

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

California Energy Commission DOCKETED 11-AFC-2
TN # 66548 AUG 10 2012

August 10, 2012

**RE: LETTER TO ENVIRONMENTAL PROTECTION AGENCY (EPA)
REQUEST FOR DETERMINATION OF ADEQUACY AND COMPLIANCE REVIEW
Great Basin Unified Air Pollution Control District's
Final Determination of Compliance (FDOC)
Hidden Hills Solar Electric Generating System (11-AFC-02)**

Dear Commissioners:

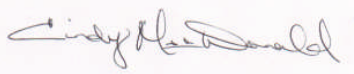
For your review, please accept the attached copy of a letter submitted to the EPA, Region 9, regarding questions and concerns related to air emission impacts and the Great Basin Unified Air Pollution Control District's Final Determination of Compliance for the Hidden Hills SEGs.

A copy of this letter is being submitted to the California Energy Commission due to its relevance to the Application for Certification (AFC) currently before the Commission.

Please also docket this submission into the public record for interested party and public review.

Thank you for your consideration.

Sincerely,



Cindy R. MacDonald/Intervener
3605 Silver Sand Court
N. Las Vegas, NV 89032
sacredintent@centurylink.net

U.S. Environmental Protection Agency
Region 9, Permits Office, Air Division
Gerardo C. Rios, Chief,
75 Hawthorne Street
San Francisco, CA 94105

August 10, 2012

**RE: REQUEST FOR DETERMINATION OF ADEQUACY AND COMPLIANCE REVIEW
Great Basin Unified Air Pollution Control District's
Final Determination of Compliance (FDOC)
Hidden Hills Solar Electric Generating System (11-AFC-02)**

Dear Mr. Rios:

I am contacting you regarding concerns about air quality and emissions related to the Final Determination of Compliance (FDOC) issued on August 1, 2012, by the Great Basin Unified Air Pollution Control District (GBUAPCD) for the Hidden Hills Solar Electric Generating System (SEGS).

Currently, there are three areas of priority concerns. These are:

- 1) No incorporation in the FDOC of operational emissions or emission limits on stationary source aggregate air contaminant emitting equipment known as Mirror Washing Machines (MWM),
- 2) No incorporation of emissions or emission limits for non-combustion PM₁₀/PM_{2.5} fugitive emissions during operations throughout the life of the project,
- 3) Green House Gas (GHG) emissions and federal trigger level review.

Based on the evidence incorporated herein, I am respectfully requesting the EPA provide a determination of adequacy and independent review of the FDOC's compliance with applicable laws, regulations and ordinances (LORS).

Given the fact that the California Energy Commission (CEC) AFC review process for the Hidden Hills SEGS is currently developing the Final Staff Assessment, EPA analysis, guidance and determinations regarding these issues are of the utmost importance.

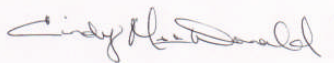
Of final concern is the current trend of public agencies deferring research, environmental review and other forms of analysis to consulting firms who are employed by applicants, as was the case with the GBUAPCD's responses located in Appendix C of the PDOC (and most likely Appendix D of the FDOC as well).

In an instance such as this, I believe it would be inappropriate to allow a firm that works for the applicant to "investigate" their employer as it obviously fails to protect the public interest through inherent potential conflicts of interest. In the event the EPA still chooses to allow the applicant or their related firms to conduct their own review and/or investigation of these issues, at minimum, it would be appropriate for the EPA to disclose this fact in their response.

In closing, due to the time constraints of the CEC's Application For Certification (AFC) process, the courtesy of acknowledging the receipt of this request as well as response as to the potential time frame a full response can be anticipated would be greatly appreciated.

If you have any questions or would like to discuss this matter further, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Cindy MacDonald".

Cindy MacDonald/Intervener
3605 Silver Sand Court
N. Las Vegas, NV 89032
702.575.3133
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Cc: Christopher Knops, Director, EPA Planning, Measuring and Oversight Division
Mike Tollstrup, Chief, Project Assessment Branch, Stationary Source Division, CARB
Theodore D. Schade, Air Pollution Control Officer, Great Basin Unified APCD

1. HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM (SEGS)

Background

In summary, the Hidden Hills SEGS will be comprised of two power plants, Solar I and Solar II, each with approximately 85,00 mirrors that surround a 750 ft. “power tower”. The mirrors direct reflected heat to the towers in order to generate steam, which is then converted to power through turbine engines.

Mirror performance can be significantly affected by mirror surface degradation from substances such as cumulative dust and/or water spotting⁽¹⁾. In order to maintain performance levels and reliable power generation, the mirrors must be periodically cleaned. The mirrors will be cleaned by specialized vehicles known as Mirror Washing Machines (MWM).

The MWMs will follow concentric roads surrounding the towers that are strategically placed in the heliostat/mirror fields. These fields are divided into two “zones”; the Near Tower Zones (NTZ) and the Far From Tower Zones (FFTZ).

MWM Emissions Compliance: GBUAPCD Rule 209-F(3)

Air emissions resulting from equipment required for operations of the proposed Hidden Hills SEGS known as Mirror Washing Machines (MWM) are evading emissions analysis, reporting and limitations in the FDOC and/or Permit To Operate (PTO). These machines are an integral component of a facility wide design system that maintains the functionality and reliability of this renewable stationary source power plant. Consequently, these machines should be considered “aggregate air contaminant equipment” as they are critical components of the renewable stationary source power plant production.

Currently, the GBUAPCD has excluded the emissions from the MWM’s from the FDOC. It has done so by maintaining it has no jurisdiction over mobile sources of emissions. However, according to Rule 209-F(3), stationary sources are defined as and required to include all emissions from aggregate air contaminant emitting equipment and operations throughout the facility as illustrated below.

“Stationary Source” means any aggregation of air-contaminant-emitting equipment which includes any structure, building, facility, equipment, installation or operation (or aggregation thereof) which is located on one or more bordering properties within the District and which is owned, operated, or under shared entitlement to use by the same person. Items of air-contaminant-emitting equipment shall be considered aggregated into the same stationary source....” [Emphasis added].

(1) BSE Amendment No. 2 filed on June 9, 2011, with the Security Exchange Commission, available at: http://ipo.nasdaq.com/ViewFiling_frames.asp?filename=0001193125-11-106341.txt&filepath=%5C2011%5C04%5C22%5C

Stationary Source Facility Design

Currently, the GBUAPCD is considering the MWM's as separate, disconnected components from stationary source operations. As a result, MWM's are being treated as secondary emissions sources resulting from mobile vehicles and as such, have been excluded from emissions reporting and limitations within the FDOC, and/or the PTO and other permitting requirements associated with stationary source power plants.

The exclusion of the MWM's from the calculation of the HHSEGS stationary source emissions is based on the premise that components related to power production at the site are confined solely to the "power towers" and any applicable equipment associated with the steam turbine engines. By limiting the definition of the stationary source to the power tower structures, significant emissions from the HHSEGS facilities, systems and operations are evading regulatory oversight and inclusion in the FDOC.

Specifically, the Hidden Hills SEGS is described as a "solar electric generating system". It is not described as a "natural gas-fired generating system", which is what it would be if its' operations were confined solely to the power tower structures.

Power plant production is based on a facility wide design that uses a system of operations to reflect solar radiation from the sun via heliostat/mirror assemblies to the power towers, which is then used to generate steam utilized by turbine engines. This solar radiation is the dominate component of the plant's design and consequently, qualifies it for its renewable energy production status. In other words, the major source of energy for purposes of power production for the HHSEGS comes from the heliostat/mirror fields, not the power towers.

The fact that the heliostat/mirror assemblies are an inseparable component of power plant operations is clearly described in the CEC Preliminary Staff Assessment for the HHSEGS, where Staff specifically states that the heliostat/mirror fields are an inseparable part of the power plant as described below.

"Additionally, because the plant would consist of two independent steam turbine generators and many rows of heliostats, maintenance could be scheduled during the times of the year when the full power output is not required to meet market demand, which is typical of industry standard maintenance procedures."⁽¹⁾ [Emphasis added.]

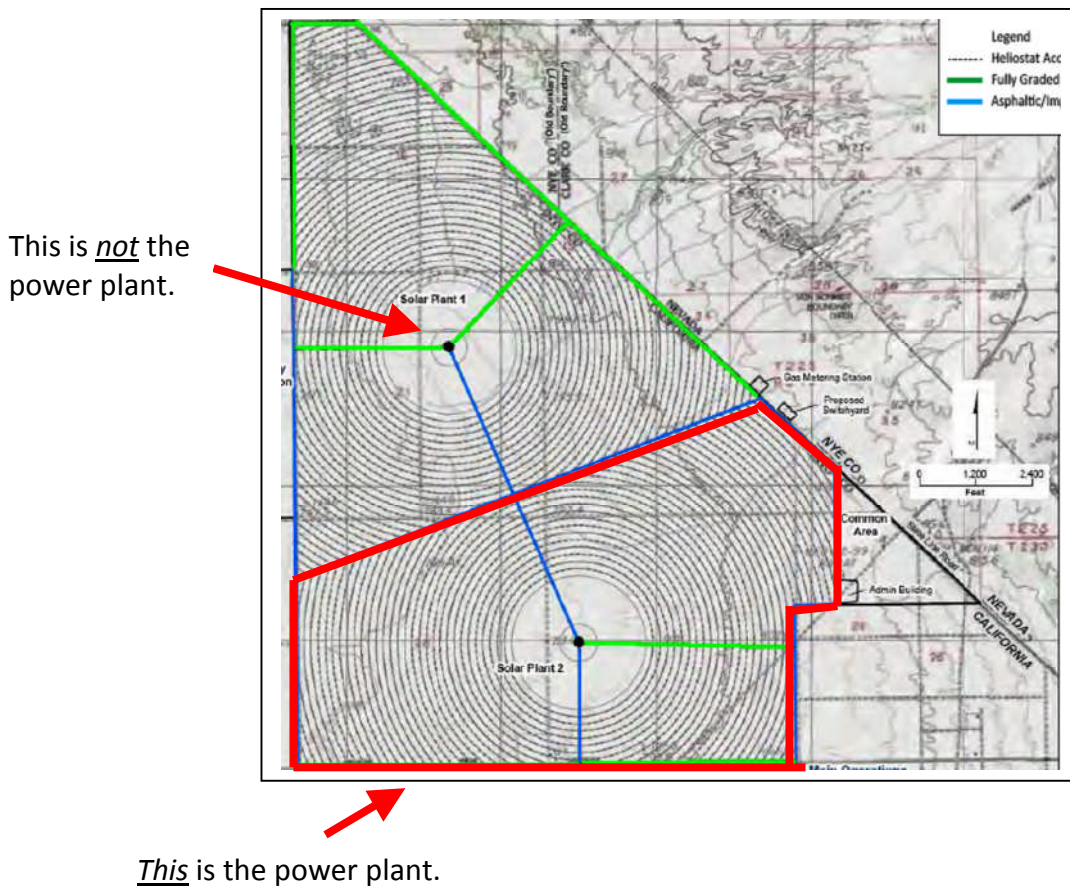
The heliostat/mirror assemblies are stationary components of the power plant's facility wide design that surround each power tower, meaning they are anchored into the ground and focus the sun's radiation to the SRGS's located on top of the power towers.

(1) CEC PSA, Power Plant Reliability, pdf. pg. 1,000

Within these heliostat/mirror fields are concentric rings known as maintenance paths or drive zones that separate each “power block” of heliostat/mirror assemblies. The purpose of these tracks is to allow the MWM’s to perform routine maintenance to clean the mirror surfaces in order to utilize the sun’s daily radiation for the exclusive purpose of power production.

The Energy Commission must make findings as to the manner in which the project is to be designed, sited, and operated to ensure safe and *reliable* operation (Title 20, CCR §1752[c]) If the MWM’s do not clean the mirror’s surfaces, the mirror surfaces will degrade causing the quality, quantity, reliability and performance levels for capturing the sun’s radiation to decline until the plant eventually becomes incapable of producing power from the sun.

When examining the design of the HHSEGS power plant, the concentric rings that surround the power towers can be likened to “cogs” in a machine that the MWM’s will perpetually move around. As cogs move, their movement results in the “transportation” and conversion of materials such as fuel, steam, water, electricity, etc., all of which are recognized as a system of aggregate components that comprise the sum total of a stationary source power plant.



According to CEC Staff, ***“major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production...”***⁽¹⁾

Based on the design of the HHSEGS for purposes of power production, the heliostat/mirror fields are an inseparable part of the stationary source facilities. The MWM’s cannot be separated from this design as a “secondary” emission source because they are the first and primary component of a facility wide design and system that ensures reliable power production will be created from the suns radiation.

The purpose of including the MWM’s within the facility design is not for “transport” but to maintain reliable power production at the site. They are not “mobile” in the sense of delivery trucks, worker vehicles, or construction related vehicles that may operate intermittently and/or periodically throughout the life of the project and which truly are “secondary” emissions not directly connected to power production. However, the MWM’s are directly connected to the plants ability to produce power. If the MWM’s are removed from the facility design system, it will render the renewable power production capabilities of the HHSEGS moot.

The MWM’s will never leave the boundaries of the HHSEGS. Their operations are a critical infrastructure component permanently anchored within the stationary source design and they will operate for more hours than any other component of the plant on a daily basis over the life of the project.

Renewable or Not

If the Hidden Hills SEGS is to be defined as a stationary source that excludes the heliostat/mirror field system and instead, relies solely on defining the “power towers” as the totality of the stationary source plant, then it would follow that it cannot be considered a renewable energy power plant. This in turn means it cannot qualify for meeting national or state renewable power production standards, renewable energy tax credits or exemptions, renewable energy loans, cannot receive any benefits attributed to renewable energy production and cannot be considered as contributing to the electrical supply as a renewable power source.

On the other hand, if the HHSEGS is to be defined as a renewable power plant through the inclusion of the heliostat/mirror fields as part of the power production system and facility wide operations, then emissions associated with the system that qualifies the plant as a renewable energy stationary source must also be included within the FDOC and/or PTO.

As it stands, the FDOC does not include the emissions for equipment required for the sole purpose of maintaining the heliostat/mirror fields for reliable power generation. Therefore, since the heliostat/mirror fields are being excluded from the stationary source facilities and power generation system, then it follows that the Hidden Hills power plant cannot be considered nor qualifies for the status of being a renewable energy power plant.

(1) HHSEGS, CEC PSA, Power Plant Reliability, pdf. pg. 932

What Does EPA Say?

The emissions resulting from the currently excluded MWM's were so significant, CEC Staff began issuing a series of data requests questioning the applicant about their high level emissions output. Ultimately, questions surrounding the total plant wide emissions as well as the cumulative emissions from the original MWM's caused the applicant take a series of actions that resulted in redesigning the plant.

Some of the power plant design revisions included the removal of the two largest auxiliary boilers, re-configuring the transmission line system, changing the engine type and fuel to be used by the MWMs and reducing the number of the original MWM's by over 50%.

However, prior to the applicant's design revisions, CEC Staff issued Air Quality Data Request #136, which stated:

"The applicant expects facility GHG emissions to be 99,700 tons/yr, just under the PSD trigger threshold of 100,000 tons/yr. However, the applicant does not include GHG emissions from mirror washing activities in total facility emissions although they estimate washing activities at a large fraction of boiler emissions, 25,673 tons/yr. US EPA indicates that the vehicle portion of the washing operations may not be required for this threshold determination because mobile sources are exempt from GHG calculations, but the portion of GHG emissions from powering the water pumps for washing purposes must be included."⁽¹⁾ [Emphasis added].

In the applicant's response to Data Request #136, the applicant contended that the MWM's are not subject to emissions oversight or limitations. As a result, no emissions data for the MWMs were included in the application submitted to the GBUAPCD for their Preliminary Determination of Compliance nor were these emissions incorporated in the Final Determination of Compliance issued on August 1, 2012.

However, in the May 2012 publication of the CEC's Preliminary Staff Assessment, emissions data for the MWM's were included in a total emissions output evaluation for the Hidden Hills SEGS based on the facility wide design and MWM emissions were treated as an "aggregate" source of stationary source emissions.

Since the EPA provided no definitive decision on the status of the MWM emissions but only indicated the MWM's may or may not be required for inclusion in the emissions estimates, the question that must be put before the EPA is;

Must the emissions from the MWM's be included in the FDOC to be in compliance with Rule 209-F(3) and other permitting processes or not?

(1) 2012-02-09_Applicant's Data Response Set 2A, TN-63608, pdf. pg. 6

2. SYSTEM FEASIBILITY, EMISSIONS IMPACTS AND RENEWABLE STATUS

Background

The heliostat/mirror fields are advertised as the central component of the project design that qualifies it as a renewable energy generation source. Therefore, their performance is critical in generating electrical output. The quantity, quality, performance and reliability of its power production depends on the degree of mirror surface degradation. Maintaining high performance mirror surfaces depends on the frequency and adequacy of cleaning operations. To insure optimum system performance, MWM's will be employed to routinely clean the mirror surfaces on a continuously rotating basis throughout the life of the project.

However, there are some serious questions and discrepancies regarding the applicant's equation for the projected mirror washing rotation schedule and the number of MWM's necessary to achieve this schedule and reported by the applicant as critically necessary to maintain even a marginal level of performance.

Feasibility of MWM Maintenance Schedules

In the original Application for Certification, the applicant estimated that each Solar Plant would require 17 MWM's for the FFTZ's and 4 MWMs for the NTZ's⁽¹⁾.

In April, 2012, the applicant revised their original AFC design plans through the Boiler Optimization Plan and reduced the number of MWM's from 17 to 7 per plant at the FFTZ's and from 4 to 1 MWM per plant for the NTZ. All total, the applicant is reporting both Solar I and Solar II will utilize 16 MWM's that will be in operation on a daily basis. The applicant also reported that the projected mirror washing frequency will be on a "2-week rotating cycle."⁽²⁾

Data the applicant has yet to include in the AFC files or subsequent documents is the time required it will take to clean each heliostat/mirror surface at the Hidden Hills SEGS. However, a general idea can be obtained from the mirror washing time requirements outlined in the Stirling Energy Systems Solar Two Project CEC Staff Assessment, which stated:

"Mirror washing would be required approximately once every month, requiring 14 gallons of water per dish with an average washing rate of 20 minutes per washed dish pair, or 10 minutes per dish, since each wash vehicle is able to wash two SunCatchers simultaneously...." ⁽³⁾ [Emphasis added.]

(1) AFC Files, Section 5.1, Air Quality, pdf. pg. 42

(2) 2012-04-09 Supplemental Data Response, Set 2, TN-64558, pg. 106

(3) http://www.energy.ca.gov/sitingcases/solartwo/documents/staff_assessment/2_CEC-700-2010-002-SA-DEIS_SectionC-D.pdf

Based on this general overview, if one mirror can be cleaned every 10 minutes, then 6 mirrors can be cleaned per hour per MWM. 6 mirrors per hour multiplied by 16 MWMs equals 96 mirrors per hour. Over the course of a 10-hour shift, 960 mirrors can be cleaned per day. At this rate, the number of days necessary to clean 170,000 mirrors is 177 days. Therefore, it is not feasible that the applicant will meet the projected two-week (14-day) rotating cycle for maintenance mirror cleaning activities. In the FDOC, the GBUAPCD states the number of mirrors is actually higher than the applicant is reporting by a total of 10,000 mirrors (90,000 per plant).

Emission Impacts

Currently available data suggests the applicant's proposed number of MWM's and their corresponding emissions in relation to the feasibility of cleaning 170,000 mirrors within the applicant's projected time frame is not feasible by a large margin. Therefore, either one of two possibilities can be reasonably assumed, these being;

- a) The currently proposed number of MWM's is unrealistic and consequently, incapable of cleaning the mirrors within the applicant's stated time frame. Therefore, corresponding emission may also be considered unrealistic and potentially underreported.
- b) If the applicant hopes to achieve their cleaning cycle rotation of cleaning the mirrors once every 14 days, they will need to increase the number of MWM's by approximately 12 times the currently reported number.

If the applicant keeps the number of MWMs to merely 16 machines between the two plants, serious questions and concerns are raised regarding the actual "renewable" status of the power plant. The applicant is also fully aware that degraded mirror surfaces will be responsible for significant declines in performance levels, as was explained to investors in their June 9, 2011 Amendment filed with the Security Exchange Commission as demonstrated in the following quote;

*"Our largely unproven mirror cleaning equipment may perform below our expectations. The primary maintenance activity for solar thermal projects using our systems will be the routine and continuous washing of reflective mirror surfaces. **We anticipate each mirror may need to be cleaned every two weeks to prevent a buildup of dust which would significantly degrade the system performance.** Mirrors will be washed at night by a dedicated crew using specialized mobile equipment. A truck is being designed that will bring purified water simultaneously to a number of mirrors. We are still designing and testing the specialized equipment to be used in this process. **If the mirror washing equipment and process are not effective, actual operating costs may be substantially higher than forecasted or total electrical production may fall short of estimates."**⁽¹⁾*
[Emphasis added].

(1) BSE Amendment No. 2 filed on June 9, 2011, with the Security Exchange Commission, available at: http://ipo.nasdaq.com/ViewFiling_frames.asp?filename=0001193125-11-106341.txt&filepath=%5C2011%5C04%5C22%5C

If the applicant chooses to increase the number of MWM's necessary to ensure the 2-week rotating cleaning cycle, they will need to employ approximately 202 MWMs throughout the plant. Preliminary analysis of the emissions resulting from the daily use of 202 MWMs throughout the facility indicate emissions levels would skyrocket and be responsible for more emissions (and by a very large margin) than any other component of the facility, all of which has been excluded from the FDOC. (A more detailed preliminary analysis of the issues surrounding the feasibility of the proposed MWM's and their emissions calculations are included in Appendix A.)

Based on the evidence available so far, the EPA must consider, review and attempt to reasonably resolve these issues prior to the acceptance of the GBUAPCD's FDOC to ensure compliance with the Clean Air Act and relevant laws, ordinances and regulations. Some of the most obvious and relevant questions might include;

1. How feasible or accurate is the applicant's reported emissions based on a realistic number of MWM's capable of fulfilling the applicant's projected cleaning schedule?
2. If the current number of MWM's are incapable of maintaining a reasonable cleaning schedule, can the HHSEGS be considered a "renewable energy" stationary power source if it cannot maintain even marginal mirror performance for power generation?
3. Would the emissions output from a revised number of increased MWM's capable of realistically achieving the 14-day cleaning cycle trigger criteria pollutant thresholds?
4. Did the applicant deliberately reduce the number of MWM's to underreport emissions to deflect CEC Staff concerns, thereby avoiding the reporting of actual emissions that would be produced by a more realistic number of MWM's necessary to ensure reasonable renewable energy reliability and performance?

3. OPERATIONAL PM₁₀/PM_{2.5} LIMITATIONS ON FUGITIVE DUST

To date, the California Energy Commission (CEC) has authorized Operational Dust Control Plans for previously approved Solar Electric Generating Systems (SEGS) to be developed 60 days prior to beginning plant operations. Though fugitive dust control during the construction phase of the proposed Hidden Hills SEGS is incorporated within the FDOC, *operational emissions* of the criteria pollutants, PM₁₀/PM_{2.5} particulate matter via fugitive dust emissions, are evading monitoring programs or criteria pollutant limitations – despite creating potentially significant impacts to local air quality and public health for at least 25-30 years.

With respect to PM₁₀/PM_{2.5} particulate matter within the proposed Hidden Hills SEGS site, ambient air quality standards for these emissions are already in excess of state standards.

As described in the MWM section, the power plants will require a series of concentric rings of graded dirt roads surrounding the heliostat/mirror fields, which are the dominate landscape of the power plants facility.

Disturbed soil via grading throughout the site will most likely continue to contribute to additional fugitive dust emissions within the area for the life of the project. Due to constant disturbance from the MWM's, these roads may never truly "settle" and ongoing fugitive dust control can only be partially mitigated through the continuous application of heavy water or chemical dust suppressants across the site for the next 25-30 years.

Based on a preliminary review of the road dust emissions for the MWMs, if the applicant revises and increases the number of MWM's necessary to achieve their 14-day cleaning schedule, non-combustion fugitive dust emissions alone via PM₁₀/PM_{2.5} concentrations are estimated to be approximately 480 lbs. per day.

While every other criteria pollutant is incorporated within the FDOC, road dust, fugitive dust emissions and non-combustion PM₁₀/PM_{2.5} particulate matter for the operational phase of the proposed power plant will most likely only be addressed by the CEC 60 days prior to commencing power plant operations.

While admittedly the CEC involvement in the review and approval of large-scale industrialized solar plants is relatively new, it just cannot be appropriate or within the parameters or intent of the Clean Air Act to allow such significant fugitive air emissions to be exempt from any ambient air quality oversight, monitoring, review or limitations within the conditions of the FDOC and/or PTO for the life of the project.

Since the CEC or GBUAPCD have not yet actively sought to incorporate an operational dust control plan with emission limitations for previously approved SEGS or the currently issued FDOC, will the EPA consider stepping in under the authority of the Clean Air Act to protect public health and ambient local air quality over the life of the project by mandating limitations and incorporating conditions within the PTO for regulating and reporting operational PM₁₀/PM_{2.5} fugitive dust emissions impacts prior to project approval?

4. GREEN HOUSE GAS EMISSIONS

There are two specific concerns related to GHG emissions and the Hidden Hills SEGS Application for Certification. These are:

- A) Since the number of MWMs required to meet reasonable renewable energy performance levels may be significantly underreported, the actual GHG emissions from a more realistic number of vehicles may trigger federal permitting requirements, and,

- B) There are questions regarding the GHG emissions resulting from onsite SF₆ quantities. Specifically, evidence suggests the applicant may have underreported the amount of onsite SF₆ during the initial filing of the Application for Certification in order to avoid triggering federal permitting requirements.

A. GHG Emissions and MWM'S

Admittedly, since an accurate accounting of the required number of MWM's is in dispute, it may be difficult for the EPA to ascertain the appropriate number of MWM's that will ultimately be utilized for mirror cleaning activities during the operational phase of the Hidden Hills SEGS.

Of additional concern is, though some data is available regarding the MWM's to be utilized for routine maintenance, additional cleaning activities are also planned by the applicant that will periodically "scrub" the mirrors over a reported 8-week scrubbing cycle rotation⁽¹⁾. No further information is currently available regarding these scrubbing activities or if additional machines will be required to meet this complimentary 8-week cleaning schedule.

Obviously, regulating emissions from an unknown number of emission sources is impossible. However, what can clearly be established is all of the machines to be utilized at the Hidden Hills SEGS for mirror cleaning activities, whether for routine or periodic maintenance, will cause significant increases in GHG emissions during operations and throughout the life of the project.

Therefore, an accurate accounting of all the aggregate equipment and/or systems required for power generation throughout the facility is necessary in order to determine if their aggregate emissions will result in triggering critical GHG emission levels.

B. SF₆ Emissions and GHG's

There are inconsistencies of reported onsite SF₆ storage between the originally filed Application of Certification and a subsequent design revision filed in April 2012 known as the Boiler Optimization Plan. Answers to questions regarding these inconsistencies have only fueled concerns regarding the credibility of emissions calculations for GHG's resulting from onsite SF₆ quantities.

Provided below are the two separate responses regarding questions surrounding the quantities of onsite SF₆ storage and their corresponding emissions calculations for the proposed Hidden Hills SEGS.

(1) 2012-04-09 Supplemental Data Response, Set 2, TN-64558, pg. 106

PDOC, Appendix C, Response to Question 2.4

“All of the SF₆ at the project site will be contained within the circuit breakers, as indicated in Table 5.5-2 of the AFC—there will be no additional SF₆ stored at the site. As shown in Note 6 to Table 5.1B-13 of the AFC, the project will include 4 breakers that contain up to 208 lb of SF₆ each and 2 breakers that contain up to 24.2 lb of SF₆ each. Total SF₆ contained within the circuit breakers is 880.4 lb, calculated as follows:

$$(4 * 208 \text{ lb}) + (2 * 24.2 \text{ lb}) = 880.4 \text{ lb}$$

The quantity of SF₆ in Table 5.5-3 of the AFC should be shown as 880.4 lb. Converting this amount to CO₂ equivalents is not appropriate, since this equivalence occurs only when the SF₆ is released to the atmosphere, and not when it is stored.”

However, when the applicant filed for the design revisions in the Boiler Optimization Plan, the quantities of SF₆ onsite storage were now reported at 1,300 lbs, not 880.4 lbs as outlined in the referenced PDOC response. In response to questions regarding over a 400 lbs. increase of SF₆ onsite storage, the FDOC stated:

FDOC, Appendix D, Response to Question 4.1

“The District is aware that the amount of SF₆ listed in Table 5.5-3R1 is different from amount of SF₆ discussed in Appendix A. It is the District’s understanding that Table 5.5-3R1 simply corrected the maximum projected onsite storage quantity to match the quantity assumed for the GHG emissions calculations in the air quality section, and did not affect the calculation of potential GHG emissions from SF₆. Therefore, there was no “increase” to be evaluated. The revised facility GHG emissions, reflecting the reduction in annual natural gas used due to elimination of the two largest boilers, are 44,394 tons per year of CO₂ equivalent (CO₂e). The PDOC evaluates the emissions of CO₂e, as revised in the April 2012 boiler optimization filing, in Section 11, PSD Considerations, on pp. 10 and 11.”

Given the fact that the original AFC files reported the annual emissions of GHG’s would equal 99,700 tons per year⁽¹⁾, the credibility of assuming the applicant over reported GHG emissions for the onsite SF₆ quantities by such a large margin is highly unlikely.

A more reasonable assumption is the applicant underreported the onsite SF₆ storage quantities to evade triggering federal permitting requirements.

During the CEC AFC review process, it is important to establish the credibility, integrity and reliability of the applicant prior to licensing and project approval. If the applicant is underreporting or misrepresenting critical components of the proposed project to evade regulatory review, it is in the public interest to investigate and disclose these activities.

(1) AFC files, Section 5.1, Air Quality, Table 5.1-28, pdf. pg. 45

Since the GBUAPCD has no authority over GHG emissions, it appears to be the responsibility of the EPA to try and ascertain the truth of the matter through supporting data and analysis found within the original AFC files and/or subsequent related documents, not through assumptions of “corrections” that have no supporting foundation in the response provided in Appendix D, a response that was also most likely supplied by firms employed by the applicant as well.

Some of the most immediate questions that need resolution include, but are not limited to:

1. What are the GHG emissions for 1,300 lbs of onsite SF₆ at the applicant’s modeled leakage rate of 0.5%?
2. Do the GHG emissions for 1,300 lbs. of onsite SF₆ equal the applicant’s originally reported GHG emissions in the AFC files?
3. Were the originally reported GHG emissions for the onsite SF₆ quantities over reported in the original AFC files and prior to the Boiler Optimization Plan?
4. If not, would 1,300 lbs. of onsite SF₆ storage and their corresponding GHG emissions rates of assumed 0.5% leakage resulted in triggering federal permitting requirements for aggregate stationary source emissions at the time the AFC was filed?
5. Are all responses and calculations correct regarding lifetime maintenance and withdrawal requirements of onsite SF₆ accurate and where is the data that supports analysis and final determinations?

APPENDIX A

SUPPLEMENTAL COMMENTS AND ANALYSIS, SET II

MIRROR WASHING MACHINES

FEASIBILITY & EMISSIONS ANALYSIS

SUPPLEMENTAL

COMMENTS & ANALYSIS, SET II

Submitted by C.R MacDonald

MIRROR WASHING MACHINES
FEASIBILITY & EMISSIONS
ANALYSIS

JULY 2012

TO
CALIFORNIA ENERGY COMMISSION

MIRROR WASHING MACHINES

The following analysis seeks to verify and explore the feasibility of the applicant's calculations regarding the number of Mirror Washing Machines (MWMs) required to meet the applicant's reported 14-day (and an alternative 28-day schedule) rotating cycle for mirror cleaning maintenance activities.

In order to accomplish this, the following objectives were developed:

1. Review current data to determine the feasibility of the applicant's projected number of MWMs (16 total) that will be employed to achieve a 14-day or 28-day mirror cleaning rotating cycle.
2. Estimate the number of MWMs that would be required to achieve the objective of cleaning 170,000 mirrors per 14-day and 28-day rotating cycles.
3. Estimate the emissions output of the required MWMs that would be needed to meet either the 14-day or 28-day rotating mirror cleaning cycles.

As a result, three sections are included in this analysis in order to develop, verify, analyze and reach the following summary conclusions:

- The applicant's currently projected number of MWM's to be employed to clean approximately 170,000 mirrors in either a 14-day or 28-day rotating cycle is not feasible.
- Based on the current number of MWM's, it would take approximately 177 days to complete one single maintenance cleaning cycle.
- The number of Mirror Washing Machines required to feasibly meet a 14-day or 28-day rotating cleaning schedule is approximately 6 to 12 times greater than the applicant has accounted for.
- The corresponding emissions for the number of MWMs necessary to achieve either a 14-day or 28-day rotating cleaning schedule would also be approximately 6 to 12 times higher than the applicant has currently accounted for.

A fourth section has also been included outlining how the emissions from the Mirror Washing Machines must be included in the Permit to Operate in order to comply with Rule 201.A and Rule 209.A.E.3.

NOTE: All page numbers cited are from the pdf. format and do not represent the actual page numbers specific to the documents.

SECTION I. CURRENT MIRROR WASHING MACHINE DATA/FEASIBILITY

1. Baseline Data

The following information is used to determine the base line data this analysis rests upon.

1. In the Boiler Optimization Plan for the Hidden Hills SEGS, the applicant states the projected mirror washing frequency is a “2-week rotating cycle”⁽¹⁾.
2. The applicant has not included data regarding the required time to clean each mirror/heliostat pair at the Hidden Hills SEGS but a general idea can be obtained from the mirror washing time requirements outlined in the Stirling Energy Systems Solar Two Project CEC Staff Assessment⁽²⁾, which stated:

“Mirror washing would be required approximately once every month, requiring 14 gallons of water per dish with an average washing rate of 20 minutes per washed dish pair, or 10 minutes per dish, since each wash vehicle is able to wash two SunCatchers simultaneously....”. [Emphasis added.]

3. The applicant is reporting it will employ a total of 16 MWMs for both Solar Plants, one MWM for each Solar Plant in the Near Tower Zones (NTZ) and 7 MWM’s for each Solar Plant in the Far From Tower Zones (FFT)⁽³⁾.
4. Each Solar Plant will utilize approximately 85,000 mirrors each, for a total of 170,000 mirrors that will comprise the Hidden Hills SEGS in its entirety⁽⁴⁾.
5. Routine operational maintenance mirror cleaning activity will be performed during the evening shift for 10 hours per day⁽⁵⁾ (as is projected for the construction phase of the proposed project), 365 days per year⁽⁵⁾.

2. Current MWM Data: Calculations and Feasibility

If one mirror can be cleaned every 10 minutes, then 6 mirrors can be cleaned per hour per MWM. 6 mirrors per hour multiplied by 16 MWMs equals 96 mirrors per hour. Over the course of a 10-hour shift, 960 mirrors can be cleaned per day. At this rate, the number of days necessary to clean 170,000 mirrors is 177 days.

Therefore, it is not feasible that the applicant will meet the projected two-week (14-day) rotating cycle for maintenance mirror cleaning activities.

(1) 2012-04-09 Supplemental Data Response, Set 2, TN-64558, pg. 106

(2) http://www.energy.ca.gov/sitingcases/solartwo/documents/staff_assessment/2_CEC-700-2010-002-SA-DEIS_SectionC-D.pdf

(3) 2012-04-09 Supplemental Data Response, Set 2, TN-64558, pg. 106

(4) Original AFC files, Executive Summary, pg. 2

(5) AFC Files, Traffic, pg. 19

SECTION II. REQUIRED NUMBER OF MWM'S TO MEET 14-DAY OR 28-DAY CLEANING SCHEDULE

1. Projected MWMs Necessary To Achieve A 14-day Rotating Cycle

If 170,000 mirrors are to be cleaned in a 14-day rotating cycle, then 170,000 must be divided by 14 days. This equals 12,142 mirrors per day that must be cleaned. If each MWM can clean 60 mirrors in a 10-hour shift, then 12,142 mirrors is divided by 60 mirrors per day to equal a total of 202.3 MWMs. This is the number of MWMs that will be required during the operational portion of the proposed project should the applicant seek to achieve the objective of a 14-day rotating cycle for mirror cleaning maintenance activities.

2. Projected MWMs Necessary To Achieve A 28-Day Rotating Cycle

If the applicant utilizes a 28-day rotating cycle for mirror cleaning maintenance activities, the number of required MWMs would be reduced by 50% to 101 MWMs during the operational phase of the proposed project.

SECTION III. INCREASED EMISSIONS FOR 14-DAY OR 28-DAY ROTATING CYCLE

Based on the conclusion reached in Section II, the following Emissions Tables are for the revised emissions estimates based on the required 202 or 101 MWMs to meet the a 14-day or 28-day rotating mirror cleaning maintenance schedule, respectively. A detailed breakdown of how these emissions were calculated is included in Appendix I: Detailed Emissions Analysis for HHSEGS Mirror Washing Machines.

Table 1. MWM Emissions Estimates for 14-Day Rotating Cycle (202 MWMs)

POLLUTANT	Total lb/day	Total lb/yr	Total ton/yr
NOx	51.76	18,893	9.45
VOC	23.99	8,755	4.37
SO2	13.9	5,069	2.53
CO	20.2	7,373	3.7
PM10/PM2.5 (combustion only)	1.26	460.8	0.2
PM10 (road dust)	436.8	159,441	79.7
PM2.5 (road dust)	44.18	16,128	8
TOTALS	592.09	216,120	108
Green House Gases (GHG)			266,980

Table 2. MWM Emissions Estimates for 28-Day Rotating Cycle (101 MWMs)

POLLUTANT	Total lb/day	Total lb/yr	Total ton/yr
NOx	25.88	9,446.5	4.7
VOC	12	4,377.5	2.2
SO2	7	2,535	1.27
CO	10.1	3,687	1.85
PM10/PM2.5 (combustion only)	0.6	230.4	0.1
PM10 (road dust)	218.4	79,721	39.9
PM2.5 (road dust)	22	8,064	4
TOTALS	296	108,060	54
Green House Gases (GHG)			133,490

SECTION IV. PERMIT TO OPERATE: MWM EMISSIONS & COMPLIANCE WITH RULE 201.A and RULE 209.A.E.3.

While the Great Basin Unified Air Pollution Control District (GBUAPCD) states it has no authority over mobile source emissions, the proposed project is not capable of operating or producing energy unless mirror washing machines (MWM) are utilized. As such, the MWM emissions are integrally bound to stationary source operations because they are a critical component of its ability to produce renewable power. Since MWM are required as a condition of operations and their corresponding emissions cannot be separated from projected stationary source emissions, they are accurately defined as an “article, machine or contrivance” as defined in Rule 201.A.

For all practical purposes, the MWM cannot be segregated from the proposed project by defining them solely as “mobile sources” as they will be exclusively confined within the stationary source project boundaries for the life of the project. If the MWM’s don’t operate, the power plant is incapable of producing power as defined in the Application for Certification. Therefore, the MWM’s should be considered an aggregate stationary emissions sources as they conform to definitions outlined in Rule 209-A.E.3.

RULE 209-A STANDARDS FOR AUTHORITIES TO CONSTRUCT

E. POWER PLANTS

3. "Stationary Source" means any aggregation of air-contaminant-emitting equipment which includes any structure, building, facility, equipment, installation or operation (or aggregation thereof) which is located on one or more bordering properties within the District and which is owned, operated, or under shared entitlement to use by the same person. Items of air-contaminant-emitting equipment shall be considered aggregated into the same stationary source, and items of non-air-contaminant-emitting equipment shall be considered associated with air-contaminant-emitting equipment only if:

- a. The operation of each item of equipment is dependent upon, or affects the process of, the other; and
- b. The operation of all such items of equipment involves a common raw material or product.

The Preliminary Notice of Determination of Compliance fails to account for or incorporate MWM emissions or operating conditions of the permit within its analysis, review, framework or emissions limitations as equipment that produces aggregated air-contaminant emissions to the stationary source as subject to permit.

Additionally, the applicant failed to account for MWM emissions in separate documents submitted for the GBUAPCD's review for the purposes of issuing a Determination of Compliance for stationary sources.⁽¹⁾

The required data for emissions review and compliance limitations must include separate emissions profiles for the MWMs, which at minimum must include number of machines in operation, vehicle miles traveled, Tier type diesel-fueled engines to be utilized, estimated daily/weekly hours of operations, and separate pollutant profiles via the accepted standards of lbs. per hour, day, month and year as described in Rule 209-A.C.3. ”

(1) 4-09-12, Supplemental Data Response, Set 2, TN-64558, pp. 46-63

APPENDIX I

**Detailed Emissions Analysis for
HHSEGS Mirror Washing Machines (MWM)**

I. GREEN HOUSE GAS (GHG) EMISSIONS

1. Baseline Data

The following information is used to determine the base line data this analysis rests upon.

1. The applicant is reporting it will employ a total of 16 MWMs for both Solar Plants, one MWM for each Solar Plant in the Near Tower Zones (NTZ) and 7 MWM's for each Solar Plant in the Far From Tower Zones (FFT)⁽¹⁾.
2. The applicant reported the total Green House Gas (GHG) emissions for 16 MWMs equals 21,147 tons per year⁽²⁾. 21,147 tons of GHG divided by 16 MWMs = 1,321.6875 tons of GHG emissions per MWM per year.

2. Green House Gas Emissions For MWMs Schedules

1. Projected MWMs Green House Gas Emissions For 14-day Rotating Cycle

$$202 \text{ MWMs} \times 1,321.6875 \text{ tons per MWM} = 266,981 \text{ tons of GHG's p/year}$$

2. Projected MWMs Green House Gas Emissions For 28-Day Rotating Cycle

$$101 \text{ MWMs} \times 1,321.6875 \text{ tons per MWM} = 133,490 \text{ tons of GHG's p/year}$$

(1) 2012-04-09 Supplemental Data Response, Set 2, TN-64558, pg. 106

(2) 2012-04-09 Supplemental Data Response, Set 2, TN-64558, Table PD1-3, pg. 31.

II. OTHER CRITERIA POLLUTANT EMISSION CALCULATIONS

1. Baseline Data

The following information is used to determine the base line data this analysis rests upon.

1. All baseline emissions calculations were taken from the applicant's Boiler Optimization Plan, Emissions from Mirror Cleaning Activities, HHSEGS, pg. 165. These emissions were calculated using 16 MWMs for both Solar Plants I & II.
2. All revised emissions calculations used the original Boiler Optimization Data for the 16 MWMs and applied it to the 202 MWM 14-day schedule.
3. All revised emissions increased the previously estimated emissions by 12.6525 as a result of dividing 16 MWMs into 202 MWMs.
4. The 101 MWM 28-day schedule merely reduced 14-day emissions by 50%.

INDIVIDUAL EMISSIONS ANALYSIS FOR 202 MWMS REQUIRED TO ACHIEVE 14-DAY CYCLE

<p><u>NOx</u> 16 MWM produces 4.1 lbs p/day of NOx. $4.1 \text{ lbs (16 MWMs)} \times 12.625 \text{ (202 MWMs)} = 51.76 \text{ lbs. p/day}$ $51.76 \times 365 = 18,893 \text{ lbs. p/yr}$ $18,893 \text{ lbs divided by } 2,000 = 9.45 \text{ tons p/yr}$</p>	
<p><u>VOC</u> 16 MWM produces 1.9 lbs of VOC per day. $1.9 \text{ lbs} \times 12.625 = 23.9875 \text{ lbs. per day}$ $23.9875 \text{ lbs} \times 365 = 8,755.43 \text{ lbs per year}$ $8,755 \text{ divided by } 2,000 = 4.37 \text{ tons per}$</p>	<p><u>PM10/PM 2.5 (Combustion Only)</u> 16 MWM produces 0.1 lbs of PM10/PM2.5 p/day. $0.1 \text{ lbs} \times 12.625 = 1.26 \text{ lbs. p/day}$ $1.26 \text{ lbs} \times 365 = 460.8 \text{ lbs p/yr}$ $460.8 \text{ divided by } 2,000 = 0.23 \text{ tons p/yr}$</p>
<p><u>SO2</u> 16 MWM produces 1.1 lbs of SO2 p/day. $1.1 \text{ lbs} \times 12.625 = 13.8875 \text{ lbs. p/day}$ $23.9875 \text{ lbs} \times 365 = 5,069 \text{ lbs p/yr}$ $5,079 \text{ divided by } 2,000 = 2.53 \text{ tons p/yr}$</p>	<p><u>PM10 (Road Dust Only)</u> 16 MWM produces 34.6 lbs of PM10 p/day. $34.6 \text{ lbs} \times 12.625 = 436.8 \text{ lbs. p/day}$ $436.8 \text{ lbs} \times 365 = 159,441 \text{ lbs p/yr}$ $159,441 \text{ divided by } 2,000 = 79.7 \text{ tons p/yr}$</p>
<p><u>CO</u> 16 MWM produces 1.6 lbs of CO p/day. $1.6 \text{ lbs} \times 12.625 = 20.2 \text{ lbs. p/day}$ $20.2 \text{ lbs} \times 365 = 7,373 \text{ lbs p/yr}$ $7,373 \text{ divided by } 2,000 = 3.6865 \text{ tons p/yr}$</p>	<p><u>PM2.5 (Road Dust Only)</u> 16 MWM produces 3.5 lbs of PM2.5 p/day. $3.5 \text{ lbs} \times 12.625 = 44.18 \text{ lbs. p/day}$ $44.18 \text{ lbs} \times 365 = 16,128 \text{ lbs p/yr}$ $16,128 \text{ divided by } 2,000 = 8 \text{ tons p/yr}$</p>



BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
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APPLICATION FOR CERTIFICATION
FOR THE *HIDDEN HILLS SOLAR ELECTRIC
GENERATING SYSTEM*

DOCKET NO. 11-AFC-02
PROOF OF SERVICE
(Revised 6/18/2012)

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DECLARATION OF SERVICE

I, Cindy R. MacDonald, declare that on August 10, 2012, I served and filed copies of the attached Copy of Letter to EPA, dated August 10th, 2012. This document is accompanied by the most recent Proof of Service list, located on the web page for this project at: www.energy.ca.gov/sitingcases/hiddenhills/index.html.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(Check all that Apply)

For service to all other parties:

- Served electronically to all e-mail addresses on the Proof of Service list;
- Served by delivering on this date, either personally, or for mailing with the U.S. 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 "e-mail preferred."

AND

For filing with the Docket Unit at the Energy Commission:

- by sending an electronic copy to the e-mail address below (preferred method); **OR**
- by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

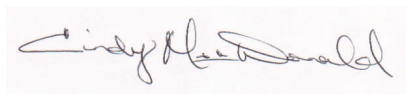
CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
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OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

- Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

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I declare under penalty of perjury that the foregoing is true and correct.



Cindy R. MacDonald