CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

March 24, 2010

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09-AFC-7	
DATE	MAR 24 2010
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Mr. Michael Mills
Senior Manager
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

**Re: Comments on Preliminary Determination of Compliance (PDOC)
Palen Solar Power Project (09-AFC-7)**

Dear Mr. Mills,

Energy Commission staff has reviewed the South Coast Air Quality Management District PDOC for the Palen Solar Power Project (PSPP) and has the following comments for your consideration for inclusion in the Final Determination of Compliance (FDOC). Staff also has attached a discussion of comments on the Health Risk Assessment in the PDOC.

Comments on PDOC Emission Estimates

Criteria Pollutant Emission Estimates
Staff is concerned with the inconsistencies between the maximum daily and annual operating emission estimates provided by the applicant in the Application for Certification (AFC) and in later responses to staff data requests and emissions estimates provided in the PDOC. Staff prefers that the Energy Commission's Staff Assessments, which are based on an analysis of the project described in the AFC and data responses, and the District's DOC be consistent in terms of the presented emission estimates.

The following provides a comparison between the AFC emission estimate values or the latest values from the applicant's data responses to the Energy Commission, and the emission limits in the PDOC where there are discrepancies that are clearly more than simple calculation rounding differences. After each table is some discussion of the discrepancies. Staff would like the FDOC to correct the discrepancies in these emission estimates, including corresponding changes to the device conditions, and provide rationale why such corrections are or are not necessary. The emission factors / estimates are for nitrogen oxide (NOx), carbon monoxide (CO), particulate matter (PM), volatile organic compounds (VOC), and sulfur oxides (SOx).

Auxiliary Boiler – Emission Discrepancies

The auxiliary boiler operations as amended by the applicant now also include operations for heat transfer fluid (HTF) freeze protection. This changes the daily and annual emissions basis as follows:

Original Daily Basis: 2 hours at full load, 15 hours at 25% load
Revised Daily Basis: 12 hours at full load, 5 hours at 25% load

Original Annual Basis: 500 hours at full load, 4,500 hours at 25% load
Revised Annual Basis: 600 hours at full load, 4,500 hours at 25% load

PDOC Tables 2 and 3 use the original operating basis and should be updated to the revised operating basis. The emissions with the change in bases have discrepancies with what is shown in the PDOC Tables 2 and 3. The following table shows updates needed for Table 3.

Auxiliary Boilers – Emission Discrepancies

	NOx		VOC		CO		PM10/PM2.5		SOx	
	lb/day	t/yr	lb/day	t/yr	lb/day	t/yr	lb/day	t/yr	lb/day	t/yr
Updated Basis	10.30	0.64	4.64	0.29	34.84	2.18	9.28	0.58	10.48	0.28
PDOC Table 3	4.48	0.63	2.02	0.28	15.12	2.14	4.02	0.57	4.54	0.28

Note: Table represents emission totals for both boilers.

Staff believes there are corresponding emission discrepancies with the air toxics emissions tables in the PDOC.

Fire Water Pump Engine – Emission Discrepancies

It appears that the SOx and PM2.5 values were inadvertently switched in PDOC Tables 4 and 5.

Heat Transfer Fluid (HTF) Ullage System Vent - VOC Emissions Table Clarity

It appears that the VOC emissions for heat transfer fluid (HTF or Therminol VP-1) shown in PDOC Table 8 are for a single unit and are shown as uncontrolled (denoted by R1) and controlled (denoted by R2). Staff recommends that it be clearly noted that the total facility emissions from these sources are twice the single unit emissions presented in Table 8 and that the meaning of “R1” and “R2” be defined under Table 8 for clarity.

HTF Piping System Emissions – Emission Factors

The PDOC appears to use the piping component emission factors as supplied by the applicant without consideration of existing District guidelines for piping component emission estimation. Staff has reviewed other recent District CEQA documents and cannot find an instance where emission factors as low as those provided by the applicant were used. The issues that staff has with the emission factors used by the applicant are summarized as follows:

1) The applicant uses heavy oil emission factors from the referenced 1995 U.S. Environmental Protection Agency (US EPA) guidance document; however, those factors are for crude oil. Therefore, if light liquid emission factors, as discussed below, are not used then heavy liquid emission factors associated with organic chemical facilities should be used rather than heavy oil emission factors.

2) Staff believes that light liquid emission factors are most representative of the HTF during the day when it is heated, but heavy liquid emission factors may be appropriate overnight. The physical characteristics of the HTF fluid at the high temperature side (750°F) and low temperature side (440°F) of the solar thermal cycle and gasoline at ambient conditions (light liquid) are compared in the table below.

Fluid	Vapor Pressure	Viscosity
HTF @ 750°F	156 PSIA	0.147 centipoise
HTF @ 440°F	7.15 PSIA	0.331 centipoise
Gasoline @ 68°F	5.3 to 9.2 PSIA	~0.4 centipoise

PSIA = Pounds per square inch absolute.
Notes:
1) Staff has already provided to the District the Therminol® VP-1 product literature.
2) The higher the vapor pressure and the lower the viscosity the “lighter” the liquid and the more prone it will be to piping component leakage.

This table clearly shows that while operating to make solar power the HTF physical properties are as or more volatile and less viscous than gasoline, which is a light liquid. Therefore, during daytime solar field operation the physical properties of the HTF are representative of a light liquid.

Staff would like to make sure that the District uses both physically appropriate emission factors and emission factors that are consistent with District permits for projects with this type of emission source.

<u>District Rule Compliance</u>

New Source Performance Standard (NSPS) Subparts Dc and IIII

This project is subject to two NSPS standards, standard Dc for the two boilers and standard IIII for the four emergency engines. Staff believes that the Prohibitory Rule Evaluation that starts on page 18 of the PDOC should be expanded to note applicability compliance with these two Regulation IX Rules.

Comments on PDOC Conditions

Auxiliary Boiler Conditions

Auxiliary Boiler Propane/LPG Standards

Staff believes it is appropriate to specify the grade of propane or liquefied petroleum gas (LPG) fuel allowed in Auxiliary Boiler Condition 3 in order to ensure that the fuel quality is controlled, and would suggest the condition be modified to something similar to the following:

3. This equipment shall be fueled exclusively with LPG meeting California motor vehicle LPG standards (CCR, Title 13, Section 2292.6).

This fuel standard includes a limit of 80 ppm sulfur. Alternatively, the District could require the applicant to use a form of LPG that meets the District's standard emission inventory sulfur content (123 ppm sulfur), or requires use of a commercial grade[1] of LPG. Staff suggests this upgrade to the condition to provide assurance of fuel quality and boiler performance, such as is often required for natural gas with conditions that specify the use of "pipeline quality natural gas."

Source Testing Condition

It is not clear if Condition 4 is a one-time source test requirement after initial installation of the boiler or if additional periodic source tests will be necessary. Staff recommends this point be clearly stated in the condition.

Auxiliary Boiler Fuel Use Limitation

Staff notes that the auxiliary boiler has two fuel limitation conditions numbered 5 and 12, neither of which are based on the proper fuel type or the applicant's noted maximum boiler use. Staff recommends that condition 12 be deleted and that condition 5 be rewritten to limit propane/LPG use, in the units of gallons, as follows:

5. The operator shall limit the fuel usage to no more than 659,836 gallons ~~393 mmcf~~ in any one year. For the purpose of this condition, one year shall be defined as a period of twelve (12) consecutive months determined on a rolling basis with a new 12 month period beginning on the first day of each calendar month.

   For the purpose of this condition, fuel usage shall be defined as the total propane usage of a single boiler. The operator shall maintain records in a manner approved by the District to demonstrate compliance with this condition.

[1] The two major commercial grades of LPG are HD-5 that requires at least 90 percent propane and no more than 5 percent of propylene among its specifications, and HD-10 that allows up to 10 percent propylene. The California motor vehicle standard LPG is an HD-10 grade of LPG as it allow up to 10 percent propylene.

The amount of propane use per boiler is calculated based on the applicant's noted fuel properties of 91,500 Btu/gallon and the applicant's stated maximum annual use of 600 hours at 100 percent load and 4,500 hours at 25 percent load as follows:

35,000,000 Btu/hr x (600 hrs + 4,500 hrs x 0.25) / 91,500 = 659,836 gallons

Please note that the fuel use limits in either condition 5 or 12, given the difference in propane vs. natural gas Btu/scf, would actually allow the boiler to operate for more than 8,760 hours per year at full load. However, if the District insists on leaving the fuel use in the units of mmcf then the appropriate limit would be 22.31 mmcf based on 2,590 Btu/scf [HHV] for LPG.

Auxiliary Boiler CO and NOx Concentration Limits

Auxiliary boiler conditions 8 and 9 note that the 9 and 50 ppm emission limits shall not apply during start-up and shutdown period, but no condition ever establishes appropriate limits for start-up and shutdown. Staff recommends that conditions be added to establish these concentration limits, or that conditions 8 and 9 be amended to establish concentration limits for normal operation and also provide limits for startup and shutdown operation.

Auxiliary Boiler Hours Limitation

As noted above on page 2, the applicant changed their maximum operating basis from 5,000 hours per year to 5,100 hours per year. Auxiliary boiler condition 11 should be revised to account for this change.

<u>Emergency Engine Conditions</u>

Concurrent Engine Testing Limits

Staff recommends that the District add or amend a condition to limit engine testing, or other non-emergency engine use, so that no two engines are tested in the same hour, which was assumed in the applicant's air quality impact analysis.

<u>Storage Tanks (a.k.a. Ullage Control System) Conditions</u>

Staff recommends that the District add the following conditions:

1) A condition that establishes the emission limit(s) for this emission source.
2) A condition that requires a source test be performed to initially establish that the ullage vent control system can meet the established emission source limit(s).

The second condition is requested due to the uncontrolled emission potential from this emission source.

Land Treatment Unit Conditions

The project's land treatment unit is identified as a permit unit, and has Rule 1166 requirements noted in the engineering analysis, but has no specified permit conditions. Staff has not seen permit units without any permit conditions in the past and asks if this was an oversight and if there should be conditions for the land treatment unit.

HTF Piping System

Staff requests the District to confirm that it does not require permits or include permit conditions within other permits (RECLAIM or Title V permits) for fugitive VOC piping systems (pumps, values, flanges, compressors, etc.) within stationary sources such as refineries. If the District does include these fugitive emissions sources in permits for other facilities, given staff's information provided above about the potential emissions from the HTF piping systems, staff believes the District should also include this emissions source at this site and include conditions consistent with other fugitive VOC piping source permits.

Staff notes that the emission limitations in the District Conditions may need to be revised to be consistent with any revisions made to address staff comments.

Staff's Public Health expert also reviewed the health risk assessment in the PDOC. See attachment for these comments.

If you have any questions, please contact Gerry Bemis of my staff at (916) 654-4960. Thank you for the opportunity to comment on the Palen Solar Power Project's Preliminary Determinations of Compliance.

Sincerely,

MATTHEW S. LAYTON, Manager
Engineering & Corridor Designation Office
Siting, Transmission and Environmental
Protection Division

cc: Docket Genesis (09-AFC-08)
Docket Blythe (09-AFC-06)
Docket Abengoa (09-AFC-05)

Comments on the
South Coast Air Quality Management District (SCAQMD)
Preliminary Determination of Compliance (PDOC)
for the Palen Solar Power Project
dated March 4, 2010

Alvin Greenberg, Ph.D.
March 24, 2010

In staff's review of the public health/toxic air contaminant assessment of the Palen PDOC issued by the SCAQMD on March 4, 2010, staff did not find any information incorrect or different from its Public Health Staff Assessment and Draft Environmental Impact Study (SA/DEIS) except for one major issue. The SCAQMD calculated the maximum individual cancer risk as 0.07E-06 compared to the value staff calculated for the Point of Maximum Impact 7.8E-06 and the value calculated by the applicant at the Point of Maximum Impact 1.5 E-5. The SCAQMD value is vastly different because the SCAQMD did not include emissions of diesel particulate matter (DPM) from mobile sources during operations (mirror cleaning, maintenance vehicles, etc.) or from the small wet cooling towers that use groundwater as a water source. Although staff is aware that SCAQMD Rule 1401 applies only to permitted stationary sources and not mobile sources or cooling towers, staff recommends that emissions of DPM from on-site mobile sources - the highest source of risk – and from the two small wet cooling towers might need to be included in their evaluation due to the unusual circumstances of this solar power plant, and any of the numerous solar projects proposed throughout the Mojave and Colorado deserts.

The SCAQMD states that the Palen project is a "new non-major stationary source". It appears that this determination was made on the basis of excluding the consistently high daily emissions projected from mobile sources at this proposed solar power plant and staff wonders if this standard approach by the SCAQMD should or can be modified due to the unusually high daily DPM emissions from mobile sources from a solar power plant.

In the PDOC, toxic air containment (TAC) emissions from the proposed project were estimated for normal operations of each emissions unit including the two auxiliary boilers, two emergency fire water pumps and two generator engines, and two heat transfer fluid (HTF) ullage system vents. The total TAC emissions from the Palen project were estimated to be less than 0.3 tons per year (page 17). The SCAQMD HRA estimated the Maximum Individual Cancer Risk as 0.07 E-6 (page 23) but did not indicate if this was at the Point of Maximum Impact or the Maximally Exposed Residential Receptor.

In contrast, Energy Commission staff modeled a total of 18 emitting units for facility operations including:

- 2 auxiliary boilers
- 4 wet cooling tower stacks (used for ancillary equipment only)
- 2 heat transfer fluid heaters
- 2 ullage system vents
- 2 diesel emergency generators
- 2 diesel firewater pumps
- 4 mobile sources involved in routine operations (mirror washing trucks, trucks used in weed abatement, trucks used in application of soil stabilizer, water trucks); 4 on-site points modeled for emissions

Staff modeled the mobile sources and the auxiliary equipment wet cooling towers that the SCAQMD did not include in their Health Risk Assessment modeling effort. According to the applicant in its Data Responses to Energy Commission Staff Public Health Data Requests 172-179 (January 2010) and in a later communication, mobile sources would emit 250 lb DPM/yr. Staff estimated the risk at the PMI to be 7.8 E-6 and that 83 percent of the cancer risk at the PMI is attributed to emissions from on-site mobile sources of DPM and 16 percent due to emissions of HTF from the auxiliary boiler, the HTF heater and ullage system. The risk at the nearest residential receptor was estimate by staff to be 1.9 E-6.

Since the PSPP project intends to use groundwater in two small auxiliary wet cooling towers, the potential exists for TACs present in the water to disperse into the air via cooling tower drift (these cooling towers are used for ancillary equipment only). In response to staff's Data Request 178, the applicant conducted water sampling and analysis of the on-site well water for volatile organic compounds, petroleum hydrocarbons, pesticides, herbicides, minerals, metals, and other chemicals of concern. The results showed that four metals considered as TACs are present in the well water (arsenic, hexavalent chromium, manganese, and zinc). Emissions calculations for staff's HRA included the metals but the SCAQMD PDOC HRA did not.

Given the prevalence of proposed diesel vehicles for on-site daily use and the use of groundwater that contains measurable natural levels of hexavalent chromium and arsenic, staff asks the SCAQMD to re-visit its policy on not including wet cooling tower emissions and mobile source emissions from its HRA for solar power plants.