Submitted To
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, CA 95814-5112

July 23, 2012

RE: HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM
APPLICATION FOR CERTIFICATION 11-AFC-02

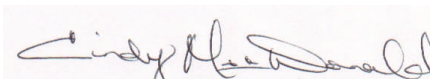
Dear Commissioners:

Please accept the following submission, "Supplemental Comments and Analysis, Set II, Mirror Washing Machines: Feasibility and Emissions Analysis" for consideration and incorporation into the California Energy Commission's Final Staff Assessment regarding the Application for Certification of the Hidden Hills Solar Electric Generating System.

Please note, this document only focuses exclusively on the "pure" mathematical analysis of Mirror Washing Machines (MWM) in relation to the number of heliostat/mirror assemblies at the proposed Hidden Hills SEGS. It does not account for reductions in employees based on the applicant's revised MWM's located in the Boiler Optimization Plan nor does it address any potential employee increases. It also does not account for employee breaks during a shift or the time it takes for each MWM to move to another cleaning station. Finally, it does not analyze the mirror scrubbing maintenance schedule, which the applicant has listed separately but provides no data as to what additional cleaning activity will be required.

Thank you for the opportunity to participate in the management of our Nation's irreplaceable resources.

Sincerely,



Cindy R. MacDonald

HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM

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 MWMs x 1,321.6875 tons per MWM = 266,981 tons of GHG's p/year

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

101 MWMs x 1,321.6875 tons per MWM = 133,490 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

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

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APPLICATION FOR CERTIFICATION
FOR THE *HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM*

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

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DECLARATION OF SERVICE

I, *Cindy R. MacDonald* , declare that on *July 23, 2012*, I served and filed copies of the attached *Supplemental Comments & Analysis, Set II: MWMs*, dated *July 23rd, 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:

(C*heck all that Apply*)

For service to all other parties:

X 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:

X 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
Attn: Docket No. 11-AFC-02
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
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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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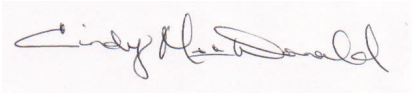
I declare under penalty of perjury that the foregoing is true and correct.



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