year} = (\text{gallons Pumped/year}) \times (\text{feet of interference drawdown})}{1,621,629}$$

Justification for Change: A reasonable threshold of significance for drawdown impacts resulting in additional electrical cost is 5 feet, as adopted by CEC for the Blythe I and II projects. A formula is needed to calculate additional electrical costs in the event that electrical consumption and pump efficiency data are not available.

- ~~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 150 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 using by interpretation of the groundwater monitoring data collected and shall take into consideration the effect of other nearby pumping and the condition and age of the well prior to the beginning of Project pumping.

Justification for Change: Clarification of the range of impacts that are being mitigated. Reimbursement should be proportional to impacts from Project pumping.

- ~~d. Electrical cost reimbursement — If the pumping water level falls below a depth of 5 feet from an average of the baseline measurements, the well owner shall be compensated by the Project owner for the additional electrical costs commensurate with the additional lift required to pump. The water level in the well will be assessed relative to the pumping rate established during the pre-site development period.~~
- e. The Project owner shall notify all any owners of the impacted wells within one month of both the AO and CPM approval of the compensation analysis for increased energy costs.

- f. 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. All The Project shall reimburse the impacted well owner for the customary local costs associated with lowering pumps ~~shall be borne by the Project owner~~ in proportion to the Project's contribution to the lowering of the water table that resulted in the impact.
 - g. Deepening of wells – If the groundwater is lowered enough as a result of Project pumping that ~~well screens and pump intakes~~ are exposed, and pump lowering is not an option. ~~In this case, such affected~~ the wells shall be deepened or new wells constructed. The Project shall reimburse the impacted well owner for aAll customary local 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. ~~shall be borne by the Project owner.~~
4. After the first five-year operational and monitoring period both the AO and 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 both the AO and CPM.
 5. At the end of every subsequent five-year monitoring period, the collected data shall be evaluated by the both the AO and 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 both the AO and CPM all monitoring reports, complaints, studies and other relevant data within 10 days of being received by the Project owner.

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

1. At least 30 days prior to Project construction, the Project owner shall submit to the both the AO and CPM, a comprehensive report presenting all the data and information required in item A above.
2. The Project owner shall submit to the both the AO and 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 both the AO and CPM quarterly and semi-annual reports (as applicable) presenting all the data and information required in item B above.

4. The Project owner shall submit to the both the AO and CPM all calculations and assumptions made in development of the report data and interpretations.
5. No later than 60 days after commencing ~~prior to~~ Project operation, the Project owner shall provide to the both the AO and 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 both the AO and CPM.
6. During Project operation, the Project owner shall submit to the both the AO and CPM, applicable quarterly, ~~or~~ semi-annual and annual reports presenting all the data and information required in item C above.
7. The Project owner shall submit to the both the AO and 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 both the AO and 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 both the AO and 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 30 days after compensation is paid, the Project owner shall submit to the both the AO and 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 both the AO and CPM that submits all monitoring data collected and provides a summary of the findings. Both the AO and CPM will determine if the water level measurement frequencies should be revised or eliminated.

WASTE DISCHARGE REQUIREMENTS

SOIL&WATER-6 Conditions to require implementation of waste discharge requirements for LTU and surface impoundments are currently in development and will be included in the SA/FEIS.

Comment: Genesis LLC reserves the right to comment on this condition when provided in the SA/FEIS.

SEPTIC SYSTEM AND LEACH FIELD REQUIREMENTS

SOIL&WATER-7 The project owner shall comply with the requirements of the County of Riverside Ordinance Code Title 8, Chapter 8.124 and the California Plumbing Code (California Code of Regulations Title 24, Part 5) regarding sanitary waste disposal facilities such as septic systems and leach fields. The septic system and leach fields shall be designed, operated, and maintained in a manner that ensures no deleterious impact to groundwater or surface water. Compliance shall include an engineering report on the septic system and leach field design, operation, maintenance, and loading impact to groundwater.

Verification: The project owner shall submit all necessary information and the appropriate fee to the County of Riverside to ensure that the project has complied with county sanitary waste disposal facilities requirements. Any written assessments prepared by the County of Riverside regarding the project's compliance with these requirements must be submitted to the AO and CPM for review and approval 30 days prior to the start of power plant operation.

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. Channel rating calculations for all the collector/conveyance channels and onsite drainage channels. 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. A discussion and associated calculation documenting the methods to be used for erosion control at outlet locations along the southern property boundary where flow is released to existing ground.
- D. Revised hydrology map showing peak discharge values at locations where the onsite drainage system discharges into the proposed detention basins, or directly offsite, including discharge values at each of the outlet structures along the southern project boundary.
- E. Stage-discharge ratings calculations for all outlet structures (i.e. pipes and weirs) used to outlet water along the southern project boundary.
- F. 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 both the AO and CPM for their review and comments 30 days before submission of civil drawings to the CBO for approval

under condition of certification CIVIL-1 after project certification. The owner will address comments provided by both the AO and 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. The Revised Project Drainage Report and 30 percent Grading and Drainage Plans shall be approved by both the AO and CPM.

Justification for Change: Civil site drawings need to be approved by the CBO (including grading and drainage), therefore it is more reasonable to provide the 30% grading and drainage documents to the AO and CPM 60 days before the first set of detailed civil drawings are provided to the CBO. This will allow the latest documents to be provided to the AO and CPM and their comments incorporated into the drawing set provided to the CBO for approval.

DETAILED FLO-2D ANALYSIS

SOIL&WATER-9 The Project owner shall provide a revised FLO-2D analysis which models the post-development flood conditions for the 10-, 25- and 100-year storm events along the southern project boundary where flow is released to existing ground. The post-development model must include all outlet structure in the model with appropriate elevations and stage-discharge data. The methods and results of the analysis must be fully documented in the revised Project Drainage Report required in **Soil&Water-8**. Graphical output must include depth and velocity mapping for the post-development condition. Color shading schemes used for the mapping must be consistent between all maps as well as clear and easily differentiated between designated intervals for hydraulic parameters. Intervals to be used in the mapping are as follows:

- Flow Depth: at 0.20 ft intervals up to 1 ft, and 0.40 ft intervals thereafter.
- Velocity: 0.5 ft/s intervals

A set of figures will be provided for the 10-, 25- and 100-year events at a scale of no less than 1 in=200 ft which show the extent, depths and velocities of flows being discharged along the southern property boundary, as well as annotation indicating the location and type of outlet structure. Digital input and output files associated with the FLO-2D analysis must be included with all submittals.

The results of this analysis will be used for design of the 30 percent project grading and drainage plans.

Verification: The Project owner shall submit a detailed FLO-2D analysis to both the AO and CPM for their review and comments with the 30 percent Grading and Drainage Plans and revised Project Drainage Report required in **Soil&Water-8**. The Project owner will address comments provided by both the AO and CPM until approval of the analysis is issued.

DRAINAGE CHANNEL DESIGN

SOIL&WATER-10 All collector and conveyance channels shall be constructed consistent with Riverside County Flood Control and Water Conservation District (RCFCWCD) guidelines where applicable. Deviation from those guidelines should be documented in the Project drainage report along with justification. Grade control structures shall be utilized where needed to meet channel velocity and Froude number requirements. Channels shall be sized along discreet sections based on the results of the detailed FLO-2D analysis described in **SOIL&WATER-9**. All grade control and drop structures shall have adequate toe-down to account for the design drop plus two additional feet to account for potential downcutting of the channel over time.

Channel confluence design must be given special consideration, especially as the preliminary Grading and Drainage Plans show 90 degree angles of confluence at nearly all locations. The issues of confluence hydraulics and potential scour shall be specifically addressed in the revised Drainage Report.

Offsite flows shall discharge directly into collector channels following the natural drainage patterns. The Project owner shall also flatten constructed channel side slopes at a 4:1 ratio at all locations where adequate space exists and in no cases are the slopes to be steeper than 3:1 along reaches requiring soil cement. At slopes of 3:1, soil cement shall be placed in horizontal lifts.

The proposed collector channel design must be fully documented in the Grading and Drainage plans and must include the following information:

- A. Detailed and accurate cut/fill lines demonstrating in plan view how the channel would tie into existing grade and the solar facility.
- B. Channel cross-sections at 4200-foot intervals showing the channel geometry, existing grade, proposed grade at the facility and how the channel would tie in at on both sides.
- C. Detailed channel profiles showing existing and finished grades at channel flow line and left and right banks. All drop structures as well as the toe-of soil cement profile must also be shown and fully annotated. The 100-year water surface elevation will be provided on all profiles.
- D. Typical sections and design details for all discreet channel sections, drop structures, channel confluences, flow dispersion structures and other relevant drainage features.
- E. Details for all outlet structures to be used along the downstream property boundary to release flow from the engineered channels to existing ground as well as details and specifications for all erosion protection measures to be used at those locations.
- F. Consistent nomenclature and stationing on all plans, sections, profiles and details.

Verification: The Project owner shall prepare preliminary, 30 percent channel design drawings and submit two (2) copies for both the AO and CPM review and comment. The preliminary design drawings shall be submitted at the same time as the **Revised Project Drainage Report** in **SOIL&WATER-8** and FLO 2D Analysis in **SOIL&WATER-9**. The Project owner will update and modify the design as necessary to obtain both the AO and CPM approval.

Justification for Change: There are some locations on the site where there is physically not enough space to have 4:1 slopes on the channels, therefore it is proposed to still allow a minimum of 3:1 slopes in these locations. In addition, it is overly burdensome to require cross sections at every 100 feet, therefore it is proposed to have cross sections at every 200 feet. At this interval, all the key channel features will still be identified.

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 Project owner will update and modify the design as necessary to obtain both the AO and CPM approval.

NPDES STORMWATER PERMIT - INDUSTRIAL ACTIVITY

SOIL&WATER-12 In the event it is determined the project will discharge to waters of the US, the Project owner shall comply with the requirements of the general NPDES permit for discharges of storm water associated with industrial activity. The Project owner shall develop, obtain both the AO and CPM approval of, and implement an industrial SWPPP for the operation of the Project.

Verification: At least 360 days prior to commercial operation, the Project owner shall submit to the both the AO and CPM a copy of the final industrial SWPPP for operation of the Project for review and approval prior to commercial operation. The Project owner shall retain a copy on site. The Project owner shall submit copies to the both the AO and CPM of all correspondence between the Project owner and the CRBRWQCB regarding the general NPDES permit for discharge of storm water associated with industrial activity within 10 days of its receipt or submittal. Copies of correspondence shall include the Notice of Intent sent by the Project owner to the SWRCB.

CHANNEL MAINTENANCE PROGRAM

SOIL&WATER-13 The Project owner shall develop and implement a Channel Maintenance Program that provides long-term guidance to implement routine channel maintenance projects and comply with conditions of certification in a feasible and environmentally-sensitive manner. The Channel Maintenance Program will be a process and policy document prepared by the Project owner, reviewed by both the AO and CPM. The Channel Maintenance Program shall include the following:

- A. Purpose and Objectives** – Establishes the main goals of the Program, of indefinite length, to maintain the diversion channel to meet its original design to provide flood protection, support GSEP mitigation, protect wildlife habitat and movement/ migration, and maintain groundwater recharge.
- B. Application and Use** – The channel maintenance work area is defined as the GSEP engineered channel, typically extending to the top of bank, include access roads, and any adjacent property that GSEP owns or holds an easement for access and maintenance. The Program would include all channel maintenance as needed to protect the GSEP facilities and downstream property owners.

C. Channel Maintenance Activities

- 1. Sediment Removal** – sediment is removed when it: (1) reduces the diversion channel effective flood capacity, to less than the design discharge, (2) prevents appurtenant hydraulic structures from functioning as intended, and (3) becomes a permanent, non-erodible barrier to instream flows.
- 2. Vegetation Management** – ~~manage vegetation in and adjacent to the diversion channel to maintain the biological functions and values proposed in the mitigation.~~ Vegetation management shall include control of invasive or nonnative vegetation as prescribed in Condition of Certification **BIO-14**.

Justification for Change: The engineered diversion channels are not intended to serve biological mitigation purposes.

- 3. Bank Protection and Grade Control Repairs** – Bank protection and grade control structure repairs involve any action by the Project owner to repair eroding banks, incising toes, scoured channel beds, as well as preventative erosion protection. The Project owner would implement instream repairs when the problem: (1) causes or could cause significant damage to GSEP; adjacent property, or the structural elements of the diversion channel; (2) is a public safety concern; (3) negatively affects groundwater recharge; or (4) negatively affects the mitigation vegetation, habitat, or species of concern.
- 4. Routine Channel Maintenance** – trash removal and associated debris to maintain channel design capacity; repair and installation of fences,

gates and signs; grading and other repairs to restore the original contour of access roads and levees (if applicable); and removal of flow obstructions at GSEP storm drain outfalls.

5. **Channel Maintenance Program** – Exclusions including: emergency repair and CIP.

D. Related Programmatic Documentation – both the AO and CPM will review and approve the Channel Maintenance Program programmatic documentation. Maintenance activities shall comply with the stream alteration agreement provisions and requirements for channel maintenance activities consistent with California's endangered species protection regulations and other applicable regulations.

E. Channel Maintenance Process Overview

1. **Program Development and Documentation** – This documentation provides the permitting requirements for channel maintenance work in accordance with the conditions of certification for individual routine maintenance of the engineered channel without having to perform separate CEQA/NEPA review or obtain permits.
2. **Maintenance Guidelines** – based on two concepts: (1) the maintenance standard and (2) the acceptable maintenance condition, and applies to sediment removal, vegetation management, trash and debris collection, blockage removal, fence repairs, and access road maintenance.
3. **Implementation** – Sets Maintenance Guidelines for vegetation and sediment management. GSEP's vegetation management activities are established in Condition of Certification **BIO-14**. Maintenance Guidelines for sediment removal provide information on the allowable depth of sediment for the engineered channel that would continue to provide design discharge protection.
4. **Reporting** – both the AO and CPM requires the following reports to be submitted each year as part of the Annual Compliance Report:
 - a. Channel Maintenance Work Plan – Describes the planned “major” maintenance activities and extent of work to be accomplished; and
 - b. Channel Maintenance Program Annual Report – Specifies which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).
 - c. A report describing "Lessons Learned" to evaluate the effectiveness of both resource protection and maintenance methods used throughout the year.

- F. Resource Protection Policies** - establishes policies to ensure that resources would be protected to the fullest extent feasible during routine channel maintenance activities. Policies would be developed to guide decision-making for channel maintenance activities. BMPs shall be developed to implement these policies.

Verification: At least 60 days prior to the start of any project-related [channel construction](#) ~~site disturbance~~ activities, the Project owner shall coordinate with both the AO and CPM to develop the Channel Maintenance Program. The Project owner shall submit two copies of the programmatic documentation, describing the proposed Channel Maintenance Program, to the both the AO and CPM (for review and approval). The Project Owner shall provide written notification that they plan to adopt and implement the measures identified in the approved Channel Maintenance Program. The Project owner shall:

- Supervise the implementation of a Channel Maintenance Program in accordance with conditions of certification;
- Ensure the GSEP Construction and Operation Managers receive training on the Channel Maintenance Program;
- As part of the GSEP Annual Compliance Report to the both the AO and CPM , submit a Channel Maintenance Program Annual Report specifying which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).

[Justification for Change: The channel maintenance plan can only be finalized when the detailed design of the channel system has been completed. Therefore it is proposed to have the verification of this condition based on the construction of the channel, rather than any site-disturbance activities.](#)

CLOSURE AND DECOMMISSIONING PLAN

[The Applicant will prepare a decommissioning plan that will meet the requirements of the BLM.](#)

SOIL&WATER-14 The Project owner shall identify likely decommissioning scenarios and develop specific decommissioning plans for each scenario that will identify actions to be taken to avoid or mitigate long-term impacts related to water and wind erosion after decommissioning. Actions may include such measures as a decommissioning SWPPP, revegetation and restoration of disturbed areas, post-decommissioning maintenance, collection and disposal of project materials and chemicals, and access restrictions.

Verification: At ~~Within~~ least ~~90-90~~ days prior to ~~after~~ the start of site mobilization, [or alternate date as agreed to with BLM](#), the Project owner shall submit decommissioning plans to the AO and CPM for review and approval. The Project owner shall amend these documents as necessary, with approval from the AO and CPM, should the decommissioning scenario change in the future.

Justification for Change: Decommissioning activities are unrelated to initial construction.

MITIGATION OF COLORADO RIVER IMPACTS

Two methods have been proposed by the US Bureau of Reclamation, the USGS and the Colorado River Board to assess whether a project will require an entitlement to Colorado River water in order to pump groundwater. They include the Accounting Surface methodology (USGS, 2008) and the Aquifer Depletion Modeling methodology (Leake, et al., 2008). Sufficient data exist to demonstrate that the Project will not pump Colorado River water or require an entitlement under either of these two methods. This conclusion is supported by the following:

- Four modeling studies were completed to assess the impacts of groundwater pumping in the CVGB. These studies included modeling for the Project (WPAR, 2010), for the Palen Solar Project (AECOM, 2010), for the Eagle Crest Pumped Storage Project (GEI, 2009), and for the Chuckwalla and Ironwood State Prison Expansion (Engineering Science, 1990), and each supported the conclusion that groundwater levels will not fall below the Bureau of Reclamation's proposed Colorado River Accounting Surface as a result of Project or cumulative pumping. Slight differences in modeling results from the above studies are related to differences in the methodology applied; however, in each case the applied methodology appears to meet the standard of care for that particular application and supports the same conclusion.
- Twenty years of groundwater monitoring in the vicinity of the Chuckwalla Valley and Ironwood State Prisons indicate that groundwater levels have stabilized above the Accounting Surface in response to pumping at the prisons.
- USGS (Leake, et al., 2008) modeled theoretical depletion of the Colorado River by pumping in various locations throughout the CVGB. Depletion is defined as the sum of decreased inflow from the aquifer to the river, and increased outflow from the river to the aquifer. The study shows that most of the CVGB, including the site, is located outside of the area where pumping would deplete the Colorado River, even if pumping were to continue for 100 years.

There is therefore no technical basis for the supposition that the Project will need to obtain an entitlement to pump Colorado River water. In addition, the requirement that mitigation proceed on the assumption that the project is pumping Colorado River water simply because the basin within which the project is located has a potential indirect hydrologic connection with the Colorado River sets a precedent that is contrary to existing LORS, specifically California groundwater rights law, which does not require that pumpers of groundwater outside the floodplains of rivers obtain entitlements for surface water diversion.

Predicted changes in underflow from the CVGB to the PVMGB as a result of Project pumping are discussed in the Groundwater Resources Investigation completed for the project (WPAR, 2010). Modeling conducted as part of this study indicates a relatively modest reduction in underflow that increases from 10 AFY after three years to 319 AFY

at the end of the Project life. This reduction in underflow will slightly effect the water budget for the PVMGB. and could result in groundwater being taken out of storage and/or possibly a depletion of Colorado River water. The extent of these effects in the PVMGB cannot be reliably predicted; however, it may be concluded that the nature and magnitude of the changes will not result in adverse impacts to wells or lead to a requirement that additional entitlements be obtained. We are currently evaluating options for refining the assessment of underflow from the CVGB to the PVMGB included in the GRI report, and evaluating the application of underflow analysis as a tool to guide the use Colorado River water entitlements as a potential mitigation measure to offset a portion of the Project's water use.

The Applicant recommends deleting Soil and Water COC-15 as written below.

~~**SOIL&WATER-15** The Project owner shall undertake one or more of the activities identified below to mitigate project impacts to flows in the Colorado River. These activities shall result in replacement of 51,920 acre feet or 1,644 AFY under wet cooling Project or 6,560 acre feet or 132 AFY for a dry cooling Project alternative in the Colorado River Basin over the life of the project.~~

~~The Project owner shall first consider the use of dry cooling for project operation, and mitigate any remaining project impacts on the Colorado River.~~

~~If dry cooling is not used for project operation then the activities may include water conservation projects in the following order of priority: Zero Liquid Discharge systems, increase cycles of concentration in the evaporative cooling process, hybrid cooling, payment for irrigation improvements in Palo Verde Irrigation District, purchase of water rights within the Colorado River Basin that will be held in reserve, and/or BLM's Tamarisk Removal Program.~~

~~The activities proposed for mitigation will be outlined in a Water Supply Plan that will be provided to the CPM and AO for review and approval.~~

~~If the project owner has filed an application to the Colorado River Board to obtain an allocation of water from the Colorado River, obtaining an allocation of 51,920 acre feet or 1,644 AFY under a wet cooling Project alternative or 6,560 acre feet or 132 AFY for a dry cooling Project alternative will meet the requirements of this condition.~~

~~The Project owner can choose to refine the estimate of the quantity of water attributed to flow from the Colorado River by implementing **SOIL&WATER-19**. If a lesser volume of water is determined to be diverted from the Colorado River as a result of project pumping pursuant to **SOIL&WATER-19**, that lesser volume shall be replaced in accordance with this Condition.~~

~~**Verification:** The Project Owner shall submit a Water Supply Plan to the CPM and AO for review and approval 30 days before the start of extraction of groundwater for construction or operation. The Water Supply Plan shall include the following at a minimum:~~

- a. ~~Identification of the activity and water source that will replace 51,920 acre feet or 1,644 AFY under a wet cooling Project alternative or 6,560 acre feet or 132 AFY for a dry cooling Project alternative diverted from the Colorado River over the life of the project;~~
- b. ~~Demonstration of the project owner's legal entitlement to the water or ability to conduct the activity;~~
- c. ~~Include a discussion of any needed governmental approval of the identified activities, including a discussion of whether that approval that requires;~~
- d. ~~Discuss whether any governmental approval of the identified activities will be needed, and, if so, whether additional that approval will require compliance with CEQA or NEPA;~~
- e. ~~Demonstration of how water diverted from the Colorado River will be replaced for each of the activities;~~
- f. ~~An estimated schedule for completion of the activities;~~
- g. ~~Performance measures that would be used to evaluate the amount of water replaced by the activities;~~
- h. ~~Monitoring and Reporting Plan outlining the steps necessary and proposed frequency of reporting to show the activities are achieving the intended benefits and replacing Colorado River diversions; and~~
- i. ~~If the application for allocation from the Colorado River is accepted by the USBR, the project owner shall submit to both AO and the CPM for their approval, a copy of a water allocation from the Colorado River issued by the CRB for the Projects diversion of Colorado River water.~~

~~The project owner shall implement the activities reviewed and approved in the Water Supply Plan in accordance with the agreed upon schedule in the Water Supply Plan. If agreement on identification or implementation of mitigation activities cannot be achieved the project owner shall immediately halt construction or operation until assurance that the agreed upon activities can be identified and implemented.~~

GROUNDWATER PRODUCTION REPORTING

SOIL&WATER-16 The Project is subject to the requirement of Water Code Sections 4999 et. seq. for reporting of groundwater production in excess of 25 acre feet per year.

Verification: The Project Owner shall file an annual "Notice of Extraction and Diversion of Water" with the SWRCB in accordance with Water Code Sections 4999 et. seq. The Project Owner shall include a copy of the filing in the annual compliance report.

GROUND SUBSIDENCE MONITORING AND ACTION PLAN

SOIL&WATER-17 ~~Three extensometers~~ If the Project utilizes wet cooling, one monument monitoring station per well or a minimum of three stations shall be constructed to measure potential inelastic subsidence that may alter surface characteristics of the Chuckwalla Valley near the proposed production wells.

Justification for Change: Almost all the subsiding areas associated with lowering of the groundwater table are underlain by young (Quaternary) unconsolidated or semiconsolidated clastic sediments of high porosity laid down in alluvial, lacustrine, or shallow marine environments (Poland, 1984). Additionally, nearly all the areas susceptible to subsidence in the southwestern United States exhibit semiconfined or confined aquifers systems containing aquifers of sand and/or gravel of high permeability and low compressibility, interbedded with clayey aquitards of low vertical permeability and high compressibility under virgin stresses (Poland, 1984). The aquifer that is proposed to be utilized for the Project water supply occurs in consolidated Pliocene sediments between approximately 800 and 1,800 feet below ground surface. The dense and consolidated clays in this interval would have a relatively lower susceptibility to compression and settlement than the younger sediments involved in most instances of reported settlement in the area, and any amount of settlement occurring in the pumped aquifer would be attenuated through the thick sequence of overlying sediments, and less subsidence would be observed at the ground surface.

In addition, analysis of documented values of subsidence and its associated drop in the water table for similar desert basins in the southwestern United States indicates that the average ratio of subsidence to water level drawdown in these basins is 1 foot of subsidence per 114 feet of drawdown. (See memorandum from Worley Parsons dated April 28, 2010.) The maximum predicted water level decline related to Project pumping is approximately 10 feet in the immediate vicinity of the pumping centroid at the site, and decreases rapidly away from the well locations. Furthermore, among the power plants permitted by the CEC that rely on groundwater as a water supply, extensometers have been required for monitoring only for Pico Power, which is located in a basin with an extensive history subsidence, and is closer to potentially sensitive receptors. Thus, the likelihood of significant subsidence to occur as a result of project pumping for wet cooling is remote, and the use of extensometers for monitoring is not warranted.

The applicant will be required to:

- A. Prepare and submit a Subsidence Monitoring Plan (SMP). The plan shall include the following elements:
 1. Construction diagrams of the proposed ~~extensometers~~ monument monitoring station including ~~borehole size~~ and description, planned ~~depth of anchor point(s)~~, measuring points;
 2. Map depicting locations (minimum of three) of the planned ~~extensometers~~ monuments;

3. Monitoring program that includes monitoring frequency, thresholds of significance, reporting format.
- B. Prepare quarterly reports commencing 3 months following commencement of groundwater production during construction and operations.
1. The reports will include presentation and interpretation of the data collected including comparison to the thresholds developed in Item C.
- C. Prepare a Mitigation Action Plan that will detail the following:
1. Thresholds of significance for implementation of proposed action plan;
 - a. Any subsidence that may occur will not be allowed to damage existing structures either on or off the site or alter the appearance or use of the structure;
 - b. Any subsidence that may occur will not be allowed to alter the natural drainage patterns or permit the formation of playas or lakes to form;
 - c. Any subsidence that violates (a) or (b) will result in the Project owner to investigate the need immediately to reduce/ceasing pumping until the cause is interpreted, subsidence caused by project groundwater pumping abates and the structures or drainage patterns are corrected or stabilized, returned to their pre-subsidence conditions.
 2. Action Plan that details proposed actions by the applicant in the event thresholds are achieved during the monitoring program.

The applicant will be required to submit the Ground Subsidence Monitoring and Action Plan that is prepared by an Engineering Geologist registered in the State of California 30 days prior to the start of extraction of groundwater for construction or operation.

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

1. At least 30 days prior to Project construction, the Project owner shall submit to the both the AO and CPM, a comprehensive report presenting all the data and information required in item A above.
2. The Project owner shall submit to the both the AO and CPM all calculations and assumptions made in development of the SMP.
3. During Project construction and operations, the Project owner shall submit to the both the AO and CPM quarterly reports presenting all the data and information required in item B above.
4. The Project owner shall submit to the both the AO and CPM all calculations and assumptions made in development of the report data and interpretations.

5. After the first five years of the monitoring period, the Project owner shall submit a 5 year monitoring report to both the AO and CPM that submits all monitoring data collected and provides a summary of the findings. Both the AO and CPM will determine if the Ground Subsidence Monitoring and Action Plan frequencies should be revised or eliminated.

WATER POLICY COMPLIANCE

SOIL&WATER-18 Pending agreement on the actions needed to bring the project into compliance with the water policy.

ESTIMATION OF COLORADO RIVER IMPACTS

Two methods have been proposed by the US Bureau of Reclamation, the USGS and the Colorado River Board to assess whether a project will require an entitlement to Colorado River water in order to pump groundwater. They include the Accounting Surface methodology (USGS, 2008) and the Aquifer Depletion Modeling methodology (Leake, et al., 2008). Data from four modeling studies in the CVGB, aquifer depletion modeling conducted by USGS, and 20 years of groundwater modeling conducted for the Chuckwalla and Ironwood State Prisons have generated sufficient data to demonstrate that the Project will not pump Colorado River water or require an entitlement under either of these two methods. There is therefore no technical basis for the supposition that the Project will need to obtain an entitlement to pump Colorado River water. In addition, the requirement that mitigation proceed on the assumption that the project is pumping Colorado River water simply because the basin within which the project is located has a potential indirect hydrologic connection with the Colorado River sets a precedent that is contrary to existing LORS, specifically California groundwater rights law, which does not require that pumpers of groundwater outside the floodplains of rivers obtain entitlements for surface water diversion.

Predicted changes in underflow from the CVGB to the PVMGB as a result of Project pumping are discussed in the Groundwater Resources Investigation completed for the project (WPAR, 2010). Modeling conducted as part of this study indicates a relatively modest reduction in underflow that increases from 10 AFY after three years to 319 AFY at the end of the Project life. This reduction in underflow will slightly effect the water budget for the PVMGB. The extent to which the reduction in underflow to the PVMGB is partitioned among these effects is uncertain, and the proposed modeling study in COC S&W-19 will not significantly decrease this uncertainty. Furthermore, the proposed modeling study would take up to approximately one year to complete, would unnecessarily delay the project, and would result in significant loss of funding and financial hardship without technical basis. We are currently evaluating options for refining the assessment of underflow from the CVGB to the PVMGB included in the GRI report, and evaluating the application of underflow analysis as a tool to guide the use Colorado River water entitlements as a potential mitigation measure to offset a portion of the Project's water use.

The results of this evaluation, and possible changes to COC S&W-19, will be discussed with CEC staff during the upcoming May 5, 2010 workshop. At this time, we recommend deleting the wording as currently shown in COC Soil and Water-19.

~~**SOIL&WATER-19** The Project owner may choose to refine the estimates of the amount of subsurface water flowing from the Colorado River due to project pumping. This estimate may be used for determining the appropriate volume of water for mitigation in accordance with **SOIL&WATER-15**. The Project owner shall do the following to provide an estimate for review and approval by the AO and CPM:~~

- ~~1. The Project owner shall conduct a detailed analysis of the contribution of Colorado River water to the PVMGB from the Projects groundwater extraction activities. The detailed analysis shall include:
 - ~~a. The development of a conceptual model~~
 - ~~b. The use of a numerical model.~~
 - ~~c. Reporting of the results of the modeling effort~~
 - ~~d. Estimation of the contribution of Colorado River water and groundwater from the adjacent Palo Verde Valley Groundwater Basin to the Palo Verde Mesa Groundwater Basin as a result of Project groundwater extraction in the CVGB.~~~~
- ~~2. The analysis shall include development of a conceptual model that includes a detailed description of the: geology; hydrogeology; boundary conditions; aquifer homogeneity/heterogeneity, recharge estimates, discharge estimates, flow regime and water balance.~~

~~The development of the conceptual model shall be based on existing data. In instances where available data is deficient, assumptions shall be developed along with the basis of the assumptions. The conceptual model shall be the basis for the numerical model.~~

- ~~3. The development of the numerical model shall include development of the grid orientation, cell size, and layering in sufficient detail to provide information concerning inflow from adjacent groundwater basins and boundaries including the Colorado River and the adjacent Palo Verde Valley Groundwater Basin for the life of the project. Model input data shall be developed for each of the boundary conditions and aquifer properties identified in the Conceptual Model.~~

~~The numerical model shall be run under steady state conditions using groundwater heads from existing wells in the basin. The numerical model shall include calibration of the model with existing conditions including simulation of groundwater levels. The model shall be based upon an industry standard model whose code is available in the public domain. The creation and calibration of the model shall use the following techniques/requirements set forth in:~~

- ~~a. ASTM D5447 – Application of a Ground-Water Flow Model to a Site-Specific Problem~~
- ~~b. ASTM D5490 – Comparing Ground-Water Flow Model Simulations to Site-Specific Information~~

- ~~c. ASTM D5609 – Defining Boundary Conditions in Ground-Water Flow Modeling~~
 - ~~d. ASTM D5610 – Defining Initial Conditions in Ground-Water Flow Modeling~~
 - ~~e. ASTM D5981 – Calibrating a Ground-Water Flow Model Application~~
 - ~~f. ASTM D5611 – Standard Guide for Conducting a Sensitivity Analysis for a Ground-Water Flow Model Application~~
- ~~4. The numerical model shall be calibrated and shall consist of comparing model results with actual field measurements and adjusting model parameters within predefined limits to improve the agreement between model estimates and actual data. Model calibration shall be completed for a specific time period that represents a period for which sufficient field data (e.g. groundwater levels) are available. Initial calibration efforts shall be completed for “steady-state” conditions when groundwater pumping was minimal. This portion of the calibration effort shall be designed to test the basic components of the conceptual model and to provide a set of groundwater levels that can be used to initialize the transient calibration solution. The transient period shall be selected based on data availability, and the model shall be calibrated using data and information from Item (1).~~
 - ~~5. The Project owner shall conduct transient groundwater model runs (including analysis) of the proposed project from construction through operation for the life of the project. The model shall use the information developed in Item (1).~~
 - ~~6. The Project owner shall conduct an analysis of the anticipated increased inflow (in afy) from the Colorado River and adjacent Palo Verde Valley Groundwater Basin during the life of the project.~~
 - ~~7. The Project owner shall provide a statistical analysis identifying the accuracy of the results of the model as well as the information developed in Item (6) in terms of percent error.~~
 - ~~8. The Project owner shall present the results of the development of the conceptual model, numerical model, calibration, transient runs and sensitivity analysis in a report for review and approval by AO and CPM. The report shall include all pertinent information regarding the development of the conceptual and numerical models. The report shall include:
 - ~~a. Introduction~~
 - ~~b. Previous Investigations and Data Collection Results~~
 - ~~c. Conceptual Model Development/Refinement~~
 - ~~d. Mathematical Model and Input Parameters~~
 - ~~e. Calibration and Sensitivity Analysis~~
 - ~~f. Transient Modeling Runs~~~~

g. ~~Conclusions~~

~~**Verification:** Within 30 days following certification of the proposed Project, the Project owner will submit to both AO and the CPM for their approval a report detailing the results of the modeling effort. The report will include the estimated amount of subsurface water flowing from the Colorado River due to project pumping. This estimate shall be used for determining the appropriate volume of water for mitigation in accordance with **SOIL&WATER-15**.~~

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 and using the well identified to comply with Condition of Certification Soil & Water-5. Prior to project construction, monitoring shall commence to establish pre-construction base-line groundwater quality level conditions in the well proposed for the program and shall include pre-construction, construction, and project operation water use. ~~A water quality baseline and groundwater level baseline shall be established for any existing and newly installed well on the ROW.~~ The primary objectives for the water quality monitoring is to ensure the project does not degrade 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-54**, establish pre-construction and project related groundwater quality and groundwater elevation levels that can be quantitatively compared against observed and simulated levels near the project pumping well and near potentially impacted existing wells, and to avoid, minimize, or mitigate significant impacts or degradation to sensitive receptors (springs and groundwater-dependent vegetation, and groundwater supply users)-.

Justification for Change: The water quality monitoring program and the water level monitoring program are related; however, the requirements of these programs should be discussed separately. The primary purpose of a monitoring is to identify potential impacts. Mitigation should be triggered by the occurrence of a significant impact using specific applicable thresholds.

Verification: The project owner shall complete the following:

1. At least six (6) weeks prior to construction, a Groundwater Level and Quality Monitoring and Reporting Plan shall be submitted to the BLM AO and CPM for review and approval before completion of Condition of Certification **SOIL&WATER-3**. 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 RWQCB 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.

2. At least four (4) weeks prior to construction, a Well Monitoring Installation and Groundwater Level Network Report shall be submitted to the CPM for review and approval [in conjunction with Condition of Certification Soil & Water-5](#). 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. Additionally, the report shall describe the water level monitoring equipment employed in the wells and document their deployment and use.
3. As part of the monitoring well network development, all newly constructed monitoring wells shall be constructed consistent with State and Riverside County specifications.
4. At least four (4) weeks prior to [use of any groundwater for construction](#) ~~project construction~~, all groundwater quality and groundwater level monitoring data shall be reported to the CPM. The report shall include the following:
 - a. 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.
 - b. 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 AO and/or CPM deem critical in protecting existing water supply quality.

Justification for Change: Isotopic analysis is not related to documentation of project impacts and is inappropriate for inclusion in this program. Analysis of water quality parameters that represent the potential impact together with the use of graphical tools such as Piper or Stiff Diagrams are typically used for water quality monitoring programs. We are not aware of any other project that has been required to conduct isotopic analysis as part of impact monitoring, and we are not aware of any detection monitoring programs required by EPA or the RWQCB where stable isotope data is required to be collected.

- c. The data shall be tabulated, summarized, and submitted to the AO and 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.

5. 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 and BLM AO. [After five years, the frequency and scope of the monitoring program shall be re-assessed by the AO and CPM.](#) The summary report shall document water level monitoring methods, the water level data, water level plots, 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.
 - a. 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.~~
 - b. 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.
 - c. Trends shall be analyzed using the Mann-Kendall test for trend [at 90 percent confidence](#). Trends in the compliance data shall be compared and contrasted to pre-project trends, if any.
 - d. 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.
 - e. 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.

Justification for Change: A detected change in water quality does not necessarily indicate a significant impact or degradation when brackish water is used as a water supply or is being monitored. Evaluation of water quality changes should be conducted using applicable LORS, which are water quality objectives.



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
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1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION FOR THE
*GENESIS SOLAR ENERGY PROJECT***

Docket No. 09-AFC-8

**PROOF OF SERVICE
(Revised 3/10/10)**

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*indicates change

DECLARATION OF SERVICE

I, Marie Mills, declare that on April 29, 2010, I served and filed copies of the attached GENESIS SOLAR, LLC'S PROPOSED SOIL AND WATER CONDITIONS OF CERTIFICATION, dated **March 2010**. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/genesis_solar].**

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(Check all that Apply)

FOR SERVICE TO ALL OTHER PARTIES:

sent electronically to all email addresses on the Proof of Service list;

by personal delivery;

by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

OR

depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION

Attn: Docket No. 09-AFC-8
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

// Original Signed //

Marie Mills