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November 24, 2009

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-12
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

Re: San Joaquin Solar 1 & 2 Hybrid Power Plant Project; 08-AFC-12

Dear Docket Clerk:

Enclosed are two copies of the Comments of the California Unions for Reliable Energy on the Preliminary Determination of Compliance (dated November 23, 2009), together with an executed original (and 1 copy) of the Declaration of Service. Please process the documents and return a conformed copies in the envelope provided. These documents were previously served via email.

Thank you for your assistance.

Sincerely,

Bonnie A. Heeley
Administrative Assistant

:bh
Enclosures

2303-061a

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November 23, 2009

By Overnight Mail

David Warner
Director of Permit Services
San Joaquin Valley Air Pollution Control District
1990 East Gettysburg Avenue
Fresno, CA 93726

Re: Preliminary Determination of Compliance
San Joaquin Solar 1 & 2 (08-AFC-12)
District Project Number C-1090203

Dear Mr. Warner:

We represent the California Unions for Reliable Energy ("CURE"). CURE is a party to the San Joaquin Solar 1 & 2 Power Plant ("Project") licensing case pending before the California Energy Commission.[1] San Joaquin Solar LLC ("Applicant") submitted an Application for an Authority to Construct ("ATC") to the San Joaquin Valley Air Pollution Control District ("SJVAPCD" or "District") for the Project on January 21, 2009. The District published notice of its Preliminary Determination of Compliance ("PDOC") on October 14, 2008, requesting public comment on the PDOC.

The Applicant proposes to construct two power plants, each containing one 53.4-MW solar facility and one 40-MW biomass combustion facility powering one steam turbine generator. Each solar facility consists of a field of solar collector elements that collect the sun's radiation and concentrate that radiation onto a series of heat collection elements containing circulating oil, the so-called heat transfer fluid ("HTF"). The hot HTF is utilized to create superheated steam for generation of electricity in a steam turbine generator. Each biomass facility includes two independently operable 20-MW combustor trains each consisting of one biomass-fired bubbling fluidized bed ("BFB") combustors and four associated

[1] PDOC, p. 1.

natural gas-fired startup burners. The two biomass facilities will have a shared fuel storage area but separate biomass and handling systems with separate baghouses.

The District extended the comment period on the PDOC to November 24, 2009 due to the District's failure to timely respond to CURE's Public Records Act request. CURE's Request for Extension is attached hereto as Attachment A, and the District's Grant of CURE's Request for Extension is attached hereto as Attachment B. We offer the following comments on the PDOC.

These comments were prepared with the technical assistance of Dr. Petra Pless, D. Env., who has over 10 years of experience in environmental consulting including review of air permits for power plants. Dr. Pless' curriculum vitae is attached hereto as Attachment C.

I. THE PDOC FAILS TO FULFILL ITS PURPOSE AS AN INFORMATIONAL DOCUMENT

The PDOC is a disorganized and unreadable document with numerous internal inconsistencies, omissions, and factual errors, and a general lack of documentation. Without access to and thorough review of the numerous documents distributed with the Application for Certification ("AFC") for the Project before the California Energy Commission ("CEC"), the PDOC would be an impenetrable document that is inadequate as a standalone document for public review. It is thus hardly surprising that the PDOC fails to include or adequately perform all analyses and determination of compliance conditions for all emission units associated with the Project. As a result, the PDOC fails to fulfill its purpose as an informational document that analyzes and ensures the Project's compliance with applicable laws and regulations.

A. The PDOC Fails to Provide Adequate Documentation

The PDOC fails to provide all of the information necessary for an adequate review of its conclusions. The District's failure to include a health risk assessment is perhaps the most egregious omission. In lieu of an analysis, the PDOC provides only the following one-sentence conclusion regarding the Project's health risks:

> The acute and chronic indices are below 1.0 and the cancer risk associated with the power generation facility is greater than 1.0 in a million, but less than 10 in a million.[2]

The PDOC fails to provide a description of the methodology and the assumptions used by the District to arrive at its conclusions regarding the Project's risk to human health.

The District's ambient air quality assessment is similarly superficial. The District provides only a brief summary of the assessment and fails to include its calculations.

To compensate for the lack of information provided in the PDOC, CURE worked diligently with the District to obtain the necessary documentation. CURE submitted its first Public Records Act request on May 28, 2009, requesting all files for the Project, including emission inventory statements and any ATC files. (Attachment D.) On June 11, 2009, the District sent the Applicant's application for an ATC, and determined that CURE's request was complete. On October 19, 2009 and subsequent to its review of the PDOC, CURE submitted two Public Records Act requests for data and analyses supporting the conclusions and assumptions made in the PDOC. (Attachment E and Attachment F). The District sent the first installment of the requested records in an email at the end of the work-day on November 5, 2009. On November 9, 2009, CURE submitted a follow-up Public Records Act request. (Attachment G.) The second installment of the requested records was transmitted by the District on November 13, 2009. CURE submitted another follow-up Public Records Act request on November 13, 2009 for information initially requested on October 19, 2009. (Attachment H.) The District transmitted responsive documents to CURE on November 16 and 17.

Although the District has cooperated with CURE following the District's initial failure to timely respond to CURE's request, CURE has spent a disproportionate amount of the comment period on the mere task of gathering all relevant information to enable an adequate analysis of the PDOC, and at a great cost to CURE. This burden on the public could have been avoided if the PDOC included sufficient information to allow for public review.

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[2] PDOC, Appx. F.

B. The PDOC Reflects the Lack of a Thorough Analysis of the Project

The PDOC appears to rely almost exclusively on assumptions provided by the Applicant without stating whether those assumptions are realistic. Absent this modicum of analysis, it is impossible to ascertain whether the District seriously considered the data before it. Moreover, the PDOC fails to produce the Applicant's data for public review. Examples of this lack of documentation include, for example, the emission rates for the biomass combustors during normal operation and startup. The scant information provided makes it is impossible to verify the integrity of the underlying data.

The absence of both data and analysis is particularly problematic in this case because the Applicant has several times revised its initial assumptions in the course of the California Energy Commission proceeding. Thus, the information contained in the ATC Application, received by the District on January 21, 2009, has been superseded. Therefore, it is unclear whether the data on which the PDOC relies continue to describe this Project, as revised by the Applicant.

C. The PDOC Lacks Organization

The PDOC is an impenetrable stack of paper with no readily discernible internal organization. It consists of a 79-page enumeration of applicable law and Project components. This summary is at once repetitive and incomplete. The data and information that it does contain are not arranged in a way that provides a reviewable analytical trail – from the Project description, to the District's emissions and conclusions, and to the District's permit conditions. Therefore, the integrity of the District's analysis, and the accuracy of its conclusions cannot be readily ascertained.

1. <u>The PDOC Fails to Present the District's Analysis in a Clear and Coherent Manner</u>

The PDOC fails to organize the District's analysis by subject matter. Specifically, the headings for the various subsections in the 79-page summary do not include the leading header number (*e.g.*, VII.C or VII.F), requiring the reviewer to thumb through numerous pages to figure out which heading a subsection belongs

to, a task not helped by the document's lack of formatting and the absence of an accurate table of contents.[3]

The PDOC also fails to present a coherent analysis for each permit unit. Rather than addressing the assumptions, emission factors, emission calculations, emission control technology evaluation, etc. for each permit unit in one section, this information is scattered throughout the PDOC. For instance, the PDOC first provides a description of the proposed emission control technology for each emission unit;[4] later on it states the assumptions used to calculate criteria pollutant emissions from each emission unit;[5] later still it sets forth uncontrolled and controlled criteria pollutant emission factors for each emission unit.[6] Several pages later it calculates the daily and annual pre- and post-potential to emit criteria pollutants for each permit unit,[7] and the PDOC finally presents annual emissions of criteria pollutants for each permit unit in a summary table a third of the way through the document.[8] It would greatly enhance the readability of this document if assumptions, emission factors, calculations, and results were combined and listed under each permit unit.

Not only is the information pertaining to each permit unit scattered throughout the PDOC, but the summary tables presented throughout the document omit descriptions of the respective emission units. This requires the reader to either memorize the permit unit number for each piece of equipment, or to constantly cross-reference the preceding sections to identify the equipment in question.

2. The PDOC Employs Inconsistent Terminology

Adding to its general lack of organization, the PDOC fails to employ consistent terminology. For example, the PDOC variously refers to the Project's biomass combustors as "fluidized bed combustor," "boiler," "combustor," or simply by

[3] The Table of Contents incorrectly cross-references page numbers for Sections VIII and IX.

[4] PDOC, pp. 6-9.

[5] PDOC, pp. 9-12.

[6] PDOC, pp. 13-19.

[7] PDOC, pp. 19-24.

[8] PDOC, p. 25.

the permit unit number. Similarly, the PDOC variously refers to the natural gas-fired burners associated with the biomass combustors as "startup burner," "preheat burner," "natural gas burners," "startup combustors," or "startup combustor train." While the terminology for these sources is clear enough, it makes reading the document and scanning for information within the PDOC more difficult than necessary. Other uses of terminology are more confusing. For example, the PDOC variously refers to "municipal green wastes" or "wood waste" or "wood waste fuel" as the portion of biomass that does not originate from agricultural waste fuels (a.k.a. "agricultural wood waste," "agricultural wood," or "ag wood") without providing a definition of any of these terms.

D. The PDOC's Project Description Is Inadequate

The PDOC fails to provide an adequate description of the Project's solar and biomass facilities.[9] The PDOC fails to include a site plan, a schematic showing the general layout of the Project, a flow diagram for Project processes, and a description of the major component design characteristics. The PDOC also fails to include a description of the solar field equipment, including the heat transfer system, the steam turbine generators, lube oil vent systems, multicyclones, economizers, scrubbers, air preheaters, baghouses, etc. Absent this basic information regarding the Project and its components, it is impossible to assess whether the PDOC adequately addresses the Project's numerous emission sources.

E. The PDOC Is Internally Inconsistent

The PDOC is internally inconsistent which impedes review of the District's calculations and conclusions

1. <u>The PDOC Wrongly Concludes that the Project is Not a Major Source for HAPs for the Purpose of District Rule 4002</u>

The PDOC concludes that the Project is a major source of hazardous air pollutants ("HAPs") because total emissions of HAPs exceed the major source threshold of 25 tons per year for any combination of HAPs pursuant to District Rule 2550, Federally Mandated Preconstruction Review for Major Sources of Air Toxics.[10] However, elsewhere, the PDOC concludes that the requirements of

[9] PDOC, pp. 1-3.

[10] PDOC, pp. 48 and 50.

Rule 4002, NESHAPs, are not applicable to the Project because the Project is a *non-major* HAPs source.[11] Inexplicably, the PDOC advises the reader that the latter conclusion is based on the District's evaluation regarding the Project's compliance with Rule 2550. However, in this evaluation of the Project's compliance with Rule 2550, the PDOC concludes that the Project *is* a major source for HAPs. The District's failure to analyze the Project as a major source for HAPs under Rule 4002 is a material error. The PDOC should be revised to identify the Project as a major source for purpose of Rule 4002 and include a discussion of the applicable requirements.

2. The PDOC Provides Varying Information Regarding the Project's Biomass Moisture Content

In Section VIII.A, the PDOC states that the moisture content for limestone receiving, storage and transfer operation is 10.25 percent as proposed by the Applicant.[12] Yet, in Section VIII.B, the PDOC calculates emission factors for limestone and hydrated lime based on 0.25 percent and 1 percent (also as proposed by the Applicant), respectively.[13] Because the assumed moisture content of these materials is a major factor in quantifying fugitive dust emissions, this type of inconsistent information impedes review of the PDOC's emission estimates for the Project's emission units.

II. THE PDOC UNDERESTIMATES THE POST PROJECT POTENTIAL TO EMIT

The Post-Project Potential to Emit ("PE2") presented in the PDOC are underestimated because they do not account for the Project's maximum potential to emit, fail to require an enforceable condition to limit biomass combustion emissions and fail to include all emission sources in its analysis.

[11] PDOC, p. 56.

[12] PDOC, p. 9.

[13] PDOC, p. 14.

A. The Maximum Annual Post Project Potential to Emit for the Biomass Combustors Is Underestimated

The PDOC determines the maximum annual Post-Project Potential to Emit for the Project's biomass combustor trains based on (1) two startup events per year, and (2) emission rates for a 50/50 mixture of agricultural wood waste and "wood waste," the latter presumably being "municipal green waste" as described in the PDOC's project description[14] However, when calculating a project's potential to emit, the District is required to calculate the maximum capacity of a stationary source to emit a pollutant under its physical and operational design.[15]

The PDOC does not limit the Applicant to combusting any particular type or types of fuel mix. Additionally, the Applicant indicated it would not accept a condition of certification by the CEC regarding the fuel blend at any given time on a continuous basis.[16] Thus, absent a clearly worded and enforceable permit condition, maximum annual Post Project Potential to Emit for the Project's biomass combustor trains must be determined based on the Project's maximum capacity, which includes the combustion of 100 percent "wood waste," *i.e.* municipal green waste, as summarized in the following tables. The PDOC admits that the combustion of "wood waste," *i.e.* municipal green waste, results in higher emissions of all criteria pollutants than the combustion of a 50/50 mix of agricultural wood waste and "wood waste," *i.e.* municipal green waste.[17] However, the PDOC fails to calculate the Project's Potential to Emit based on its capability to combust 100 percent "wood waste," *i.e.* municipal green waste.

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[14] PDOC, pp. 3 and 22.

[15] 40 C.F.R. § 52.21 (b)(4); *see also Alabama Power Co. v. Costle,* (D.C. Cir. 1979) 636 F.2d 323, 353.

[16] 08-AFC-12, San Joaquin Solar 1 & 2 Hybrid Project, Supplemental Information in Response to CURE Data Request Set #5, October 5, 2009, Response to Data Request #210. (Attachment I.)

[17] PDOC, p. 16.

Table 1: Maximum Annual Post Project Potential to Emit ("PE2") per biomass combustor

	Startup Emission Rate (lb/year)	**Revised Maximum Potential Annual Emission Rate** 100% load and 100% "wood waste"* (lb/year)	**Revised Maximum Annual Post Project Potential to Emit** 100% load and 100% "wood waste"* (lb/year)	**PDOC Maximum Annual Post Project Potential to Emit** 100% load and 50% agricultural wood waste/ 50% "wood waste" (lb/year)	**Difference** (lb/year)
Pollutant/ Formula	(lb/hr) x (2 events) x (8 hr/event)	(lb/hr) x (6,570 hr/yr)	Startup + 100% load	Startup + 100% load	Revised – PDOC
NOx	204.20	24,309	24,513	24,053	**460**
SOx	173.68	24,966	25,140	24,286	**854**
PM10	46.36	50,326	50,373	45,642	**4,731**
PM2.5	46.36	50,326	50,373	45,642	**4,731**
CO	117.00	55,582	55,699	41,180	**14,519**
VOC	11.48	8,672	8,684	6,778	**1,906**

* Consistent with the PDOC's terminology, the use of the term "wood waste" in this instance refers to "municipal green waste."

As shown in Table 1, maximum annual emissions of PM10, PM2.5 and CO from the biomass combustors are substantially higher when based on 100 percent combustion of "wood waste," *i.e.* municipal green waste, as opposed to the 50/50 mix of agricultural wood waste and "wood waste," *i.e.* municipal green waste, assumed by the PDOC.

Further, as discussed in more detail in Comments VI.C., a portion of municipal green waste would contain construction and demolition ("C&D") wood and agricultural wood waste may contain a variety of materials that could potentially result in higher emission rates of criteria pollutants than the emission rates determined by the biomass combustor manufacturer for "wood waste and relied upon by the PDOC." Thus, in addition to revising the Project's potential to

emit calculations, the District must review available source tests conducted for C&D wood and agricultural wood waste at other, similar facilities or require the Applicant to supply such source tests conducted by the vendor.

B. The District's Permitting Condition for Biomass Combustion is Inadequate

The PDOC contains a determination of compliance condition limiting Project emissions to the "calculated" maximum annual emissions.[18] However, the PDOC fails to make this condition enforceable by failing to require a demonstration that the annual fuel supply would indeed consist of a 50/50 mix of agricultural wood waste and "wood waste," *i.e.* municipal green waste. In fact, the PDOC's proposed determination of compliance conditions do not even define the terms "biomass," "agricultural wood waste," or "wood waste."

The PDOC does not specify how the type, quantity and the higher heating value ("HHV") of each fuel are to be used to calculate the Project's maximum annual emissions. Significantly, the PDOC does not specify which hourly emission rates must be used nor does it contain a condition requiring source testing for each type of fuel that would be combusted at the facility. The PDOC only requires a demonstration of compliance with annual emission limits through a calculation but does not specify how annual emissions are to be calculated.[19] Such condition of certification is ineffectual.

C. The PDOC Fails to Include All Fugitive Emissions in the Post Project Potential to Emit

The District is required to include fugitive emissions in its calculation of a major source of criteria pollutants for any permit unit that is included as a source under 40 C.F.R. 70.2, or when determining if a stationary source is a major air toxics source as defined in Rule 2520.[20] The U.S. EPA defines fugitive emissions as "... those emissions which could not reasonably pass through a stack, chimney, vent,

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[18] PDOC, Appx. A, Equipment Description, Unit C-7558-3-0, Condition 58.

[19] Condition 60 for biomass combustors states, "the twelve consecutive month rolling average emissions to determine compliance with annual emissions limitations shall be compiled from the twelve most recent calendar months."

[20] District Rule 2201, § 3.25.1.

or other functionally equivalent opening."[21] Fugitive emissions can be broadly considered as those air pollutant emissions that enter the atmosphere without being directed through an engineered structure. Examples include leaks in process lines, piping, or machinery, emissions of road dust created by vehicle traffic, and wind-blown dust from stockpiles of stored materials.

The District is required to include fugitive emissions in its calculation of the Project's potential to emit because the Project is a listed source under 40 C.F.R. 70.2 and a major air toxics source under District Rule 2520.[22] Although the PDOC recognizes that fugitive emissions must be included in the Project's emissions estimates and includes particulate matter emissions from wind erosion of the biomass storage piles,[23] it fails to include a number of other sources of fugitive emissions.

1. Fugitive Dust Particulate Matter Emissions from Entrained Road Dust

Onsite travel of the vehicles on paved or unpaved roads would result in fugitive particulate matter emissions from entrained road dust. The Project would receive 27,166 haul trucks per year.[24] Mirror washing would occur nightly, five days per week, and each of the three mirror washing trucks would travel approximately 6 miles per day and 1,560 miles per year.[25] In addition, the Project would operate two front end loaders on site.[26] Emissions from these sources must be included in the Post Project Potential to Emit and the ambient air quality modeling and offsets must be procured.

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[21] 40 C.F.R. § 51.301.

[22] *See* 40 C.F.R. § 70.2 2(xxvii) and District Rule 2520 § 3.18 (defining a major air toxics source as a source that emits or has the potential to emit 25 tons per year or more of a combination of HAPs); *see* PDOC, p. 50.

[23] PDOC, pp. 19 and 25.

[24] San Joaquin Solar 1 & 2 Hybrid Project, Supplemental Information in Response to CEC Data Request Set #1, 08-AFC-12, July 13, 2009, p. AIR-45 and Attachment AQ-2, Operational Emission Calculations, July 10, 2009. (Attachment J.)

[25] San Joaquin Solar 1 & 2 Hybrid Project, Supplemental Information in Response to CEC Data Request Set #1, 08-AFC-12, July 13, 2009, p. AIR-45 and Attachment AQ-2, Operational Emission Calculations, July 10, 2009. (Attachment J.)

[26] San Joaquin Solar 1 & 2 Hybrid Project, Supplemental Information in Response to CEC Data Request Set #1, 08-AFC-12, July 13, 2009, p. AIR-9. (Attachment J.)

2. VOC Emissions from Heat Transfer System Leakage

The Project would include a heat transfer fluid ("HTF") system for each solar facility designed to transfer energy from the solar field to the power block at each plant. Each heat transfer system (one per plant) would contain 185,000 gallons of HTF in a circulating loop.[27] Leaks of volatile organic compounds ("VOCs") from the valves of the HTF systems have been estimated at 1.7 tons/ year.[28] Additional emissions would occur from accidental leaks from the HTF system resulting in HTF-contaminated soil. The maximum quantity of HTF released from accidental leaks has been estimated by the Applicant at 275 gallon per incident.[29] The HTF-contaminated soil would be temporarily stored (up to 90 days) within a laydown area consisting of a concrete slab with eight-foot concrete walls on three sides and open to the atmosphere.[30] VOC emissions from these sources must be included in the Post Project Potential to Emit and the ambient air quality modeling and offsets must be procured.

III. THE EMISSION ESTIMATES PRESENTED IN THE PDOC ARE INCONSISTENT WITH THE EMISSION ESTIMATES PROVIDED BY THE APPLICANT TO THE CALIFORNIA ENERGY COMMISSION

The emission estimates presented in the PDOC are substantially inconsistent with the revised Project emissions provided by the Applicant in the proceeding before the CEC on October 9, 2009.

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[27] Application for Certification, San Joaquin Solar 1 & 2, 08-AFC-12, Section 3, p. 3-18.

[28] Applicant's emission estimate is based on VOC emission factors for heavy liquids for the synthetic organic compound manufacturing industry from the U.S. EPA's "Protocol for Equipment Leaks Emission Estimates." *See*, for example, San Joaquin Solar 1 & 2 Hybrid Project, Supplemental Information to CURE Data Request Set #3, August, 26, 2009, Response to CURE Data Request No. 86. (Attachment K.)

[29] San Joaquin Solar 1&2 Hybrid Project, Supplemental Information in Response to CURE Data Request Set #4, September 23, 2009, Response to Data Request No. 117.

[30] San Joaquin Solar (08-AFC-12), Data Request Workshop Items Response, August 21, 2009, p. 2.

Table 2a: Post-Project Potential to Emit Presented in the PDOC*

Emission source	**NOx** (lb/year)	**SOx** (lb/year)	**PM10** (lb/year)	**PM2.5** (lb/year)	**CO** (lb/year)	**VOC** (lb/year)
Fugitive dust	-	-	231	51	-	-
Biomass combustors	96,212	97,144	182,568	182,568	164,720	27,112
Emergency generators	318	-	10	10	186	22
Firewater pumps	260	-	8	8	150	22
WSACs	-	-	12,376	12,376	-	-
Total	**96,790**	**97,144**	**195,193**	**195,013**	**165,056**	**27,156**
Major source threshold	50,000	140,000	140,000	140,000	200,000	50,000
Major source?	**YES**	**no**	**YES**	**YES****	**no**	**no**

* PDOC, p. 25.

** For a discussion of the major source determination for PM2.5, *see* Comment IV and V.

Table 2b:
Post Project Potential to Emit provided by the Applicant to the CEC on October 9, 2009

Emission source	**NOx** (lb/year)	**SOx** (lb/year)	**PM10** (lb/year)	**PM2.5** (lb/year)	**CO** (lb/year)	**VOC** (lb/year)
Fugitive dust	-	-	180	38	-	-
Biomass combustors	98,060	100,560	201,500	201,500	222,800	34,740
Emergency generators	338	-	10	10	186	52
Firewater pumps	282	-	8	8	150	42
WSACs	-	-	12,380	12,380	-	-
HTF system leaks	-	-	-	-	-	3,400
Total	**98,680**	**100,560**	**214,078**	**213,936**	**223,136**	**38,234**
Major source threshold	50,000	140,000	140,000	140,000	200,000	50,000
Major source?	**YES**	**no**	**YES**	**YES****	**YES**	**no**

* 08-AFC-12, San Joaquin Solar 1 & 2 Hybrid Project, Supplemental Information in Response to CURE Data Request Set #5, October 5, 2009, Response to Data Request #227. Emissions in (lb/year) calculated from (ton/year) x (2,000 lb/ton).

** For a discussion of the major source determination for PM2.5, *see* Comment IV and V.

A comparison of the emission estimates for the individual emission sources shows that the Applicant's revised emission estimates for the biomass combustors are substantially higher for all criteria pollutants than those presented in the PDOC. In addition, the Applicant's revised estimates are higher for NOx and VOC emission from the emergency generators and firewater pumps and somewhat lower for fugitive dust emissions. In addition, the Applicant provided an estimate of fugitive emissions for leaks from the heat transfer fluid circulating system of 3,400 lb/year of VOC which are not included in the PDOC's emissions estimate.

While the PDOC determines that the Project is not a significant source of carbon monoxide ("CO") emissions, the Applicant's revised emission estimates indicate that the maximum annual Post Project Potential to Emit *exceeds the major source threshold of 200,000 lb/year*.

IV. THE PDOC FAILS TO PROVIDE A VALID JUSTIFICATION FOR THE EXCLUSION OF PROJECT EMISSIONS OF CONDENSABLE PM2.5

On May 8, 2008, the U.S. EPA promulgated regulations implementing the New Source Review ("NSR") program for PM2.5 ("PM2.5 Implementation Rule").[31] The PM2.5 Implementation Rule requires that all NSR applicability determinations for PM2.5 and PM10 made after January 1, 2011 address condensable emissions.[32] Importantly, the PM2.5 Implementation Rule provides that although the U.S. EPA is not requiring State NSR programs to address emissions of condensable PM until January 1, 2011, "States that have developed the necessary tools are not precluded from acting to measure and control condensable PM emissions in NSR permit actions prior to the end of the transition period."[33] The PM2.5 Implementation Rule provides further that "to the extent that a State has the supporting technical information and test methods, the State may assess the capabilities of current control technologies, possible modifications to such technologies, or new technologies as appropriate relative to control of condensable PM2.5 emissions."[34] Finally, the PM2.5 Implementation Rule expressly "encourage[s] State to begin *immediately* to identify measures for reducing condensable PM emissions in major NSR permit actions, *particularly where those emissions are expected to represent a significant portion of total PM emissions from a source*."[35]

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[31] 73 Fed. Reg. 28321, 28324.

[32] *Id*. at 28335.

[33] *Id*.

[34] *Id*.

[35] *Id*. (emphasis added).

A. The District's Failure to Include Condensable PM2.5 is Arbitrary

The PDOC gives short shrift to EPA's guidance. While recognizing the existence of the PM2.5 Implementation Rule, it states only that "in determining the PM2.5 emissions only the 'front half' or filterable (not condensable) fraction is considered."[36] The District provides no further explanation for its exclusion of condensable emissions from its determination of the Project's potential to emit or why, consistent with the PM2.5 Implementation Rule, it is *unable* at this time to calculate condensable emissions. What's more, the District then proceeds to *calculate* the Project's filterable PM2.5 emissions as a fraction of total PM2.5 emissions. As a logical extension, the condensable fraction can thus be calculated as total PM2.5 emissions minus condensable PM2.5 emissions.

Based on information contained in the PDOC, the Project will emit more than 50 tons of condensable PM2.5 annually,[37] or more than 50% of total PM2.5 emissions.[38] Even this estimate of PM emissions is too low, as explained in Section V below. While some air districts may have questions regarding the appropriate calculation of condensable PM2.5, the District is clearly not one of them. No rational justification exists for the District's discounting of condensable PM2.5 emissions from its calculation of the Project's potential to emit. Such lax enforcement is unacceptable given that the condensable PM2.5 emissions are in fact expected to represent a significant portion of total PM2.5 emissions, and the Project is a major source for PM2.5 based on PM2.5 total emissions of 195,013 tons/year and the District's major source threshold of 140,000 lb PM2.5/year.[39]

The District's failure to include emissions of condensable PM2.5 is not just arbitrary but short-sighted. On March 25, 2009, the U.S. EPA initiated rulemaking and solicited comments on whether to end the transition period for condensable PM in the NSR program on a date earlier than the current end-date of January 1,

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[36] PDOC, p. 26.

[37] (1 – 0.465) × (195,013 lb PM2.5 total/year) = 104,332 lb PM2.5 condensable/year; 104,332 lb PM2.5 condensable/year / (2,000 lb/ton) = 52.2 tons PM2.5 condensable/year.

[38] PDOC, p. 26.

[39] PDOC, p. 25.

2011.[40] Consequently, the transition period may end before the Project is permitted.

B. The District's Failure to Include Condensable PM2.5 is Inconsistent with the Clean Air Act's Mandate for Expeditious Attainment and the District's 2008 PM2.5 Plan

The District's failure to include condensable emissions of PM2.5 in its calculation of the Project's potential to emit and to require offsets for those emissions contradicts the Clean Air Act's mandate of expeditious attainment. The District was designated a federal non-attainment area for PM2.5 in January of 2005.[41] As such, the Act requires attainment in the District to be achieved "as expeditiously as practicable."[42]

Exclusion of condensable emissions of PM2.5 also contradicts the District's 2008 PM2.5 Plan. The 2008 PM2.5 Plan explains that the District's strategy for attainment is through "achieving the maximum reductions in the most expeditious manner possible."[43] In the 2008 PM2.5 Plan, the District also avowed to rely on the latest advanced technology to achieve necessary reductions in PM2.5.[44]

Supporting technical information and the test methods to assess the capabilities of current control technologies to control condensable PM2.5 emissions exist today, and have been in existence for years. As early as 1988, studies have confirmed the methodology for calculating condensable emissions of PM2.5.[45] Method 202 has been available since 1991.[46] The EPA affirmed this method in 2005, and then again in 2009.[47] Therefore, the District cannot now in good faith claim that it is unable to control condensable emissions of PM2.5.

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[40] 74 Fed. Reg. 12970.

[41] 70 Fed. Reg. 944. 955.

[42] 42 U.S.C. § 7502(a)(2)(A).

[43] 2008 PM2.5 Plan, 4-1.

[44] *Id*.

[45] *See* 74 Fed. Reg. 12973.

[46] 56 Fed. Reg. 65433

[47] 70 Fed. Reg. 66050; 74 Fed. Reg. 12970.

C. The PDOC's Determination of Significance For Project Particulate Matter Emissions Is Inconsistent

Although the PDOC excludes condensable PM2.5, the District's calculation of maximum Post Project Potential to Emit of PM10 includes both filterable and condensable particulate matter. Furthermore, the PDOC provides no justification for its differential treatment of particulate matter of different size ranges.

For the reasons provided, the PDOC should be revised to include emissions of condensable PM2.5.

V. THE PDOC'S ESTIMATE OF FILTERABLE PM2.5 EMISSIONS IS UNRELIABLE

The District calculates filterable PM2.5 emissions as 46.5 percent of total PM2.5 emissions from the Project based on a "source test performed by the manufacturer for a similar boiler as proposed in this project" to demonstrate that the Project would not be a major source for PM2.5.[48] The PDOC's calculations are incorrect and unreliable.

First, the PDOC applies the ratio of filterable to total particulate matter to the total annual Project PM2.5 emissions of 195,013 lb/year regardless of where these emissions originate.[49] Clearly, emissions from biomass, lime or flyash receiving, storage, and handling, the cooling towers, or the diesel-powered generators and firewater pumps will have different ratios of filterable versus total particulate matter than emissions from the biomass combustors.

Second, the PDOC only provides a one-page summary for this manufacturer source test which for some pollutants looks conspicuously more like a spreadsheet calculation than the results of an actual source test. Abated emissions of condensable particulate matter (back-half) appear to have been *calculated based on 80 percent abatement efficiency* rather than being actual measurement results.[50] Thus, the ratio of filterable versus condensable particulate matter is entirely dependent on the assumed percentage abatement efficiency. This suspicion is

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[48] PDOC, p. 26.

[49] *Ibid.*

[50] PDOC, Appendix G, Boiler Source Test Results.

confirmed by reviewing similar summary pages provided by the Applicant for different load conditions.

Third, it is entirely undocumented to what extent this spreadsheet relies on actual emission data obtained at a "similar boiler." Further, emissions were determined for unspecified "waste wood." It is therefore unclear whether these manufacturer-provided emissions are representative of the Project's emissions at 100 percent load and using a fuel that results in the maximum emissions. The PDOC is silent on the applicability of these data for the Project.

Finally, the filterable to total particulate matter ratio measured at any source appears to be rather variable. For example, source tests conducted at the Mendota Biomass Power plant in 2008 and 2009 showed remarkably dissimilar proportions of filterable (front-half) particulate matter to condensable (back-half) particulate matter: in 2008, based on the average of three test runs, the filterable portion of total particulate matter accounted for 76.9 percent of total particulate matter;[51,52] in 2009, based on the average of three test runs, the filterable portion of total particulate matter accounted for 66.2 percent of total particulate matter.[53,54] The variability of filterable versus total particulate matter ratios determined in these source tests demonstrates that the PDOC's approach to determining the filterable portion of PM2.5 based on only one source test is unreliable. Further, the source tests at the Mendota facility resulted in considerably higher ratios of filterable particulate matter than the source test performed by the manufacturer for a similar boiler as proposed for the Project.

VI. THE PDOC UNDERESTIMATES THE MAXIMUM POTENTIAL EMISSIONS OF HAZARDOUS AIR POLLUTANTS FROM THE PROJECT

With respect to HAPs, the PDOC claims that "[a]ny pollutant that may be emitted from the project and is on the federal new source review list and the federal

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[51] Calculated from: (2.56 lb/hr) / [(2.56 lb/hr filterable PM) + (0.001 lb/hr condensable PM)] = 0.769.

[52] Covanta Mendota, 2008 Source Test Report, September 4, 2008, Table 1-1, Summary of Average Results, Particulate Matter Emissions, Biomass-fired Boiler, Covanta Mendota, June 11, 2008.

[53] Calculated from: (4.2 lb/hr filterable PM) / (6.34 lb/hr total PM) = 0.662.

[54] Covanta Mendota, Compliance and CEMS RATA Source Test Report, Cogeneration Unit, August 7, 2009, Table 2-1, p. 2-1.

Clean Air Act list has been evaluated." [55] This is incorrect. The PDOC fails to evaluate emissions of a number of HAPs from the biomass combustor trains and the emission factors used for estimating HAP emissions from the biomass combustors underestimate the maximum potential emission from the Project. The PDOC fails entirely to evaluate the Project's heat transfer fluid system as a source of HAPs.

A. HAP Emissions from Combustor Trains Are Incorrectly Calculated

The Project would contain four 20-MW biomass combustor trains (two per facility), each consisting of one biomass-fired bubbling fluidized bed combustor with one 15 MMBtu/hr and three 50 MMBtu/hr natural gas-fired startup burners for a total of four biomass-fired combustors and 16 natural gas-fired startup burners.[56] The PDOC presents emissions estimates for 29 HAPs for each biomass combustor and for 11 HAPs for the four natural gas burners associated with each biomass combustor based on information supplied by the Applicant.[57] The Applicant cites the equipment vendor, Energy Products of Idaho ("EPI"), and the District as sources for the HAP emission factors for the biomass combustors. The emission factors for hydrogen chloride and ammonia were supplied by EPI; all other emission factors were supplied by the District based on source tests conducted at another biomass facility within the District's boundaries, Mendota Biomass Power ("Mendota HAP Source Tests").[58] For the natural gas-fired startup burners, the Applicant relies on emission factors published by the Ventura County Air Pollution Control District.[59] A comparison of the Applicant's information, the Mendota source tests and the information contained in the PDOC reveal discrepancies, omissions, and incorrectly calculated emissions.

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[55] PDOC, p. 48.

[56] PDOC, pp. 3-5.

[57] PDOC, p. 49.

[58] *See*, for example, Application for Certification, San Joaquin Solar 1 & 2, 08-AFC-12, Section 5.16, pp. 5.16-8 – 5.16-10.

[59] *See*, for example, Application for Certification, San Joaquin Solar 1 & 2, 08-AFC-12, Section 5.16, pp. 5.16-11 – 5.16-12.

1. Biomass Combustors

The PDOC presents maximum hourly and maximum annual HAP emissions for the Project's biomass combustors of 2.1 lb/hr and 13,674 lb/year, respectively, based on 75 percent capacity and 310.57 MMBtu/hr full load operation.[60] However, the information supplied by the Applicant shows that the PDOC appears to have mislabeled several HAPs: emissions shown for toluene are actually for mercury; emissions shown for naphthalene are actually for toluene; and emissions shown for PAHs are actually for naphthalene.

Further, the PDOC failed to quantify a number of HAPs for which the Mendota source tests determined emission factors. These include:

- acenaphthene (CAS 83329);
- acenaphthylene (CAS 208968);
- anthracene (CAS120127);
- benzo[g,h,i]perylene (CAS 191242);
- chromium (CAS 7440473);
- fluoranthene (CAS 206440);
- fluorene (CAS 86737);
- 2-methyl-naphthalene (CAS 91576);
- phenanthrene (CAS 85018);
- pyrene (129000);
- xylenes (CAS 1330207); and
- zinc (CAS 7440666).

The above HAPs are listed as pollutants for which emissions must be quantified under the California Air Toxics Hot Spots Program.[61] Of these pollutants, xylenes and zinc *must* be included in a health risk assessment.[62] Acenaphthene, acenaphthylene, anthracene, benzo[g,h,i]perylene, fluoranthene, fluorene, 2-methyl-naphthalene, phenanthrene, and pyrene, and xylenes are "polycyclic aromatic matter compounds with more than one benzene ring and which

[60] PDOC, p. 49.

[61] Office of Environmental Health Hazard Assessment, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, August 2003, p. 4-4 and Appendix A-I: Substances for which Emissions Must Be Quantified.

[62] Office of Environmental Health Hazard Assessment, Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, updated February 9, 2009.

have a boiling point greater than or equal to 100°C (212 F)" for purposes of the federal Clean Air Act Section 112(b)(1).

Finally, the Mendota source tests appear not to have tested for styrene and vinyl chloride, which are listed by the U.S. EPA as HAPs emitted from wood residue-fired boilers.[63] These compounds must be quantified and included in a health risk assessment for Project HAP emissions.

2. Startup Combustors

The PDOC's emission estimate for total Project HAP emissions from the startup combustor trains is underestimated by a factor of two. The PDOC presents maximum hourly and maximum annual HAP emissions for the Project's startup combustors of 1.33E-2 lb/hr and 0.13 lb/year, respectively, per combustor train.[64] The PDOC then calculates total Project HAPs based on two combustor trains.[65] However, the Project will contain *four* combustor trains, one for each of the four fluidized bed boilers.

B. Mendota Source Tests Are Not Representative of Maximum Project HAP Emissions

The PDOC does not include a copy or description of the Mendota HAP Source Tests, nor does it discuss whether the emission factors determined at the Mendota Biomass Power facility are representative for the Project. We obtained a copy of the 1997 Mendota HAP Source Tests from the District[66] and determined that the emission rates determined for the Mendota Biomass Power facility are not representative of the Project's maximum daily and annual potential to emit.

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[63] U.S. Environmental Protection Agency, External Combustion Sources, 1.6 Wood Residue Combustion in Boilers, September 2003, Table 1.6-3.

[64] PDOC, p. 49.

[65] PDOC, p. 50.

[66] Parsons Engineering Science, Inc., Report of Air Pollution Source Testing, Biomass Fuel Fired Steam Generating Plant, Mendota Biomass Power, Ltd., California, Conducted on May 13-14, 1997, November 25, 1997.

The Project would burn agricultural wood wastes and municipal green wastes.[67] Due to their dissimilar composition and moisture content, agricultural wood wastes and municipal solid green wastes result in dissimilar emissions of HAPs. The Mendota HAP Source Tests were conducted with a 50/50 blend of "agricultural biomass fuel" and "on-hand urban wood fuel."[68] Thus, the emission rates are only representative for burning a 50/50 mix of these fuels. Analogous to criteria pollutant emissions, HAP emissions must be determined for the Project's maximum potential to emit to determine the maximum daily and annual Project Potential to Emit. (*See* Comment II.)

C. The PDOC Fails to Assess and Control HAP Emissions from Combustion and Demolition Wood

The Applicant indicated that the municipal green waste fraction of the biomass fuel used for the Project may contain C&D wood.[69] The PDOC does not include a condition that limits Applicant from using C&D wood. Therefore, it is highly likely that the Project will combust C&D wood.

Construction waste originates from construction, repair, or remodeling of residential, commercial, and industrial buildings and typically consists of a variety of building products such as roofing, gypsum wallboard, and wood products. Construction waste wood typically consist of wood scraps from dimensional lumber, siding, laminates, flooring (potentially stained), laminated beams, and moldings (potentially painted). Demolition waste originates from the destruction of buildings or other structures. Typical constituents include aggregate, concrete, wood, paper, metal, insulation, glass, and other building materials, which are frequently contaminated with paints, including lead paints.

As a result, C&D wood waste may be contaminated with a variety of hazardous chemicals including heavy metals such as copper, chromium, arsenic, cadmium, lead, mercury, zinc, and beryllium, and organic contaminants such as creosote, pentachlorophenol, dioxin, polychlorinated biphenyls, polycyclic aromatic

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[67] PDOC, p. 3.

[68] Mendota HAP Source Tests, Section 3.3.2.

[69] 08-AFC-12, San Joaquin Solar 1 & 2 Hybrid Project, Supplemental Information in Response to CURE Data Request Set #3, August 26, 2009, Response to Data Request #44. (Attachment K.)

hydrocarbons, solvents, and volatile organic compounds.[70] Incineration results in volatilization of metals during combustion and accumulation of metals in ash, which may result in health and environmental impacts.[71]

A critical element in minimizing air emissions, especially toxic air contaminants, is the elimination of copper-chromium-arsenic ("CCA")-treated and pentachlorophenol-treated ("penta-treated") wood and the minimization of painted wood and fines in the C&D wood waste.[72] CCA is a major arsenic-based treatment chemical used to preserve wood. Although in the U.S. it is no longer used for residential uses, it is still used in industrial applications. Wood preservatives, especially CCA, accounted for most of the arsenic consumption in the U.S. until about 2004. As a result, a large quantity of arsenic-treated wood is currently in use and is present in significant amounts in C&D waste. Its presence in the disposal sector is predicted to increase heavily in the near future.

The separation of wood products from C&D debris for beneficial uses depends on the type and origin of the debris. Typically, construction debris is more easily separated than demolition debris. No statewide standards for the content of C&D waste exist and most waste management firms rely on their own standards and specifications to remove the majority of the contaminants and non-burnables from the C&D waste. Limited test data from one facility indicate that concentrations of arsenic and dioxin are doubled and quadrupled, respectively, when burning 50 percent C&D wood compared to burning only forest biomass.[73]

Due to concerns regarding the release of hazardous substances, several states have restricted or banned the use of C&D wood waste as fuel for biomass plants and

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[70] Ellen Moyer, Ph.D., P.E., Should Construction and Demolition Wood Be Burned? An Evaluation of NESCAUM's May 2006 Report, December 20, 2007; http://www.mass.gov/Eoeea/docs/doer/gca/aps/apsmoyer.pdf.

[71] Florida Center for Solid and Hazardous Waste Management, Final Report of Evaluation of Thermal Processes for CCA Wood Disposal in Existing Facilities, May 15, 2006; http://combustcca.ees.ufl.edu/FCSHWM%20Report-CCA%20Thermal%20Processes.pdf.

[72] Ellen Moyer, Ph.D., P.E., Should Construction and Demolition Wood Be Burned? An Evaluation of NESCAUM's May 2006 Report, December 20, 2007; http://www.mass.gov/Eoeea/docs/doer/gca/aps/apsmoyer.pdf, accessed November 9, 2009.

[73] Ellen Moyer, Should Construction and Demolition Wood Be Burned? An Evaluation of NESCAUM's May 2006 Report, December 20, 2007, p. 23; http://www.mass.gov/Eoeea/docs/doer/gca/aps/apsmoyer.pdf, accessed November 6, 2009.

other purposes. For example, New Hampshire has banned the use of C&D debris regardless of whether it is clean, unadulterated waste from construction sites or pressure-treated and painted wood, for example, from demolition activities. The State of Massachusetts has implemented a moratorium on use of C&D waste. The City of Portland, Oregon, prohibits any use, including combustion, of painted or pressure-treated woods except in "incidental" quantities.[74] The Maine Department of Environmental Protection has published detailed specifications limiting the permissible fraction of non-combustible materials, plastics, CCA-treated wood, fines, and asbestos in C&D wood waste and specifying fuel quality standards for arsenic, lead, and PCBs in blended biomass fuel.[75] The open burning of C&D waste also happens to be banned in the San Joaquin Valley Air District.[76]

At a minimum, the PDOC must identify and analyze HAP emissions from the combustion of C&D waste because it appears that the Applicant does not intend to segregate C&D waste prior to incineration. Because the incineration of C&D waste may significantly increase HAP emissions, the PDOC must require Applicant to segregate C&D waste and to employ the maximum available control technology ("MACT") to control these emissions.

D. The PDOC Fails to Assess HAP Emissions from Pre-Separated Paper or Cardboard

The Applicant indicated that the municipal green waste fraction of the biomass fuel used for the Project may contain pre-separated paper or cardboard.[77] The Applicant stated that it would not accept a condition of certification prohibiting the use of pre-separated paper and cardboard as fuel.[78] HAP emission rates from pre-separated paper and cardboard may be higher than those determined during

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[74] Ron Kotrba, The Politics of 'Dirty' Wood, Biomass Magazine, April 2009; http://www.biomassmagazine.com/article.jsp?article_id=2539&q=&page=all, accessed November 9, 2009.

[75] Maine Department of Environmental Protection, Maine Solid Waste Management Rules: Chapter 418, Beneficial Use of Solid Wastes, June 16, 2006, pp. 13-14.

[76] District Rule 4103 § 5.1.

[77] 08-AFC-12, San Joaquin Solar 1 & 2 Hybrid Project, Supplemental Information in Response to CURE Data Request Set #5, October 5, 2009, Response to Data Request #219. (Attachment I.)

[78] 08-AFC-12, San Joaquin Solar 1 & 2 Hybrid Project, Supplemental Information in Response to CURE Data Request Set #5, October 5, 2009, Response to Data Request #220.

the 1997 Mendota HAP Source Tests. The PDOC must identify and analyze HAP emissions from the incineration of pre-separated paper and cardboard, and require the Applicant to employ MACT to control these emissions.

E. Fugitive HAP Emissions from Agricultural Waste

In 2003, the Governor approved prohibitions on the open-burning of certain agricultural waste materials in the San Joaquin Valley in an effort to reduce the emissions of PM2.5 and PM10 in the San Joaquin Valley air basin.[79] The prohibitions are set forth in California Health & Safety Code sections 41855.5 and 41855.6, and allow the District to adopt a graduated ban on open burning based on the economic feasibility of banning the burning of a particular type of agricultural waste. District Rule 4103 implements these prohibitions.[80]

Rule 4103 currently prohibits the open burning of diseased crops, field crops, particular tree prunings, and certain weeds.[81] The District is now in Phase IV of the implementation of the State prohibition of open-burning. As such, Rule 4103 will be revised to ban the open burning of a broader range of agricultural waste. The Applicant has indicated its intent to rely on these newly diverted fuel sources.[82] The definition of "agricultural waste," as proposed by the Preliminary Draft Staff Report for a revision of Rule 4103, contains a number of unexpected materials including brooder paper, deceased goats, diseased bee hives (made of wood and plastic), pesticide and fertilizer sacks, and raisin trays (containing five percent polymer).[83] Burning of these materials as part of the agricultural waste received at the Project could result in higher HAP emissions than determined during the 1997 Mendota HAP Source Tests.

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[79] *See* Cal. Health & Saf. Code §§ 41850-41855.6; San Joaquin Valley Air Pollution Control District Preliminary Draft Staff Report Amendments to Rule 4103 (Open Burning), Sep. 8, 2009, pp. 1-2.

[80] District Rule 4103 § 5.5.

[81] District Rule 4103 § 5.5.1.

[82] San Joaquin Valley Air Pollution Control District, Determination of Compliance Evaluation, San Joaquin Solar 1 & 2, California Energy Commission, Application for Certification Docket #: 08-AFC-12, p. 3-6.

[83] San Joaquin Valley Air Pollution Control District, Preliminary Draft Staff Report: Rule 4103, September 8, 2009, pp. 21, 24, and A-2.

Because the Project has the potential to emit HAPs from the burning of "agricultural waste," as defined by Rule 4103, and the Applicant plans to rely on agricultural waste to meet its fuel needs, the PDOC must identify and analyze HAP emissions from the incineration of these materials. The PDOC must also require the Applicant to employ MACT to control these emissions.

F. Fugitive HAP Emissions from Heat Transfer Fluid System

The Project includes a heat transfer fluid ("HTF") circulation loop system designed to transfer energy from the solar field to the power block at each plant. Each heat transfer system (one per plant) would contain 185,000 gallons of Therminol® VP1 as the HTF in a circulating loop.[84] Therminol® VP1 is classified as a hazardous flammable liquid and consists of 73.5 percent diphenyl ether (CAS No. 101-84-8) and 26.5 percent biphenyl (CAS No. 92-52-4).[85] Biphenyl is listed as one of the original HAPs by the U.S. EPA[86] and must therefore be accounted for in the Project's HAP emission estimates. However, the PDOC fails to account for biphenyl emissions from the Project's HTF systems.[87]

VII. THE PDOC'S HEALTH RISK ASSESSMENT AND AMBIENT AIR QUALITY MODELING RELY ON OUTDATED EMISSION ESTIMATES

The PDOC provides a summary of the results of a health risk assessment and ambient air quality modeling dated June 8, 2009 in Appendix F. The District provided the modeling files to CURE on November 17, 2009, less than a week before comments were due. This time frame was too short to fully review the District's modeling.

However, a cursory review of the modeling files shows that the health risk assessment and ambient air quality modeling do not rely on the Applicant's most

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[84] Application for Certification, San Joaquin Solar 1 & 2, 08-AFC-12, Section 3, p. 3-18.

[85] Solutia, Inc., Material Safety Data Sheet, Therminol® VP1 Heat Transfer Fluid, version 5.3E, May 16, 2009.

[86] Clean Air Act Section 112(b)(1).

[87] *See* PDOC, pp. 48-50.

recent emission estimates that the Applicant provided to the CEC on October 9, 2009. Thus, the results of the health risk assessment and ambient air quality modeling are not applicable to the Project, as currently proposed. Moreover, the District's conclusions regarding significance of health risks and potential exceedances of ambient air quality standards are not applicable to the Project, as currently proposed.

VIII. THE PDOC FAILS TO PROVIDE A CASE-BY-CASE MAXIMUM ACHIEVABLE TECHNOLOGY DETERMINATION

Section 112(g)(a)(B) of the Clean Air Act provides that,

> [N]o person may construct or reconstruct any major source of hazardous air pollutants, unless the Administrator (or the State) determines that the maximum achievable control technology emission limitation under this section for new sources will be met. Such determination shall be made on a case-by-case basis where no applicable emission limitations have been established by the Administrator.[88]

When a case-by-case MACT determination is required, the owner or operator must obtain from the permitting authority an approved MACT determination.[89]

District Rule 2550, Federally Mandated Preconstruction Review for Major Sources of Air Toxics, implements the preconstruction review requirements of 40 C.F.R. Part 63.40 through 63.44.[90] It provides that "no person shall construct a new major air toxics source[91] at any undeveloped site unless TBACT [Toxic Best Available Control Technology, a.k.a. MACT] is applied.[92] It further provides that,

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[88] 42 U.S.C. § 7412(g)(2)(B).

[89] 40 C.F.R. § 63.43(b).

[90] District Rule 2550, §1.

[91] A "major air toxics source" is defined by Rule 2520 as "a stationary source that emits or has the potential to emit, including fugitive emissions, 10 tons per year or more of a hazardous air pollutant, or 25 tons per year or more, including fugitive emissions, of a combination of hazardous air pollutants "; *see* District Rule 2550 §3.3.

[92] *Id*. §§ 3.0, 5.0-5.1.

"a preliminary written decision to approve an Authority to Construct for construction or reconstruction of a major air toxic source issued pursuant to Rule 2201 NSR, shall serve as an Initial Notice of MACT approval.[93] An Authority to Construct for a newly constructed major air toxic source issued pursuant to Rule 2201 shall include all conditions necessary to assure compliance with the requirements of Rule 2550 and TBACT.[94]

The PDOC's analysis of the Project's compliance with District Rule 2550 is laconic. It states:

> Emissions of each individual HAP are below 10 tons per year but total HAP emissions are above 25 tons per year. Therefore, SJS will be a major air toxics source and the provisions of this rule [Rule 2550] apply. The facility's emissions also exceed the major source thresholds of District Rule 2201, therefore, this facility is a major source. Per Rule 2520 Section 5.1, the facility will have up to 12 months from the date of ATC issuance to either submit a Title V Application or comply with District Rule 2530 *Federally Enforceable Potential to Emit*. The applicant will be in compliance with Rule 2550 with the submittal of the Title V Application.[95]

Thus, the PDOC fails to provide the appropriate MACT standards for the Project. Instead, it postpones its review and approval of MACT for the Project. As such, the PDOC grants preliminary approval of a MACT determination that has yet to be performed.[96] The MACT standard that would apply to the Project is found at 40 C.F.R. Part 63, Subpart DDDDD, National Emission Standards for Hazardous Air Pollutants: Industrial, Commercial and Institutional Boilers and Process Heaters under ("Boiler MACT"). However, due to a recent legal challenge, the Boiler MACT has been vacated.[97] Therefore, because the U.S. EPA has not yet promulgated a new MACT standard for this source category, the District is required

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[93] District Rule 2550, § 6.2.

[94] *Id*. at § 6.3.

[95] PDOC, pp.50-51.

[96] *See* District Rule 2550, § 6.2.

[97] *See Natural Resources Defense Council et al. v. Environmental Protection Agency* (D.C. Cir. 2007) 489 F.3d 1250.

to make a case-by-case MACT determination, consistent with section 112(g)(2)(B) of the Clean Air Act.

The District's failure to include a case-by-case MACT analysis in the PDOC violates federal requirements for public notice and comment. Specifically, 40 C.F.R. § 63.43 requires the District to give the public 30 days to comment on the Initial Notice of MACT Approval, defined by section 6 of Rule 2550 as the preliminary written decision to approve an Authority to Construct.[98] In this way, the District failed to ensure that the Authority to Construct will, in fact, contain "all conditions necessary to assure compliance with the requirements of Rule 2550 and TBACT." [99]

A case-by-case MACT determination requires the District to conduct a complex analysis of maximum achievable control technologies and standards. Specifically, the MACT determination should be no less stringent than the emission control which is achieved in practice by the best controlled similar source; the MACT emission limitation must achieve the maximum degree of reduction in emissions of HAP which can be achieved by utilizing available control technologies, taking into consideration their cost; design, equipment, work practice or operational standards to be used if the maximum reductions are not feasible; and a consideration of relevant emission standards proposed by the Administrator under section Clean Air Act section 112(d) or (h).[100] The MACT emission limitation and requirements established shall be effective the date that the District serves Notice of Final Action pursuant to District Rule 2201.[101]

To satisfy the requirements of Clean Air Act 112(g), the District must conduct a MACT determination specifying the control technologies that, if properly operated and maintained, will permit the Project to meet the MACT emission limitations or standards determined according to the principles set forth in 40 C.F.R. 63.43(d). The District must revise the PDOC to include its proposed MACT determination, and the public must be given an opportunity to comment on these determinations consistent with 40 C.F.R. § 63.43(h).

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[98] 40 C.F.R. §§ 63.43(f)(6), 63.43(g), 63.43(h).

[99] *Id*. at § 6.3.

[100] 40 C.F.R. § 63.43(d).

[101] 40 C.F.R. § 63.43(c)(j); District Rule 2550 § 6.2.

IX. THE PDOC FAILS TO PROVIDE AN ADEQUATE OFFSET ANALYSIS

The Project requires offsets for NOx, SOx, PM10, and VOCs.[102] Therefore, the PDOC correctly observes that offset calculations will be required for this Project.[103] However, the PDOC then provides the following, incomprehensible statement:

> The applicant has identified a pool of ERCs for use in this project since the District is currently evaluating offset exemption for biomass facilities that burn agricultural wastes as part of a revised Rule 4103.[104]

This statement is problematic not only for its impenetrable logic, but also because it suggests that the Project may rely on offsets that do not yet exist and have not been approved by the U.S. EPA as part of the California State Implementation Plan ("SIP").

The Clean Air Act defines a valid offset as one that is *in effect*, *enforceable* and shall *assure* that the total tonnage of increased emissions of the air pollutant from the new or modified source shall be offset by an equal or greater reduction by the time the Project is permitted.[105] The Clean Air Act mandates that adequate emission offsets be identified and federally enforceable before a state may issue any construction permit to a new major source in an area designated as nonattainment for NAAQs. Section 173(a)(1) of the Act authorizes states to issue new source permits only where the permitting agency determines that:

> [B]y the time the source is to commence operation, sufficient offsetting emissions reductions have been obtained, such that total allowable emissions from existing sources in the region, from new or modified sources which are not major emitting facilities, and from the proposed source will be sufficiently less than total emissions from existing sources[.][106]

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[102] PDOC, p. 32.

[103] *Id.*

[104] *Id.*

[105] 42 U.S.C. § 7503(c)(1).

[106] 42 U.S.C. § 7503(a)(1)(A); *see also* § 7503(c)(1).

Subdivision (a) goes on to clarify this requirement as follows:

> Any emission reductions required as a precondition of the issuance of a permit under paragraph (1) shall be federally enforceable *before such permit may be issued.*[107]

In the years since the 1990 Amendments, U.S. EPA has repeatedly affirmed, in regulations and guidance documents, that sufficient offsets must be both identified and enforceable prior to permit issuance. In a 1994 U.S. EPA Memorandum, the U.S. EPA Director wrote, "offsets must be federally enforceable *before a permit to construct and operate may be issued*, although the offsetting emissions reductions need not be achieved until the permitted source commences operation."[108] Consistent with this, District Rule 2201 requires that offsets be "real, enforceable, quantifiable, surplus, and permanent."[109]

Any offsets stemming from a proposed revision to the District's New Source Review rules are by definition unenforceable. In order to be approved as part of the State Implementation Plan ("SIP"), the District must first formally adopt a rule after an opportunity for public comment.[110] Then, and only after the rule has been approved by the U.S. EPA, would it be incorporated into the SIP and identified in 40 C.F.R. Part 52.[111] The District has not even disclosed its proposal for a potential biomass offset exemption. Therefore, any offsets issuing from a potential revision to the District's New Source Review rules are invalid and may not be relied upon by the Applicant. The PDOC should be revised to strike any reference to a potential offset exemption as extraneous to this Project.

---

[107] 42 U.S.C. § 7503(a)(5) (emphasis added).

[108] Memorandum from John S. Seitz, Director, EPA Office of Air Quality Planning and Standards, to all Regional Air Division Directors, Subject: "Offsets Required Prior to Permit Issuance," June 14, 1994.)

[109] District Rule 2201 § 3.2.1.

[110] 42 U.S.C. §7410(a)(2)

[111] *See* 42 U.S.C. §7410(k).

X. CONCLUSION

In order to ensure that the Project actually complies with all of the requirements of a draft Authority to Construct permit, the District must issue a new, revised PDOC to address the numerous errors and omissions identified by CURE.

Thank you for the opportunity to comment on the PDOC. Please feel free to call if you have any questions about these comments.

Sincerely,

/s/

Tanya A. Gulesserian

TAG:bh
Attachments
cc: CEC Docket 08-AFC-12
Service List 08-AFC-12

ATTACHMENT A

ADAMS BROADWELL JOSEPH & CARDOZO
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
601 GATEWAY BOULEVARD, SUITE 1000
SOUTH SAN FRANCISCO, CA 94080-7037

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SACRAMENTO OFFICE
520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4715
TEL: (916) 444-6201
FAX: (916) 444-6209

DANIEL L. CARDOZO
THOMAS A. ENSLOW
TANYA A. GULESSERIAN
MARC D. JOSEPH
ELIZABETH KLEBANER
RACHAEL E. KOSS
LOULENA A. MILES
ROBYN C. PURCHIA

OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL
GLORIA D. SMITH

November 5, 2009

BY FACSIMILE AND OVERNIGHT MAIL—
FOR IMMEDIATE DELIVERY

Seyed Sadredin
Air Pollution Control Officer
San Joaquin Unified Valley Air Pollution Control District
1990 E. Gettysburg Ave.
Fresno, CA 93726-0244
Fax: (559) 230-6061

Jim Swaney
Permit Services Manager –Northern Region
San Joaquin Unified Valley Air Pollution Control District
Central Region
1990 E. Gettysburg Ave.
Fresno, CA 93726
Fax: (559) 230-6061

David Warner
Director of Permit Services
San Joaquin Valley Unified Air Pollution Control District
Central Region
1990 E. Gettysburg Ave.
Fresno, CA 93726
Fax: (559) 230-6061

Re: Failure to Provide Documents – Preliminary Determination of Compliance for the San Joaquin Solar 1 & 2 Facility (Air District Project No. C01090203; California Energy Commission Docket No. 08-AFC-12) – Request for Extension of Comment Period

Dear Seyed Sadredin, Jim Swaney and David Warner:

We are writing on behalf of the California Unions for Reliable Energy ("CURE") to request that the San Joaquin Valley Air Pollution Control District ("Air District") extend the comment period on the Preliminary Determination of Compliance ("PDOC") for the San Joaquin Solar 1 and 2 Facility ("Project"). This request should be granted because the Air District failed to make available the supporting documentation for the PDOC as required by Air District Rule 2201 and to respond to CURE's request for public records as required by Air District Rule 1031. We therefore request an extension of the comment period for thirty days following the date that the Air District provides the requested documents.

Section 5.4 of Air District Rule 2201 requires the Air District to provide public notice and an opportunity for public comment on a preliminary decision regarding a new major stationary source. The Project is a new major stationary source within the meaning of Rule 2201, and therefore subject to the public notice and comment procedure set forth in section 5 of Rule 2201.[1] Section 5.5.4 of Air District Rule 2201 requires that *no later* than the time that the notice of the preliminary decision is published, the Air District shall make available for public inspection "the information submitted by the applicant and the analysis."[2] As such, the Air District is *required* to make information and analysis submitted by the applicant publicly available for the full 30-day comment period.[3]

On October 14, 2009, the Air District published a notice of availability of the PDOC.[4] The following Monday, on October 19, 2009, CURE submitted two Public Records Act requests for information and analyses used by the Air District in its analysis for the PDOC. Specifically, CURE requested air modeling data and vendor information submitted and relied upon by the Project applicant and relied upon by the PDOC. (Exhibit 1.) CURE also requested information regarding the Mendota Biomass Power Plant facility, because the Air District's analysis of toxic air contaminant emissions relies on the emission factors from that facility. (Exhibit 2.) The Air District finally sent some documents responsive to our request at 4:15 pm on November 5, 2009, even though only eight days remain of the 30-day comment period for the Project. Moreover, based on our review of the documents, the District failed to provide the RFP and vendor guarantees, the air quality modeling files

---

[1] *See* Preliminary Determination of Compliance San Joaquin Solar 1 & 2 Facility ("PDOC"), p. 25.
[2] San Joaquin Unified Valley Air Pollution Control District Rule 2201 § 5.5.4 (emphasis added).
[3] *See id.* at § 5.5.1.
[4] Public Notice # 7011 Preliminary Determination of Compliance, Fresno Bee Online, Oct. 14, 2009, at Classifieds.

(specifically AERMOD input/output files and met data), the HRA input files, and any of the Mendota files.

The Air District's failure to provide information and analysis submitted by the Project applicant is in violation of Rule 2201. Rule 2201 clearly provides that, in addition to the notice and the preliminary determination, the information and the analyses submitted by the applicant must be made available to the public no later than the date of public notice of the Air District's preliminary determination. As such, this information should have been made available no later than October 14, 2009.

The Air District's failure to provide the requested information also violates Air District Rule 1031 which sets forth the procedures for responding to public records requests. Specifically, Rule 1031 provides that public records must be made available within ten working days of a request unless good cause exists for a delay.[5] If good cause exists, the Air District must notify the requesting party of the reason and state when the information will be made available.[6] The Air District failed to comply with these requirements.

The Air District acknowledged receipt of our requests on October 21, 2009 but never contacted CURE as required by Rule 1031. (Exhibit 3.) We called the District on October 29, 2009 and left a voicemail. We received no response. On November 4, 2009, twelve working days after our request, we sent an email to the Air District asking when the requested documents would be made available. (Exhibit 4.) That same day we received an email response from the Air District notifying us that our email had been forwarded to Mr. Jim Swaney who would be out of the office until the following today. (Exhibit 5.) The Air District finally sent some documents responsive to our request at 4:15 pm on November 5, 2009. The Air District's failure to timely respond or to provide good cause for the delay violates Rule 1031.

The Air District Rules plainly require that the public be given the opportunity to inspect and comment on the information and analyses supporting an applicant's request for a preliminary determination of compliance. Rule 2201 states that this information must be made available for, at least, the duration of the 30-day comment period. Moreover, the Air District's general rules for public records

---

[5] San Joaquin Unified Valley Air Pollution Control District Rule 1031 § 3.
[6] *Id.*

requests require that all public information be made available within ten working days absent good cause for delay. To date, the Air District has failed to comply with the procedures set forth in Rules 2201 and 1031 by failing to provide the requested information in a timely manner.

To comply with Rule 2201, the Air District must extend the public comment period until at least thirty days following the date that the Air District provides us with the responsive documentation. We request that the documents responsive to our October 19, 2009 requests be sent to us via email or overnight mail using our UPS number 81A0v2.

In addition, we request that the Air District provide, by the end of business day tomorrow, a written extension of the public review period for the PDOC.

Please call me at (650) 589-1660 if you have any questions. Thank you for your assistance with this matter.

Sincerely,

Elizabeth Klebaner

EK:bh
Attachments

EXHIBIT 1

ADAMS BROADWELL JOSEPH & CARDOZO
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
601 GATEWAY BOULEVARD, SUITE 1000
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FAX: (916) 444-6209

DANIEL L. CARDOZO
THOMAS A. ENSLOW
TANYA A. GULESSERIAN
MARC D. JOSEPH
ELIZABETH KLEBANER
RACHAEL E. KOSS
LOULENA A. MILES
ROBYN C. PURCHIA

OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL
GLORIA D. SMITH

October 19, 2009

VIA FACSIMILE AND U.S. MAIL

Ms. Diane Falcon
San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Ave.
Fresno, CA 93726
Fax: (559) 230-6061

Re: Public Records Act Request – San Joaquin Solar 1&2 Hybrid Solar Field and Biomass Facility (Project Number C-1090203)

Dear Ms. Falcon:

We are writing on behalf of California Unions for Reliable Energy to request copies of the following documents relating to the San Joaquin Solar 1 & 2 Hybrid Field and Biomass Facility, Project Number C-1090203:

1. Applicant San Joaquin Solar 1&2 (SJS)'s Request for Proposal;

2. Any and all vendor proposals;

3. Any and all guarantees of baghouse performance;

4. All health risk assessment modeling data supporting the District's analysis in the Preliminary Determination of Compliance, issued on October 8, 2009; and

5. All air quality modeling data supporting the District's analysis in the Preliminary Determination of Compliance, issued on October 8, 2009.

This request is made pursuant to the California Public Records Act. (Government Code §§ 6250, et seq.) This request is also made pursuant to Article I, section 3(b) of the California Constitution, which provides a Constitutional right of

access to information concerning the conduct of government. Article I, section 3(b) provides that any statutory right to information shall be broadly construed to provide the greatest access to government information and further requires that any statute that limits the right of access to information shall be narrowly construed.

Please forward the copied materials responsive to our request to the following address:

Janet Laurain
Environmental Paralegal
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Please call me at (650) 589-1660 if you have any questions. Thank you for your assistance with this matter.

Sincerely,

Janet Laurain
Environmental Paralegal

JML:bh

MESSAGE CONFIRMATION

OCT-19-2009 04:11 PM MON

FAX NUMBER : 16505895062
NAME : ADAMS BROADWELL JOSE

NAME/NUMBER : 15592306061-2303
PAGE : 3
START TIME : OCT-19-2009 04:10PM MON
ELAPSED TIME : 00'26"
MODE : STD ECM
RESULTS : [O.K]

ADAMS BROADWELL JOSEPH & CARDOZO

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TO:	Diane Falcon	**FAX NO:**	(559) 230-6061
FROM:	Janet M. Laurain	**DATE:**	October 19, 2009

ENCLOSURE:

PAGES, including cover: 3

---

601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080-7037
Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: jlaurain@adamsbroadwell.com

ADAMS BROADWELL JOSEPH & CARDOZO

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FROM:	Janet M. Laurain	**DATE:**	October 19, 2009

ENCLOSURE:

PAGES, including cover: 3

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EXHIBIT 2

ADAMS BROADWELL JOSEPH & CARDOZO
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RACHAEL E. KOSS
LOULENA A. MILES
ROBYN C. PURCHIA

OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL
GLORIA D. SMITH

October 19, 2009

VIA FACSIMILE AND U.S. MAIL

Ms. Diane Falcon
San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Ave.
Fresno, CA 93726
Fax: (559) 230-6061

Re: Public Records Act Request – Mendota Biomass Power Plant (a.k.a. Spinnaker Steamcycle-004-C)

Dear Ms. Falcon:

We are writing on behalf of California Unions for Reliable Energy to request copies of the following documents regarding the Mendota Power Plant (also known as Spinnaker—Steamcycle-004-C), located at 400 Guillen Parkway, Mendota, California 93640:

1. Any and all air permit(s) issued by the San Joaquin Valley Air Pollution Control District (District);

2. District-issued engineering evaluations or a final determination of compliance; and

3. The two most recent boiler source tests for toxic air contaminant emissions and criteria pollutant emissions.

This request is made pursuant to the California Public Records Act. (Government Code §§ 6250, et seq.) This request is also made pursuant to Article I, section 3(b) of the California Constitution, which provides a Constitutional right of access to information concerning the conduct of government. Article I, section 3(b) provides that any statutory right to information shall be broadly construed to provide the greatest access to government information and further requires that

any statute that limits the right of access to information shall be narrowly construed.

Please forward the copied materials responsive to our request to the following address:

Janet Laurain
Environmental Paralegal
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Please call me at (650) 589-1660 if you have any questions. Thank you for your assistance with this matter.

Sincerely,

Janet Laurain

Janet Laurain
Environmental Paralegal

JML:bh

MESSAGE CONFIRMATION

OCT-19-2009 04:12 PM MON

FAX NUMBER : 16505895062
NAME : ADAMS BROADWELL JOSE

NAME/NUMBER : 15592306061-2303
PAGE : 3
START TIME : OCT-19-2009 04:11PM MON
ELAPSED TIME : 00'30"
MODE : STD ECM
RESULTS : [O.K]

ADAMS BROADWELL JOSEPH & CARDOZO

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TO:	Diane Falcon	**FAX NO:**	(559) 230-6061
FROM:	Janet M. Laurain	**DATE:**	October 19, 2009

ENCLOSURE:

PAGES, including cover: 3

---

601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080-7037
Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: jlaurain@adamsbroadwell.com

ADAMS BROADWELL JOSEPH & CARDOZO

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TO:	Diane Falcon	**FAX NO:**	(559) 230-6061
FROM:	Janet M. Laurain	**DATE:**	October 19, 2009

ENCLOSURE:

PAGES, including cover: 3

601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080-7037
Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: jlaurain@adamsbroadwell.com

EXHIBIT 3

Janet M. Laurain

From: Noemi Walther [Noemi.Walther@valleyair.org]
Sent: Wednesday, October 21, 2009 9:32 AM
To: Janet M. Laurain
Subject: Public Records Request C-2009-10-19

October 21, 2009

Janet Laurain
Adams Broadwell Joseph & Cardozo
601 Gateway Blvd Suite 1000
South San Francisco, CA 94080-7037

SUBJECT: Public Records Request C-2009-10-19
FACILITY: San Joaquin 1 & 2 Hybrid Field and Biomass Facility

Dear Ms. Laurain,

The San Joaquin Valley Air Pollution Control District has received your Public Records Request and is currently being processed.

Should you have any questions, please contact me at the phone number or email provided below. When calling or emailing please include the control number assigned to the request, C-2009-10-19.

Respectfully,

Noemi Walther, OA II
SJVAPCD
1990 E. Gettysburg Ave.
Fresno, CA 93726
559-230-6006

EXHIBIT 4

Janet M. Laurain

From: Janet M. Laurain
Sent: Wednesday, November 04, 2009 3:30 PM
To: 'Noemi.Walther@valleyair.org'
Subject: Public Records Act Requests for San Joaquin Solar 1&2 and Mendota Biomass Power Plant

Dear Naomi,

I'm just checking in on the a status of October 19, 2009 PRA requests for:

1. San Joaquin Solar 1&2 Hybrid Solar Field and Biomass Facility (Project No. C-1090203)
2. Mendota Biomass Power Plant (a.k.a. Spinnaker Steamcycle-004-C)

Were you able to locate the requested documents? If you have any of them in electronic form, would it be possible to email them? Can you tell me when you will be able to respond with the requested documentation?

Thank you.

Janet

Janet M. Laurain
Adams Broadwell Joseph & Cardozo
(650) 589-1660
jlaurain@adamsbroadwell.com

Janet M. Laurain
Adams Broadwell Joseph & Cardozo
(650) 589-1660
jlaurain@adamsbroadwell.com

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EXHIBIT 5

Janet M. Laurain

From: Noemi Walther [Noemi.Walther@valleyair.org]
Sent: Wednesday, November 04, 2009 4:02 PM
To: Janet M. Laurain
Subject: RE: Public Records Act Requests for San Joaquin Solar 1&2 and Mendota Biomass Power Plant

Hi Janet, your email has been forwarded to Jim Swaney; he is the manager of our Permits Department. He's currently out of the office. I hope to hear from him tomorrow morning.

Noemi

From: Janet M. Laurain [mailto:jlaurain@adamsbroadwell.com]
Sent: Wednesday, November 04, 2009 3:30 PM
To: Noemi Walther
Subject: Public Records Act Requests for San Joaquin Solar 1&2 and Mendota Biomass Power Plant

Dear Naomi,

I'm just checking in on the a status of October 19, 2009 PRA requests for:

1. San Joaquin Solar 1&2 Hybrid Solar Field and Biomass Facility (Project No. C-1090203)
2. Mendota Biomass Power Plant (a.k.a. Spinnaker Steamcycle-004-C)

Were you able to locate the requested documents? If you have any of them in electronic form, would it be possible to email them? Can you tell me when you will be able to respond with the requested documentation?

Thank you.

Janet

Janet M. Laurain
Adams Broadwell Joseph & Cardozo
(650) 589-1660
jlaurain@adamsbroadwell.com

Janet M. Laurain
Adams Broadwell Joseph & Cardozo
(650) 589-1660
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TO:	Seyed Sadredin	**FAX NO:**	559-230-6061
	Jim Swaney		559-230-6061
	David Warner		559-230-6061
FROM:	Elizabeth Klebaner	**DATE:**	November 5, 2009

ENCLOSURE: Klebaner letter (11/5/09) re Failure to Provide Documents – Preliminary Determination of Compliance for the San Joaquin Solar 1 & 2 Facility (Air District Project No. C01090203; California Energy Commission Docket No. 08-AFC-12) – Request for Extension of Comment Period

PAGES, including cover: 20

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Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: eklebaner@adamsbroadwell.com

MESSAGE CONFIRMATION NOV-05-2009 06:02 PM THU

FAX NUMBER : 16505895062
NAME : ADAMS BROADWELL JOSE

NAME/NUMBER : 15592306061-2303
PAGE : 21
START TIME : NOV-05-2009 05:59PM THU
ELAPSED TIME : 02'20"
MODE : STD ECM
RESULTS : [O.K]

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TO:	Seyed Sadredin	**FAX NO:**	559-230-6061
	Jim Swaney		559-230-6061
	David Warner		559-230-6061
FROM:	Elizabeth Klebaner	**DATE:**	November 6, 2009
ENCLOSURE:	Klebaner letter (11/6/09) re Failure to Provide Documents – Preliminary Determination of Compliance for the San Joaquin Solar 1 & 2 Facility (Air District Project No. C01090203; California Energy Commission Docket No. 08-AFC-12) – Request for Extension of Comment Period		

PAGES, including cover: 20

FOR IMMEDIATE DELIVERY

601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080-7037
Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: eklebaner@adamsbroadwell.com

ATTACHMENT B

Elizabeth Klebaner

From: Jim Swaney [Jim.Swaney@valleyair.org]
Sent: Tuesday, November 10, 2009 5:35 PM
To: Elizabeth Klebaner
Cc: Catherine Redmond; Dave Warner
Subject: RE: San Joaquin Solar PDOC

Ms. Klebaner,

We have made a decision on allowing you more time to provide comments on this project. We are willing to accept any comments you make through Tuesday, November 24, 2009. This date was determined by calculating the number of days left in the 30 day public notice period from the 10th day after the submission of your original public information request, and adding that amount of time to when the request was satisfied. Per the e-mail you received from Ms. Noemi Walther, the original requests were closed yesterday, November 9, 2009.

We don't agree that District Rule 2201, Section 5.5.4, allows for a 30 day review period after the submission and completion of a public records request. This section is clear that the material must be available at the District's office, which it was, and so has no bearing on the fulfillment of a public information request.

We will prepare a letter to this effect, and further detailing our reasoning, on Thursday. Thank you for your patience in awaiting this decision, and contact me if you have any questions.

Regarding the new public information request, we are working on it and should have that information to you on Thursday.

Thanks,
Jim

Jim Swaney, P.E.
Permit Services Manager
Valley Air District
(559) 230-6000
(559) 230-6061 fax
www.valleyair.org

ATTACHMENT C

Petra Pless, D.Env.

440 Nova Albion Way, #2
San Rafael, CA 94903
(415) 492-2131 phone
(815) 572-8600 fax
petra@ppless.com

Dr. Pless is a court-recognized expert with over 10 years of experience in environmental consulting conducting and managing interdisciplinary environmental research projects and preparing and reviewing environmental permits and other documents for U.S. and European stakeholder groups. Her broad-based experience includes air quality and air pollution control; water quality, water supply, and water pollution control; biology; public health and safety; and noise studies; California Environmental Quality Act ("CEQA"), Clean Air Act ("CAA"), and National Environmental Policy Act ("NEPA") review; industrial ecology and risk assessment; and use of a wide range of environmental software.

EDUCATION

Doctorate in Environmental Science and Engineering (D.Env.), University of California Los Angeles, 2001

Master of Science (equivalent) in Biology, Technical University of Munich, Germany, 1991

PROFESSIONAL HISTORY

Pless Environmental, Inc., Principal, 2008–present

Environmental Consultant, Sole Proprietor, 2006–2008

Leson & Associates (previously Leson Environmental Consulting), Kensington, CA, Environmental Scientist/Project Manager, 1997–2005

University of California Los Angeles, Graduate Research Assistant/Teaching Assistant, 1994–1996

ECON Research and Development, Environmental Scientist, Ingelheim, Germany, 1992–1993

Biocontrol, Environmental Projects Manager, Ingelheim, Germany, 1991–1992

REPRESENTATIVE EXPERIENCE

Air Quality and Pollution Control

Projects include CEQA/NEPA review; attainment and non-attainment new source review ("NSR"), prevention of significant deterioration ("PSD") and Title V permitting; control technology analyses (BACT, LAER, RACT, BARCT, BART, MACT); technology evaluations and cost-effectiveness analyses; criteria and toxic pollutant emission inventories; emission offsets; ambient and source monitoring; analysis of emissions estimates and ambient air pollutant concentration modeling. Some typical projects include:

- Critically reviewed and prepared technical comments on the air quality, biology, noise, water quality, and public health and safety sections of CEQA/NEPA documents for numerous

commercial, residential, and industrial projects (*e.g.*, power plants, airports, residential developments, retail developments, hospitals, refineries, slaughterhouses, asphalt plants, food processing facilities, printing facilities, quarries, and mines) and provided litigation support in a number of cases filed under CEQA.

- Critically reviewed and prepared technical comments on the air quality and public health sections of the Los Angeles Airport Master Plan (Draft, Supplement, and Final Environmental Impact Statement/Environmental Impact Report) for the City of El Segundo. Provided technical comments on the Draft and Final General Conformity Determination for the preferred alternative submitted to the Federal Aviation Administration.
- For several California refineries, evaluated compliance of fired sources with Bay Area Air Quality Management District Rule 9-10. This required evaluation and review of hundreds of source tests to determine if refinery-wide emission caps and compliance monitoring provisions were being met.
- Critically reviewed and prepared technical comments on Draft Title V permits for several refineries and other industrial facilities in California.
- Evaluated the public health impacts of locating big-box retail developments in densely populated areas in California and Hawaii. Monitored and evaluated impacts of diesel exhaust emissions and noise on surrounding residential communities.
- In conjunction with the permitting of several residential and commercial developments, conducted studies to determine baseline concentrations of diesel exhaust particulate matter using an aethalometer.
- For an Indiana steel mill, evaluated technology to control NOx and CO emissions from fired sources, including electric arc furnaces and reheat furnaces, to establish BACT. This required a comprehensive review of U.S. and European operating experience. The lowest emission levels were being achieved by steel mills using selective catalytic reduction ("SCR") and selective non-catalytic reduction ("SNCR") in Sweden and The Netherlands.
- For a California petroleum coke calciner, evaluated technology to control NOx, CO, VOCs, and PM10 emissions from the kiln and pyroscrubbers to establish BACT and LAER. This required a review of state and federal clearinghouses, working with regulatory agencies and pollution control vendors, and obtaining and reviewing permits and emissions data from other similar facilities. The best-controlled facilities were located in the South Coast Air Quality Management District.
- For a Kentucky coal-fired power plant, identified the lowest NOx levels that had been permitted and demonstrated in practice to establish BACT. Reviewed operating experience of European, Japanese, and U.S. facilities and evaluated continuous emission monitoring data. The lowest NOx levels had been permitted and achieved in Denmark and in the U.S. in Texas and New York.
- In support of efforts to lower the CO BACT level for power plant emissions, evaluated the contribution of CO emissions to tropospheric ozone formation and co-authored report on same.
- Critically reviewed and prepared technical comments on applications for certification ("AFCs") for numerous natural-gas fired, solar, biomass, and geothermal power plants in California permitted by the California Energy Commission. The comments addressed construction and operational emissions inventories and dispersion modeling, BACT

determinations for combustion turbine generators, fluidized bed combustors, diesel emergency generators, etc.

- Critically reviewed and prepared technical comments on draft PSD permits for several natural gas-fired power plants in California, Indiana, and Oregon. The comments addressed emission inventories, greenhouse gas emissions, BACT, case-by-case MACT, compliance monitoring, cost-effectiveness analyses, and enforceability of permit limits.
- For a California refinery, evaluated technology to control NOx and CO emissions from CO Boilers to establish RACT/BARCT to comply with BAAQMD Rule 9-10. This required a review of BACT/RACT/LAER clearinghouses, working with regulatory agencies across the U.S., and reviewing federal and state regulations and State Implementation Plans ("SIPs"). The lowest levels were required in a South Coast Air Quality Management District rule and in the Texas SIP.
- In support of several federal lawsuits filed under the federal Clean Air Act, prepared cost-effectiveness analyses for SCR and oxidation catalysts for simple cycle gas turbines and evaluated opacity data.
- Provided litigation support for a CEQA lawsuit addressing the pollution control equipment at a proposed biomass cogeneration plant.
- Prepared comments and provided litigation support on several proposed regulations including the Mojave Desert Air Quality Management District Rule 1406 (fugitive dust emission reduction credits for road paving); South Coast Air Quality Management District Rule 1316, San Joaquin Valley Air Pollution Control District Rule 2201, Antelope Valley Air Quality Management District Regulation XIII, and Mojave Desert Air Quality Management District Regulation XIII (implementation of December 2002 amendments to the federal Clean Air Act).
- Critically reviewed draft permits for several ethanol plants in California, Indiana, Ohio, and Illinois and prepared technical comments.
- Reviewed state-wide average emissions, state-of-the-art control devices, and emissions standards for construction equipment and developed recommendations for mitigation measures for numerous large construction projects.
- Researched sustainable building concepts and alternative energy and determined their feasibility for residential and commercial developments, *e.g.*, regional shopping malls and hospitals.
- Provided comprehensive environmental and regulatory services for an industrial laundry chain. Facilitated permit process with the South Coast Air Quality Management District. Developed test protocol for VOC emissions, conducted field tests, and used mass balance methods to estimate emissions. Reduced disposal costs for solvent-containing waste streams by identifying alternative disposal options. Performed health risk screening for air toxics emissions. Provided permitting support. Renegotiated sewer surcharges with wastewater treatment plant. Identified new customers for shop-towel recycling services.
- Designed computer model to predict performance of biological air pollution control (biofilters) as part of a collaborative technology assessment project, co-funded by several major chemical manufacturers. Experience using a wide range of environmental software, including air dispersion models, air emission modeling software, database programs, and geographic information systems ("GIS").

Water Quality and Pollution Control

Experience in water quality and pollution control, including surface water and ground water quality and supply studies, evaluating water and wastewater treatment technologies, and identifying, evaluating and implementing pollution controls. Some typical projects include:

- Evaluated impacts of on-shore oil drilling activities on large-scale coastal erosion in Nigeria.
- For a 500-MW combined-cycle power plant, prepared a study to evaluate the impact of proposed groundwater pumping on local water quality and supply, including a nearby stream, springs, and a spring-fed waterfall. The study was docketed with the California Energy Commission.
- For a 500-MW combined-cycle power plant, identified and evaluated methods to reduce water use and water quality impacts. These included the use of zero-liquid-discharge systems and alternative cooling technologies, including dry and parallel wet-dry cooling. Prepared cost analyses and evaluated impact of options on water resources. This work led to a settlement in which parallel wet dry cooling and a crystallizer were selected, replacing 100 percent groundwater pumping and wastewater disposal to evaporation ponds.
- For a homeowner's association, reviewed a California Coastal Commission staff report on the replacement of 12,000 linear feet of wooden bulkhead with PVC sheet pile armor. Researched and evaluated impact of proposed project on lagoon water quality, including sediment resuspension, potential leaching of additives and sealants, and long-term stability. Summarized results in technical report.

Applied Ecology, Industrial Ecology and Risk Assessment

Experience in applied ecology, industrial ecology and risk assessment, including human and ecological risk assessments, life cycle assessment, evaluation and licensing of new chemicals, and fate and transport studies of contaminants. Experienced in botanical, phytoplankton, and intertidal species identification and water chemistry analyses. Some typical projects include:

- Conducted technical, ecological, and economic assessments of product lines from agricultural fiber crops for European equipment manufacturer; co-authored proprietary client reports.
- Developed life cycle assessment methodology for industrial products, including agricultural fiber crops and mineral fibers; analyzed technical feasibility and markets for thermal insulation materials from natural plant fibers and conducted comparative life cycle assessments.
- For the California Coastal Conservancy, San Francisco Estuary Institute, Invasive Spartina Project, evaluated the potential use of a new aquatic pesticide for eradication of non-native, invasive cordgrass (*Spartina spp.*) species in the San Francisco Estuary with respect to water quality, biological resources, and human health and safety. Assisted staff in preparing an amendment to the Final EIR.
- Evaluated likelihood that organochlorine pesticide concentrations detected at a U.S. naval air station are residuals from past applications of these pesticides consistent with manufacturers' recommendations. Retained as expert witness in federal court case.
- Prepared human health risk assessments of air pollutant emissions from several industrial and commercial establishments, including power plants, refineries, and commercial laundries.

- Managed and conducted laboratory studies to license pesticides. This work included the evaluation of the adequacy and identification of deficiencies in existing physical/chemical and health effects data sets, initiating and supervising studies to fill data gaps, conducting environmental fate and transport studies, and QA/QC compliance at subcontractor laboratories. Prepared licensing applications and coordinated the registration process with German environmental protection agencies. This work led to regulatory approval of several pesticide applications in less than six months.
- Designed and implemented database on physical/chemical properties, environmental fate, and health impacts of pesticides for a major multi-national pesticide manufacturer.
- Designed and managed experimental toxicological study on potential interference of delta-9-tetrahydrocannabinol in food products with U.S. employee drug testing; co-authored peer-reviewed publication.
- Critically reviewed and prepared technical comments on applications for certification for several natural-gas fired, solar, and geothermal power plants and transmission lines in California permitted by the California Energy Commission. The comments addressed avian collisions and electrocution, construction and operational noise impacts on wildlife, risks from brine ponds, and impacts on endangered species.
- For a 180-MW geothermal power plant, evaluated the impacts of plant construction and operation on the fragile desert ecosystem in the Salton Sea area. This work included baseline noise monitoring and assessing the impact of noise, brine handling and disposal, and air emissions on local biota, public health, and welfare.
- Designed research protocols for a coastal ecological inventory; developed sampling methodologies, coordinated field sampling, determined species abundance and distribution in intertidal zone, and conducted statistical data analyses.
- Designed and conducted limnological study on effects of physical/chemical parameters on phytoplankton succession; performed water chemistry analyses and identified phytoplankton species; co-authored two journal articles on results.
- Organized and conducted surveying and mapping of aquatic plant species in several lakes and rivers in Sweden and Germany as ecological indicators for the health of limnological ecosystems.

PRO BONO ACTIVITIES

Founding member of "SecondAid," a non-profit organization providing tsunami relief for the recovery of small family businesses in Sri Lanka. (www.secondaid.org.)

PROFESSIONAL AFFILIATIONS

Association of Environmental Professionals

PUBLICATIONS

Available upon request

ATTACHMENT D

Elizabeth Klebaner

From: Elizabeth Klebaner
Sent: Thursday, May 28, 2009 11:34 AM
To: 'dianfalcon@valleyair.com'
Subject: Public Records Act Request: San Joaquin Solar 1&2

Dear Ms. Falcon,

Pursuant to our conversation this morning, please find attached a Public Records Act request for San Joaquin Solar 1 and 2. I was not able to locate a facility number in my review of valleyair.com. Please let me know if any part of the request is unclear, or if you have other concerns about this matter.

Thank you very much for your assistance.

Sincerely,

PRA Request;
ın Joaquin Solar

Elizabeth Klebaner

Elizabeth Klebaner
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080-7037
Ph.: (650) 589-1660
Fax: (650) 589-5062
eklebaner@adamsbroadwell.com

San Joaquin Valley
Air Pollution Control District
1990 E. Gettysburg Avenue, Fresno, CA 93726-0244
(559) 230-6000 www.Valleyair.org

Public Records Requests
Phone (559) 230-6000
Fax (559) 230-6061

Office Use Only
CONTROL NUMBER

PUBLIC RECORDS REQUEST FORM

ATTENTION REQUESTOR: To expedite your request for District records, please fill out this form completely. Identify specifically the type of records you are requesting. Please limit your request to one facility or one site address for each request form filed, and three requests items per form. Additional forms or pages can be used if requesting information for more than one facility or for records not identified on this form. Requests should reasonably describe identifiable records prepared, owned, used, or retained by the District. Staff is available to assist you in identifying those records in the District's possession. The District is not required by law to create a new record or list from an existing record. By submission of this form I hereby agree to reimburse the SJVUAPCD for the direct cost of duplicating the requested records in accordance with Gov. Code Sec. 6253(b).

REQUESTOR INFORMATION

NAME: Elizabeth Klebaner DATE: May 28, 2009

COMPANY: Adams Broadwell Joseph & Cardozo

MAILING ADDRESS: 601 Gateway Boulevard

CITY: South San Francisco STATE: CA ZIP CODE: 94080

PHONE # 650 589 1660 FAX # 650 589 5062 E-MAIL: eklebaner@adamsbroadwell.com

DOCUMENTS REQUESTED *(3 items per form)*

- ☐ Permit Application(s)
- ☐ Permit(s) to Operate (PTO)
- ☑ Authorities to Construct (ATC)
- ☐ Engineering Evaluation(s)
- ☑ Emissions Inventory Statement(s)
- ☐ Health Risk Assessment(s)
- ☐ Site Inspection Report(s)
- ☐ Source Test Report(s)
- ☐ Air Monitoring Data
- ☐ Complaints
- ☐ Notice(s) of Violation (NOV)
- ☐ Notice(s) to Comply (NTC)
- ☑ All Records/General File Review
- ☐ Toxic Sources within 1/4 mi School Review
- ☐ Asbestos Notification(s)/Record(s)
- ☐ AB2588 "Hot Spots" Information
- ☐ Other *(Describe below or on additional pages)*:

DATE OF DOCUMENTS REQUESTED: From: 01/01/2008 To: 5/28/2009

REQUESTED FACILITY INFORMATION *(If Applicable)*

FACILITY NAME: San Joaquin Solar 1 and 2 FACILITY I.D. NO. *(if known)*

FACILITY ADDRESS: 12555 HIGH BLUFF DR STE 100

CITY: SAN DIEGO STATE: CA ZIP CODE: 92130

METHOD OF DELIVERY (Check all that apply)

- ☐ Pick Up
- ☑ U.S. Mail
- ☑ FAX (Maximum 30 Pages)
- ☑ CD/DVD
- ☑ Email (Maximum 5 MB)
- ☐ Other _____
- ☐ Inspection of records only, no copies required (District will contact you to setup an appointment for inspection)

☐ I request that the SJVUAPCD contact me prior to completing the requested records if the cost exceeds $_____

ATTACHMENT E

ADAMS BROADWELL JOSEPH & CARDOZO
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
601 GATEWAY BOULEVARD, SUITE 1000
SOUTH SAN FRANCISCO, CA 94080-7037
TEL: (650) 589-1660
FAX: (650) 589-5062
jlaurain@adamsbroadwell.com

DANIEL L. CARDOZO
THOMAS A. ENSLOW
TANYA A. GULESSERIAN
MARC D. JOSEPH
ELIZABETH KLEBANER
RACHAEL E. KOSS
LOULENA A. MILES
ROBYN C. PURCHIA

OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL
GLORIA D. SMITH

SACRAMENTO OFFICE
520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4715
TEL: (916) 444-6201
FAX: (916) 444-6209

October 19, 2009

VIA FACSIMILE AND U.S. MAIL

Ms. Diane Falcon
San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Ave.
Fresno, CA 93726
Fax: (559) 230-6061

Re: Public Records Act Request – Mendota Biomass Power Plant (a.k.a. Spinnaker Steamcycle-004-C)

Dear Ms. Falcon:

We are writing on behalf of California Unions for Reliable Energy to request copies of the following documents regarding the Mendota Power Plant (also known as Spinnaker—Steamcycle-004-C), located at 400 Guillen Parkway, Mendota, California 93640:

1. Any and all air permit(s) issued by the San Joaquin Valley Air Pollution Control District (District);

2. District-issued engineering evaluations or a final determination of compliance; and

3. The two most recent boiler source tests for toxic air contaminant emissions and criteria pollutant emissions.

This request is made pursuant to the California Public Records Act. (Government Code §§ 6250, et seq.) This request is also made pursuant to Article I, section 3(b) of the California Constitution, which provides a Constitutional right of access to information concerning the conduct of government. Article I, section 3(b) provides that any statutory right to information shall be broadly construed to provide the greatest access to government information and further requires that

any statute that limits the right of access to information shall be narrowly construed.

Please forward the copied materials responsive to our request to the following address:

Janet Laurain
Environmental Paralegal
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Please call me at (650) 589-1660 if you have any questions. Thank you for your assistance with this matter.

Sincerely,

Janet Laurain

Janet Laurain
Environmental Paralegal

JML:bh

MESSAGE CONFIRMATION OCT-19-2009 04:12 PM MON

FAX NUMBER : 16505895062
NAME : ADAMS BROADWELL JOSE

NAME/NUMBER : 15592306061-2303
PAGE : 3
START TIME : OCT-19-2009 04:11PM MON
ELAPSED TIME : 00'30"
MODE : STD ECM
RESULTS : [O.K]

ADAMS BROADWELL JOSEPH & CARDOZO

FAX TRANSMITTAL

NOTICE – PRIVILEGED AND CONFIDENTIAL INFORMATION
This message is for addressee only. Review, distribution or copy by others is strictly prohibited. Notify us immediately by telephone if you received this message in error and return the original.

TO:	Diane Falcon	**FAX NO:**	(559) 230-6061
FROM:	Janet M. Laurain	**DATE:**	October 19, 2009
ENCLOSURE:			
PAGES, including cover: 3			

601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080-7037
Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: jlaurain@adamsbroadwell.com

ADAMS BROADWELL JOSEPH & CARDOZO

FAX TRANSMITTAL

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TO:	Diane Falcon	**FAX NO:**	(559) 230-6061
FROM:	Janet M. Laurain	**DATE:**	October 19, 2009

ENCLOSURE:

PAGES, including cover: 3

601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080-7037
Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: jlaurain@adamsbroadwell.com

ATTACHMENT F

ADAMS BROADWELL JOSEPH & CARDOZO
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
601 GATEWAY BOULEVARD, SUITE 1000
SOUTH SAN FRANCISCO, CA 94080-7037

TEL: (650) 589-1660
FAX: (650) 589-5062
jlaurain@adamsbroadwell.com

SACRAMENTO OFFICE
520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4715
TEL: (916) 444-6201
FAX: (916) 444-6209

DANIEL L. CARDOZO
THOMAS A. ENSLOW
TANYA A. GULESSERIAN
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ELIZABETH KLEBANER
RACHAEL E. KOSS
LOULENA A. MILES
ROBYN C. PURCHIA

OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL
GLORIA D. SMITH

October 19, 2009

VIA FACSIMILE AND U.S. MAIL

Ms. Diane Falcon
San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Ave.
Fresno, CA 93726
Fax: (559) 230-6061

Re: Public Records Act Request – San Joaquin Solar 1&2 Hybrid Solar Field and Biomass Facility (Project Number C-1090203)

Dear Ms. Falcon:

We are writing on behalf of California Unions for Reliable Energy to request copies of the following documents relating to the San Joaquin Solar 1 & 2 Hybrid Field and Biomass Facility, Project Number C-1090203:

1. Applicant San Joaquin Solar 1&2 (SJS)'s Request for Proposal;

2. Any and all vendor proposals;

3. Any and all guarantees of baghouse performance;

4. All health risk assessment modeling data supporting the District's analysis in the Preliminary Determination of Compliance, issued on October 8, 2009; and

5. All air quality modeling data supporting the District's analysis in the Preliminary Determination of Compliance, issued on October 8, 2009.

This request is made pursuant to the California Public Records Act. (Government Code §§ 6250, et seq.) This request is also made pursuant to Article I, section 3(b) of the California Constitution, which provides a Constitutional right of

access to information concerning the conduct of government. Article I, section 3(b) provides that any statutory right to information shall be broadly construed to provide the greatest access to government information and further requires that any statute that limits the right of access to information shall be narrowly construed.

Please forward the copied materials responsive to our request to the following address:

Janet Laurain
Environmental Paralegal
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Please call me at (650) 589-1660 if you have any questions. Thank you for your assistance with this matter.

Sincerely,

Janet Laurain

Janet Laurain
Environmental Paralegal

JML:bh

MESSAGE CONFIRMATION OCT-19-2009 04:11 PM MON

FAX NUMBER : 16505895062
NAME : ADAMS BROADWELL JOSE

NAME/NUMBER : 15592306061-2303
PAGE : 3
START TIME : OCT-19-2009 04:10PM MON
ELAPSED TIME : 00'26"
MODE : STD ECM
RESULTS : [O.K]

ADAMS BROADWELL JOSEPH & CARDOZO

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TO:	Diane Falcon	**FAX NO:**	(559) 230-6061
FROM:	Janet M. Laurain	**DATE:**	October 19, 2009

ENCLOSURE:

PAGES, including cover: 3

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601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080-7037
Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: jlaurain@adamsbroadwell.com

ADAMS BkOADWELL JOSEPH & CARDOZO

FAX TRANSMITTAL

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TO:	Diane Falcon	**FAX NO:**	(559) 230-6061
FROM:	Janet M. Laurain	**DATE:**	October 19, 2009

ENCLOSURE:

PAGES, including cover: 3

601 Gateway Boulevard, Suite 1000
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Facsimile: (650) 589-5062
E-mail: jlaurain@adamsbroadwell.com

ATTACHMENT G

ADAMS BROADWELL JOSEPH & CARDOZO
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
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ROBYN C. PURCHIA

OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL
GLORIA D. SMITH

SACRAMENTO OFFICE
520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4715
TEL: (916) 444-6201
FAX: (916) 444-6209

November 9, 2009

VIA FACSIMILE AND U.S. MAIL

Ms. Noemi Walther, OA II
San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Avenue
Fresno, CA 93726
Fax: (559) 230-6064

Re: Public Records Act Request - San Joaquin Solar 1 & 2 Solar Field (C-2009-10-19)

Dear Ms. Walther:

We are writing on behalf of California Unions for Reliable Energy to request copies of the following documents regarding the San Joaquin Solar 1 & 2 Preliminary Determination of Compliance:

1. Any and all calculations to support the HAP emission factors provided to SJS Solar (C-2009-10-19); and

2. 1997 AB2588 "Hot Spots" Emissions Testing for the Mendota Biomass Power Facility, also known as Spinnaker—Steamcycle-004-C, (C-2009-10-18). This report was used as a basis for emissions calculations for the San Joaquin Solar 1 & 2 Solar Field.

This request is made pursuant to the California Public Records Act. (Government Code §§ 6250, et seq.) This request is also made pursuant to Article I, section 3(b) of the California Constitution, which provides a Constitutional right of access to information concerning the conduct of government. Article I, section 3(b) provides that any statutory right to information shall be broadly construed to provide the greatest access to government information and further requires that any statute that limits the right of access to information shall be narrowly construed.

Please forward the copied materials responsive to our request to the following address:

Janet Laurain
Environmental Paralegal
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Please call me at (650) 589-1660 if you have any questions. Thank you for your assistance with this matter.

Sincerely,

Janet Laurain
Environmental Paralegal

JML:bh

cc: Jim Swaney
Permit Services Manager –Northern Region SJVAPCD
Fax: (559) 230-6061

ADAMS BROADWELL JOSEPH & CARDOZO

FAX TRANSMITTAL

NOTICE – PRIVILEGED AND CONFIDENTIAL INFORMATION
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TO:	Noemi Walther	**FAX NO:**	559-230-6064
	Jim Swaney		559-230-6061
FROM:	Janet M. Laurain	**DATE:**	November 9, 2009
ENCLOSURE:	Laurain letter (11/9/09) re Public Records Act Request – San Joaquin Solar 1 & 2 Solar Field (C-2009-10-19)		

PAGES, including cover: 3

601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080-7037
Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: jlaurain@adamsbroadwell.com

MULTI COMMUNICATION REPORT

NOV-09-2009 04:55 PM MON

FAX NUMBER : 16505895062
NAME : ADAMS BROADWELL JOSE

REF. NAME :
PAGES : 3

1. SUCCESSFUL

FAX NUMBER	NAME
15592306064-2303	
15592306061-2303	

2. UNSUCCESSFUL

FAX NUMBER	NAME

3. MULTI COMMUNICATION JOURNAL

NO.	NAME/NUMBER	START TIME	TIME	MODE	PAGE	RESULTS
6174	15592306064-2303	11-09 04:53PM	00'28"	ECM BC	003/003	[O.K]
6174	15592306061-2303	11-09 04:55PM	00'30"	ECM BC	003/003	[O.K]

ATTACHMENT H

ADAMS BROADWELL JOSEPH & CARDOZO
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
601 GATEWAY BOULEVARD, SUITE 1000
SOUTH SAN FRANCISCO, CA 94080-7037

TEL: (650) 589-1660
FAX: (650) 589-5062
eklebaner@adamsbroadwell.com

SACRAMENTO OFFICE
520 CAPITOL MALL, SUITE 350
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ELIZABETH KLEBANER
RACHAEL E. KOSS
LOULENA A. MILES
ROBYN C. PURCHIA

OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL
GLORIA D. SMITH

November 13, 2009

Via Facsimile and Email

Ms. Noemi Walther, OA II
San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Avenue
Fresno, CA 93726
Fax: (559) 230-6064

Jim Swaney
Permit Services Manager
San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Avenue
Fresno, CA 93726
Fax: (559) 230-6061

Re: Public Records Act Request – San Joaquin Solar 1 & 2 Facility (Air District Project No. C01090203; California Energy Commission Docket No. 08-AFC-12)

Dear Ms. Walther and Mr. Swaney

We are writing on behalf of California Unions for Reliable Energy to request a complete health risk assessment and ambient air quality assessment with all supporting files and methodology.

This request is made pursuant to sections 5.4 and 5.5.4 of Air District Rule 2201, which require the Air District to provide opportunity for public comment on a preliminary decision regarding a new major stationary source and make available for public inspection information supporting the permit. This request is also made pursuant to the California Public Records Act. (Government Code §§ 6250, et seq.) and Article I, section 3(b) of the California Constitution, which provides a Constitutional right of access to information concerning the conduct of government. Article I, section 3(b) provides that any statutory right to information shall be broadly construed to provide the greatest access to government information and further requires that any statute that limits the right of access to information shall be narrowly construed.

Please forward the copied materials responsive to our request as soon as possible to the following address:

Elizabeth Klebaner
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080
eklebaner@adamsbroadwell.com

Please call me at (650) 589-1660 if you have any questions. Thank you for your assistance with this matter.

Sincerely,

Elizabeth Klebaner

EK:bh

San Joaquin Valley
Air Pollution Control District
1990 E. Gettysburg Avenue, Fresno, CA 93726-0244
(559) 230-6000 www.Valleyair.org

Public Records Requests
Phone (559) 230-6000
Fax (559) 230-6061

Office Use Only
CONTROL NUMBER

PUBLIC RECORDS REQUEST FORM

ATTENTION REQUESTOR To expedite your request for District records, please fill out this form completely. Identify specifically the type of records you are requesting. Please limit your request to one facility or one site address for each request form filed, and three requests items per form. Additional forms or pages can be used if requesting information for more than one facility or for records not identified on this form. Requests should reasonably describe identifiable records prepared, owned, used, or retained by the District. Staff is available to assist you in identifying those records in the District's possession. The District is not required by law to create a new record or list from an existing record. By submission of this form I hereby agree to reimburse the SJVUAPCD for the direct cost of duplicating the requested records in accordance with Gov. Code Sec. 6253(b).

REQUESTOR INFORMATION

NAME: Elizabeth Klebaner DATE: 11/13/09

COMPANY: Adams Broadwell Joseph & Cardozo

MAILING ADDRESS: 601 Gateway Blvd.

CITY: South San Francisco STATE: CA ZIP CODE: 94408

PHONE # 650 589 1660 FAX # 650 589 5062 E-MAIL: eklebaner@adamsbroadwell.com

DOCUMENTS REQUESTED (3 Items per form)

- [ ] Permit Application(s)
- [ ] Permit(s) to Operate (PTO)
- [ ] Authorities to Construct (ATC)
- [ ] Engineering Evaluation(s)
- [ ] Emissions Inventory Statement(s)
- [x] Health Risk Assessment(s)
- [ ] Site Inspection Report(s)
- [ ] Source Test Report(s)
- [ ] Air Monitoring Data
- [ ] Complaints
- [ ] Notice(s) of Violation (NOV)
- [ ] Notice(s) to Comply (NTC)
- [ ] All Records/General File Review
- [ ] Toxic Sources within 1/4 mi School Review
- [ ] Asbestos Notification(s)/Record(s)
- [ ] AB2588 "Hot Spots" Information
- [x] Other (*Describe below or on additional pages*):

A complete Health Risk Assessment and ambient air quality assessment, including all supporting files and methodology.

DATE OF DOCUMENTS REQUESTED: From: 1/1/1990 To: 11/13/2009

REQUESTED FACILITY INFORMATION (If Applicable)

FACILITY NAME: San Joaquin Solar 1 & 2 FACILITY I.D. NO. (if known) C-1099203

FACILITY ADDRESS: West Jayne Avenue

CITY: Fresno STATE: CA ZIP CODE: 93210

METHOD OF DELIVERY (Check all that apply)

- [ ] Pick Up
- [x] U.S. Mail
- [x] FAX (Maximum 30 Pages)
- [ ] CD/DVD
- [x] Email (Maximum 5 MB)
- [ ] Other UPS account no. 81AAV2
- [ ] Inspection of records only, no copies required (District will contact you to setup an appointment for inspection)

- [ ] I request that the SJVUAPCD contact me prior to completing the requested records if the cost exceeds $_____

ADAMS BROADWELL JOSEPH & CARDOZO

FAX TRANSMITTAL

NOTICE – PRIVILEGED AND CONFIDENTIAL INFORMATION
This message is for addressee only. Review, distribution or copy by others is strictly prohibited. Notify us immediately by telephone if you received this message in error and return the original.

TO:	Noemi Walther	**FAX NO:**	559-230-6064
	Jim Swaney		559-230-6061
FROM:	Elizabeth Klebaner	**DATE:**	November 13, 2009

ENCLOSURE: Klebaner letter (11/13/09) re Public Records Act Request – San Joaquin Solar 1 & 2 Facility (Air District Project No. C01090203; California Energy Commission Docket No. 08-AFC-12) and Public Records Request Form

PAGES, including cover: 4

601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080-7037
Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: eklebaner@adamsbroadwell.com

MULTI COMMUNICATION REPORT

NOV-13-2009 03:29 PM FRI

FAX NUMBER : 16505895062
NAME : ADAMS BROADWELL JOSE

REF. NAME :
PAGES : 4

1. SUCCESSFUL

FAX NUMBER	NAME
15592306064-2303	
15592306061-2303	

2. UNSUCCESSFUL

FAX NUMBER	NAME

3. MULTI COMMUNICATION JOURNAL

NO.	NAME/NUMBER	START TIME	TIME	MODE	PAGE	RESULTS
6199	15592306064-2303	11-13 03:26PM	00'42"	ECM BC	004/004	[O.K]
6199	15592306061-2303	11-13 03:28PM	00'44"	ECM BC	004/004	[O.K]

ATTACHMENT I

SAN JOAQUIN SOLAR 1 & 2 HYBRID PROJECT
12-AFC-08

Supplemental Information
In Response To Cure Data Request Set #5

October 5, 2009

URS

1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4314
619.294.9400 Fax: 619.293.7920

URS Project No.27658033

Data Request 210: Please indicate whether the Applicant would accept a Condition of Certification requiring no less than 50 percent agricultural wood waste in the biomass fuel for the Project at any given time on a continuous basis.

Response: No the applicant would not accept a condition of certification regarding the fuel blend, because in any given hour the fuel may be any combination of municipal green waste or agricultural wood waste, or either individually.

Data Request 211: Please state whether the Project will rely on urban wood waste sourcing from metropolitan centers tributary to the San Joaquin Fuel Study Area. Please document your assumptions.

Response: The origin of urban wood waste has not been finalized since purchase agreements are not in place. Priority for locally supplied fuel will be given. SJS is expected to accept urban wood waste from metropolitan centers within or in tributaries to the Fuel Study area.

Data Request 212: If the Project will rely on urban wood waste sourcing from metropolitan areas tributary to the San Joaquin Fuel Study Area, please provide what percentage of the Project's fuel demand would be met by non-local sources, i.e. sources located farther than 60 miles from Coalinga.

Response: As stated in response to number 211, the origin of urban wood waste has not been finalized since purchase agreements are not in place, as such the percentage of fuel originating from non-local sources is unknown.

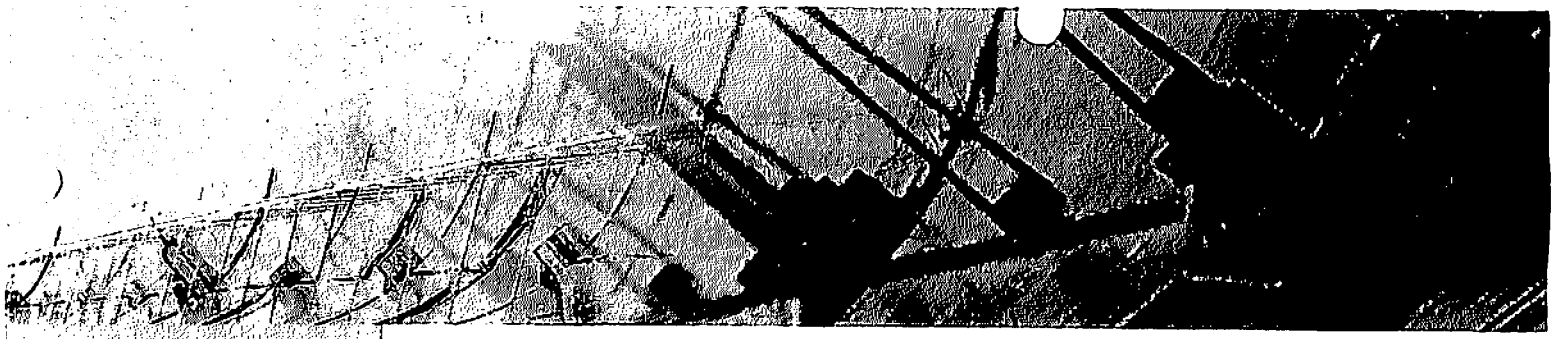
Data Request 213: Please demonstrate the basis for assuming that the average one way delivery distance for urban wood waste is 60 miles.

Response: Biomass fuel supply contracts have not been executed at this time. Priority will be given to fuel sources located closest to the site. Based on transportation costs, it is a reasonable assumption that the average delivery distance will be approximately 60 miles.

Data Request 214: Please specify the maximum feed rate for the Project's biomass combustors.

Response: From the data provided by the biomass combustor vendor, EPI, the maximum feed rate is anticipated to occur during full load operation combusting 100% urban wood waste with an ambient temperature of 30F, for a feed rate of 54,846 lb/hour per combustor or 219,384 lb/hour for all four combustors.

ATTACHMENT J



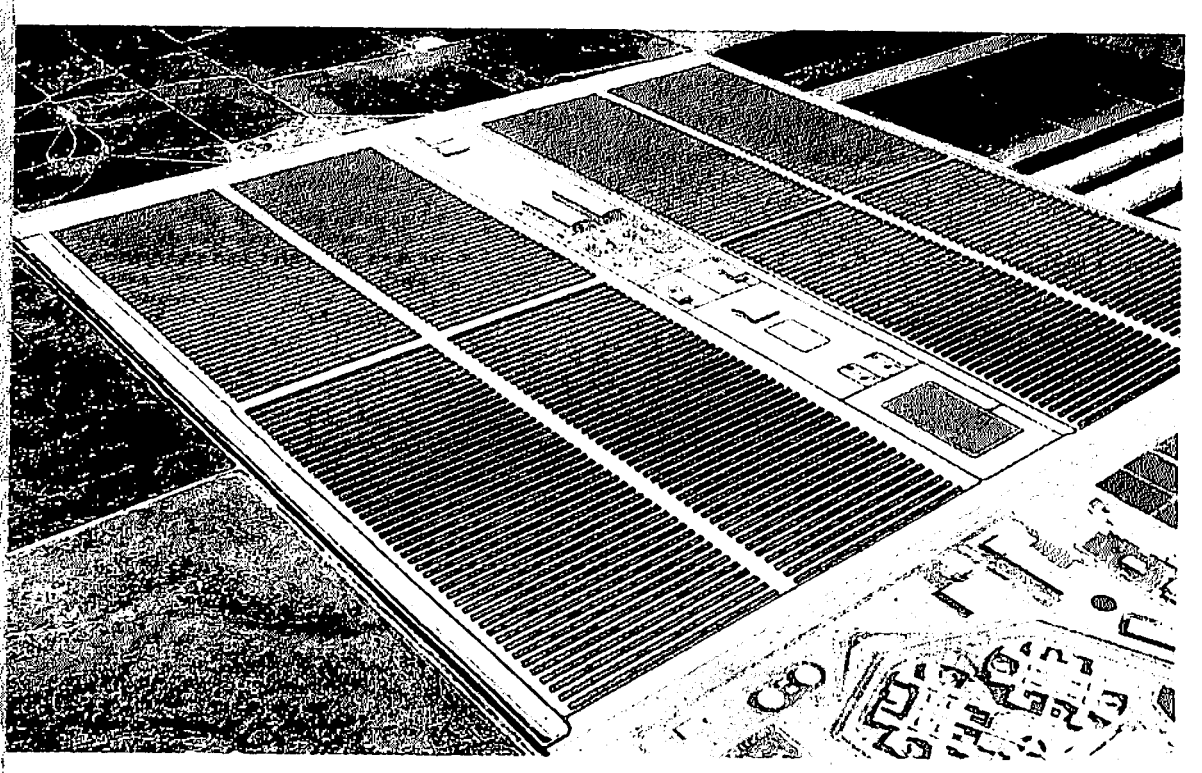
JULY 13, 2009

San Joaquin Solar 1 & 2 Hybrid Project

3rd Response to CEC Data Request

Set #1, 08-AFC-12

Submitted to:
California Energy Commission



Submitted by:

MARTIFER

RENEWABLES SOLAR THERMAL

With Support from:

URS **ENERGY**

combustor for cold startup purposes, replacing the two 2-cell WSACs with four 2-cell WSACs and revising the locations of buildings on the plot plan.

- Modified biomass handling activities by removing the biomass storage building and adding a baghouse to the biomass handling system for each plant.
- Updated travel distances for operations vehicles.
- Modified fugitive dust emission calculations per CEC staff suggestion.

Below is a brief description of the planned operations and maintenance activities for SJS1&2, followed by how the emissions from these activities were estimated and characterized in the AERMOD modeling. Detailed emission calculations are presented in Appendix AQ-2, Operation Emission Calculations.

The proposed Project consists of two solar power plants, each augmented with a biomass combustion facility. Each plant is sized for a nominal 53.4 MW net of solar generation, each complemented by up to 40 MW net of biomass generated production to supplement solar production when not fully charged by solar input, or during non-solar hours. The biomass facility at each plant consists of two 20 MW combustor trains, which can be operated independently. The primary fuel source for the biomass combustors is anticipated to be 50% agricultural wood waste, comprised primarily of wastes collected during clearing or pruning of local orchards, and 50% municipal green waste, comprised primarily of clippings and collected wood materials from local municipalities. The combustion of waste wood is expected to emit more air contaminants than the agricultural wood waste; thus only the emissions and impacts from the waste wood combustion were examined in this analysis. The biomass combustion equipment will consist of a fluidized bed system that is ideal for combusting a fuel such as waste wood.

The primary sources of criteria air pollutants emissions from SJS 1&2 would be the four biomass combustors, although additional emissions would occur due to ancillary sources, including the following stationary sources:

- Sixteen natural gas burners (four burners located in each of the biomass combustors for use during unit cold start-ups only),
- Four 2-cell evaporative wet surface air cooler condensers (WSACs),
- Two diesel emergency generators,
- Two diesel firewater pumps,
- Two baghouses associated with the two biomass handling systems (one per plant) that receive, process and transport the biomass to the combustors, and
- Fugitive particulate emissions from the conveyor drop points and wind erosion of the biomass storage piles and unloading and handling of the lime, limestone and fly ash.

Emissions are also expected from the operation of mobile sources associated with the routine operations of the Project. Those include emissions from:

- The biomass loaders (two front-end loaders),
- Heavy-duty trucks delivering biomass, limestone, lime and ammonia and removing fly ash,

Data Request 34: Please provide a description of the techniques that would be used to clean the mirrors of the SCAs. Include in this description the transport of the water supply, the number and types of vehicles that would be used, the frequency of use (daily, monthly and annual) of these vehicles, and the miles traveled (daily, monthly and annual).

Response: Mirror washing will occur nightly, five days per week. Each truck will operate 12 hours using 2,500 gallons per day, for a total of 5,000 gallons per day. Each mirror washing truck will refill its water tank daily from the demineralized water tank. Each mirror washing truck will travel approximately 6 miles per day, 132 miles per month and 1,560 miles per year.

Routine mirror washing will consist of application of high-pressure demineralized water sprayed onto the mirror surfaces. The Applicant will utilize several mirror washing methods on a rotating basis, once each month the mirrors will be washed with a high pressure method; once a month the mirrors will be washed with a high volume method. Details of the methods include:

- High-pressure rig consisting of a tractor-pulled trailer that contains a water tank and hand-held spray nozzles;
- Rotating-head rig consisting of a tractor pulling a wheeled tank-and-pump unit. The tractor is mounted with a controllable arm mounted in the front. The arm, with five movement articulated control from within the tractor cab, supports a configuration of spray arms that are fed by high-pressure water from the tank unit, and,.
- High-volume method using a large-capacity water truck driven with fixed nozzles on each side of the truck to spray the rows of mirrors simultaneously with a "deluge-type" stream of water.

It takes approximately two weeks to complete the washing of one solar field. Therefore, each solar field has one washing crew using either the high pressure or high deluge. After completing the solar field in two weeks, they begin washing the solar field again with the alternate method, so each mirror is cleaned twice each month. See Data Request 92 for photos for the typical mirror washing methods.

Data Request 35: Please describe if the emissions from mirror cleaning in Appendix B-3 include the activity of watering the site to achieve the cited 85 percent dust control efficiency or if site watering would cause additional water truck activity.

Response: The emissions from mirror cleaning do not include the dust control water activity. The additional emissions from the dust control water truck have been included in the operational emissions presented in Table 5.2-12 Revised and in Appendix AQ-2.

Attachment AQ-2
Operational Emission Calculations
(July 10, 2009)

San Joaquin 1&2 Solar Hybrid Project Total Operational Emissions

	Maximum Annual Emission Rate (ton/yr)					
	NO_X	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$
Onsite Emission Sources						
Stationary Sources						
Combustion Emissions						
Fluidized Bed Combustors with Natural Gas Burners	49.03	111.40	17.37	50.28	100.75	100.75
Emergency Generators	0.169	0.093	0.026	0.0001	0.005	0.005
Fire Water Pumps	0.141	0.075	0.021	0.0001	0.004	0.004
WSAC					1.61	1.61
Fugitive Emissions						
Biomass, Limestone and Ash Handling Fugitive Dust					0.090	0.019
Total Onsite Stationary Source Emissions	*49.34*	*111.57*	*17.42*	*50.28*	*102.45*	*102.38*
Mobile Sources						
Combustion Emissions						
Biomass Handling Equipment	0.20	0.15	0.03	0.0003	0.02	0.02
Water Trucks (Cleaning Solar Mirrors & Dust Control)	0.01	0.01	0.001	0.00002	0.0008	0.0007
Worker Vehicles - Travel Onsite	0.03	0.10	0.009	0.00022	0.0045	0.0038
Delivery Trucks - Travel & Idling Onsite	2.30	1.00	0.475	0.002	0.096	0.091
Fugitive Emissions						
Water Trucks (Cleaning Solar Mirrors & Dust Control)					0.67	0.07
Worker Vehicles - Travel Onsite					0.08	0.01
Delivery Trucks - Travel Onsite					5.18	0.77
Total Onsite Mobile Source Emissions	*2.53*	*1.26*	*0.51*	*0.00*	*6.04*	*0.96*
Total Onsite Emissions	***51.87***	***112.82***	***17.93***	***50.28***	***108.49***	***103.34***
Offsite Emission Sources						
Mobile Sources						
Combustion Emissions						
Delivery Trucks - Offsite Travel	18.55	3.98	0.85	0.02	0.71	0.62
Worker Vehicles - Offsite Travel	1.70	3.91	0.15	0.01	0.15	0.10
Fugitive Emissions						
Delivery Trucks - Offsite Travel					17.69	2.47
Worker Vehicles - Offsite Travel					0.21	0.04
Total Offsite Mobile Source Emissions	*20.25*	*7.90*	*1.00*	*0.03*	*18.75*	*3.22*
Total Offsite Emissions	***20.25***	***7.90***	***1.00***	***0.03***	***18.75***	***3.22***
Total Project Operational Emissions (ton/yr)	**72.12**	**120.72**	**18.93**	**50.31**	**127.24**	**106.56**

	Maximum Daily Emission Rate (pound/day)					
	NO_X	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$
Onsite Emission Sources						
Stationary Sources						
Combustion Emissions						
Fluidized Bed Combustors with Natural Gas Burners	645.20	812.16	126.72	590.55	735.36	735.36
Emergency Generators	28.22	15.43	4.41	0.01	0.88	0.87
Fire Water Pumps	5.43	2.88	0.82	0.00	0.16	0.16
WSAC					10.09	10.09
Fugitive Emissions						
Biomass, Limestone and Ash Handling Fugitive Dust					0.49	0.10
Total Onsite Stationary Source Emissions	*678.84*	*830.47*	*131.95*	*590.56*	*746.99*	*746.59*
Mobile Sources						
Combustion Emissions						
Biomass Handling Equipment	1.53	1.12	0.22	0.00	0.13	0.12
Water Trucks (Cleaning Solar Mirrors & Dust Control)	0.09	0.09	0.01	0.00	0.01	0.01
Worker Vehicles - Travel Onsite	0.15	0.55	0.049	0.00119	0.0247	0.0208
Delivery Trucks - Travel & Idle Onsite	17.66	7.71	3.65	0.02	0.74	0.70
Fugitive Emissions						
Water Trucks (Cleaning Solar Mirrors & Dust Control)					5.16	0.52
Worker Vehicles - Travel Onsite					0.43	0.05
Delivery Trucks - Travel Onsite					39.82	5.94
Total Onsite Mobile Source Emissions	*19.42*	*9.46*	*3.92*	*0.02*	*46.30*	*7.34*
Total Onsite Emissions	***698.27***	***839.93***	***135.88***	***590.58***	***793.30***	***753.94***
Offsite Emission Sources						
Mobile Sources						
Combustion Emissions						
Delivery Trucks - Offsite Travel	142.67	30.63	6.54	0.18	5.44	4.78
Worker Vehicles - Offsite Travel	9.31	21.44	0.82	0.05	0.80	0.55
Fugitive Emissions						
Delivery Trucks - Offsite Travel					136.05	18.96
Worker Vehicles - Offsite Travel					1.15	0.19
Total Offsite Mobile Source Emissions	*151.98*	*52.08*	*7.36*	*0.23*	*143.44*	*24.49*
Total Offsite Emissions	***151.98***	***52.08***	***7.36***	***0.23***	***143.44***	***24.49***
Total Project Operational Emissions (pound/day)	**850.25**	**892.01**	**143.24**	**590.81**	**936.74**	**778.43**

San Joaquin 1&2 Solar Hybrid Project Total Operational Emissions

	Annual Emission Rate (tonnes/yr)				
	CO_2	CH_4	N_20	SF_6	CO_2e
Onsite Emission Sources					
Stationary Sources					
Fluidized Bed Combustors	940,168				940,168.5
Natural Gas Burners Only	167.5	3.07E-04	9.79E-04		167.8
Emergency Generators	16.9	6.68E-04	1.67E-04		17.0
Fire Water Pumps	14.8	5.82E-04	1.46E-04		14.8
Circuit breakers				1.22E-03	29.3
Total Onsite Stationary Source CO_2e Emissions					*940,397.4*
Mobile Sources					
Biomass Handling Equipment	20.2	2.31E-03	0.00E+00		20.2
Water Trucks (Cleaning Solar Mirrors & Dust Control)	1.6	5.15E-06	7.95E-06		1.6
Worker Vehicles - Travel Onsite	21.1	1.56E-03	1.99E-03		21.7
Delivery Trucks - Travel & Idle Onsite	190.6	1.94E-04	1.83E-04		190.7
Total Onsite Mobile Source CO_2e Emissions					*234.2*
Total Onsite CO_2e Emissions					***940,631.7***
Offsite Emission Sources					
Mobile Sources					
Delivery Trucks - Offsite Travel	2,221.9	6.78E-03	6.38E-03		2,224.0
Worker Vehicles - Offsite Travel	849.4	1.56E-01	1.99E-01		914.3
Total Offsite Mobile Source CO_2e Emissions					*3,138.3*
Total Offsite CO_2e Emissions					***3,138.3***
Total Project Operational CO_2e Emissions (tonne/yr)					**943,770**

BEEST Input

Normal Operations

										Short-term Emission Rate (g/s)								Annual Emission Rate (g/s)			
										1hour	1hour	8hour	1hour	3hour	24hour	24hour	24hour				
StackID	Stack Release Type	Description	UTM x (m)	UTM y (m)	Elevation (m)	stack ht (m)	temp (K)	exit velocity (m/s)	diameter (m)	NO_x	CO	CO	SO_2	SO_2	SO_2	PM_{10}	$PM_{2.5}$	NO_x	SO_2	PM_{10}	$PM_{2.5}$
BMS1	DEFAULT	biomass combustor stack 1	749634.51000	4001852.20000	180.0	30.48	383.15	16.6083	2.082	0.467	1.067	1.067	0.479	0.479	0.479	0.96601	0.96601	0.353	0.362	0.72518	0.72518
BMS2	DEFAULT	biomass combustor stack 2	749634.92000	4001835.85000	180.0	30.48	383.15	16.6083	2.082	0.467	1.067	1.067	0.479	0.479	0.479	0.96601	0.96601	0.353	0.362	0.72518	0.72518
BMS3	DEFAULT	biomass combustor stack 3	749636.60000	4001766.03000	180.0	30.48	383.15	16.6083	2.082	0.467	1.067	1.067	0.479	0.479	0.479	0.96601	0.96601	0.353	0.362	0.72518	0.72518
BMS4	DEFAULT	biomass combustor stack 4	749636.99000	4001749.58000	180.0	30.48	383.15	16.6083	2.082	0.467	1.067	1.067	0.479	0.479	0.479	0.96601	0.96601	0.353	0.362	0.72518	0.72518
WSAC_NWS	DEFAULT	WSAC Northwest building-south cell	749572.19000	4001842.78000	180.0	10.973	310.93	10	7.925							0.00663	0.00663			0.00578	0.00578
WSAC_NWN	DEFAULT	WSAC Northwest building-north cell	749571.33000	4001873.30000	180.0	10.973	310.93	10	7.925							0.00663	0.00663			0.00578	0.00578
WSAC_NES	DEFAULT	WSAC Northeast building-south cell	749589.30000	4001843.16000	180.0	10.973	310.93	10	7.925							0.00663	0.00663			0.00578	0.00578
WSAC_NEN	DEFAULT	WSAC Northeast building-north cell	749588.41000	4001873.58000	180.0	10.973	310.93	10	7.925							0.00663	0.00663			0.00578	0.00578
WSAC_SWN	DEFAULT	WSAC Southwest building-north cell	749574.28000	4001751.77000	180.0	10.973	310.93	10	7.925							0.00663	0.00663			0.00578	0.00578
WSAC_SES	DEFAULT	WSAC Southeast building-south cell	749592.03000	4001730.32000	180.0	10.973	310.93	10	7.925							0.00663	0.00663			0.00578	0.00578
WSAC_SEN	DEFAULT	WSAC Southeast building-north cell	749591.36000	4001752.16000	180.0	10.973	310.93	10	7.925							0.00663	0.00663			0.00578	0.00578
WSAC_SWS	DEFAULT	WSAC Southwest building-south cell	749574.77000	4001729.94000	180.0	10.973	310.93	10	7.925							0.00663	0.00663			0.00578	0.00578
GEN1	DEFAULT	emergency diesel generator 1	749501.40000	4001847.85000	180.0	7.62	622	45.401	0.300	1.779	0.973	0.122	0.000934	0.000311	0.000039	0.00663	0.00663			0.00578	0.00578
GEN2	DEFAULT	emergency diesel generator 2	749503.81000	4001747.59000	180.0	7.62	622	45.401	0.300	1.779	0.973	0.122	0.000934	0.000311	0.000039	0.00232	0.00210	2.44E-03	1.28E-06	0.00008	0.00008
DF_PUMP1	DEFAULT	Diesel fire waterpump 1	749153.17000	4001812.74000	180.0	3.048	622	50.075	0.120	0.342	0.181	0.023	0.000188	0.000063	0.000008	0.00232	0.00210	2.44E-03	1.28E-06	0.00008	0.00008
DF_PUMP2	DEFAULT	Diesel fire waterpump 2	749154.88000	4001742.72000	180.0	3.048	622	50.075	0.120	0.342	0.181	0.023	0.000188	0.000063	0.000008	0.00043	0.00043	2.03E-03	1.12E-06	0.00006	0.00006
BIOBAG1	HORIZONTAL	biomass handling baghouse 1	749778.00000	4001872.15000	180.0	11.7988	311	10.049	1.862							0.00043	0.00043	2.03E-03	1.12E-06	0.00006	0.00006
BIOBAG2	HORIZONTAL	biomass handling baghouse 2	749778.00000	4001736.87000	180.0	11.7988	311	10.049	1.862							1.39E-05	2.10E-06			6.95E-09	1.05E-09
																1.39E-05	2.10E-06			6.95E-09	1.05E-09
VOLUMN SOURCES																					
LIMSHDL1		limestone silo 1	749752.3400	4001871.2100	180.0	1.0										3.33E-07	5.04E-08			3.33E-07	5.04E-08
LIMSHDL2		limestone silo 2	749752.5100	4001883.8100	180.0	1.0										3.33E-07	5.04E-08			3.33E-07	5.04E-08
LIMSHDL3		limestone silo 3	749755.3000	4001743.7200	180.0	1.0										3.33E-07	5.04E-08			3.33E-07	5.04E-08
LIMSHDL4		limestone silo 4	749755.6500	4001735.4000	180.0	1.0										3.33E-07	5.04E-08			3.33E-07	5.04E-08
ASHHDL1		ash silo 1	749633.9800	4001882.2300	180.0	1.0										3.33E-07	5.04E-08			3.33E-07	5.04E-08
ASHHDL2		ash silo 2	749635.7500	4001805.9000	180.0	1.0										2.50E-06	3.79E-07			2.50E-06	3.79E-07
ASHHDL3		ash silo 3	749635.9700	4001795.9700	180.0	1.0										2.50E-06	3.79E-07			2.50E-06	3.79E-07
ASHHDL4		ash silo 4	749637.8900	4001719.5600	180.0	1.0										2.50E-06	3.79E-07			2.50E-06	3.79E-07
HLIMHDL1		hydrate lime storage silo 1	749620.5100	4001845.9200	180.0	1.0										2.50E-06	3.79E-07			2.50E-06	3.79E-07
HLIMHDL2		hydrate lime storage silo 2	749620.8100	4001841.4500	180.0	1.0										1.38E-07	2.09E-08			1.38E-07	2.09E-08
HLIMHDL3		hydrate lime storage silo 3	749622.6200	4001759.7600	180.0	1.0										1.38E-07	2.09E-08			1.38E-07	2.09E-08
HLIMHDL4		hydrate lime storage silo 4	749622.6900	4001755.3600	180.0	1.0										1.38E-07	2.09E-08			1.38E-07	2.09E-08
																1.38E-07	2.09E-08			1.38E-07	2.09E-08
AREA SOURCES																					
BIOAREA1		biomass collection area 1	749783.0000	4001827.0000	180.0	0.5										1.28E-03	2.70E-04			6.40E-07	1.35E-07
BIOAREA2		biomass collection area 2	749784.0000	4001759.0000	180.0	0.5										1.28E-03	2.70E-04			6.40E-07	1.35E-07

NOTE:

1. Normal operation is using combustor scenario #3 stack parameters except for CO and PM
2. Normal operation for CO-1hr is using combustor scenario #12 stack parameters.
   8.02281346
3. Normal operation for CO-8hr is using combustor scenario #10 stack parameters.
   8.192939311 = Exit Velocity (m/s)
4. Normal operation for PM-24hr and PM-annual is using combustor scenario #1 stack parameters.
   17.38153774 = Exit Velocity (m/s)
5. Normal annual emissions include the annual startup emissions
6. Short-term averages do not include any startup emissions
7. Worst day operation will be 12 hours operation for any of the limestone, hydrated lime, or fly ash handlings and 24 hours for biomass unloading & handling.

Startup Scenarios

StackID	Stack Release Type	Description	UTM x (m)	UTM y (m)	Elevation (m)	stack ht (m)	temp (K)	exit velocity (m/s)	diameter (m)	Short-term Emission Rate (g/s) 1hour NO_x	1hour CO	8hour CO	1hour SO_2	3hour SO_2	24hour SO_2
BMS1	DEFAULT	biomass combustor stack 1	749634.53	4001852.2	180	30.48	383.15	10.138	2.0818	4.744	1.955	1.192	5.864	3.737	0.886
BMS2	DEFAULT	biomass combustor stack 2	749634.92	4001835.85	180	30.48	383.15	10.138	2.0818	4.744	1.955	1.192	5.864	3.737	0.886
BMS3	DEFAULT	biomass combustor stack 3	749636.6	4001766.03	180	30.48	383.15	10.138	2.0818	4.744	1.955	1.192	5.864	3.737	0.886
BMS4	DEFAULT	biomass combustor stack 4	749636.99	4001749.68	180	30.48	383.15	10.138	2.0818	4.744	1.955	1.192	5.864	3.737	0.886
GEN1	DEFAULT	emergency diesel generator 1	749501.4	4001847.66	180	7.62	622.00	45.401	0.3000	1.779	0.973	0.122	0.000934	0.000311	0.000039
GEN2	DEFAULT	emergency diesel generator 2	749503.81	4001747.59	180	7.62	622.00	45.401	0.3000	1.779	0.973	0.122	0.000934	0.000311	0.000039
DF_PUMP1	DEFAULT	Diesel fire waterpump 1	749153.17	4001812.74	180	3.05	622.00	50.075	0.1200	0.342	0.181	0.023	0.000188	0.000063	0.000008
DF_PUMP2	DEFAULT	Diesel fire waterpump 2	749154.88	4001742.72	180	3.05	622.00	50.075	0.1200	0.342	0.181	0.023	0.000188	0.000063	0.000008

Note:

1. Stack flow calcs for startup

we know

stack exhaust Flow (lb/hr)	248,592
stack temp (F)	230.00
stack temp (K)	383.15

assume that the stack gas has the same density as air.
density of air 1.275 at 0°C and 1000mb

use the ideal gas law P=ρRT
then, $\rho_2 = \rho_1 \times T_1/T_2$

density of stack gas (kg/m³) =	0.908 at F =	383.15 K and 1000 mb
density of stack gas (lb/ft³) =	0.0567 at F =	383.15 K and 1000 mb

therefore,

stack exhaust Flow (acfm)	73121
acfm = actual cubic feet per minute	
stack exhaust Flow (acf/sec)	1218.7
stack exhaust Flow (m³/s)	34.5093277

diameter (ft)	6.830052493
diameter (m)	2.0818
m/s	10.13838102

2. Biomass Hopper Baghouse Parameter Calculation

Data Provided by FBD (June 17, 2009)

Baghouse height	45.00	feet		
Baghouse diameter	13.97	feet		
Baghouse stack height	38.71	feet		
Baghouse stack diameter	5.58	feet by	5.25	feet rectangle horizontal stack
Baghouse effective stack diameter	6.11	feet		
Outlet grain loading	0.01	grains/DSCF		
	1.43E-06	lb/ft³		
Baghouse flow rate	58,000.00	acfm		
	4.97	lb/hr		
	0.63	g/s		
Hopper height	27.00	feet		
Hopper width	12.75	feet, or	3.89	meter
Hopper length	37.84	feet, or	11.53	meter

Combustor Scenarios in Different Load, Ambient Temperature, and Relative Humidity

Cases / Parameters	1	2	3	4	5	6	7	8	9	10	11	12
Load	100%	100%	100%	100%	75%	75%	75%	75%	50%	50%	50%	50%
Ambient Temperature (degree F)	30	60	70	90	30	60	70	90	30	60	70	90
Ambient Relative Humidity	90%	60%	9%	20%	90%	60%	9%	20%	90%	60%	9%	20%
Total Energy Input, MBtu/hr (HHV)	315.7	313.8	310.6	310.2	234.9	234.3	231.9	231.6	154.8	154.6	153.2	152.9
Exhausted Temperature (degree F)	230	230	230	230	230	230	230	230	230	230	230	230
Gas Flow (lb/hr)	416,370	405,897	395,963	398,467	299,207	301,670	294,977	296,175	187,893	191,652	188,130	188,315
Exhausted Flow Rate (acfm)	125,361	125,771	119,784	123,041	89,868	93,263	89,118	91,244	56,291	59,090	56,735	57,863
Exhausted Flow Rate (m/s)	17.381538	17.438385	16.608276	17.059865	12.460367	12.931090	12.356378	12.651152	7.804853	8.192939	7.866414	8.022813
Exhausted Moisture Content (Wt %)	13.4	18.6	14.5	18.0	13.3	18.2	14.32	17.7	13.3	18.1	14.3	17.5
CO (lb/hr)	6.3	8.5	6.20	8.4	4.6	6.8	4.63	6.7	5.7	7.2	5.9	7.1
SO_2 (lb/hr)	3.8	3.8	3.74	3.7	2.4	2.4	2.35	2.4	1.5	1.5	1.46	1.5
NO_X (lb/hr)	3.7	3.7	3.63	3.6	2.7	2.7	2.71	2.7	1.8	1.8	1.77	1.8
PM_{10} (lb/hr)	7.7	7.2	7.321	7.2	5.6	5.4	5.469	5.4	3.1	3.0	3.536	3.0
$PM_{2.5}$ (lb/hr)	7.7	7.2	7.321	7.2	5.6	5.4	5.469	5.4	3.1	3.0	3.536	3.0
VOC (lb/hr)	1.0	1.3	0.98	1.3	0.8	1.1	0.73	1.1	0.7	0.77	0.70	0.76
CO (lb/MMBtu)	0.02	0.027	0.020	0.027	0.02	0.029	0.020	0.029	0.037	0.046	0.039	0.046
SO_2 (lb/MMBtu)	0.012	0.012	0.012	0.012	0.01	0.01	0.010	0.01	0.01	0.01	0.010	0.01
NO_X (lb/MMBtu)	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
PM_{10} (lb/MMBtu)	0.024	0.023	0.024	0.023	0.024	0.023	0.024	0.023	0.02	0.019	0.023	0.019
$PM_{2.5}$ (lb/MMBtu)	0.024	0.023	0.024	0.023	0.024	0.023	0.024	0.023	0.02	0.019	0.023	0.019
VOC (lb/MMBtu)	0.003	0.004	0.003	0.004	0.003	0.005	0.003	0.005	0.005	0.005	0.005	0.005
CO (ppmdv)[3]	18.7	25.3	20.0	25.3	18.5	27.1	20.0	27.1	34.3	43.4	40.0	43.4
SO_2 (ppmdv)[3]	4.9	4.9	5.3	4.9	4.2	4.2	4.4	4.2	3.9	3.9	4.3	3.9
NO_X (ppmdv)[3]	6.7	6.7	7.1	6.7	6.7	6.7	7.1	6.7	6.6	6.6	7.3	6.6
VOC (ppmdv)[3]	2	2.5	2.0	2.5	1.9	2.7	2.0	2.7	2.7	3	3.0	3

Note:

1. Other stack parameters
   - stack height = 100 ft
   - stack diameter = 6.83 ft
2. all cases are for burning 100% wood waste and for 75% annual capacity (6,570 hours per year)
3. All ppm corrected to 7% O_2, dry basis
4. Updated from 2009/06/05 version of "combustor scenarios (for EPI)_20090605.pdf" from EPI except for the Case 3, 7, and 11.
5. Case 3, 7 and 11 used the data from "emiss 100% 5 21 09 Rev A.pdf", "emiss 75% 5 21 09 Rev B.pdf", and "emiss 50% 5 21 09 Rev A.pdf", respectively. (all from EPI)

Combustor Maximum Emission Estimations

Emissions from maximum combustor emissions with 100% wood waste fuel

Pollutants	Each Combustor Train							Total Project (4 combustor trains)		
	Maximum Emission Factors	Maximum Emission Concentration	Maximum Hourly Emissions[2]	Daily Emissions (normal operations all day)	Daily Emissions (normal operations and 1 startup event)	Maximum Daily Emissions[4,5]	Annual Emissions (normal operations and 2 startup events)[1]	Maximum Hourly Emissions	Maximum Daily Emissions[4,5]	Annual Emissions (normal operations and 2 startup events)[1]
	(lb/MMBtu)	(ppmdv)	(lb/hr)	(lb/day)	(lb/day)	(lb/day)	(tons/yr)	(lb/hr)	(lb/day)	(tons/yr)
CO	0.046	43.40	8.46	203.04	193.86	203.04	27.85	33.84	812.16	111.40
SO_2	0.012	5.30	3.80	91.20	147.64	147.64	12.57	15.20	590.55	50.28
NO_X	0.012	7.30	3.70	88.80	161.30	161.30	12.26	14.80	645.20	49.03
PM_{10}	0.024	NA	7.66	183.84	145.74	183.84	25.19	30.64	735.36	100.75
$PM_{2.5}$[3]	0.024	NA	7.66	183.84	145.74	183.84	25.19	30.64	735.36	100.75
VOC (total)	0.005	3.00	1.32	31.68	26.86	31.68	4.34	5.28	126.72	17.37

Notes:

1. Operation schedule and heat input:
   6570 Annual operations based on 75% capacity (not including startup hours)
2. Hourly emissions and emission concentration per combustor are from EPI emission data from 27-May-09 (EPI reference #1587) revision #5 for 100% load, 100% wood waste
3. Assumes all $PM_{10} = PM_{2.5}$
4. All day in normal operations has the maximum daily emissions for PM and VOC.
5. Maximum daily emissions for CO, SO_2, and NO_x include 1 startup event and the rest of time in normal operations.
6. Maximum emission factors, maximum emission concentration, and maximum hourly emissions may happen in different combustor scenarios.

Combustors Data from EPI

Combustor Scenarios

Rev 1 6 5 00

Cases / Parameters	1	2	3	4	5	6	7	8	9	10	11	12
Load	100%	100%	100%	100%	75%	75%	75%	75%	50%	50%	50%	50%
Ambient Temperature (degree F)	30	50	70	90	30	50	70	90	30	50	70	90
Ambient Moisture Humidity	90%	90%	9%	30%	90%	60%	9%	30%	90%	60%	9%	30%
Total Energy Input, Volumy (MMV)	315.7	313.9	310.6	310.2	234.9	234.3	231.9	231.6	154.5	154.6	153.2	153.9
Exhaust Conditions												
Exhausted Temperature (degree F)	230	230	230	230	230	230	230	230	230	230	230	230
Gas Flow (lb/hr)	416,370	425,827	395,953	385,457	299,237	301,670	294,417	296,176	197,893	191,552	187,501	185,315
Exhausted Flow Rate (acfm)	125,351	125,771	119,784	123,561	89,865	93,263	88,857	91,244	59,291	59,090	56,443	57,563
Exhausted Moisture Content (vol %)	13.4	13.6	14.5	15.0	13.3	13.2	14.2	17.7	13.3	15.1	16	17.5
Emissions												
CO (lb/hr)	6.3	6.5	6.2	6.4	4.6	5.6	4.5	6.7	5.7	7.2	5.9	7.1
SO_2 (lb/hr)	3.6	3.9	3.7	3.7	2.4	2.4	2.4	2.4	1.5	1.5	1.5	1.5
NO_x (lb/hr)	2.7	2.7	3.6	3.5	2.7	2.7	2.7	2.7	1.8	1.8	1.8	1.8
PM_{10} (lb/hr)	7.7	7.2	7.0	7.2	5.6	5.4	5.5	5.4	3.1	3.5	3.0	3.0
$PM_{2.5}$ (lb/hr)	7.7	7.2	7.0	7.2	5.6	5.4	5.5	5.4	3.1	3.5	3.0	3.0
VOC (lb/hr)	1.0	1.5	1.0	1.3	0.6	1.1	0.7	1.1	0.7	0.77	0.75	0.75
CO (lb/MMBtu)	0.02	0.021	0.02	0.021	0.02	0.024	0.02	0.029	0.037	0.047	0.039	0.046
SO_2 (lb/MMBtu)	0.012	0.012	0.012	0.012	0.01	0.01	0.010	0.01	0.01	0.01	0.010	0.01
NO_x (lb/MMBtu)	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
PM_{10} (lb/MMBtu)	0.024	0.023	0.024	0.023	0.024	0.023	0.024	0.023	0.02	0.019	0.02	0.019
$PM_{2.5}$ (lb/MMBtu)	0.024	0.023	0.024	0.023	0.024	0.023	0.024	0.023	0.02	0.019	0.02	0.019
VOC (lb/MMBtu)	0.003	0.004	0.003	0.004	0.003	0.005	0.003	0.005	0.005	0.005	0.005	0.005
CO (ppmdv)[3]	18.7	25.3	18.7	25.3	18.8	27.1	18.7	27.1	34.3	43.4	36.1	43.4
SO_2 (ppmdv)[3]	4.9	4.9	4.9	4.9	4.2	4.2	4.2	4.2	3.9	3.9	3.9	3.9
NO_x (ppmdv)[3]	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.6	6.6	6.6	6.6
VOC (ppmdv)[3]	2	2.5	1.9	2.5	1.9	2.7	1.9	2.7	2.7	3	2.7	3

Note:

1. Other stack parameters
   - stack height = 150 ft
   - stack diameter = 6.83 ft
2. All cases are for 100% wood and 71% capacity (6,570 hours per year)
3. All ppm corrected to 7% O2, dry basis

Combustors Data from EPI

EMISSIONS AT STACK

EPI Reference Number: 1187
Customer: Sycamore - Steam cycle -004-C
Project Name: San Joaquin, Ca
100%

Performed by: mhm
Date: 27-May-09
Revision: 5
Filename: permit calc 5 21 09
Page: 1a

emissions per boiler

Flue Gas @ ID Fan Outlet						
	Mass Flow	395,963	lbs/hr		O2	6.04 % vol.(dry)
	Vol. Flow	119,784	acfm		CO2	14.41 % vol.(dry)
	Temp.	330	deg. F		N2	79.54 % vol.(dry)
	Dry MW	30.57	moles/lb		density	0.253 lb/ft3
	Wet MW	27.75	moles/lb			
	Std. Vol.	92,008	scfm		Moisture	14.51 % by vt.
	Std. Dry Vol	71,398	sdcfm		Moisture	22.40 % by vol.

Flue Gas @ Stack				Scf Gas
	Mass Flow	395,581	lbs/hr	100.00%
	Vol. Flow	119,784	acfm	100.00%
	Temp.	330	deg. F	
	Std. Vol.	92,008	scfm	100.00%
	Std. Dry Vol.	71,398	sdcfm	100.00%

capacity factor: 75.00%

Emissions @ Stack		Potential Controlled Emissions			Abated Emissions @ Stack			
Pollutant	mole. wt.	gr/scdf	lbs/hr	lbs/MBtu	gr/scdf	lbs/hr	lbs/MBtu	Tons/yr
CO	28.01				20.0	6.20	0.020	20.38
SO2	64.07	111	78.77	0.254	5.3	3.74	0.012	12.29
NOx	46.01	159	131.99	0.423	7.1	3.63	0.012	11.92
HCl	36.47	88	35.45	0.114	3.5	1.42	0.005	4.66
VOC	44.09				2.0	0.98	0.003	3.21
NH3	17.03				3.0	0.94	0.003	

Particulate -Front Half Catch

	Potential From FBI	Leading To Cleanup	Abated @ Stack
gr/SDCF	4.28	1.10	0.005
lbs/hr	2.635	675	3.04
lbs/day	62.890	16,191	72.87
tons/yr	9.608	2.216	9.97
lbs/MMBTU	0.437	2.172	0.010

Particulate Back Half Catch - Only

	Potential From FBI	Leading To Stack	Abated @ Stack
gr/SDCF	0.035	0.035	0.007
lbs/hr	21	21	4
lbs/day	514	514	103
tons/yr	70	70	14
lbs/MBTU	0.069	0.069	0.014

Total Particulate	
Abated @ Stack	
0.012	
7.321	
175.701	
24.049	
0.024	

Combustors Data from EPI

EMISSIONS AT STACK

EPI Reference Number: 1587
Customer: Spreaker - Steam cycle -004-C
Project Name: San Joaquin, ca
75%
emissions per boiler

Performed by: mlm
Date: 18-May-09
Revision: 4
Filename: [illegible]
Page 1a

Flue Gas @ ID Fan Outlet

Mass Flow	294,977	lbs/hr	O2	6.04	% vol.(dry)
Vol. Flow	89,118	acfm	CO2	14.41	% vol.(dry)
Temp.	330	deg. F	N2	79.54	% vol.(dry)
Dry MW	30.57	moles/lb	density	0.056	lb/ft3
Wet MW	27.79	moles/lb			
Std. Vol.	68,453	scfm	Moisture	14.32	% by wt.
Std. Dry Vol	53,316	sdcfm	Moisture	22.11	% by vol

Flue Gas @ Stack

			% of Total
Mass Flow	294,977	lbs/hr	100.00%
Vol. Flow	89,118	acfm	100.00%
Temp	330	deg. F	
Std. Vol	68,453	scfm	100.00%
Std. Dry Vol	53,316	sdcfm	100.00%

capacity factor 75.00%

Emissions @ Stack

		Potential Controlled Emissions			Abated Emissions @ Stack			
Pollutant	mole. wt	grs/dcf	lbs/hr	lbs/MBtu	grs/dcf	lbs/hr	lbs/MBtu	Tons/yr
CO	28.01				50.0	4.63	0.029	15.22
SO2	64.07	111	58.82	0.354	4.4	2.35	0.013	7.73
NOx	46.01	259	98.57	0.625	7.1	2.71	0.012	8.90
HCl	36.47	88	25.47	0.154	3.5	1.05	0.006	3.48
VOC	44.09				2.0	0.73	0.003	2.40
NH3	17.03				5.0	0.70	0.003	

Particulate -Front Half Catch

	Potential From FBI	Loading To Clarifier	Abated @ Stack
gr/SDCF	4.28	1.10	0.035
lbs/hr	1,957	504	2.27
lbs/day	46,963	12,104	54.48
tons/yr	8.428	1.957	7.48
lbs/MMBTU	8.427	2.174	0.010

Particulate Back Half Catch - Only

	Potential From FBI	Loading To Stack	Abated @ Stack
gr/SDCF	0.035	0.035	0.007
lbs/hr	16	16	3
lbs/day	384	384	77
tons/yr	53	53	11
lbs/MBTU	0.069	0.069	0.014

Total Particulate
Abated @ Stack
0.012
5.469
131.253
17.957
0.024

Combustors Data from EPI

EMISSIONS AT STACK

EPI Reference Number: 1587
Customer: Spreaker - Steam cycle -054-C
Project Name: San Joaquin, ca
10%
emissions per boiler

Performed by: mlm
Date: 27-Mar-09
Revision: 4
Reference: permit info 5 21 09
Page: 1a

Flue Gas @ ID Fan Outlet					
	Mass Flow	188,130	lbs/hr	O2	5.68 % vol (dry)
	Vol. Flow	56,735	acfm	CO2	14.95 % vol (dry)
	Temp	230	deg. F	N2	79.36 % vol (dry)
	Dry MW	30.03	moles/lb	density	0.055 lb/ft3
	Wet MW	27.84	moles/lb		
	Std. Vol.	43,579	scfm	Moisture	14.30 % by wt
	Std. Dry Vol.	33,944	sdcfm	Moisture	22.11 % by vol.

Flue Gas @ Stack				% of Total
	Mass Flow	188,130	lbs/hr	100.00%
	Vol. Flow	56,735	acfm	100.00%
	Temp	230	deg. F	
	Std. Vol.	43,579	scfm	100.00%
	Std. Dry Vol.	33,944	sdcfm	100.00%

Capacity Factor: 75.00%

Emissions @ Stack		Potential Uncontrolled Emissions			Abated Emissions @	Stack		
Pollutant	Molec. Wt.	gr/scf	lbs/hr	lbs/MMBtu	gr/scf	lbs/hr	lbs/MMBtu	Tons/yr
CO	28.01				60.0	5.90	0.039	19.38
SO2	64.07	115	38.84	0.254	6.3	1.45	0.010	4.79
NOx	46.01	259	65.09	0.425	7.3	1.77	0.012	5.82
HCl	36.47	91	17.48	0.114	3.6	0.70	0.005	2.30
VOC	44.09				3.0	0.70	0.005	2.29
NH3	17.03				5.0	0.45	0.003	

Particulate - Front Half Catch

	Potential From FBC	Leading To Chimney	Abated @ Stack
gr/SDCF	4.44	1.15	0.035
lbs/hr	1,292	333	10.00
lbs/day	31,013	7,996	239.99
tons/yr	4,245	1,094	32.83
lbs/MMBTU	8.437	2.175	0.065

Particulate Back Half Catch - Only

recovered either	60.00%	Potential From FBC	Leading To Stack	Abated @ Stack
gr/SDCF		0.035	0.035	0.007
lbs/hr		10	10	2
lbs/day		264	264	49
tons/yr		33	33	7
lbs/MBTU		0.066	0.066	0.013

Total Particulate
Abated @ Stack
0.013
3.536
84.875
11.917
0.023

Total Project SJS 1&2

Calculation of CO_2 emissions from burning the combination of agricultural and wood waste in all 4 fluidized be

Quantity of wood waste burned per year	609,170 tons/yr
Quantity of ash created per year	30,459 tons/yr
Wood - ash	578,712 tons/yr
Carbon fraction of fuel from wood waste (as received value)	0.4885 by weight
Assume all fuel carbon is converted to CO_2	
CO_2 annual emissions (tonnes per year) =	940,168

Note:

1. Assumes all the carbon in ash does not convert to CO_2
2. Data from EPI emissions data on "Ambient Variation 5 27 09.pdf (rev 5)" for normal ambient conditions.

Combustor Startup Emission Estimations

Table 1587 (from EPI)
BFB Cold Start-up Sequence[1]

Start time (hrs)	1	2	3	4	5	6	7	8	NOTES
main steam flow	16%	24%	29%	39%	44%	48%	77%	100%	ratio calculated based on total heat input
Wood flow (pph)	-	-	-	-	-	-	13,028	53,847	Maximum wood firing rate for short-term emission calcs.
heat (MMBtu/hr) (HHV)	50	75	90	120	135	150	165	-	3 x 50 MBtu/hr overbed and 1 x 15 MBtu/hr underbed.
Wood heat input (MMBtu/hr) (HHV)	-	-	-	-	-	-	75	310	
Total heat input (MMBtu/hr) (HHV)	50	75	90	120	135	150	240	310	Calculated as the sum of nat gas startup and wood MMBtu
Bed Temperature (degree F)	100	300	500	650	725	725	1,200	1,300	
Vapor Temperature	450	600	750	950	1,200	1,200	1,500	1,700	
Gas Flow	308,704	362,051	336,057	322,391	248,592	294,449	302,398	363,716	
Stack Temperature	100	120	150	200	230	230	230	230	
Stack Exit Flow (scfm) approximately	68,601	80,456	74,679	71,642	55,243	65,433	67,199	80,826	
NO_x Removal Efficiency (%)	-	-	-	-	-	-	-	77	Not until SNCR is activated
SO_2 Removal Efficiency (%)	-	-	-	-	-	-	-	71	No acid gas scrubbing till hour 7
HCl Removal Efficiency (%)	-	-	-	-	-	-	-	96	No acid gas scrubbing till hour 7
NO_x Emission Factors (lb/MMBtu)	0.0620	0.0620	0.0620	0.0620	0.0620	0.0620	0.1570	0.0840	0.02 after SCR @ 9hr
SO_2 Emission Factors (lb/MMBtu)	-	-	-	-	-	-	0.1590	0.1500	0.012 after wet scrub @ 9hr
PM/PM_{10} Emission Factors (lb/MMBtu)	-	-	-	-	-	-	0.0141	0.0450	0.025 after wet scrub @ 9hr
CO Emission Factors (lb/MMBtu)	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.02 after SCR @ 9hr
VOC Emission Factors (lb/MMBtu)	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0047	0.0120	0.003 after SCR @ 9hr
HCl Emission Factors (lb/MMBtu)	-	-	-	-	-	-	0.0390	0.0050	
NO_x Emissions (lb/hr)	3.10	4.65	5.58	7.44	8.37	9.30	37.62	26.04	
SO_2 Emissions (lb/hr)	-	-	-	-	-	-	38.14	46.50	
PM/PM_{10} Emissions (lb/hr)	-	-	-	-	-	-	3.38	13.95	
CO Emissions (lb/hr)	2.50	3.75	4.50	6.00	6.75	7.50	12.00	15.50	
VOC Emissions (lb/hr)	0.07	0.11	0.13	0.17	0.19	0.21	1.14	3.72	
HCl Emissions (lb/hr)	-	-	-	-	-	-	9.37	1.55	

Additional Emission Factors For Tho Natural Gas [2,3,5,6,7]

SO_2 Emission Factors (lb/10^6 scf)	2.854	2.854	2.854	2.854	2.854	2.854	2.854	2.854
PM/PM_{10} Emission Factors (lb/10^6 scf)	7.600	7.600	7.600	7.600	7.600	7.600	7.600	7.600
CO_2 Emission Factors (lb/10^6 scf)	120,000.000	120,000.000	120,000.000	120,000.000	120,000.000	120,000.000	120,000.000	120,000.000
CH_4 Emission Factors (lb/10^6 scf)	2.300	2.300	2.300	2.300	2.300	2.300	2.300	2.300
N_2O Emission Factors (lb/10^6 scf)	0.640	0.640	0.640	0.640	0.640	0.640	0.640	0.640
SO_2 Emission Factors (lb/MMBtu)	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
PM/PM_{10} Emission Factors (lb/MMBtu)	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
CO_2 Emission Factors (lb/MMBtu)	117.647	117.647	117.647	117.647	117.647	117.647	117.647	117.647
CH_4 Emission Factors (lb/MMBtu)	0.002		0.002	0.002	0.002	0.002	0.002	0.002
N_2O Emission Factors (lb/MMBtu)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Additional GHG Emission Factors For Wood Combustions [9]

CO_2 Emission Factors (lb/MMBtu)	206.948	206.948	206.948	206.948	206.948	206.948	206.948	206.948
CH_4 Emission Factors (lb/MMBtu)	0.071	0.071	0.071	0.071	0.071	0.071	0.071	0.071
N_2O Emission Factors (lb/MMBtu)	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009

Combined Emission Rates In The Startup Event

NO_x Emissions (lb/hr)	3.10	4.65	5.58	7.44	8.37	9.30	37.62	26.04
SO_2 Emissions (lb/hr)	0.14	0.21	0.25	0.34	0.38	0.42	38.60	46.50
PM/PM_{10} Emissions (lb/hr)	0.37	0.56	0.67	0.89	1.01	1.12	4.61	13.95
CO Emissions (lb/hr)	2.50	3.75	4.50	6.00	6.75	7.50	12.00	15.50
VOC Emissions (lb/hr)	0.07	0.11	0.13	0.17	0.19	0.21	1.14	3.72
HCl Emissions (lb/hr)	-	-	-	-	-	-	9.37	1.55
CO_2 Emissions (lb/hr)	5,882.35	8,823.53	10,588.24	14,117.65	15,882.35	17,647.06	34,932.86	64,153.87
CH_4 Emissions (lb/hr)	0.11	-	0.20	0.27	0.30	0.34	5.66	21.87
N_2O Emissions (lb/hr)	0.03	0.05	0.06	0.08	0.08	0.09	0.80	2.87

Startup Info.

4 burners per fluidized bed combustor used for startup, one 15 MMBtu/hr and three 50 MMBtu/hr burners

Total power rating (4 burners) 165 MMBtu/hr

	Number of startups per year per combustor	Duration of each startup (hours)	Total MMBtu from Natural Gas Burner per startup event
Cold start	2	8	785
Annual operations	16	hrs/yr	
Max daily operations	8	hrs/day	

7 hrs/start with power rating as shown in the table provided by EPI

Startup Emission Estimates (Natural Gas Burners and Combustors) [4,6]

	Each Combustor Train (With 4 Natural Gas Burners)				Total Project (4 combustor trains)		
	Max Hourly Emissions (during 8 hour startup event)	Emissions from the Natural Gas Burners (only from 4 burners from hour 1 through 7)	Emissions in the Entire Startup Event (from 4 burners and wood combustion from hour 1 through 8)	Annual Startup Emissions	Max Hourly Emissions (during 8 hour startup event)	Emissions in the Entire Startup Event (from 4 burners and wood combustion from hour 1 through 8)	Annual Startup Emissions
	lb/hr	lbs	lbs	ton/yr	lb/hr	lbs	ton/yr
NO_x	37.62	48.67	102.10	0.10	150.48	408.40	0.41
CO	15.50	39.25	58.50	0.06	62.00	234.00	0.23
VOC (TOC)	3.72	1.10	5.74	0.01	14.88	22.96	0.02
SO_2	46.50	2.20	86.84	0.09	186.00	347.35	0.35
PM_{10}	13.95	5.85	23.18	0.02	55.80	92.72	0.09
$PM_{2.5}$	13.95	5.85	23.18	0.02	55.80	92.72	0.09
CO_2	64,153.87	92,352.94	172,027.91	172.03	256,615.47	688,111.62	688.11
CH_4	21.87	0.17	28.76	0.03	87.48	115.05	0.12
N_2O	2.87	0.54	4.06	0.00	11.48	16.23	0.02

Note:

1. Emission factors for NOx, CO and VOC from vendor (EPI)
2. Emission factors for PM_{10}, CO_2, CH_4 & N_2O from AP-42 Table 1.4-2 for Natural Gas Combustion
3. Emission factor for SO_2 from mass balance and sulfur content of the natural gas
4. Assume all of the PM_{10}=$PM_{2.5}$
5. Sulfur content 1 gr/100 scf
6. Thermal equivalent 1,020 Btu/scf from AP-42 Appendix A
7. Emissions exhausted through the combustor stack.
8. The combustors can stay warm for up to 48 hours.
9. Greenhouse gas emission factors from CCAR General Reporting Protocol January 2009 Tables C.7 and C.8

WSAC Drift Calculation

Four 2-cell Wet Surface Air Cooler Condensers (WSAC)

Cooling Towers
Total Project SJS 1&2

Annual average design circulating water rate	61,000	gallons/min	
Maximum daily design circulating water rate	70,000	gallons/min	
Cycles of concentration	4		
TDS	600	mg/liter	
	5.01	lb/1000 gallons	
Drift Eliminator Control	0.000005	=	0.0005 %
Operating hours per year	8760	hr/yr	
number of 2-cell WSAC	4		
Number of cells in each cooling tower	2		

	Total SJS 1&2	Each 2-cell WSAC	each cell	each cell (g/s)
Annual PM emissions (ton/year)	1.61	0.40	0.201	0.00578
Maximum daily PM emissions (lb/day)	10.09	2.52	1.262	0.00663

Total Project SJS 1&2

Fugitive Emissions from Material Handling

	Usage (lb/hr)	Usage (ton/hr)	M = material moisture content (%)	PM_{10} Emission Factor (lb/ton)	$PM_{2.5}$ Emission Factor (lb/ton)	Emissions Without Controls		Control Efficiency		Emissions With Controls					
						PM_{10} Emission Rate (lb/hr)	$PM_{2.5}$ Emission Rate (lb/hr)	PM_{10} Control (%)	$PM_{2.5}$ Control (%)	PM_{10} Emission Rate (lb/hr)	$PM_{2.5}$ Emission Rate (lb/hr)	PM_{10} Daily Emission Rate (lb/day)	$PM_{2.5}$ Daily Emission Rate (lb/day)	PM_{10} Annual Emission Rate (ton/yr)	$PM_{2.5}$ Annual Emission Rate (ton/yr)
Biomass unloading & handling conveyor drops	185,440	92.7	27	3.39E-05	5.14E-06	3.15E-03	4.77E-04	0%	0%	3.15E-03	4.77E-04	7.55E-02	1.14E-02	1.38E-02	2.09E-03
Limestone unloading & handling	1,232	0.6	1	3.42E-03	5.19E-04	2.11E-03	3.19E-04	99%	99%	2.11E-05	3.19E-06	2.53E-04	3.83E-05	4.62E-05	7.00E-06
Hydrated Lime unloading & handling	512	0.3	1	3.42E-03	5.19E-04	8.77E-04	1.33E-04	99%	99%	8.77E-06	1.33E-06	1.05E-04	1.59E-05	1.92E-05	2.91E-06
Fly ash handling & truck loading	9,272	4.6	1	3.42E-03	5.19E-04	1.59E-02	2.40E-03	99%	99%	1.59E-04	2.40E-05	1.91E-03	2.89E-04	3.48E-04	5.27E-05
biomass storage piles										1.71E-02	3.80E-03	4.11E-01	9.13E-02	7.51E-02	1.67E-02
Total SJS1&2 Biomass baghouses				2.38E-04	3.60E-05	2.20E-02	3.34E-03	99%	99%	2.20E-04	3.34E-05	5.29E-03	8.01E-04	9.65E-04	1.46E-04
									Total	2.07E-02	4.34E-03	4.94E-01	1.04E-01	9.02E-02	1.90E-02

Note:

1. The unloading of the limestone, lime and fly ash is done with a pneumatic system.
2. Worst day operation will be 12 hours operation for any of the limestone, hydrated lime, or fly ash handlings and 24 hours for biomass unloading & handling.
3. 365 days operation per year for any of the limestone, hydrated lime, fly ash handlings or biomass unloading & handling.
4. Each biomass baghouse will draw from 7 locations, thus the emissions into the baghouse can at most be 7 times the drop emissions, then the baghouse control is added.

Calculation of Fugitive Dust Emission Factor

Unloading & Handling Emission Factors

AP-42 Section 13.2.4 Aggregate Handling and Storage Piles (11/06) Equation 1

$$E = \frac{k\,(0.0032)\,(U/5)^{1.3}}{(M/2)^{1.4}}$$

	PM_{10}	$PM_{2.5}$
k =	0.35	0.053
U = mean wind speed (mph) =	1	Inside building
U = mean wind speed (mph) =	5.6	Annual average from 2000-2004 Hanford airport data

Biomass Storage Pile

E = 1.7 * G/1.5 * (365-H)/235 * I/15 * J SCAQMD Table A9-9-E

PM10 Emission factor from wind erosion of storage piles per day per acre

2 G = Silt content (%) (URS engineer estimate)

37 H = Number of days with >= 0.01 inches of precipitation per year (from WRCC for Coalinga COOP Station)

5 I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height

0.5 J = Fraction of TSP that is PM10 = 0.5

0.527 lb/acre/day

Source	Quantity	Size of Pile (acre)	Hours/ Day	Days/ Year per Pile	Watering Control Efficiency	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Biomass Storage Piles	2	1	24	365	61%	0.41	0.09	0.08	0.02

(http://www.aqmd.gov/CEQA/handbook/mitigation/fugitive/MM_fugitive.html)

- (watering every 3 hours) Table XI-A

Emissions from each Emergency Generator (there is one generator per plant)

Max Engine Power	1000	Kw
Power rating	1341	hp
Testing duration	1	hr/week
Expected non-emergency usage	12	hr/yr

Diesel Fuel Fired	Emission Factor	Hourly Emission Rate	Daily Emission Rate	Yearly Emission Rate
	g/Kw/Hr	lb/hr	lb/day	lb/yr
NO_X	6.400	14.11	14.11	169.32
CO	3.500	7.72	7.72	92.59
VOC (Total Hydrocarbons)	1.000	2.20	2.20	26.46
SO_2		0.01	0.01	0.09
PM_{10}	0.200	0.44	0.44	5.29
$PM_{2.5}$	0.198	0.44	0.44	5.24
	kg/gal			
CO_2	10.15	1555.90	1555.90	18670.75
CH_4	0.0004	0.06	0.06	0.74
N_20	0.0001	0.02	0.02	0.18

Note:

1. Emission rates based on EPA Tier 2 emission limits (most conservative)
2. NO_x emission rate = maximum NO_x + HC emission limit
3. PM_{10} emission rate includes filterable and condensable emissions.
4. SO_2 emission rate calculation based on sulfur content in the fuel.
5. Greenhouse gas emission factors from CCAR General Reporting Protocol V3.1 January 2009 Tables C.7 and C.9
6. Diesel Sulfur content (ppm) 15
7. Diesel density (lb/gal) 7.1

Engine parameters

Flow Rate (acfm)	6,800	from CARB data (conservative)
fuel rate (gal/hr)	69.5	from CARB data (conservative)
Stack Diameter (feet)	0.984	from CARB data (conservative)
Stack diameter (m)	0.300	from CARB data (conservative)
Stack height (feet)	10	
Stack height (m)	3.048	
Exhaust Temp (K)	622	from CARB data
Exit velocity (m/s)	45.401	

Reference:

1. CARB Table 1 of "Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines", Oct 2000.
2. $PM_{2.5}$ emission factors from updated CEIDARS List with $PM_{2.5}$ fractions. $PM_{2.5}$ numbers obtained by multiplying the PM_{10} values by fraction in CEIDARS list for Internal Combustion DISTILLATE AND DIESEL-EXCEPT ELECTRIC GENERATION sources.

Emissions from each Fire Pump Engine (there is one fire pump per plant)

Max Engine Power	186.4	Kw
Power rating	250	hp
Testing duration	1	hr/week
Expected non-emergency usage	52	hr/yr

Diesel Fuel Fired	Emission Factor	Hourly Emission Rate	Daily Emission Rate	Yearly Emission Rate
	g/Kw/Hr	lb/hr	lb/day	lb/yr
NO_X	6.600	2.71	2.71	141.06
CO	3.500	1.44	1.44	74.80
VOC (Total Hydrocarbons)	1.000	0.41	0.41	21.37
SO_2		0.001	0.00	0.08
PM_{10}	0.200	0.08	0.08	4.27
$PM_{2.5}$	0.198	0.08	0.08	4.24
	kg/gal			
CO_2	10.15	313.27	313.27	16290.23
CH_4	0.0004	0.01	0.01	0.64
N_20	0.0001	0.003	0.00	0.16

Note:

1. Emission rates based on EPA Tier 2 emission limits (most conservative)
2. NO_x emission rate = maximum NO_x + HC emission limit
3. PM_{10} emission rate includes filterable and condensable emissions.
4. SO_2 emission rate calculation based on sulfur content in the fuel.
5. Greenhouse gas emission factors from CCAR General Reporting Protocol V3.1 January 2009 Tables C.7 and C.9
6. Diesel sulfur content (ppm) 15
7. Diesel density (lb/gal) 7.1

Engine parameters

Flow Rate (acfm)	1,200	from CARB data (conservative)
fuel rate (gal/hr)	14.0	from CARB data (conservative)
Stack Diameter (feet)	0.4	from CARB data (conservative)
Stack diameter (m)	0.12	from CARB data (conservative)
Stack height (feet)	10	
Stack height (m)	3.048	
Exhaust Temp (K)	622	from CARB data
Exit velocity (m/s)	50.075	

Reference:

1. CARB Table 1 of "Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines", Oct 2000.
2. $PM_{2.5}$ emission factors from updated CEIDARS List with $PM_{2.5}$ fractions. $PM_{2.5}$ numbers obtained by multiplying the PM_{10} values by fraction in CEIDARS list for Internal Combustion DISTILLATE AND DIESEL-EXCEPT ELECTRIC GENERATION sources.

Total Project SJS 1&2
Estimated SF_6 emissions from total project

Breaker	Qty	SF_6 Lbs/Bkr	Leakage Rate	Leakage All Breakers Lbs/Yr	SF_6 emissions (tonnes/Yr)	CO_2e emissions (tonnes/Yr)
230kV Breaker	2	135	1%	2.7	0.00122	29.27
		Total Annual Emissions			0.00122	29.27

Note:

1. Greenhouse Gas Global Warming Potentials (GWPs) - Intergovernmental Panel on Climate Change, Second Assessment Report (1996)

Greenhouse Gas	GWP (SAR, 1996)
SF_6	23,900

2. Leakage rate assumed same as another similar solar project

Total Project SJS 1&2
Biomass Handling Equipment Exhaust Emissions

Emissions for both plants combined
Diesel Fired Offroad Equipment

Equipment	Quantity	Percent of time operating (%)	Hours /Day	Days/ Week	Hours/year	Horsepower
Front end loader	2	50	4	5	1040	100

Emission factors (lb/hr)									
ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
0.0542	0.3832	0.2791	0.0005	0.0325	0.0299	42.7234	0.0049	0.0000	42.8261

Hourly Emissions (lb/hr)									
ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
0.05	0.38	0.28	0.00	0.03	0.03	42.72	0.00	0.00	42.83

Daily Emissions (lb/day)									
ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
0.22	1.53	1.12	0.00	0.13	0.12	170.89	0.02	0.00	171.30

Annual Emissions (ton/year)									
ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
0.03	0.20	0.15	0.00	0.02	0.02	22.22	0.00	0.00	22.27

Notes:

1. Emission factors from CARB Off-road 2007 application. (calendar year: 2011) used the 120hp emission factor for Skid steer loader from OFFROAD2007.
2. PM emission factors determined using guidance from SCAQMD Final - Methodology to Calculate PM_{10} and $PM_{2.5}$ Significance Thresholds 10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions Off-road equipment
   - $PM_{2.5}$ Fraction of total PM, Diesel: 0.920
   - PM_{10} Fraction of total PM, Diesel: 1.000
3. CO_2, CH_4 and N_2O emission factors for diesel fuel off-road vehicle and equipment are from OFFROAD2007 model
4. Fugitive dust emissions from the moving of the biomass are calculated in the biomass fugitive tab
5. All of the biomass fuel handling equipment will be electric powered conveyors, stackers and reclaimers.
6. Hydraulic unloaders will be used for unloading the biomass delivery trucks.
7. Two- 100hp front end loaders will be used part time for housekeeping/clean-up of biomass for approximately 4hrs/day, 5days/week each.

Total Project SJS 1&2
Mirror cleaning truck & dust control water truck emissions

Exhaust Emissions (all trucks)

Pollutant	Emission Factor (lb/mile)	Max Hourly Emissions (lb/hr)	Max Daily Emissions (lb/day)	Annual Emissions (tons/yr)	CO_2e Annual Emissions (tonne/yr)
CO	4.90E-03	0.007	0.058	0.011	
NO_x	4.87E-03	0.007	0.058	0.011	
VOC	4.70E-04	0.001	0.006	0.001	
SO_2	6.61E-06	0.000	0.000	0.000	
PM_{10}	3.53E-04	0.001	0.006	0.001	
$PM_{2.5}$	3.12E-04	0.000	0.005	0.001	
CO_2	7.65E-01	1.147	13.701	1.769	1.62
CH_4	2.43E-06	3.64E-06	4.37E-05	5.67E-06	1.06E-04
N_2O	3.75E-06	5.62E-06	0.75E-05	8.77E-06	2.47E-03
				Total CO_2e	1.63

NOTE:

1. All emission factors (except for CH_4 and N_2O) for on-road 8500 lb truck (Light-Heavy-Duty Diesel Truck, LHDT1) are from EMFAC2007 model (calendar year = 2011; model year = 1990-2011).
2. CH_4 and N_2O emission factors for on-road vehicle are from Reference source 1: Table C.4, California Climate Action Registry General Reporting Protocol Version 3.1, January 2009.
3. $PM_{2.5}$ emission factors determined using guidance from SCAQMD "Final - Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds", 10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions
   - $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
   - $PM_{2.5}$ Fraction of PM_{10}, light heavy duty trucks: 0.964
   - $PM_{2.5}$ Fraction of PM_{10}, Tire wear: 0.250
4. Humidity reference from http://www.wrcc.dri.edu/htmlfiles/CALIFORNIA.html
5. Operational schedule assumptions:
   - 200 Annual days of operation
   - 6 Average total trip miles
   - 3 Number of trucks cleaning per day (2 trucks for mirror cleaning and 1 truck for watering the site)
   - 18 miles/day all cleaning vehicles
   - 12 hours/day cleaning schedule

Fugitive Dust Emissions

Travel on unpaved surfaces

$E = k * (s/12)^a * (W/3)^b * [(365 - P)/365]$ EPA AP-42 Section 13.2.2 Unpaved Roads Equations 1a and 2

E = size-specific emission factor (lb/VMT)

k, a, b = empirical constants

4.3 s = surface material silt content (%) EPA AP-42 Table 13.2.2-1 service road

10 W = mean vehicle weight (tons) Note the roads between the solar arrays will be graded, covered with fly ash and compacted to minimize road dust

constants

	$PM_{2.5}$	PM_{10}
k	0.15	1.5
a	0.9	0.9
b	0.45	0.45

Industrial Roads

37 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Coalinga COOP Station)

E	0.114	1.137

Vehicle Type	Number of Vehicles per Day	Max Daily Distance per Vehicle (mile/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours per Day	Max. Operating Days per Year	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Mirror cleaning truck & dust control water trucks	3	6	18.0	18	12	200	4680	0.114	1.137

Vehicle Type	Mitigation Control Efficiency[1]		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Mirror cleaning truck & dust control water trucks	0%	74.6%	1.71	0.43	20.48	5.16	2.68	0.67	0.17	0.04	2.05	0.52	0.27	0.07
TOTAL Fugitive emissions for vehicles traveled on unpaved road			1.71	0.43	20.48	5.16	2.68	0.67	0.17	0.04	2.05	0.52	0.27	0.07

NOTE:

1. Mitigation controls include watering and limit maximum speed on unpaved roads to 25 miles per hour. The efficiency is 55% for watering and 44% for speed limit for unpaved road from SCAQMD CEQA Handbook 2007 - Mitigation Measures and Control Efficiencies (http://www.aqmd.gov/CEQA/handbook/mitigation/fugitive/fdtbl_fugitive.html) (Table XI-D)

Total Project SJS 1&2
Emissions from Workers Commuting Trips During Normal Operations

Exhaust Emissions

Pollutant	Emission factor (lb/mile)	Max Hourly Emissions (lb/hr)	Max Daily Emissions (lb/day)	Annual Emissions (tons/yr)	CO_2e Annual Emissions (tonne/yr)
CO	7.36E-03	0.14	0.55	0.10	
NO_x	1.90E-03	0.04	0.15	0.03	
VOC	8.50E-04	0.01	0.05	0.01	
SO_2	1.52E-05	0.00	0.00	0.00	
PM_{10}	3.30E-04	0.01	0.02	0.00	
$PM_{2.5}$	2.79E-04	0.01	0.02	0.00	
CO_2	1.71E+00	31.88	127.45	23.26	21.10
CH_4	1.26E-04	0.00	0.01	0.00	0.03
N_2O	1.61E-04	0.00	0.01	0.00	0.62
				Total CO_2e	21.75

NOTE:

1. All emission factors (except for CH_4 and N_2O) for on-road On-Road Passenger Vehicles (LDA, diesel/gasoline) are from EMFAC2007 model (calendar year = 2011, model year = 1850-2011, average speed = 5mph).
2. Assume On-Road Passenger Vehicles: 30% burn diesel and 70% burn gasoline (catalyst).
3. CH_4 and N_2O emission factors for on-road vehicle are from Reference source 1: Table C.4, California Climate Action Registry General Reporting Protocol Version 3.1, January 2009.
4. $PM_{2.5}$ emission factors determined using guidance from SCAQMD "Final - Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds", 10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions
   - $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
   - $PM_{2.5}$ Fraction of PM_{10}, Diesel: 0.920
   - $PM_{2.5}$ Fraction of PM_{10}, Gasoline-catalyst: 0.928
   - $PM_{2.5}$ Fraction of PM_{10}, Tire wear: 0.250
5. Humidity reference from http://www.wrcc.dri.edu/htmlfiles/CALIF ORNIA.html
6. Operational schedule assumptions:
   - 365 Annual days of operation
   - 1.4 Average round trip miles from plant entrance to parking lot
   - 60 Number of workers per day
   - 75 miles/day all worker vehicles
   - 4 hours of driving per day
   - 1.5 Carpooling assumes 1.5 employees per vehicle
   - 2 mean vehicle weight (ton)

Fugitive Dust Emissions

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$ EPA AP-42 Section 13.2.1 Paved Roads Equation 2

E = particulate emission factor (lb/VMT),

k = particle size multiplier for particle size range and units of interest

1.6 sL = road surface silt loading (grams per square meter) (g/m^2), From CARB - Emission Inventory Database - Section 7.9 Entrained Paved Road Dust for Local Rural Road Fresno County - (emission inventory code: 640-641-5400-0000) July 1997

W = average weight (tons) of the vehicles traveling the road, and

C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

37 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Coalinga COOP Station)

365 N = number of days in the year (averaging period)

Vehicle Type	Number of Vehicles per Day	Max Daily Distance per Vehicle (mile/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours per Day	Max. Operating Days per Year	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Worker Vehicles	53	1.4	75	2	4	365	27253.3333	0.001	0.007

	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
Vehicle Type	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Worker Vehicles	0%	10%	0.13	0.11	0.51	0.43	0.03	0.05	0.01	0.01	0.06	0.05	0.01	0.01
TOTAL Fugitive emissions for vehicles traveled on paved road			0.13	0.11	0.51	0.43	0.09	0.08	0.01	0.01	0.06	0.05	0.01	0.01

1. Mitigation controls includes sweeping of paved roads, from SCAQMD CEQA HandBook 2007 - Mitigation Measures and Control Efficiencies (http://www.aqmd.gov/CEQA/handbook/mitigation/fugDust/fugDust.html)

Total Project SJS 1&2
Emissions from Workers Commuting Trips During Normal Operations

Exhaust Emissions

Pollutant	Emission factor (lb/mile)	Max Hourly Emissions (lb/hr)	Max Daily Emissions (lb/day)	Annual Emissions (tons/yr)	CO_2e Annual Emissions (tonnes/yr)
CO	2.87E-03	5.38	21.44	3.01	
NO_x	1.25E-03	2.33	9.31	1.70	
VOC	1.10E-04	0.20	0.82	0.15	
SO_2	6.61E-06	0.01	0.05	0.01	
PM_{10}	1.08E-04	0.20	0.80	0.15	
$PM_{2.5}$	7.32E-05	0.14	0.55	0.10	
CO_2	6.87E-01	1282.88	5131.51	936.50	849.41
CH_4	1.26E-04	0.24	0.94	0.17	3.28
N_2O	1.61E-04	0.30	1.20	0.22	61.63
				Total CO_2e	914.31

NOTE:

1. All emission factors (except for CH_4 and N_2O) for on-road On-Road Passenger Vehicles (LDA, diesel/gasoline) are from EMFAC2007 model (calendar year = 2011, model year = 1969-2011, average speed = 50mph).
2. Assume On-Road Passenger Vehicles: 30% burn diesel and 70% burn gasoline (catalyst).
3. CH_4 and N_2O emission factors for on-road vehicle are from Reference source 1: Table C.4, California Climate Action Registry General Reporting Protocol Version 3.1, January 2009.
4. $PM_{2.5}$ emission factors determined using guidance from SCAQMD "Final - Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds", 10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions
   - $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
   - $PM_{2.5}$ Fraction of PM_{10}, Diesel: 0.920
   - $PM_{2.5}$ Fraction of PM_{10}, Gasoline-catalyst: 0.928
   - $PM_{2.5}$ Fraction of PM_{10}, Tire wear: 0.250
5. Humidity reference from http://www.wrcc.dri.edu/narratives/CALIFORNIA.htm
6. Operational schedule assumptions:
   - 365 Annual days of operation
   - 140 Average round trip miles (based on the distance to Fresno)
   - 80 Number of workers per day
   - 7,467 miles/day all worker vehicles
   - 4 hours of driving per day
   - 1.5 Carpooling assumes 1.5 employees per vehicle
   - 2 mean vehicle weight (ton)

Fugitive Dust Emissions

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C](1 - P/4N)$ EPA AP-42 Section 13.2.1 Paved Roads Equation 2

E = particulate emission factor (lb/VMT),

k = particle size multiplier for particle size range and units of interest

0.035 sL = road surface silt loading (grams per square meter) (g/m^2)

W = average weight (tons) of the vehicles traveling the road, and

C = emission factor for 1630's vehicle fleet exhaust, brake wear and tire wear.

From CARB - Emission Inventory Database - Section 7.9 Entrained Paved Road Dust for Major Street - (emission inventory code: 040-641-5400-0000), July 1997.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00038	0.00047

37 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Coalinga COOP Station)

365 N = number of days in the year (averaging period)

Vehicle Type	Number of Vehicles per Day	Max Daily Distance per Vehicle (miles/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours per Day	Max. Operating Days per Year	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Worker Vehicles	53	140	7467	2	4	365	2725333.33	2.60E-05	1.54E-04

	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
Vehicle Type	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Worker Vehicles	0%	0%	0.29	0.29	1.15	1.15	0.21	0.21	0.05	0.05	0.19	0.19	0.04	0.04
TOTAL Fugitive emissions for vehicles traveled on paved road			0.29	0.29	1.15	1.15	0.21	0.21	0.05	0.05	0.19	0.19	0.04	0.04

1. The commuter vehicle PM2.5 dust emission factor was set to 10.0% of the PM10 commuter vehicle emissions factor, since it calculated from the EPA emission factor equation the value was negative.
2. The PM2.5 percentage of PM10 is from Appendix A (updated CEIDARS List with PM2.5 fractions) from Final -Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, SCAQMD, October 2006.

Total Project SJS 1&2

Emissions from Onsite Heavy Duty Truck Trips (Biomass, Limestone, Lime and Ammonia Deliveries and Ash Removal)

Exhaust Emissions

Pollutant	Traveling Emission Factor (lb/mile)	Idling Emission Factor (g/hour)	Max Hourly Emissions (lb/hr)	Max Daily Emissions (lb/day)	Annual Emissions (ton/yr)	CO_2e Annual Emissions (tonne/yr)
CO	3.33E-02	4.62E+01	0.64	7.71	1.00	
NO_x	7.63E-02	1.13E+02	1.47	17.66	2.30	
VOC	2.05E-02	1.14E+01	0.30	3.65	0.47	
SO_2	8.16E-05	8.20E-02	0.00	0.02	0.00	
PM_{10}	4.45E-03	1.42E+00	0.06	0.74	0.10	
$PM_{2.5}$	4.21E-03	1.42E+00	0.06	0.70	0.09	
CO_2	8.42E+00	8.54E+03	134.71	1618.49	210.14	190.60
CH_4	1.12E-05	neg	1.37E-04	1.64E-03	2.14E-04	4.07E-02
N_2O	1.06E-05	neg	1.29E-04	1.55E-03	2.01E-04	5.66E-02
					Total CO_2e	190.66

NOTE:

1. All emission factors (except for CH_4 and N_2O) for on-road Heavy-Heavy-Duty Diesel Truck (HHDT) are from EMFAC2007 model (calendar year = 2011, model year = 1923-2011, average speed = 5mph).
2. CH_4 and N_2O emission factors for on-road vehicle are from Reference source 1: Table C.4, California Climate Action Registry General Reporting Protocol Version 3.1, January 2009.
3. CH_4 and N_2O emission factors for on-road vehicle (idling) are negligible
4. $PM_{2.5}$ emission factors determined using guidance from SCAQMD "Final - Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds", 10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions
   - $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
   - $PM_{2.5}$ Fraction of PM_{10}, heavy heavy duty trucks: 0.964
   - $PM_{2.5}$ Fraction of PM_{10}, Tire wear: 0.253
5. Humidity reference from http://www.wrcc.dri.edu/summary/climCALIFORNIA.html
6. Operational schedule assumptions:
   - 6 days/week delivery schedule
   - 12 hours/day delivery schedule
   - 15 minutes per truck maximum idling time

Total Onsite Project Truck Trips

Source	Max Hourly Usage (lb/hr)	Annual Usage (tons/yr)	Trucks per year	Total onsite trip miles	Annual miles
Biomass Delivery Trips	185,440	809,170	24,397	1.4	34,114
Limestone Deliveries	1,232	4,047	162	1.4	227
Lime Deliveries	512	1,662	67	1.4	94
Aqueous Ammonia Deliveries	2,432	9,185	257	1.4	360
Ash Removal	8,272	33,459	1,218	1.4	1,705
Sludge Removal	17,548	27,375	1,094	1.4	1,532
Total Project Truck Trips		885,918	27,195		38,033

NOTE:

1. Delivery vehicle size — 25 tons/truck
2. Density of 19% aqueous ammonia — 7.582 lb/gal
3. Ammonia delivery vehicle size — 6000 gallons/truck
4. Data from EPA emissions data on "Ambient Variation 5 27 CB.pdf (for 1)" - normal case

Fugitive Dust Emissions

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$ EPA AP-42 Section 13.2.1 Paved Roads Equation 2

E = particulate emission factor (lb/VMT),

k = particle size multiplier for particle size range and units of interest

1.8 sL = road surface silt loading (grams per square meter) (g/m^2), From CARB - Emission Inventory Database - Section 7.9 Entrained Paved Road Dust for Local Rural Road Fresno County - (emission inventory code: 640-641-5400-0000) July 1997.

W = average weight (tons) of the vehicles traveling the road, and

C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00033	0.00047

37 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Coalinga COOP Station)

365 N = number of days in the year (averaging period)

Vehicle Type	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours per Day	Max. Operating Days per Year	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Delivery Trucks	148	25	12	260	38,033	0.048	0.324

	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
Vehicle Type	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Delivery Trucks	0%	19%	3.99	3.32	47.40	39.82	6.16	5.18	0.59	0.49	7.07	5.94	0.92	0.77
TOTAL Fugitive emissions for vehicles traveled on paved road			3.99	3.32	47.40	39.82	6.16	5.18	0.59	0.49	7.07	5.94	0.92	0.77

1. Mitigation controls includes sweeping of paved roads, from SCAQMD CEQA Handbook 2007 - Mitigation Measures and Control Efficiencies (http://www.aqmd.gov/CEQA/handbook/mitigation/fugitive/MM2_fugitive.html)

Total Project SJS 1&2

Emissions from Offsite Heavy Duty Truck Trips (Biomass, Limestone, Lime and Ammonia Deliveries and Ash Removal)

Exhaust Emissions

Pollutant	Emission factor (lb/mile)	Max Hourly Emissions (lb/hr)	Max Daily Emissions (lb/day)	Annual Emissions (ton/yr)	CO_2e Annual Emissions (tonne/yr)
CO	5.80E-03	0.70	8.44	1.10	
NO_x	2.70E-02	3.27	39.29	5.11	
VOC	1.28E-03	0.15	1.80	0.23	
SO_x	3.53E-05	0.00	0.05	0.01	
PM_{10}	1.06E-03	0.12	1.50	0.19	
$PM_{2.5}$	9.35E-04	0.11	1.32	0.17	
CO_2	3.68E+00	432.42	5189.00	674.57	611.84
CH_4	1.12E-05	0.00	0.02	0.00	0.04
N_2O	1.06E-05	0.00	0.01	0.00	0.54
				Total CO_2e	612.42

NOTE:

1. All emission factors (except for CH_4 and N_2O) for on-road Heavy-Heavy-Duty Diesel Truck (HHDT) are from EMFAC2007 model (calendar year = 2011, model year = 1980-2011; average speed = 50mph).
2. CH_4 and N_2O emission factors for on-road vehicle are from Reference source 1. Table C.4, California Climate Action Registry General Reporting Protocol Version 3.1, January 2009.
3. $PM_{2.5}$ emission factors determined using guidance from SCAQMD "Final - Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds", 10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions
   - $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
   - $PM_{2.5}$ Fraction of PM_{10}, heavy heavy duty trucks: 0.964
   - $PM_{2.5}$ Fraction of PM_{10}, Tire wear: 0.253
4. Humidity reference from http://www.wrcc.dri.edu/climsum/CALIFORNIA.htm
5. Operational schedule assumptions:
   - 5 days/week delivery schedule
   - 12 hours/day delivery schedule

Total Offsite Project Truck Trips

Source	Max Hourly Usage (lb/hr)	Annual Usage (tons/yr)	Trucks per year	Round trip miles	Annual miles
Biomass Delivery Trips	165,440	603,170	NOTE: 6		
Limestone Deliveries	1,232	4,047	162	120	19,426
Lime Deliveries	512	1,682	67	120	8,073
Aqueous Ammonia Deliveries	2,492	8,169	327	120	39,204
Ash Removal	9,272	30,450	1,218	120	146,201
Sludge Removal	17,548	27,375	1,095	140	153,300
Total Project Truck Trips		71,749	2,870		366,294

NOTE:

1. Delivery vehicle size — 25 tons/truck
2. Density of 19% aqueous ammonia — 7.862 lb/gal
3. Ammonia delivery vehicle size — 8000 gallons/truck
4. Data from EPI emissions data on "Ambient Variation 5 27 03 pdf (rev 5)" - normal case and "sim 9 26 03.pdf".
5. The round trip distance for the biomass delivery is taking the average of Average ag biomass delivery distance (30 miles one way) and the average urban waste delivery distance (90 miles one way).
6. The calculations of biomass delivery off-site emissions are in the "Attachment AQ-6 biomass calculation".

Fugitive Dust Emissions

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$ EPA AP-42 Section 13.2.1 Paved Roads Equation 2

E = particulate emission factor (lb/VMT).

k = particle size multiplier for particle size range and units of interest

0.035 sL = road surface silt loading (grams per square meter) (g/m²) — From CARB - Emission Inventory Database - Section 7.0 Entrained Paved Road Dust for Major Street - (emission inventory code: 640-641-5400-0000), July 1997.

W = average weight (tons) of the vehicles traveling the road, and

C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants

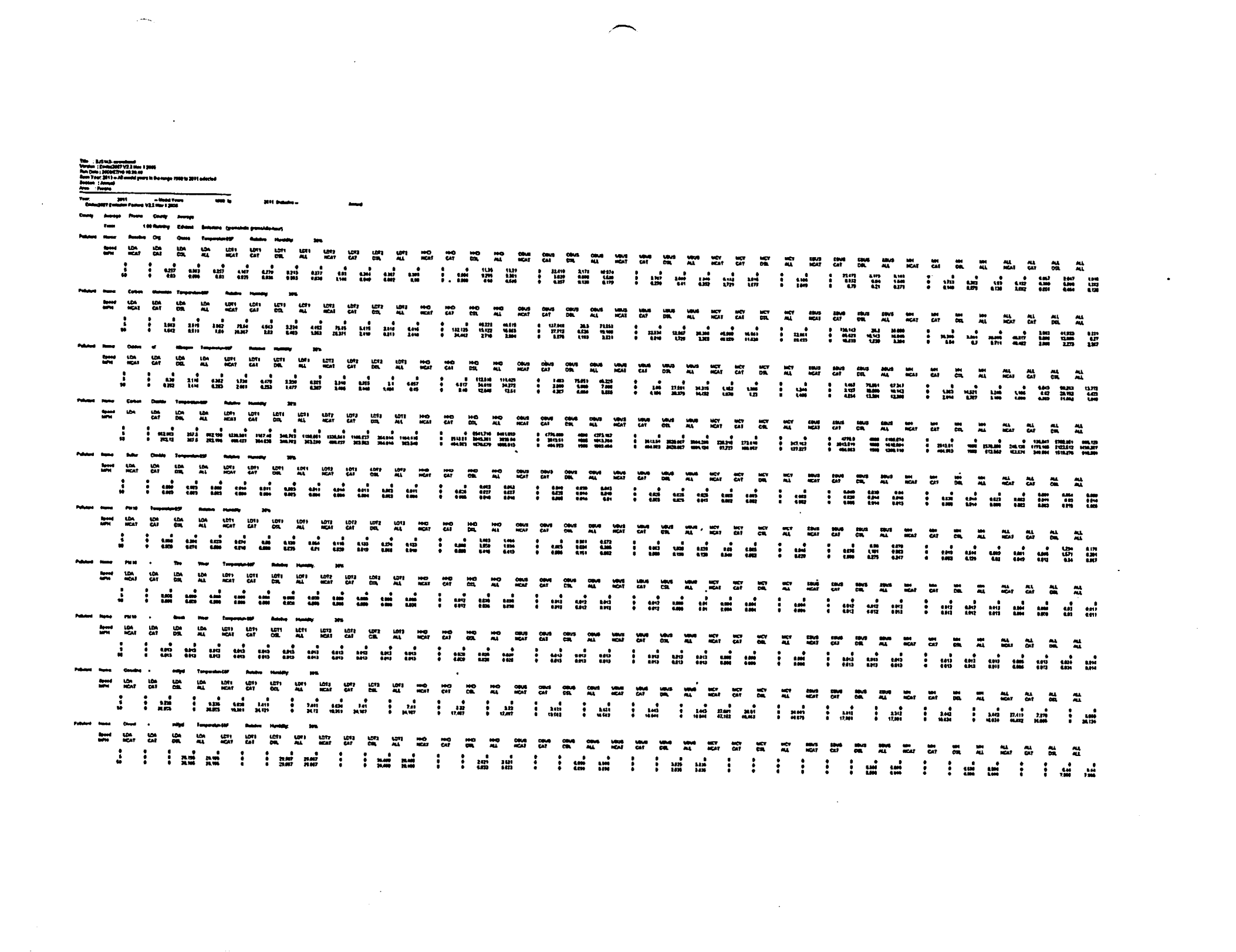
	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

37 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Coalinga COOP Station)

365 N = number of days in the year (averaging period)

Vehicle Type	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours per Day	Max. Operating Days per Year	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Delivery Trucks	1403	25	12	260	366,294	0.004	0.027

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Delivery Trucks	0%	0%	3.12	3.12	37.46	37.46	4.87	4.87	0.44	0.44	5.22	5.22	0.68	0.68
TOTAL Fugitive emissions for vehicles traveled on paved road			3.12	3.12	37.46	37.46	4.87	4.87	0.44	0.44	5.22	5.22	0.68	0.68



CY	Season	AvgDays	Code	Equipment	Fuel	MaxHP	Class	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust/Activity	CO Exhaust/Activity	NOX Exhaust/Activity	CO2 Exhaust/Activity	SO2 Exhaust/Activity	PM Exhaust/Activity	N2O Exhaust/Activity	CH4 Exhaust/Activity
2011	Annual	Mon-Fri	2270002072	Skid Steer Loaders	D	120	Construction and Mining Equipment	Fresno	SJV	SJU	2.51E+02	6.74E+02	1.32E+03	2.71E-05	1.40E-04	1.92E-04	2.14E-02	2.51E-07	1.82E-05	0.00E+00	2.44E-06

Reference source 1: Table C.4, California Climate Action Registry General Reporting Protocol Version 3.1, January 2009

Table C.4 Methane and Nitrous Oxide Emission Factors for Highway Vehicles by Model Year

Vehicle Types/Model Years	N_2O (g/mile)	CH_4 (g/mile)
Gasoline Passenger Cars		
Model Years 1984-1993	0.0647	0.0704
Model Year 1994	0.0560	0.0531
Model Year 1995	0.0473	0.0386
Model Year 1996	0.0426	0.0272
Model Year 1997	0.0422	0.0269
Model Year 1998	0.0393	0.0249
Model Year 1999	0.0337	0.0216
Model Year 2000	0.0273	0.0175
Model Year 2001	0.0158	0.0110
Model Year 2002	0.0155	0.0107
Model Year 2003	0.0185	0.0114
Model Year 2004	0.0083	0.0145
Model Year 2005 - Present	0.0079	0.0147
Gasoline Light Trucks (Vans, Pickup Trucks, SUVs)		
Model Years 1987-1993	0.1395	0.0813
Model Year 1994	0.0982	0.0846
Model Year 1995	0.0908	0.0517
Model Year 1996	0.0871	0.0452
Model Year 1997	0.0871	0.0452
Model Year 1998	0.0728	0.0351
Model Year 1999	0.0564	0.0321
Model Year 2000	0.0621	0.0346
Model Year 2001	0.0164	0.0151
Model Year 2002	0.0228	0.0178
Model Year 2003	0.0114	0.0155
Model Year 2004	0.0132	0.0152
Model Year 2005 - Present	0.0101	0.0157

Table C.4 Methane and Nitrous Oxide Emission Factors for Highway Vehicles by Model Year (continued)

Vehicle Types/Model Years	N_2O (g/mile)	CH_4 (g/mile)
Gasoline Heavy-Duty Vehicles		
Model Years 1983-1986	0.0515	0.4093
Model Year 1987	0.0849	0.3675
Model Years 1988-1989	0.0983	0.3492
Model Years 1990-1995	0.1142	0.3246
Model Year 1996	0.1680	0.1278
Model Year 1997	0.1726	0.0904
Model Year 1998	0.1693	0.0641
Model Year 1999	0.1435	0.0578
Model Year 2000	0.1092	0.0493
Model Year 2001	0.1235	0.0528
Model Year 2002	0.1307	0.0546
Model Year 2003	0.1240	0.0525
Model Year 2004	0.0285	0.0341
Model Year 2005 - Present	0.0177	0.0326
Diesel Passenger Cars		
Model Years 1960-1982	0.0012	0.0006
Model Years 1983 - Present	0.0010	0.0005
Diesel Light Trucks		
Model Years 1960-1982	0.0017	0.0011
Model Years 1983-1995	0.0014	0.0009
Model Years 1996 - Present	0.0015	0.0010
Diesel Heavy-Duty Vehicles		
All Model Years	0.0968	0.0051

Source: Gasoline vehicle factors from EPA Climate Leaders, Mobile Combustion Guidance, (2008) based on U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005 (2007). Diesel vehicle factors based on U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005 (2007), Annex 3.2, Table A-99.

Reference source 2:

Greenhouse Gas Global Warming Potential (GWP) - Intergovernmental Panel on Climate Change, Second Assessment Report (1996)

CO_2 GWP (SAR, 1996) = 1

CH_4 GWP (SAR, 1996) = 21

N_2O GWP (SAR, 1996) = 310

Attachment AQ-3
Commissioning Data
(June 29, 2009)

ATTACHMENT K

SAN JOAQUIN SOLAR 1 & 2 HYBRID PROJECT
12-AFC-08

Supplemental Information
In Response To Cure Data Request Set #3

August 26, 2009

URS

1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4314
619.294.9400 Fax: 619.293.7920

URS Project No.27658033

Data Request 85: Please discuss and quantify the potential side product formation from the SCR and SNCR systems such as isocyanic acid, nitrous oxide, ammonia, hydrogen cyanide, etc. under unfavorable conditions.

Response: Please see Objections To Data Requests Of California Unions For Reliable Energy, Set 3, dated August 17, 2009.

Data Request 86: Please provide estimates for annual fugitive VOC emissions from heat transfer fluid system components and from larger equipment leaks and spills and include these estimates in the operational emissions inventory.

Response: The HTF system is welded pipe so the main source of fugitive emissions will be from the valves in the system. Using EPA emission factors for heavy liquid and a valve count of 750 valves throughout the HTF system, the fugitive emission of VOC is estimated to be approximately 1.7 tons per year.
Average VOC emission factors of heavy liquids for synthetic organic compound manufacturing industry from *Protocol for Equipment Leaks Emissions Estimates*, EPA-453/R-95-017

Data Request 87: Please revise the ambient air quality modeling for Project operations to include emissions from mobile sources.

Response: Please see Objections To Data Requests Of California Unions For Reliable Energy, Set 3, dated August 17, 2009.

Data Request 88: Please provide offset protocols and methodologies that have been developed by the Applicant to offset PM10 emissions through interpollutant offsets, pursuant to Rule 2201.

Response: Emission reduction credits (ERCs) will be used to offset PM_{10} emissions. Some interpollutant ERCs may be used, as approved by San Joaquin Valley Air Pollution Control District.

Data Request 89: In the event that the Applicant and the SJVAPCD cannot gain approval from the U.S. EPA with regard to interpollutant offset schemes, please identify other opportunities available to the Applicant to offset emissions of PM10.

Response: Please see Objections To Data Requests Of California Unions For Reliable Energy, Set 3, dated August 17, 2009.

Data Request 39: Please indicate for how long the uncomminuted biomass would be stored on site.

Response: Uncomminuted biomass (biomass that has not been reduced in size) will not be stored on site. As described in Supplemental Information In Response To Cure Data Request Set #2, response 5, upon receipt of the biomass, the fuel is screened and oversized particles are resized before being conveyed to the storage piles. The estimated storage duration for the comminuted biomass is no more than three weeks.

Data Request 40: Please indicate whether the different types of pre-sized biomass would be stored in separate piles and whether the storage piles would be covered.

Response: The biomass is stored as it is received and the storage pile formation is independent of the type of biomass. No attempt is made to segregate the biomass into separate piles. Storage is open pile with 20 foot high walls down each side of each pile.

Data Request 41: Please provide a discussion of the expected dry matter loss and moisture loss for the different types of pre-sized biomass expected to be used for the Project.

Response: Dry-matter loss, which is the degradation of lignin, cellulose, and hemicellulose, occurs when wet woody biomass, in any form, is not utilized immediately. Several studies (Thornqvist and Jirjis 1990; Fredholm and Jirjis 1998) have observed dry matter loss in stored woody biomass. These studies observe the dry matter loss over a period of many months (six to seven). Because the biomass at SJS will be utilized in less than 3 weeks, dry matter loss is expected to be minimal.

Moisture loss from the biomass is not expected to be measurable due to the short duration of onsite storage.

Data Request 42: Please provide a discussion of the risks of self-heating and self-ignition of the biomass storage piles. Please discuss any procedures such as temperature and carbon dioxide ("CO2") or carbon monoxide ("CO") measurements that would be implemented to monitor self-heating and prevent self-ignition of the biomass storage piles.

Response: Self heating and self ignition of biomass storage piles depend on a variety of factors including particle size, material type, moisture content, and type of ventilation of the pile. Minimal self heating in the biomass piles is anticipated since the length of storage on site will be less than one month (three weeks is the expected maximum duration). Due to the management of the biomass storage, using a "first in, first out" practice, and the limited duration of storage on site, the risk of self ignition is negligible. Temperature and gas measurement of the biomass pile is not currently planned during operations because of the short storage time of the biomass.

Data Request 43: Please provide a discussion of potential health risks associated with growth of fungi and bacteria within the biomass storage piles.

Response: The rate at which fungi and bacteria begin colonization occurs and the types of fungi and bacteria that exist are dependent on moisture content, wood composition, particle size, size and form of pile, as well as storage duration. The length of storage on site will be less than one month (three weeks is the expected maximum duration). Due to the management of the biomass storage, using a "first in, first out" practice, and the limited duration of storage on site, health risks associated with growth of fungi and bacteria are not anticipated.

Data Request 44: Please indicate whether the Project would burn construction/demolition wood, pallets, or "miscellaneous residential and commercial wood waste."

Response: The anticipated fuel mix for SJS is at least 50% to be agricultural wood waste and up to 50% municipal green waste. Construction/demolition wood, pallets, or "miscellaneous residential and commercial wood waste", may be included in the municipal green waste fuel.

Data Request 45: Please discuss whether the Project may burn alternative fuels such as rail ties, tires, or municipal solid waste in the future.

Response: The Project has no intention of ever using these fuels.

STATE OF CALIFORNIA

Energy Resources Conservation

and Development Commission

In the Matter of:	
The Application for Certification for the San Joaquin Solar 1 and 2 Hybrid Power Plant Project	Docket No. 08-AFC-12

DECLARATION OF SERVICE

I, Bonnie Heeley, declare that on November 24, 2009, I served and filed copies of the attached **Comments of the California Unions for Reliable Energy on the Preliminary Determination of Compliance (dated November 23, 2009)**. 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/sjsolar/SJSOLAR_POS.PDF. The document has been sent (1) electronically, and (2) via US Mail by depositing in the US Mail at South San Francisco, CA, with first-class postage thereon full prepaid and addressed as provided on the attached Proof of Service list to those addresses NOT marked "email preferred." It was sent for filing to the Energy Commission by sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address shown on the attached Proof of Service list.

I declare under penalty of perjury that the foregoing is true and correct. Executed at South San Francisco, California, on November 24, 2009.

_____/s/_____
Bonnie Heeley

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