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DOCKET	
09-AFC-7	
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October 15, 2010

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

Subject: **PALEN SOLAR I, LLC'S OPENING TESTIMONY: AIR QUALITY & SOIL & WATER RESOURCES**
PALEN SOLAR POWER PROJECT
DOCKET NO. (09-AFC-7)

Enclosed for filing with the California Energy Commission is the original of **PALEN SOLAR I, LLC'S OPENING TESTIMONY: AIR QUALITY & SOIL & WATER RESOURCES**, for the Palen Solar Power Project (09-AFC-7).

Sincerely,

Marie Mills

Palen Solar I, LLC's Opening Testimony:

Air Quality &

Soil & Water Resources

Palen Solar Power Project (09-AFC-7)

October 15, 2010

PALEN SOLAR POWER PROJECT
AIR QUALITY
OPENING TESTIMONY

I. Name: Michael Cressner

II. Purpose:

My testimony addresses the subject of the Air Quality Resources associated with the construction and operation of the Palen Solar Power Project (09-AFC-7).

III. Qualifications:

Michael Cressner: I am presently employed at Solar Millennium LLC, and have been for the past year and am presently an Associate Developer with that organization. I have a Degree in Political Science and I have over 5 years of experience in the development field. I prepared, caused to be prepared, or reviewed the Air Quality section of the AFC as well as the post-filing information, data responses, and supplemental filings. A detailed description of my qualifications was presented in my resume which was included in Attachment A to our Opening Testimony package.

To the best of my knowledge all referenced documents and all of the facts contained in this testimony are true and correct. To the extent this testimony contains opinions, such opinions are my own. I make these statements and provide these opinions freely and under oath for the purpose of constituting sworn testimony in this proceeding.

IV. Exhibits

In addition to this written testimony, I am sponsoring the following exhibits in this proceeding.

Exhibit 1	**Palen Solar I, LLC's Application for Certification Volumes I & II**, dated August 2009, and docketed on August 24, 2009, Section 5.2, Appendix E.

Exhibit 2	**Air Quality Modeling Files**, dated August 2009 and docketed on August 31, 2009
Exhibit 4	**Palen Solar I, LLC's Data Adequacy Supplement**, dated October 2009, and docketed on October 30, 2009.
Exhibit 11	**Palen Solar I, LLC's Responses to CEC Data Requests Set 1**, dated January 2010, and docketed on January 22, 2010, Responses 1 through 32.
Exhibit 12	**Palen Solar I, LLC's Supplemental Responses to CEC Data Request Set 1**, dated January 2010, and docketed on January 27, 2010, Responses 5, 9, 12 & 27.
Exhibit 16	**Palen Solar I, LLC's Responses to January 14, 2010 CEC Workshop Queries – Revised Construction Emissions Spreadsheet, Refinement to PSPP Air Permit Applications, and Response to CEC Data Request 29**, dated February 2010, and docketed on February 9, 2010.
Exhibit 20	**Heat Transfer Fluid Emissions Conference Call Record of Conversation (Between W. Walters (Aspen) and CEC, Abengoa Solar, Inc, Abener N. America,**

	Atmospheric Dynamics & Solutia, Inc), dated January 27, 2010, and docketed on February 24, 2010.
Exhibit 23	**South Coast Air Quality Management District's Preliminary Determination of Compliance**, dated March 4, 2010, and docketed on March 10, 2010.
Exhibit 27	**Palen Solar I, LLC's Initial Comments on the Staff Assessment/ Draft Environmental Impact Statement**, dated May 4, 2010, and docketed on May 4, 2010.
Exhibit 37	**Palen Solar I, LLC's Revised Rule 1401 Health Risk Assessment for Auxiliary Boiler Operations**, dated May 25, 2010, and docketed on May 25, 2010.
Exhibit 43	**Palen Solar I, LLC's HTF Fugitive Components Letter**, dated June 25, 2010, and docketed on July 20, 2010.
Exhibit 44	**Palen Solar I, LLC's Data Responses to Alternatives 2 & 3**, dated July 20, 2010 and docketed on July 20, 2010.

Exhibit 46	**Email Regarding Receptors Alternatives Figures (From Russell Kingsley (AECOM) to Jillian Baker (SCAQMD))**, dated July 2010, and docketed on July 30, 2010.

V. Opinion and Conclusions

I have reviewed the Air Quality section of the Revised Staff Assessment and Staff's modification of Condition of Certification to **AQ-SC11** dated September 28, 2010 and I agree that with incorporation of these Conditions of Certification the Project will not result in significant Air Quality impacts and will comply with all applicable Air Quality-related laws, ordinances, regulations and standards (LORS).

STATE OF CALIFORNIA

Energy Resources
Conservation and Development Commission

In the Matter of:	**DOCKET NO. 09-AFC-07**
Application For Certification for the PALEN SOLAR POWER PROJECT	**DECLARATION OF** Michael Cressner

I, Michael Cressner, declare as follows:

1. I am presently employed by Solar Millennium, LLC as an Associate, Project Development and Permitting.

2. A copy of my professional qualifications and experience was included with my Opening Testimony and is incorporated by reference in this Declaration.

3. I prepared the attached testimony relating to Air Quality for the Palen Solar Power Project (California Energy Commission Docket Number 09-AFC-07).

4. It is my professional opinion that the attached prepared testimony is valid and accurate with respect to issues that it addresses.

5. I am personally familiar with the facts and conclusions related in the attached prepared testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct to the best of my knowledge and that this declaration was executed on October 15, 2010.

Original Signed

Michael Cressner

PALEN SOLAR POWER PROJECT
SOIL AND WATER RESOURCES
OPENING TESTIMONY

I. Name: Mike Flack

II. Purpose:

My testimony addresses the subject of Soil and Water Resources associated with the construction and operation of the Palen Solar Power Project (09-AFC-07).

III. Qualifications:

Mike Flack: I am presently employed at AECOM, and have been for the past 15 years and am presently a Senior Program Manager with that organization. I have a Masters of Science Degree in Geology and I have over 27 years of experience in the field of groundwater and water resource investigation and remediation. I prepared or assisted in the preparation of the Soil and Water Resources section of the AFC as well as the post-filing information, data responses, and supplemental filings. A detailed description of my qualifications is contained in the attached resume.

To the best of my knowledge all referenced documents and all of the facts contained in this testimony are true and correct. To the extent this testimony contains opinions, such opinions are my own. I make these statements and provide these opinions freely and under oath for the purpose of constituting sworn testimony in this proceeding.

IV. Exhibits

In addition to this written testimony, I am sponsoring the following exhibits in this proceeding.

Exhibit 1	**Palen Solar I, LLC's Application for Certification Volumes I & II**, dated August 2009, and docketed on August 24, 2009, Sections 5.12 & 5.17, Appendices J & L.

Exhibit 4	**Palen Solar I, LLC's Data Adequacy Supplement**, dated October 2009, and docketed on October 30, 2009.
Exhibit 5	**Streambed Alteration Agreement Application**, dated November 2009, and docketed on November 25, 2009.
Exhibit 6	**Palen Solar Power Plant Pre-Development Drainage Conditions Report**, dated November 25, 2009, and docketed on November 30, 2009.
Exhibit 10	**Palen Solar I, LLC's Response to CEC Data Request 226 - Attachment G Water Supply Assessment**, dated January 2010, and docketed on January 19, 2010.
Exhibit 11	**Palen Solar I, LLC's Responses to CEC Data Requests Set 1**, dated January 2010, and docketed on January 22, 2010, Responses 181 through 253.
Exhibit 18	**Palen Solar I, LLC's Responses to January 14, 2010 CEC Workshop Queries – (Supplemental Data for DR-S&W-242)**, dated February 2010, and docketed on February 16, 2010.

Exhibit 24	**Palen Solar I, LLC's Responses to January 14, 2010, CEC Workshop Queries**, dated March 2010, and docketed on March 15, 2010.
Exhibit 25	**Palen Solar I, LLC's Supplemental Data Responses to January 14, 2010, CEC Workshop Queries (Groundwater) - DR – S&W – 242**, dated February 2010, and docketed on March 15, 2010.
Exhibit 27	**Palen Solar I, LLC's Initial Comments on the Staff Assessment/ Draft Environmental Impact Statement**, dated May 4, 2010, and docketed on May 4, 2010.
Exhibit 34	**Palen Solar I, LLC's Responses to Questions from the April 28, 29, and May 7, 2010, CEC Workshops- Worker Safety, Hazardous Materials, Soil & Water Resources**, dated May 21, 2010, and docketed on May 21, 2010.
Exhibit 36	**Palen Solar I, LLC's Application/ Report of Waste Discharge - Soil & Water Resources**, dated May 25, 2010, and docketed on May 25, 2010.
Exhibit 44	**Palen Solar I, LLC's Data Responses to Alternatives 2 & 3**, dated July 20, 2010 and docketed on July 20, 2010.

V. Opinion and Conclusions

I have reviewed the Soil and Water Resources section of the Revised Staff Assessment and with incorporation of the modifications set forth below to the Conditions of Certification, the Project will not result in

significant Soil and Water impacts and will comply with all applicable Soil and Water Resource laws, ordinances, regulations and standards (LORS).

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: ***The Project owner shall follow the groundwater quality monitoring requirements as provided in SOIL&WATER-18 by providing Groundwater Quality Monitoring and Reporting Plan 90 days prior to operation of water supply wells for construction activities. The plan shall provide methods and procedures for monitoring background water quality, and site groundwater quality related to operation of the waste management units. Well locations, groundwater sampling procedures and analytical methods shall be provided consistent with requirements stipulated in the Waste Discharge Requirements provided in Appendix B, C and D.***

No later than 60 days prior to any wastewater discharge or use of land treatment units, the project owner shall provide documentation to the CPM, with copies to the CRBRWQCB, demonstrating compliance with the WDRs established in Appendices B, C, and D. Any changes to the design, construction, or operation of the evaporation basins, treatment units, or storm water system shall be requested in writing to the CPM, with copies to the CRBRWQCB, and approved by the CPM, in consultation with the CRBRWQCB, prior to initiation of any

changes. The project owner shall provide to the CPM, with copies to the CRBRWQCB, 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 or treatment units.

SOIL&WATER-14 ~~The Project owner shall undertake one or more of the following activities to mitigate project impacts to flows in the Colorado River: These activities shall result in replacement of 10,530 acre-feet or 300 afy in the Colorado River Basin over the life of the project.~~

To mitigate the impact from Project pumping, the Project owner shall identify and implement offset measures to mitigate the increase in discharge from surface water to groundwater that affects recharge in the Palo Verde Valley Groundwater Basin (USGS). The project owner shall implement SOIL&WATER-17 to evaluate the change in recharge over the life of the project including any latency effects from Project pumping. The activities shall include the following water conservation projects: payment for irrigation improvements in Palo Verde Irrigation District, payment for irrigation improvements in Imperial Irrigation District, purchase of water rights within the Colorado River Basin that will be held in reserve, and/or BLM's Tamarisk Removal ***Program or other proposed mitigation activities acceptable to the CPM.***

The activities proposed for mitigation shall be outlined in a Water ~~Supply~~ ***Offset*** Plan that will be provided to the CPM ~~and AO~~ for review and approval ***and which shall include the following at a minimum:***

A. Identification of the water offsets as determined in SOIL&WATER-17;

B. Demonstration of the Project owner's ability to conduct the activity;

C. Whether any governmental approval of the identified offset will be needed, and if so, whether additional approval will require compliance with CEQA or NEPA;

D. Demonstration of how much water is provided by each of the offset measures;

E. An estimated schedule for completion of the activities;

F. Performance measures that would be used to evaluate the amount of water replaced by the proposed offset measure; and,

G. A Monitoring and Reporting Plan outlining the steps necessary and proposed frequency of reporting to show the activities are achieving the intended benefits of the water supply offsets;

~~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 10,530 af or 300 afy will meet the requirements of this condition. The Project owner can choose to further evaluate the quantity of water attributed to flow from the Colorado River by implementing **SOIL&WATER-18** and determining what volume of water shall be mitigated consistent with this Condition of Certification.~~

Verification: ***The project Owner shall submit a Water Offset ~~Supply~~ Plan to the CPM for review and approval thirty (30) days before the start of extraction of groundwater for construction or operation.***
The Project owner shall implement the activities reviewed and approved in the Water Offset ~~Supply~~ Plan in accordance with the agreed upon schedule in the Water Offset ~~Supply~~ Plan. If agreement with the CPM on identification or implementation of offset activities cannot be achieved the Project owner shall immediately halt construction or operation until the agreed upon activities can be identified and implemented.
~~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 10,530 af or 300 afy 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. 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.~~
~~d. Demonstration of how much Colorado River water each of the chosen activities replaces;~~
~~e. An estimated schedule for completion of the activities;~~
~~f. Performance measures that would be used to evaluate the amount of water replaced by the activities;~~
~~g. 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~~
~~h. 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.~~

ESTIMATION OF ~~COLORADO RIVER~~ *SURFACE WATER* IMPACTS

SOIL&WATER-17 ***To further assess the impacts from Project pumping, the Project owner shall estimate the increase in discharge from surface water to groundwater that affects recharge in the Palo Verde Valley Groundwater Basin (PVVGB)(USGS). This estimate may be used for determining the appropriate offset volume in accordance with SOIL&WATER-14. The Project owner shall do the following to provide an estimate for review and approval by the CPM:***

1. ***The Project owner shall conduct a detailed analysis of the affect from Project pumping on at the end of the 30 year operational period the change in groundwater outflow from the Chuckwalla Valley Groundwater Basin to the Palo Verde Valley and how the change in outflow may affect recharge of surface water to the PVVGB from the Project's groundwater extraction activities. The detailed analysis shall include:***
    a. ***The conceptual model developed in the AFC and the Staff Assessment, for the Chuckwalla Valley Groundwater Basin and the Palo Verde Valley, and any changes resultant from further analysis in support of numerical modeling;***
    b. ***The use of an appropriately constructed groundwater model 1.) for the eastern portion of the Chuckwalla Valley Groundwater Basin that describes the affect from Project pumping on the outflow of groundwater to the Palo Verde Valley, and 2.) an appropriately constructed groundwater model of the Palo Verde Valley, inclusive of the mesa and floodplain. The models shall be coupled as appropriate to determine the effect from Project pumping on the surface water recharge in the Palo Verde Valley. Each models shall be constructed in consideration of the following:***
        i. ***Horizontal and vertical geometry information gained through on- and offsite investigations conducted as part of the hydrogeological field investigations for the AFC, and any subsequently***

documented investigation performed as part of the model development ;

ii. Aquifer properties developed as part of the AFC and any subsequently documented investigations performed as part of the model development, and an assessment of aquifer properties available from other published sources. The properties used shall be representative of the available data,; and

iii. The modeling effort shall include a sensitivity analysis where in the most sensitive variables will be identified and varied within a reasonable range outside of the calibration value to provide an assessment of the range of potential impacts from the Project pumping on the recharge from the Palo Verde Valley Groundwater Basin.

c. Reporting of the results of the modeling effort

d. Estimation of the increased contribution of surface water discharge to groundwater and the change in recharge to the Palo Verde Valley Groundwater Basin attributable to Project groundwater pumping.

2. The analysis shall include the following elements:

a. The change in groundwater flux to the regional aquifer from surface water sources attributable to Project pumping in afy for the life of the Project (30 years) until pre-project (within 95%) conditions are achieved;

b. A sensitivity analysis that would provide a range in the potential changes in flux relative to variation in the key model variables within each model as a result of Project pumping for life of the Project until pre-project (within 95%) conditions are achieved;

3. The project owner shall present the results of the conceptual model, numerical model, transient runs and sensitivity analysis in a report for review and approval by the CPM. The report shall include all pertinent information regarding the development of the numerical models. The report shall include as discussion of the following as appropriate to each model:

a. Introduction

b. Previous Investigations

c. Conceptual Model

d. Numerical Model and Input Parameters

e. Sensitivity Analysis

f. Transient Modeling Runs

g. Conclusions

~~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

1. 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).

2. 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).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.

3. 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.

4. 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 thirty (30) days following certification of the proposed Project, the project owner shall submit to the CPM for their review and approval a report detailing the results of the modeling effort. The report shall include the estimated amount of change in discharge from surface water to groundwater within the Palo Verde Valley due to Project pumping. This estimate shall be used for determining the appropriate volume of water for offset in accordance with **SOIL&WATER-14.**

~~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 increased amount of subsurface water flowing into the Palo Verde Mesa and/or Palo Verde Valley Groundwater Basins 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**.~~

SOIL&WATER-18 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 quality ***following the Waste Discharge Requirements of SOIL&WATER-6, to assess the effects from pumping on changes in the aquifer water chemistry, and to monitor potential impacts from operation of proposed septic leach fields, if required.*** The ***initial background water quality*** sampling ~~required for the water quality monitoring program~~ shall be implemented during the ***background*** groundwater level monitoring events in accordance with SOIL&WATER-***4***~~6~~. Prior to project construction, ***access to offsite wells shall be obtained and samples collected and monitoring wells shall be installed to evaluate background water quality in the shallow and deep regional aquifer in areas that will be affected by Project pumping. These data will be used to establish pre-construction water quality that can be quantitatively compared against data gathered during construction and operation to assess if project pumping or a release from the waste management units (See SOIL&WATER-6), or***

septic systems (if required) has adversely affected the water supply or sensitive receptors. ~~construction groundwater quality conditions in the well proposed for the program and shall include pre-construction, construction, and project operation water use. pre-construction and project related groundwater quality 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 to sensitive receptors (springs and groundwater-dependent vegetation, and groundwater supply users).~~

1. A Groundwater Quality Monitoring and Reporting Plan shall be submitted to the CPM ***90 days prior to operation of the water supply wells for construction*** ~~for review and approval before completion of Condition of Certification SOIL&WATER-~~4. 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 that shall be installed include wells required in accordance with Condition of Certification SOIL&WATER-6, for the evaporation ponds and land treatment unit proposed for the project***, and if required for the sanitary leachfield system.*** 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. 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-***4 and 60 days prior to operation of the water supply wells.*** ~~.~~ 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. Prior to use of any groundwater for construction, all groundwater quality and groundwater level monitoring data shall be reported to the CPM in the Well Monitoring Installation and Groundwater Quality Network Report ***that is due in conjunction with the background water level monitoring report under SOIL&WATER-4 and 60 days prior to construction.*** 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. An assessment of pre-project groundwater quality with groundwater samples analyzed for those constituents required ***under the Waste Discharge Requirements (Appendix B, C and D) and if not included*** total dissolved solids (TDS), chloride, nitrates, major cations and anions, oxygen-18 and deuterium isotopes***, and soluble metals.*** ~~., and any other constituents required by the CPM to protecting existing water supply quality~~.
   c. The data shall be tabulated and include the estimated range (minimum and maximum values), average, and median for each constituent analyzed. If a sufficient number of data points are available ***from the background sampling,*** the data shall also be analyzed using the Mann-Kendall test for trend at 90% 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 semiannually to the CPM ***one month following the end of the 1st and 3rd quarter and following the operation reporting requirement under SOIL&WATER-4.*** After five years of project operations, the frequency and scope of the monitoring program shall be reassessed by the CPM. The ***semi-annual*** ~~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 ***those constituents required in the Waste Discharge Requirements (Appendix B, C and D) and if not included*** 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 ***to determine the effects from Project pumping and after the installation and operation of the waste management units in compliance with the Waste Discharge Requirements (Appendix B, C and D) and the sanitary leachfields, if required.*** ~~The compliance data shall be analyzed for both trends and for contrast with the pre-project data.~~

c. Trends ***in water quality data*** shall be analyzed using the Mann-Kendall test for trend at the 90% 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 CRBRWQCB 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% 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 ***to evaluate the effects from Project pumping or potential impacts from operation of sanitary leachfield*** indicate that the water supply quality has

deteriorated in (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) ***adjacent water supply wells that can be shown to be adversely influenced by Project Pumping*** for three consecutive years, the ***P***roject owner shall provide ***well-head*** 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 ***90***~~45~~ days prior to construction, a Groundwater Level and Quality Monitoring and Reporting Plan shall be submitted to the CPM for review and approval.
- At least ***60***~~30~~ days prior to construction, a Well Monitoring Installation and Groundwater Level Network Report shall be submitted to the CPM for review and approval.
- At least ***60***~~30~~ days prior to use of any groundwater for construction, all groundwater quality and groundwater level monitoring data shall be reported to the CPM.
- ***On a semiannual basis water quality data shall be collected during construction and 5 years following initial operation. The results of the monitoring will be reported on a semiannual basis, one month following the end of the 1st and 3rd quarters.***

STATE OF CALIFORNIA

Energy Resources
Conservation and Development Commission

In the Matter of:	**DOCKET NO. 09-AFC-07**
Application For Certification for the PALEN SOLAR POWER PROJECT	**DECLARATION OF** Mike Flack

I, Mike Flack, declare as follows:

1. I am presently employed by AECOM, as a Senior Program Manager.

2. A copy of my professional qualifications and experience is included herewith (Attachment A to Testimony) and is incorporated by reference in this Declaration.

3. I prepared the attached testimony relating to Soil and Water Resources for the Palen Solar Power Project (California Energy Commission Docket Number 09-AFC-07).

4. It is my professional opinion that the attached prepared testimony is valid and accurate with respect to issues that it addresses.

5. I am personally familiar with the facts and conclusions related in the attached prepared testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct to the best of my knowledge and that this declaration was executed on October 15, 2010.

Original Signed

_____

Mike Flack

Attachment A

Resume - Flack

Michael E. Flack
Senior Program Manager

Professional History

Education

BS, Geology, California State University of Northridge
MS, Geology, California State University of Northridge

Registrations

Professional Geologist, CA
Certified Engineering Geologist, CA

Years of Experience

With AECOM 14
With other firms 13

Technical Specialties

Brownfield Development
Contaminated Sediment Investigation
Groundwater & Soil Subsurface Investigation
Groundwater Recovery & Treatment Systems
In Situ and Ex Situ Soil Remediation & Treatment
Landfill and Waste Capping & Containment
Operation & Maintenance of Remediation Systems
Remedial Fate & Transport Modeling
Remedial Process Optimization & Performance-based Remediation
Remediation Feasibility Studies
Remediation Technology Testing/Evaluation/Pilot Studies

Mr. Michael Flack has over 25 years of experience in managing investigation and remediation programs that employ both in-situ and ex-situ technologies at oil field and refining facilities throughout the western United States. Further, he has assisted responsible parties, regulatory agencies, and water purveyors in identifying and implementing water supply alternatives to replace groundwater resources impacted by industrial facilities. In this capacity he evaluated surface and groundwater resources to identify feasible short-term and long-term water supply alternatives. Water quality studies were performed to determine water chemistry and acceptability of potential sources, and groundwater modeling and basin yield evaluations were performed to assess a wide range of alternatives including potable and non-potable reuse. As one outgrowth of these projects, he has designed water supply wells and overseen well-head treatment programs. He is a Professional Geologist and Certified Engineering Geologist in California with experience in managing projects under CERCLA and RCRA regulation. He is also experienced with CEQA, having prepared numerous Initial Studies, developed mitigation measures and directed groundwater surveys needed to support implementation of remedial actions.

Experience

Confidential Client, Western Mojave Desert, California. Project hydrogeologist assigned to evaluate groundwater resources as part of an application for certification (AFC) to the California Energy Commission (CEC) in support of a proposed 250-megawatt solar power plant planned for commercial operation in 2011. Project tasks included development of a groundwater basin conceptual model and subsequently a numerical groundwater model (MODFLOW) to determine availability of groundwater to meet project water requirements and evaluate the impacts to groundwater basin storage and water quality for the AFC. Tasks in support of the basin conceptual modeling included conducting several step and constant-discharge a pumping tests, down-hole geophysical and conductivity logging, developing a database of recent and historic hydrologic and well data, and evaluating groundwater geochemistry. Critical elements for the modeling included development of the basin water balance and recharge. Several analyses of recharge were performed that

Tank Removal
Vapor Intrusion
Waste Facility Site Selection, Permitting, Design/Build & Operation
Water Resources Investigations
Water Supply Permitting & Development

Professional Affiliations

National Groundwater Association
Association of Engineering Geologists
Groundwater Resources Association of California

showed the groundwater basin is in recovery from prior period of overdraft. These analyses provided foundation for the proposed groundwater use, and supported that the project would have less than significant impact to the groundwater basin storage. Additionally, supported the project through all data response and communications to the CEC and provided leadership in the preparation of all water-related permitting such as the report of waste discharge for proposed evaporation ponds and dredge and fill-permit to the Regional Water Quality Control Board and Conditional Letter of Map Revision to Federal Emergency Management Agency.

Confidential Client, Western Mojave Desert, California. Assigned as project hydrogeologist to evaluate soil, geologic hazards and water resources impacts as part of three applications for certification to the California Energy Commission. Multiple projects are proposing parabolic mirror technology with dry cooling at 250-megawatt increments at three sites within the Mojave Desert. Project responsibilities include negotiation and development of scoping and approach consistent with current CEC and Federal Bureau of Land Management requirements for assessment of impacts.

San Luis Rey Municipal Water District, Pala, California. As project hydrogeologist, provided an evaluation of groundwater resources within a small water district in Southern California. In support of the planned development of formerly agricultural properties, the project objectives were to determine storage and sustainable yield for an alluvial groundwater basin. Project tasks included literature review, analytical modeling of storage, and sustainable yield and water balance. In addition, the project included evaluation of alternative management schemes to return treated wastewater to the aquifer system.

The Boeing Company, Inactive Rancho Cordova Test Site, CERCLA RI/FS and Remediation, Sacramento, California. Senior hydrogeologist, and geologist of record under the Order, for the investigation and remediation of a former 4,000-acre rocket-test facility under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidance. Responsible for all technical deliverables and a field program that has included soil vapor sampling, rock coring programs, and the installation of over 150 multi-completion monitoring wells. Provided comprehensive interpretation of a multi-layered aquifer system through the interpretation of lithologic and geophysical logging (short and long-normal resistivity, Spontaneous Potential, and natural gamma logs) of the well and soil borings. Identified and implemented water supply alternatives to replace groundwater resources impacted by contamination. Water quality studies were performed to determine water chemistry and acceptability of potential sources, and groundwater modeling and basin yield evaluations were performed to assess a wide range of alternatives including potable and non-potable reuse. Coordinated development of a probabilistic groundwater model (MODFLOW) to evaluate impacts from proposed pumping and determine if the viability of developing alternative groundwater resources down-gradient from the remedial system pumping centers. Prepared an engineering evaluation and cost analysis (EE/CA) of remedial alternatives to contain and remediate groundwater impacted by perchlorate and VOCs. Designed extraction well network and supervised and directed probabilistic modeling program for the hydraulic containment system. Designed soil vapor system network as part of several ongoing source removal programs for sources of VOCs on former rocket-test facilities. Provided senior review of proposed in-situ biological degradation pilot

testing program for soil and groundwater involving both perchlorate and VOC-impacted media. Prepared water supply alternative reports that identify reuse alternatives for treated groundwater. Prepared and peer-reviewed remedial investigation/feasibility study (RI/FS) reports and remedial action plans for multiple operable units. Provided oversight for human-health and ecological risk assessments and negotiated risk-based cleanup objectives for various soil and interim groundwater source removal programs.

Tronox LLC, Henderson, Nevada. Acted as both the program manager and senior hydrogeologist for the investigation and remediation of a 450-acre active chemical plant south of Las Vegas, in the City of Henderson, Nevada. The project is under two consent agreements with the Nevada Department of Environmental Protection, one for containment of perchlorate and hexavalent chromium-affected groundwater and a second for assessment and remediation of the sources of chemical impacts in soil that would threaten human health and groundwater. Responsibilities include development and refinement of the site conceptual model for a complex multi-layer aquifer system, including chemical fate and transport modeling, design and evaluation of three groundwater containment systems for groundwater discharging to Las Vegas Wash, and evaluation of soil remedial alternatives and the site human-health risk assessment. The site soils and groundwater have been impacted by perchlorate, hexavalent chromium, volatile organic compounds (VOCs), pesticides, metals and radionuclides. Responsibilities in role as program manager include senior technical review of all technical deliverables, including Standard Operating Procedures, Quality Assurance Project Plan, soil and groundwater sampling and analysis plans, and remedial investigation and remedial system operation reports.

Aircraft Manufacturing Facility Closure, El Segundo, California. Supervised environmental investigation and closure of a large government defense contractor's 55-acre facility. Coordinated hydrogeologic investigations that included an extensive exploratory boring and monitoring well program, and soil gas cone penetrometer and pore-water surveys. Coordinated closure programs for numerous WMUs and completed a remedial excavation effort, which accounted for removal of 100,000 cubic yards of “high-boiling” point petroleum hydrocarbons and chlorinated volatile organic compounds. Soils were sent for thermal incineration and reuse as backfill. Secured closure of further soil investigation and remedial action, and negotiated a limited ground water monitoring effort with the LEA using a risk-based approach. Established monitoring program to evaluate intrinsic bioattenuation of the chlorinated volatile organic compounds in the shallow groundwater by methanotrophic bacteria in an anaerobic environment. Groundwater closure received. Site is currently under redevelopment.

Aerospace Contractors Test Facility Remedial Design, Washoe County, Nevada. Supervised design of a ground water pump and treat program for remediation of a TCE plume using MODFLOW/MODPATH. Evaluated basin and canyon hydrogeology and a contaminant plume over 1-mile in length. Designed, directed and provided peer review of the groundwater modeling effort to design the remedial system layout. Provided technical and cost-benefit analysis for the use of horizontal extraction wells. Designed infiltration galleries and pumping wells, and prepared portions of the design specification package related to well installation, performance monitoring, and future modeling. Assembled and

reviewed bid package including engineering design specifications for the ground water pump and treat program.

United Technologies Corporation/Pratt & Whitney Space Propulsion, San Jose, California. Served as senior hydrogeologist for the investigation and remediation of a former 5,300-acre rocket and propellant test facility under California Regional Water Quality Control Board and Department of Toxic Substances Control Orders. As the senior project hydrogeolgist, developed the site conceptual model and interpretation of a complex alluvial and bedrock aquifer system impacted by perchlorate, VOCs, and 1, 4 dioxane. Responsible for review and technical content for investigation reports describing the extent of perchlorate in surface and un-saturated zone soils and groundwater. Also served as senior author for the preparation of a remedial action plan for perchlorate-affected groundwater at the site. Reviewed historic pump-and-treat-program for perchlorate migrating in a narrow alluvial aquifer and evaluated alternative remedial technologies to improve containment and capture. Developed EE/CA for containment enhancements to prevent perchlorate and VOC migration in groundwater off site to a down-gradient water supply reservoir belonging to the Santa Clara Water District. Directed a groundwater modeling program (MODFLOW) for the evaluation of various containment enhancements.

ARCO Environmental Remediation, Oil Field Closure, Santa Barbara, California. Acted as project manager for abandonment of a 102-acre oil field facility along California's central coast. Responsible for design and implementation of an investigation program to delineate former sumps and petroleum hydrocarbons in the soil and groundwater. Used a conductivity survey as a reconnaissance tool to identify former sumps. Developed risk-based assessment and closure program that was accepted by the LEA.

Former Aircraft Manufacturing Facility Closure, El Segundo, California. Provided innovative sampling program using immunoassay technology for assessment of building materials and former waste management units. Designed program for a wide variety of chemicals of concern that had impacted soils, concrete, and building walls. Supervised Phase I ESA of transonic wind tunnel facility impacted by PCBs. Provided recommendations for assessment of soils and concrete materials.

Various Petroleum Companies Investigation and Remediation, Arizona, California, Oregon, and Washington. Managed two large petroleum companies in Southern California. Responsible for administrative, peer review and technical oversight of $3 M of assessment and remedial programs for petroleum-impacted properties. Supervised a team of six project managers handling more than 70 assessment and remediation projects in Arizona, California, Oregon and Washington.

Brown and Bryant, CERCLA RI/FS, Bakersfield, California. Developed and implemented an RCRA remedial investigation (RI) at a 15-acre former pesticide formulating and distribution facility. Coordinated field program that included installation of a 300-foot monitoring well and 22 exploratory borings in Level B protection and served as site supervisor and site safety officer. Prepared RI work plan including field sampling and analysis, quality assurance project plan (FSAP/QAPP), health and safety plan, RI report and Feasibility Study work plan.

Western Farm Service, BTEX and Pesticide Remediation, Watsonville, California. Supervised design and operation of a groundwater pump and treat program to mitigate and contain volatile petroleum hydrocarbon, pesticide and volatile fumigant-impacted groundwater. Supervised operation of a soil vapor extraction program to mitigate volatile petroleum- hydrocarbon-impacted soils and three source area son the former pesticide formulation and distribution facility. Prepared a partitioning factor analysis (risk) to develop site-specific target levels in soil protective of shallow groundwater. The partitioning factor analysis was done under the oversight and concurrence of the RWQCB-Central Coast Region. Provide senior oversight of the remedial excavation program to remove pesticide-impacted soils and secure soil closure status from the LEA.

Fletcher Refinery, Petroleum Hydrocarbon Investigation, Carson, California. Managed a hydrogeologic investigation at a large refinery in Southern California. Project tasks included assessment of several acres of impacted soil and groundwater, design of a groundwater monitoring well network, aquifer evaluation and testing, and groundwater pump and treat system design and implementation. Evaluated and supervised excavation of 4,000 cubic yards of petroleum hydrocarbon-impacted soils from a former oil field production sump as part of site restoration operations and property transfer.

The Dial Corporation, Brownfield Closure, South Gate, California. Managed assessment and remediation of a former bleach and soap manufacturing facility. Designed and implemented a soil vapor extraction system to mitigate petroleum and chlorinated volatile organic compounds as part of a “brownfield” redevelopment of the 15-acre site. Prepared facility closure plan and negotiated risk-based closure of several areas containing residual hydrocarbon compounds. Provided senior technical review of all submittals and prepared facility demolition specifications as part of site closure.

Former Golden Eagle Refinery, Due Diligence Assessment, Torrance, California. Served as manager and third-party reviewer of evaluation of an SVE and air sparging program implemented as part of a brownfield redevelopment of a former refinery. Remedial system consisted of 123 dual air sparging and vapor extraction wells installed over an approximate 50-acre area. Provided opinions on system design during development and prepared a predictive analysis on system performance and failure scenarios. Assessed long-term system performance and prepared cost analysis for potential failure scenarios for inclusion in the indemnification agreement. Assisted in negotiations during final design phase, which resulted in an expansion from the initial remedial design of 63 wells to the final design of 123 wells. Provided recommendations for a sub-foundation vapor recovery network and design of a passive methane recovery system.

Salt Lake Valley Landfill, Landfill Assessment, Salt Lake City, Utah. Supervised geotechnical and hydrogeologic field investigation for expansion of the largest landfill in Utah, consistent with State regulation and Federal Subtitle D requirements. The program involved installation of 10 monitoring wells and 25 borings to assess hydrogeologic and geotechnical conditions in the area proposed for cell expansion. Designed ground water monitoring network for new expansion cells and prepared FSAP/QAPP.

County of Ventura Regional Sanitation District, Landfill Siting: California,

Ventura County, California. Conducted and coordinated the evaluation of several potential landfill sites in Ventura County, California in preparation for expansion of landfill operations by the County sanitation district. The geotechnical investigations of candidate sites included detailed surface mapping of several quadrangles in the County and supervision of exploratory trenching and boring and well-installation programs. The investigation and siting programs were performed consistent with California Title 23, Chapter 15 criteria.

Puente Hills Landfill, Slope Stability Analysis, Los Angeles, California. Designed and implemented the geotechnical field investigation for a cut slope stability analysis at the largest landfill in Southern California. Provided recommendations to the engineering staff regarding geologic conditions and hazards that would affect the cut slope stability and placement of a composite liner.

Double-Butte Landfill, Landfill Hydrogeologic Analyses, San Bernardino County, California. As part of a design basis for a remedial system, provided an analysis of the site hydrogeology and impacts from chlorinated volatile organic compounds, soluble metals and dissolved solids to a shallow perched and bedrock aquifer below the landfill footprint. Reviewed site hydrogeologic information and pumping test data to establish the pumping scheme and well placement for the groundwater extraction network. Provided a scope for additional investigation to close data gaps in the occurrence and extent of the contaminant plume and the hydrogeology. Further, established the ground water modeling program to evaluate the additional information and proposed well field as part of the design basis.

Texaco of California, Closure of Land Treatment Units and Landfills, Ventura County, California. Served as senior reviewer and technical resource for the preparation of closure plans for three land treatment units and landfills operated within the Ventura Avenue Oilfield. Provided closure strategy and technical approach for closure and post-closure monitoring programs.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
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APPLICATION FOR CERTIFICATION FOR THE *PALEN SOLAR POWER PLANT PROJECT*

Docket No. 09-AFC-7

PROOF OF SERVICE
(Revised 8/27/10)

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*indicates change

DECLARATION OF SERVICE

I, Marie Mills, declare that on October 15, 2010, I served and filed copies of the attached PALEN SOLAR I, LLC'S OPENING TESTIMONY: AIR QUALITY & SOIL & WATER RESOURCES, dated October 15, 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/solar_millennium_palen]

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:

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

_____ by personal delivery;

__X__ 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:

__X__ 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-7
1516 Ninth Street, MS-4
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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.

Marie Mills