Petition to Amend No. 1

Reduction in Air Emissions

for the

Ivanpah Solar Electric Generating System

San Bernardino County, California

(07-AFC-05C)

Submitted to the:

California Energy Commission

Submitted by:

Solar Partners I, LLC; Solar Partners II, LLC;
and Solar Partners VIII, LLC

With Technical Assistance by:

CH2MHILL

Sacramento, California

February 2012

Contents

Acronyms and Abbreviations

AFC	Application for Certification
AFY	acre feet per year
BiOp	Biological Opinion
BLM	Bureau of Land Management
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CNPS	California Native Plant Society
COC	Condition of Certification
DPM	diesel particulate matter
FDOC	Final Determination of Compliance
GPH	gallons per hour
GPM	gallons per minute
LORS	laws, ordinances, regulations, and standards
NRPMA	Northern Rare Plant Mitigation Area
PTA	Petition to Amend
SEGS	Solar Electric Generating System
SHRA	screening health risk assessment
USFWS	U.S. Fish and Wildlife Service

Executive Summary

Solar Partners I, LLC; Solar Partners II, LLC; and Solar Partners VIII, LLC (Solar Partners or Applicant) petition the California Energy Commission (CEC) to modify the certification for Ivanpah Solar Electric Generating System (Ivanpah SEGS or the Project) (07-AFC-05C). Ivanpah SEGS consists of three projects being implemented by the Project applicants: Solar Partners II, LLC (Ivanpah 1); Solar Partners I, LLC (Ivanpah 2); and Solar Partners VIII, LLC (Ivanpah 3). This Petition to Amend (PTA) proposes to make specific equipment changes to the Project in the form of minor design changes that will result in a net reduction of air emissions for pollutants we are in nonattainment for impacts for the Project, which were already determined to be less than significant in the original certification proceeding. These proposed equipment changes are described in detail in Section 2.0 below, and the application package submitted to the Mojave Desert Air Quality Management District (District), which is included as Attachment 1.

Reduction of Air Emissions

A Final Determination of Compliance (FDOC) for the Ivanpah SEGS Project air permit was issued by the District on December 3, 2008. The FDOC was subsequently amended to its current form on April 13, 2010. The CEC's final decision issued on September 22, 2010 incorporated the April 2010 version of the FDOC.

Project construction has commenced, and is currently underway. After careful evaluation and a comprehensive review of the project design, the Applicant has determined that some minor changes to the original project description will be beneficial to efficient and effective operation of the Project. With this application, the Applicant is seeking District approval for these minor design changes. The proposed improvements will result in small overall reductions (from those identified in the Commission Decision) in annual air emissions from the facility.

SECTION 1.0

Introduction

1.1 Overview of Modifications

Solar Partners I, LLC; Solar Partners II, LLC; and Solar Partners VIII, LLC (Solar Partners or Applicant) for their Ivanpah 2, Ivanpah 1, and Ivanpah 3 project, respectively, petition the California Energy Commission (CEC) to modify the certification for Ivanpah SEGS (07-AFC-05C). The Application for Certification (AFC) for this Project was filed on August 31, 2007 and the facility received CEC certification on September 22, 2010.

This Petition to Amend (PTA) proposes to make several minor changes to the original Project description that will be beneficial to efficient and effective operation of the Project. A detailed description of the proposed modifications to the Ivanpah SEGS is included in Section 2.0.

This PTA contains all of the information that is required pursuant to the CEC's Siting Regulations (California Code of Regulations [CCR] Title 20, Section 1769, Post Certification Amendments and Changes). The information necessary to fulfill the requirements of Section 1769 is contained in Sections 1.0 through 6.0, as summarized in Table 1.

TABLE 1
Informational Requirements for Post-Certification Modifications

Section 1769(a)(1) Requirements	Section of Petition Fulfilling Requirement
(A) A complete description of the proposed modifications, including new language for any conditions that will be affected	Section 2.0 Sections 3.1 to 3.2—Proposed changes to Conditions of Certification, if necessary, are located at the end of the technical section
(B) A discussion of the necessity for the proposed modifications	Section 1.3
(C) If the modification is based on information that was known by the petitioner during the certification proceeding, an explanation why the issue was not raised at that time	Sections 1.3 and 2.0
(D) If the modification is based on new information that changes or undermines the assumptions, rationale, findings, or other bases of the final decision, an explanation of why the change should be permitted	Sections 2.0
(E) An analysis of the impacts the modification may have on the environment and proposed measures to mitigate any significant adverse impacts	Section 3.0
(F) A discussion of the impact of the modification on the facility's ability to comply with applicable laws, ordinances, regulations, and standards;	Section 3.0
(G) A discussion of how the modification affects the public	Section 4.0

TABLE 1
Informational Requirements for Post-Certification Modifications

Section 1769(a)(1) Requirements	Section of Petition Fulfilling Requirement
(H) A list of property owners potentially affected by the modification	Section 5.0
(I) A discussion of the potential effect on nearby property owners, the public and the parties in the application proceedings.	Section 6.0

1.2 Ownership of the Facility Property

Solar Partners II, LLC; Solar Partners II, LLC; and Solar Partners VIII, LLC are the owners of Ivanpah 2, Ivanpah 1, and Ivanpah 3, respectively. These three units, along with a commonly controlled Common Logistics Area (CLA), collectively make up the Ivanpah SEGS. All three units and the CLA are located on federal property under a right-of-way grant from the Bureau of Land Management (BLM).

1.3 Necessity of Proposed Changes

The Siting Regulations require a discussion of the necessity for the proposed revision to Ivanpah SEGS certification and whether the modification is based on information known by the petitioner during the certification proceeding (Title 20, CCR, Sections 1769 (a)(1)(B) and (C)). This PTA requests approval to make several minor equipment changes to the Project that will be beneficial to efficient and effective operation, resulting in an overall reduction of air quality emissions. This PTA proposes specific equipment changes that are described in detail in Section 2.0 below, and the application package submitted to the District, which is included as Attachment 1.

After careful evaluation and a comprehensive review of the Project during the detailed design phase post-certification, the Applicant has determined that several minor changes to the original Project configuration will be beneficial to efficient and effective operation of the Project. In addition, the amendment is not based on information known during the certification process. The improvements are instead based upon information developed during the post-certification, detailed design phase. The Commission's AFC process expressly contemplates that the detailed design process occurs only after project approval. The proposed improvements will result in small reductions in overall annual air emissions for which the project area is in nonattainment compared to the levels approved in the license, which were found to be less than significant with approved mitigation. A more detailed discussion of the changes can be found in Section 2.0 and the application package to the District, which is included as Attachment 1.

1.4 Consistency of Changes with Certification

The Siting Regulations require a discussion of the consistency of the proposed Project revision with the applicable laws, ordinances, regulations, and standards (LORS) and whether the modifications are based on new information that changes or undermines the

assumptions, rationale, findings, or other basis of the final decision (Title 20, CCR Section 1769 (a)(1)(D)). If the Project is no longer consistent with the certification, the PTA must provide an explanation why the modification should be permitted.

The proposed Project improvements are consistent with all applicable LORS. This PTA is not based on new information that changes or undermines any basis for the Final Decision. The findings and conclusions contained in the Commission's Final Decision for Ivanpah SEGS are still applicable to the Project, as modified.

1.5 Summary of Environmental Impacts

The CEC Siting Regulations require that an analysis be conducted to address the potential impacts the proposed modifications may have on the environment, and proposed measures to mitigate any potentially significant adverse impacts (Title 20, CCR, Section 1769 (a)(1)(E)]). The regulations also require a discussion of the impact of the modification on the facility's ability to comply with applicable LORS (Section 1769 (1)(a)(F)). Section 3.0 of this PTA includes a discussion of the potential environmental impacts associated with the modifications, as well as a discussion of the consistency of the modification with LORS. Section 3.0 concludes that, because of compliance with the Conditions of Certification (COCs), there will be no significant environmental impacts associated with implementing the actions specified in the PTA and that the Project as modified will comply with all applicable LORS.

1.6 Conditions of Certification

No CEC Air Quality COCs (those designated as "AQ-SC") and no Public Health COCs will be changed. The only COCs that will be affected by this PTA are the Air Quality COCs designated as "AQ", as described in Attachment 1 - Revisions to the Authority to Construct for Ivanpah SEGS Project. Specifically, language and emission maximums have been changed in conditions AQ-5 and AQ-6 and daily fuel use in condition AQ-12.

SECTION 2.0

Description of Project Modifications

This section includes a description of the proposed Project modifications, consistent with CEC Siting Regulations (Title 20, CCR, Section 1769 (a)(1)(A)). This PTA proposes specific equipment changes that are described in detail in Section 2.0 below, and the application package submitted to the District (Attachment 1). The result of these modifications will be a reduction in the air quality emission impacts for the Project. The changes described in this section are based on information that was unknown by the Applicant at the time of the licensing proceedings. It is based on new information resulting from the detailed design phase.

2.1 Revised Mojave Desert AQMD Final Determination of Compliance and Authority to Construct

Subsequent to the Project's approval during detailed design, the Applicant determined that minor changes to the facility design would enhance the plant's operations. The proposed specific equipment changes are briefly noted below, and are described in greater detail in the application package to the District (Attachment 1). The Project owners intend to amend the CEC certification to accomplish the following:

- Provide additional operating flexibility for the auxiliary boilers by increasing the maximum allowable daily operation (without increasing allowable annual operation);
- Increase the nominal size of each of the three auxiliary boilers from 231.1 MMBtu/hr to 249 MMBtu/hr;
- Move each auxiliary boiler approximately 30 feet from the location shown in AFC drawings;
- Add three small natural gas-fired nighttime preservation boilers (no larger than 10 MMBtu/hr each);
- Reduce the size of three emergency generators from 2,500 kw each to 1,500 kw each;
- Add a 250 kw emergency engine in the common area;
- Add a 100 HP diesel fire pump engine in the common area; and
- Replace auxiliary dry cooling systems with partial dry cooling systems.

The main process steam cooling system will remain as a solely dry cooling system. The Applicant proposes in this PTA to enhance the dry cooling system at each power block with a partial dry cooling system that incorporates a wet surface air cooling (WetSAC) system for equipment protection and reliability. Particulate emissions from each cooling system will be about 14 pounds per year. The partial dry cooling systems are exempt from District permit requirements because the water flow is less than 10,000 gpm and the unit is not used for evaporative cooling of process water (MDAQMD Rule 219 (E)(4)(c)).

The partial dry cooling system will operate without the use of any water when the dry bulb temperature is below approximately 82 degrees F. Assuming ambient temperatures above

approximately 82 degrees F, the WetSAC system will use water, and the maximum amount of makeup water required to supply and operate the WetSAC system during hot temperatures is projected to be 2,226 gallons per hour (GPH), which equals approximately 1.9 million GPY or 6 acre feet per year (AFY). As described in the Commission's Final Decision, "The Applicant estimates the combined maximum annual use of groundwater for project operations to be 76.4 acre-feet per year (AFY), but rounded this number up to 100 AFY in the AFC and supplemental documents." (CEC Decision, p. 7, Soils & Water). Based on the maximum projected water consumption of the WetSAC system of 6 AFY, the potential addition water use from this equipment is within the 100 AFY described in the Decision and therefore will not change the conclusions in the Commission's Final Decision.

Furthermore the Applicant proposes to retain the existing annual limits on fuel usage for each auxiliary boiler, and to incorporate the fuel consumed by the new nighttime preservation boilers within those limits. As a result, the increase in auxiliary boiler size and the addition of the nighttime preservation boilers will not result in an overall increase in annual emissions from the boilers, with the exception of a slight project-wide increase (above the levels previously approved) of 1 TPY of CO. This increase of 1 TPY brings the overall CO potential to emit to 5.7 TPY which is below the threshold of 15 TPY for significance and therefore will not affect the conclusions contained in the Commission's Final Decision. A detailed breakdown of the reductions to emissions as a result of the proposed Project changes is included in Section 3.0 of Attachment 1. Table 13, in Section 3.7 of Attachment 1, summarizes the annual emissions changes from the proposed equipment changes and shows that the proposed amendment will result in a small increase in CO emissions and an overall reduction in annual emissions for all other pollutants from the Project.

No CEC Air Quality COCs (those designated as "AQ-SC") and no Public Health COC will be changed. The only COCs that will be affected by this PTA are the Air Quality COCs designated as "AQ," as described in Attachment 1 - Revisions to the Authority to Construct for Ivanpah SEGS Project.

SECTION 3.0

Environmental Analysis of Proposed Project Modifications

Consistent with prior practice and in order to avoid unnecessary duplication, the majority of the environmental analysis is set forth in Attachment 1, the "Application to the Mojave Desert Air Quality Management District - Revisions to the Authority to Construct for Ivanpah SEGS Project." This Section 3 provides a summary of the major findings and conclusions set forth in Attachment 1.

The modifications to the Project proposed in this PTA would be limited to changes to COCs, as described in Attachment 1. The proposed changes in Air Quality permitting include specific equipment changes described in Section 2.0 and Attachment 1. Specifically, language and emission maximums have been changed in conditions AQ-5 and AQ-6 and daily fuel use in condition AQ-12. The result of these modifications will be a reduction in the overall air quality emission impacts for the Project.

Because these changes have negligible effects beyond those previously assessed, the results of the environmental analyses do not differ substantively from that described in the AFC and Commission Decision. The impacts resulting from approval of this PTA would be less than significant. Impacts to the following resource categories would not differ substantively from the AFC or Commission Decision and thus also remain less than significant:

- Biological Resources
- Cultural Resources
- Geologic Hazards and Resources
- Hazardous Materials Handling
- Land Use
- Noise
- Paleontological Resources
- Socioeconomics
- Soils
- Traffic and Transportation
- Visual Resources
- Waste Management
- Water Resources
- Worker Safety and Fire Protection
- Transmission System Engineering

For Air Quality and Public Health, additional evaluation and verification by technical resource experts was undertaken to confirm that the proposed changes would not change the environmental analysis presented in the AFC and Commission Decision. Section 3.1 below describes the additional evaluation performed for the aforementioned two resource areas.

3.1 Areas Affected by the Reduction in Air Quality Emissions

The Commission Decision determined that the Project would not have significant impacts on Air Quality or Public Health. Pursuant to this proposed PTA, the changes in the Project equipment configuration are not expected to have a significant impact on Air Quality or Public Health. Both disciplines are address in detail in Attachment 1 and summarized in this section.

3.1.1 Air Quality

3.1.1.1 Environmental Consequences

The proposed changes in the Project's equipment are not expected to cause any significant or adverse change to Air Quality analysis or conclusions.

The Project owners propose to retain the existing annual limits on fuel usage for each auxiliary boiler, and to incorporate the fuel consumed by the new nighttime preservation boilers within those limits. As a result, the increase in auxiliary boiler size and the addition of the nighttime preservation boilers will not result in an overall increase in annual emissions from the boilers, with the exception of a slight project-wide increase (above the levels previously approved) of 1 TPY of CO, as described above in Section 2.1.

A detailed discussion of the proposed Project changes is included in Section 2.0 of Attachment 1, and is summarized below. A breakdown of the reductions to emissions as a result of the proposed Project changes is included in Section 3.0 of Attachment 1. Table 13 in Section 3.7 of Attachment 1 summarizes changes in the annual emissions from the proposed equipment changes, and shows that the proposed amendment will result in an overall reduction in annual emissions from the Project, with the exception of a slight increase of 1 TPY in CO.

Attachment 1, Section 2.1 - Increase Auxiliary Boiler Daily Fuel Use Limits and Revise Maximum Daily Emissions

Infrequent situations occasionally arise that may extend boiler operation for the day until the situation is corrected. Therefore, Applicant proposes to increase the daily fuel limit while maintaining the annual limit. As a result of this change, the auxiliary boilers will trigger BACT for the following pollutants: NOx, CO, VOC, $PM_{10,}$ and $PM_{2.5}$.

Applicant also proposes to delete the portion of the permit condition that specifies the percent excess air. The actual amount of excess air being added is expected to vary somewhat from the level currently specified. The proper level of excess air for good combustion will be determined by operating conditions.

Attachment 1, Section 2.2 - Increase Size of Auxiliary Boilers

During final project engineering, Applicant determined that a small increase in the size of the auxiliary boilers, from 231.1 MMBtu/hr to 249 MMBtu/hr, is required for facility operation. Existing permit conditions limit daily and annual fuel use for each boiler. Applicant is proposing to change the daily limits, but not the annual limits. As a result, the proposed revisions to the Auxiliary Boiler conditions will increase

maximum allowable hourly emissions slightly, increase maximum allowable daily emissions, and have no effect on maximum allowable annual emissions.

The Applicant has conducted an air quality analysis and has determined that the increase in maximum allowable daily emissions will not cause or contribute to a violation of ambient air quality standards.

Attachment 1, Section 2.3 - Add Nighttime Boilers

Applicant has determined that the use of small (less than 10 MMBtu/hr each) natural gas-fired boilers to maintain the condenser system vacuum overnight will be more efficient and less impactful than running the auxiliary boilers at greatly reduced loads. Firing the large boilers at these greatly reduced firing rates would be thermally inefficient and would result in higher emissions on a lbs/MMBtu basis. Alternatively, allowing the system to lose vacuum overnight will extend the daily start-up process, reducing the effectiveness of the project, and could require incremental firing resulting in emissions increases beyond those presently contemplated.

Attachment 1, Section 2.4 - Enable Supplemental Steam for Power Boosting

Within the existing annual fuel use and emissions limits, Applicant proposes to potentially utilize the auxiliary boilers for boosting and/or extending power production.

Attachment 1, Section 2.5 - Reduce Size of Emergency Generators

The original project design included three 2,500 kW emergency generators to provide backup power to the facility in case of loss of line power. During final engineering design, Applicant has determined that the size of emergency generators can be reduced from 2,500 kw each to 1,500 kw each.

Attachment 1, Section 2.6 - Add a Small Emergency Generator in the Common Area

The original project design provided emergency generation for each power block, but did not include an emergency power source for the common area. Applicant has determined that the common area should be served by its own small (250 kW) emergency generator that would provide emergency power to the common area buildings. This will be a more efficient way of meeting any relatively small need for emergency power than calling on one of the much larger emergency generators at an individual power block.

Attachment 1, Section 2.7 - Add a Diesel-Powered Fire Pump Engine in the Common Area

The original project design provided diesel-powered fire pump engines for each power block, but did not include a separate fire pump engine for the common area. Applicant has determined that a small (100 hp) fire pump located in the common area is necessary to comply with fire codes.

Attachment 1, Section 2.8 - Replace Auxiliary System Dry Cooling System with Partial Dry Cooling System

The main process steam cooling system will remain as a solely dry cooling system. During final engineering, Applicant determined that certain auxiliary systems such as turbine and generator lube oil, boiler feed pump seal oil, chemical feed systems, and boiler circulation pump seal oil dry cooling systems should be augmented with some evaporative cooling during hot weather to enhance cooling capacity for protection of this project critical equipment. Therefore a Wet Surface-Air Cooled condenser that uses either dry-, evaporative-and dry, or evaporative only cooling based on ambient air temperature was added in lieu of a fin-fan cooler.

3.1.1.2 Mitigation Measures

The impacts on Air Quality as a result of the proposed Project modifications are less than significant, and will, therefore, not require additional mitigation measures.

3.1.1.3 Consistency with LORS

The proposed Project changes will remain consistent with all applicable LORS related to Air Quality.

3.1.1.4 Conditions of Certification

No CEC Air Quality COCs (those designated as "AQ-SC") and no Public Health COC will be changed. The only COCs that will be affected by this PTA are the Air Quality COCs (designated as "AQ"), as described in Attachment 1 - Revisions to the Authority to Construct for Ivanpah SEGS Project.

3.1.2 Public Health

The Commission Decision determined that the Project would not have significant impacts on Public Health. Pursuant to this proposed PTA, the Project changes to the equipment configuration would not have a significant impact on Public Health.

3.1.2.1 Environmental Consequences

A screening health risk assessment (SHRA) was conducted in support of the original AFC. The results of the SHRA as considered in the CEC's certification demonstrated that Project's potential impacts for all non-criteria pollutants were more than an order of magnitude below significance thresholds and thus less than significant.

The proposed modifications to the emissions sources at the power blocks result in no change in annual emissions from the boilers, and a significant decrease in both annual and short-term emissions from the emergency engines. The short-term impacts of all pollutants from the power blocks are the result of testing the emergency engines. The impacts from the proposed changes to the power blocks are therefore within the envelope of impacts already reviewed and approved by the CEC.

The proposed new emergency engine and fire pump engine in the common area are relatively small, but also relatively close to the Project fence line. Diesel engines emit diesel particulate matter (DPM), which has been identified by California as a carcinogen. As discussed in Attachment 1, dispersion modeling was conducted to determine the potential

impacts from testing the new engines. The maximum annual particulate matter impact from that modeling was used to calculate the residential cancer risk at the point of maximum offset annual impact. Although the area surrounding the Project is desert, and it is extremely unlikely that anyone would reside at the site boundary for 70 years, the residential cancer risk is used to characterize risk at this point. The estimated annual average DPM concentration and the resulting residential cancer risk are shown in Table 2 below. The estimated Project cancer risk from this conservative screening calculation is 1.1E-6, which is well below the significance level of 10.0E-6.

TABLE 2
Particulate Concentration and Residential Cancer Risk from Common Area Engines (combined)

	Annual Concentration ($\mu g/m^3$)	Unit risk $(\mu g/m^3)^{-1}$	Cancer risk
Project residential risk (from AFC)	---	---	8.0E-08
Impacts from Common Area Engines	1.87E-03	5.28E-04	0.99E-07
Combined risk	---	---	1.1E-06

All combustion PM2.5 is assumed to be DPM
DPM = Diesel Particulate Matter
Unit Risk = (Lifetime Dose Response) * (Breathing Rate) = (1.1 mg/kg)-1 * (581 l/day per kg of body weight)

3.1.2.2 Mitigation Measures

The impacts on Public Health as a result of the proposed changes are less than significant, and will, therefore, not require additional mitigation measures.

3.1.2.3 Consistency with LORS

The proposed changes to the Project will remain consistent with all applicable LORS related to Public Health.

3.1.2.4 Conditions of Certification

The proposed changes to the Project will not require changes to the COCs for Public Health.

3.2 LORS

The Commission Decision certifying the Ivanpah SEGS project concluded that the Project is in compliance with all applicable LORS. The Project, as modified, will continue to comply with all applicable LORS.

SECTION 4.0

Potential Effects on the Public

This section discusses the potential effects on the public that may result from the modifications proposed in this PTA application, pursuant to CEC Siting Regulations (Title 20, CCR, Section 1769(a)(1)(G)).

No adverse effects on the public will occur because of the changes to the Project, as proposed in this PTA, since all impacts are less than significant.

SECTION 5.0

List of Property Owners

This section lists the property owners in accordance with the CEC Siting Regulations (Title 20, CCR, Section 1769(a)(1)(H)). The only property owner is the federal government. The land surrounding the project is managed by the BLM.

SECTION 6.0

Potential Effects on Property Owners

This section addresses potential effects of the Project changes proposed in this Petition to Amend (PTA) on nearby property owners, the public, and parties in the application proceeding, pursuant to CEC Siting Regulations (Title 20, CCR, Section 1769 (a)(1)(I)).

The change in operations resulting in overall reduced air emissions will have a slight benefit to adjacent property owners (the nearest being the Primm Valley Golf Club, located 0.5 mile away). It would not have any significant adverse effects on the public and parties in the application proceeding.

ATTACHMENT 1

Application to the Mojave Desert Air Quality Management District

sierra research

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Ann Arbor MI
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February 28, 2012

Mr. Sam Oktay
Mojave Desert Air Quality Management District
14306 Park Avenue
Victorville, CA 92392-2310

Subject: Revisions to the Authority to Construct for Ivanpah SEGS Project

Dear Mr. Oktay:

On December 3, 2008, the District issued the Final Determination of Compliance (FDOC) for the Ivanpah SEGS project. During the CEC licensing process, project design details were revised, requiring amendments to the District's FDOC and permits. The last revision, Revision C, was issued by the District on April 13, 2010. Solar Partners I, LLC, Solar Partners II, LLC, and Solar Partners VIII, LLC (collectively, the "Applicant") thank the District for its continued hard work, diligence, and responsiveness.

Construction has begun on the project. After careful evaluation and a comprehensive review of the project design, the Applicant has determined that several minor changes to the original project description will be beneficial to efficient and effective operation of the project. With this application, the Applicant is seeking District approval for these minor design changes. The proposed revisions will result in small reductions in annual air emissions from the facility and will not have any adverse environmental impacts.

On behalf of the Applicant, we are requesting revisions to the District's permits and associated conditions for the project.

- Provide additional operating flexibility for the auxiliary boilers by increasing the maximum allowable daily operation (without increasing allowable annual operation);
- Increase the nominal size of each of the three auxiliary boilers from 231.1 MMBtu/hr to 249 MMBtu/hr;
- Move each auxiliary boiler approximately 30 feet from the location shown in AFC drawings;
- Add three small natural gas-fired nighttime preservation boilers (No larger than 10 MMBtu/hr each);
- Reduce the size of three emergency generators from 2,500 kw each to 1500 kw each;
- Add a 250 kw emergency engine in the common area;
- Add a 100 HP diesel fire pump engine in the common area; and

The Applicant also proposes to enhance the auxiliary systems dry cooling system at each power block with a partial dry cooling system that incorporates a wet surface air cooling

(Wet SAC) system for equipment protection and reliability. (NOTE: Main Process Steam Cooling remains fully dry cooling). Particulate emissions from each cooling system will be about 14 pounds per year. The partial dry cooling systems are exempt from District permit requirements because the water flow is less than 10,000 gpm and the unit is not used for evaporative cooling of process water (MDAQMD Rule 219 (E)(4)(c)).

Details of the proposed changes are provided in Attachment A. Also enclosed are District forms for the new sources.

Following District guidance, we have calculated filing fees for this application to be $1,180, and have enclosed a check for that amount.

Please do not hesitate to contact me if you have any questions.

Sincerely,

Steve Hill

cc: Doug Davis, BrightSource Site Compliance Manager
Jeff Harris, Ellison, Schneider and Harris L.L.P.
John Carrier, CH2M-Hill

TRUE WATERMARK PAPER - HOLD TO LIGHT TO VIEW - HEAT SENSITIVE RED IMAGE DISAPPEARS WITH HEAT

13097

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(510) 550-8161
1999 HARRISON STREET, SUITE 2150
OAKLAND, CA 94612

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02/01/12

PAY TO THE ORDER OF MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT

$ **1,180.00

One Thousand One Hundred Eighty Dollars And Zero Cents*** DOLLARS

Mojave Desert Air Quality Management District
14306 Park Avenue
Victorville,CA 92392

MEMO

AUTHORIZED SIGNATURE

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⑈013097⑈ ⑆121000248⑆ 4121436612⑈

BRIGHTSOURCE ENERGY, INC.

13097

Supplier: Mojave Desert Air Quality Management District | Supplier #: 11492 | Check #: 13097 | Check Date: 02/01/12

Invoice #	Invoice Date	Description	Discount	Payment
Ckreq020312	02/01/12		.00	1,180.00
		Invoice Subtotal		1,180.00
		Check Amount:		**1,180.00

Ivanpah Solar Electric Generating System
Application for Permit Amendment

February 23, 2012

1.0 Introduction

On September 22, 2010, the California Energy Commission (CEC) approved Solar Partners II, LLC, Solar Partners I, LLC and Solar Partners VIII, LLC, collectively Solar Partners Application for Certification of the Ivanpah Solar Electric Generating System (ISEGS) project. This project is comprised of three thermal solar facilities with a combined nominal capacity of 370 MW, located in San Bernardino County. Solar Partners (Applicant) will build and operate the ISEGS units.

A Final Determination of Compliance (FDOC) for the ISEGS project was issued by the Mojave Desert Air Quality Management District (District) on December 3, 2008. The FDOC was subsequently amended to its current form on April 13, 2010. The CEC's final approval incorporated the April 2010 version of the FDOC.

After careful evaluation and a comprehensive review of the project design, Applicant has determined that some minor changes to the original project description will be beneficial to efficient and effective operation of the project. With this application, Applicant is seeking District approval for these minor design changes. The proposed revisions will result in small changes in annual air emissions from the facility (reductions in emissions of all pollutants except for CO) and will not have any adverse environmental impacts.

2.0 Project Changes

Subsequent to the project's approval, Applicant determined that minor changes to the facility design would enhance the plant's operations. Applicant wishes to amend the permit conditions for the Ivanpah SEGS to accomplish the following:

- Provide additional operating flexibility for the auxiliary boilers by increasing the maximum allowable daily operation (without increasing allowable annual operation);
- Increase the nominal size of each of the three auxiliary boilers from 231.1 MMBtu/hr to 249 MMBtu/hr;
- Move each auxiliary boiler approximately 30 feet from the location shown in AFC drawings;
- Add three small natural gas-fired nighttime preservation boilers (No larger than 10 MMBtu/hr each);

- Reduce the size of three emergency generators from 2,500 kw each to 1500 kw each;
- Add a 250 kw emergency engine in the common area;
- Add a 100 HP diesel fire pump engine in the common area; and
- Replace auxiliary dry cooling systems with partial dry cooling systems.

Applicant proposes to retain the existing annual limits on fuel usage for each auxiliary boiler, and to incorporate the fuel consumed by the new nighttime preservation boilers within those limits. As a result, the increase in auxiliary boiler size and the addition of the nighttime preservation boilers will not result in an overall increase in annual emissions from the boilers, except for a small increase in CO.

2.1 Increase Auxiliary Boiler Daily Fuel Use Limits and Revise Maximum Daily Emissions

Infrequent situations occasionally arise that may extend boiler operation for the day until the situation is corrected. Therefore, Applicant proposes to increase the daily fuel limit while maintaining the annual limit. As a result of this change, the auxiliary boilers will trigger BACT for the following pollutants: NOx, CO, VOC, $PM_{10,}$ and $PM_{2.5}$.

Applicant also proposes to delete the portion of the permit condition that specifies the per cent excess air. The actual amount of excess air being added is expected to vary somewhat from the level currently specified. The proper level of excess air for good combustion will be determined by operating conditions.

2.2 Increase Size of Auxiliary Boilers

During final project engineering, Applicant determined that a small increase in the size of the auxiliary boilers, from 231.1 MMBtu/hr to 249 MMBtu/hr, is required for facility operation. Existing permit conditions limit daily and annual fuel use for each boiler. Applicant is proposing to change the daily limits, but not the annual limits. As a result, the proposed revisions to the Auxiliary Boiler conditions will increase maximum allowable hourly emissions slightly, increase maximum allowable daily emissions, and have no effect on maximum allowable annual emissions.

The Applicant has conducted an air quality analysis and has determined that the increase in maximum allowable daily emissions will not cause or contribute to a violation of ambient air quality standards.

2.3 Add Nighttime Boilers

Applicant has determined that the use of small (less than 10 MMBtu/hr each) natural gas-fired boilers to maintain the condenser system vacuum overnight will be more efficient and less impactful than running the auxiliary boilers at greatly reduced loads. Firing the large boilers at these greatly reduced firing rates would be thermally inefficient and would result in higher emissions on a lbs/MMBtu basis. Alternatively, allowing the system to lose vacuum overnight will extend the daily start-up process, reducing the

effectiveness of the project, and could require incremental firing resulting in emissions increases beyond those presently contemplated.

2.4 Enable Supplemental Steam for Power Boosting

Within the existing annual fuel use and emissions limits, Applicant proposes to potentially utilize the auxiliary boilers for boosting and/or extending power production.

2.5 Reduce Size of Emergency Generators

The original project design included three 2,500 kW emergency generators to provide backup power to the facility in case of loss of line power. During final engineering design, Applicant has determined that the size of emergency generators can be reduced from 2,500 kw each to 1,500 kw each.

2.6 Add a Small Emergency Generator in the Common Area

The original project design provided emergency generation for each power block, but did not include an emergency power source for the common area. Applicant has determined that the common area should be served by its own small (250 kW) emergency generator that would provide emergency power to the common area buildings. This will be a more efficient way of meeting any relatively small need for emergency power than calling on one of the much larger emergency generators at an individual power block.

2.7 Add a Diesel-Powered Fire Pump Engine in the Common Area

The original project design provided diesel-powered fire pump engines for each power block, but did not include a separate fire pump engine for the common area. Applicant has determined that a small (100 hp) fire pump located in the common area is necessary to comply with fire codes.

2.8 Replace Auxiliary System Dry Cooling System with Partial Dry Cooling System

The main process steam cooling system will remain as a solely dry cooling system.During final engineering, Applicant determined that certain auxiliary systems such as turbine and generator lube oil, boiler feed pump seal oil, chemical feed systems, and boiler circulation pump seal oil dry cooling systems should be augmented with some evaporative cooling during hot weather to enhance cooling capacity for protection of this project critical equipment. Therefore a Wet Surface-Air Cooled condenser that uses either dry-, evaporative-and dry, or evaporative only cooling based on ambient air temperature was added in lieu of a fin-fan cooler.

3.0 Air Quality Impacts

3.1 Increase the Nominal Size of the Auxiliary Boilers from 231.1 MMBtu/hr to 249 MMBtu/hr and Increase Maximum Daily Usage from 4 hours to 24

Applicant has determined that the nominal size of the regular boilers should be 249 MMBtu/hr (up from 231.1 MMBtu/hr). This will result in a small increase in hourly

emissions due to increased fuel use. Applicant is also requesting an increase in daily fuel usage limits, Applicant is not requesting an increase in annual fuel usage.

The increase in heat input rating from 231.1 to 249 MMBtu/hr will not change the classification of the boilers relative to applicable regulations, including new source performance standards or best available control technology (BACT) requirements. However, the proposed increase in the maximum daily emissions will trigger BACT for NOx, CO, VOC, PM_{10}, and $PM_{2.5}$.

Emission changes are summarized in Table 1.

Table 1
Emissions Changes—Auxiliary Boilers
(per boiler)

Timeframe	Maximum Emissions						
	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	GHGs
FDOC Revision C (4-13-2010)							
lb/hr	2.5	4.2	1.2	0.6	1.7	1.7	27,008
lb/day	10.0	17.0	4.9	2.6	6.6	6.6	108,030
tons/year	1.8	3.1	0.9	0.5	1.2	1.2	19,716
Revised[b]							
lb/hr	2.7	4.5	1.3	0.7	1.7	1.7	29,099
lb/day	65.7	107.6	32.3	16.7	41.8	41.8	698,385
tons/year	1.8	3.1	0.9	0.5	1.2	1.2	19,716
Net Change							
lb/hr	0.2	0.3	0.1	0.1	0.0	0.0	2,092
lb/day	55.7	90.6	27.4	14.1	35.2	35.2	590,355
tons/year	0	0	0	0	0	0	0

Note:
a. Baseline calculations from District emission calculations in PDOC Revision C.
b. lb/hr increase due to larger boilers; lb/day increase due to increased max daily fuel use (24 hours at max firing); tons/year increase = 0 because annual fuel use is unchanged.

3.1.1 Best Available Control Technology

Because of the daily fuel use limits in the existing FDOC, the auxiliary boiler was exempt from District BACT requirements (Rule 1303(A)). This application's requested increase in daily fuel use will trigger BACT for each auxiliary boiler's emissions of the following pollutants because maximum daily emissions will exceed 25 pounds per day:

- NOx
- VOC
- PM_{10}
- $PM_{2.5}$

The following published BACT resources were reviewed for BACT determinations: ARB BACT clearinghouse, EPA BACT/LAER Clearinghouse, SJVAPCD BACT guidelines, BAAQMD BACT Workbook, and SCAQMD.

Results of the review are presented in Table 2.

Table 2
BACT Determinations—Boilers 100-250 MMBH

					Pollutant				
					NOx	CO	VOC	PM_{10}	$PM_{2.5}$
Capacity	Year	Facility	Location	Database	ppm	Ppm	Lb/MMbtu	lb/MMbtu	lb/MMbtu
110 MMBtu/hr	1990	Darling Int	SCAQMD	CARB	9	100	-	-	-
250 MMBtu/hr	2009	Power County	Idaho	EPA	15	100	-	0.0052	0.0052
162 MMBtu/hr	2009	Amherst Campus	Massachusetts	EPA	-	-	-	0.020	-
200 MMBtu/hr	2008	Mcdonough	Georgia	EPA	-	50	0.0051	-	-
160 MMBtu/hr	2006	Riverside	Minnesota	EPA	-	114	0.0050	-	-
		Rule 4306	SJVAPCD		9	400			
>50 MMBtu/hr	2010	Achieved in Practice	BAAQMD	BACT Wkbook	25	50	-	-	-

The Applicant's proposed levels of 9 ppm NOx, 25 ppm CO, and 0.007 lb/MMBtu PM are consistent with BACT determinations for similar facilities. The Applicant proposes to revise the VOC limit from its current value of 0.0054 lb/MMBtu VOC to 0.005 lb/MMBtu, to be consistent with the BACT levels in the McDonough and Riverside permits.

3.2 Add New Nighttime Preservation Boilers (Less than 10 MMBH each) to Each Power Block

Applicant proposes to retain the annual limits on auxiliary boiler fuel usage currently in permits, and to incorporate the fuel used by the new nighttime preservation boilers within these limits. Applicant proposes that the same emission limits (in lbs/MMBtu) apply to the nighttime boilers as to the regular boilers except for CO. The boiler manufacturers have indicated that the expected CO emissions from a 10 MMBtu/hr boiler will be 50 ppm, rather than the 25 ppm proposed for the auxiliary boilers. As a result, there will be a small (0.526 TPY) increase in CO emissions associated with each Nighttime Preservation Boiler, even though total fuel use is unchanged. There will be no increase in each facility's annual emissions, except for CO, as a result of the proposed addition of these small boilers.

Emissions from the nighttime boilers are based on maximum daily usage of 24 hours (a rainy or sunless day) and an annual average usage of up to 16 hours per day.

Because the nighttime boilers are smaller than 10 MMBtu/hr, they are not subject to NSPS subpart D, Da, Db, or Dc. Because the nighttime boilers emit less than 25 pounds per day of all nonattainment pollutants, they are not subject to District BACT requirements (Rule 1303(A)(1).

Design specifications and emission calculations are shown in Table 3. Emission changes are summarized in Table 4.

Table 3
Nighttime Boiler Specifications and Emissions Calculations (per boiler)

Specifications		
Capacity, MMBtu/hr: <10.0		
Daily max firing rate, MMBtu[a]: 240		
Annual Max Firing, MMBtu[b]: 58,400		
	Emission Factors (lb/MMBtu)	Emissions, lb/hr
NOx	0.0110	0.11
CO	0.0360	0.36
VOC	0.0054	0.054
SO_2	0.0030	0.028
PM_{10}	0.0070	0.07
$PM_{2.5}$	0.0070	0.07
GHGs	116.87	1168.65

Notes:
a. Based on 24 hrs/peak day of operation (cloudy/rainy day).
b. Based on 5,840 hrs/yr of operation.

Table 4 Emission Changes – Nighttime Boilers (per boiler)							
	Maximum Emissions						
Timeframe	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	GHGs
Sept. 2010 Certification							
lb/hr	0	0	0	0	0	0	0
lb/day	0	0	0	0	0	0	0
ton/year	0	0	0	0	0	0	0
Revised[a]							
lb/hr	0.11	0.36	0.05	0.03	0.07	0.07	1169
lb/day	2.6	8.6	1.3	0.7	1.7	1.7	28,048
ton/year[a]	0	0.526	0	0	0	0	0
Net Change[a]							
lb/hr	0.11	0.36	0.05	0.03	0.07	0.07	1169
lb/day	2.6	8.6	1.3	0.7	1.7	1.7	28,048
ton/year	0	0.526	0	0	0	0	0

Note:
a. Annual fuel use will be included in the existing limits on fuel use for the associated auxiliary boiler; therefore there will be no increased annual emissions due to use of nighttime boilers, except for CO emissions. There is an increase in annual CO emissions because the NPBs have a higher CO emission factor (50 ppm for the NPBs compared to 25 ppm for the auxiliary boilers).

3.3 Reduce the Size of Emergency Generators from 2,500 kW Each to 1,500 kW Each

The revised units will be much smaller than the units currently authorized. Hours of usage of the emergency generators for testing will not change, so the proposed change will result in a reduction in emissions and air quality impacts.

Design specifications and emission calculations are shown in Table 5. Emission changes are summarized in Table 6.

Table 5
Revised Specifications and Emissions Calculations for Emergency Engines
(per engine)

Specifications					
kVA: 1875					
kW: 1500					
HP: 2250					
Fuel use (gal/hr): 104.8					
hours of testing: 50 per year (maximum)					
hours of testing: 0.5 per day (maximum)					
hours of testing: 0.5 per hour (maximum)					
Pollutant	Emission Factor[a]	Emission Rate			
	g/bhp-hr	lb/hr[b]	lb/day[b]	lb/year	Tpy
CO	2.6	6.45	6.45	644	0.322
NOx	4.8	11.91	11.91	1190	0.595
$PM_{10}/PM_{2.5}$	0.15	0.37	0.37	37	0.019
VOC	0.1	0.25	0.25	24	0.012
SO_2	0.046	0.11	0.11	11	0.006
GHGs	467.8	1,160	1,160	58,011	29

Note:
a. CO, NOx, and PM_{10} emission factors are Tier 2 limits. SO_2 emission factor is based on fuel sulfur content of 0.0015%. GHG emission factor is based on CARB emission factor for distillate fuel oil (CARB GHG Reporting Rule, Table 4).
b. Pounds per hour and pounds per day emissions based on 30 minutes of testing.

Table 6
Emissions Changes – Emergency Engines
(per engine)

Timeframe	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	GHGs
Sept. 2010 Certification							
lb/hr[a]	20.0	10.8	0.4	0.0	0.6	0.6	1805
lb/day	20.0	10.8	0.4	0.0	0.6	0.6	1805
ton/year	0.992	0.538	0.021	0.001	0.031	0.031	45
Revised							
lb/hr[a]	11.9	6.4	0.2	0.0	0.4	0.4	1160
lb/day[a]	11.9	6.4	0.2	0.0	0.4	0.4	1160
ton/year	0.595	0.322	0.012	0.001	0.019	0.019	29
Net Change							
lb/hr[a]	-8.1	-4.3	-0.2	0.0	-0.2	-0.2	-645
lb/day	-8.1	-4.3	-0.2	0.0	-0.2	-0.2	-645
ton/year	-0.397	-0.215	-0.009	0.000	-0.012	-0.012	-16

Note:
a. Pounds per hour and pounds per day emissions based on 30 minutes of testing.

3.4 Add a 250 kW Emergency Generator in the Common Logistics Area

The new emergency generator will operate for testing purposes no more than 50 hours per year, no more than 30 minutes per test day. Dispersion modeling was conducted to determine maximum impacts from engine testing, using the same procedures utilized in the initial AFC.

The modeling was based on the assumption that both common logistics area engines (emergency generator and fire pump engine) would be tested simultaneously. Modeling results are summarized in Section 3.8.

Design specifications and emission calculations are shown in Table 7. Emission changes are summarized in Table 8. The new engine will be subject to EPA Tier 3 requirements.

Table 7
Common Logistics Area Emergency Generator Engine Specifications and Emission Calculations

Specifications					
kW: 250					
HP: 335					
hours of testing: 50 per year (maximum)					
hours of testing: 0.5 per day (maximum)					
hours of testing: 0.5 per hour (maximum)					
Pollutant	Emission Factor[a]	Emission Rate			
	g/bhp-hr	lb/hr[b]	lb/day[b]	lb/year	tpy
CO	2.6	0.96	0.96	96	0.048
NOx	3	1.11	1.11	111	0.055
$PM_{10}/PM_{2.5}$	0.15	0.06	0.06	6	0.003
VOC	0.49	0.18	0.18	18	0.009
SO_2	0.046	0.02	0.02	0.2	0.000
GHGs	467.8	173	173	17,274	8

Note:
a. CO, NOx, and PM_{10} emission factors are Tier 3 limits. SO_2 emission factor based on fuel sulfur content of 0.0015%. GHG emission factor based on CARB emission factor for distillate fuel oil (CARB GHG Reporting Rule, Table 4)
b. Pounds per hour and pounds per day emissions based on 30 minutes of testing.

Table 8 Emission Changes—New Common Logistics Area Emergency Generator Engine							
Timeframe	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	GHGs
Sept. 2010 Certification							
lb/hr[a]	0	0	0	0	0	0	0
lb/day	0	0	0	0	0	0	0
ton/year	0	0	0	0	0	0	0
Revised							
lb/hr[a]	1.1	1.0	0.2	0.0	0.1	0.1	173
lb/day[a]	1.1	1.0	0.2	0.0	0.1	0.1	173
ton/year	0.055	0.048	0.009	0.000	0.003	0.003	9
Net Change							
lb/hr[a]	1.1	1.0	0.2	0.0	0.1	0.1	173
lb/day	1.1	1.0	0.2	0.0	0.1	0.1	173
ton/year	0.055	0.048	0.009	0.000	0.003	0.003	9

a. Pounds per hour and pounds per day emissions based on 30 minutes of testing.

3.5 Add a 100 HP Diesel Fire Pump Engine in the Common Logistics Area

The new fire pump engine will operate for testing purposes no more than 50 hours per year, no more than 30 minutes per test day. Dispersion modeling was conducted to determine maximum impacts from engine testing, using the same procedures utilized in the initial AFC. The modeling was based on the assumption that both common area engines (emergency generator engine and fire pump engine) would be tested simultaneously.

The new engine will be subject to EPA Tier 3 requirements.

Design specifications and emission calculations are shown in Table 9. Emission changes are summarized in Table 10.

Table 9 Common Area Fire Pump Engine Specifications and Emission Calculations					
Specifications					
HP: 100					
hours of testing: 50 per year (maximum)					
hours of testing: 0.5 per day (maximum)					
hours of testing: 0.5 per hour (maximum)					
Pollutant	Emission Factor	Emission Rate			
	g/bhp/hr	lb/hr[a]	lb/day[a]	lb/year	tpy
CO	3.7	0.41	0.41	41	0.020
NOx	3	0.33	0.33	33	0.017
$PM_{10}/PM_{2.5}$	0.15	0.02	0.02	2	0.001
VOC	0.49	0.05	0.05	5	0.003
SO_2	0.046	0.01	0.01	0	0.000
GHGs	467.8	52	52	5,157	3

a. Pounds per hour and pounds per day emissions based on 30 minutes of testing.

Table 10 Emission Changes – New Common Area Fire Pump Engine							
Timeframe	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	GHGs
Sept. 2010 Certification							
lb/hr[a]	0	0	0	0	0	0	0
lb/day	0	0	0	0	0	0	0
ton/year	0	0	0	0	0	0	0
Revised							
lb/hr[a]	0.3	0.4	0.1	0.0	0.0	0.0	52
lb/day	0.3	0.4	0.1	0.0	0.0	0.0	52
ton/year	0.0	0.0	0.0	0.0	0.0	0.0	1
Net Change							
lb/hr[a]	0.3	0.4	0.1	0.0	0.0	0.0	52
lb/day[a]	0.3	0.4	0.1	0.0	0.0	0.0	52
ton/year	0.017	0.020	0.003	0.000	0.001	0.001	3

Note:
a. Pounds per hour and pounds per day emissions based on 30 minutes of testing.

3.6 Replace the Dry Cooling Systems for the Auxiliary Oil and Chemical Cooling Requirements in Each Power Block with Partial Dry-Cooling Systems that Utilize both dry fan coolers and evaporative coolers

While the main process steam cooling system will remain as a solely dry cooling system, Applicant proposes to use a partial dry-cooling system (PDCS) for the auxiliary systems, including, but not limited to, lube and seal oil cooling for major equipment, and boiler circulating pump cooling requirements. The addition of PDCS for these systems is based on equipment protection and reliability and not on efficiency penalties. The PDCS is a

closed-loop two-stage cooling system, in each power block. In this system, the heat will be rejected using ambient air in a dry cooling system, followed by a closed-loop evaporative fluid cooler for additional cooling. Under most conditions, all cooling will be provided by the dry portion of the cooling system. The wet portion is operated only when the ambient temperature is 86°F or higher.

The dry cooling portion of the cooling system has no air emissions. The wet portion of each cooling system will be a 1638 gallon per minute (gpm) wet surface air cooler. The wet surface air cooler uses mechanical, induced-draft technology in a closed circuit. In the fluid cooler, the process fluid to be cooled is pumped through coils and cooling water passes over the coils, cooling the process fluid by evaporation. Particulate emissions result from evaporation of the cooling water that drifts (escapes) from the fluid cooler.

Deionized water will be used for makeup water. As a result, the Total Dissolved Solids (TDS) level of the recirculating water will still be very low (400 ppmw) even after 20 cycles of concentration.

Particulate emissions from each cooling system will be about 14 pounds per year. The partial dry cooling systems are exempt from District permit requirements because the water flow is less than 10,000 gpm and the unit is not used for evaporative cooling of process water (MDAQMD Rule 219 (E)(4)(c)).

Emission changes resulting from the proposed change from dry cooling to partial dry cooling are summarized in Table 11. Design specifications and emission calculations for the wet surface air cooler portions of the partial dry cooling systems are shown in Table 12.

Table 11 Cooling Systems Design Specifications (per system)		
	Per Cell	Per System
# of cells		6
Height, ft		22
Diameter, ft		4.7
Exhaust temp, F		86
Air flow, CFM	38,800	232,858
Air density, lb/cu ft		0.07146
Air flow, lb/hr	166,400	998,400
Exit velocity, (ft/min)		2269
Exit velocity, (m/sec)		11.5
Water Flow Rate, 10E6 lbm/hr	0.136	0.819
Water Flow Rate, gal/min	273	1638
Drift Rate, %	0.0005	0.0005
Drift, lbm water/hr	0.682	4.093
PM_{10} Emissions Based on TDS Level		
TDS level, ppm	400	400
PM, lb/hr	<0.001	0.002
PM, lb/day	0.007	0.039
PM, tpy	0.001	0.007

Note: Emissions based on 8,760 hours/year of operation. Actual hours of operation will be significantly less.

Table 12 Emissions Changes—Cooling Systems (per system)							
Timeframe	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	GHGs
Sept. 2010 Certification							
lb/hr	0	0	0	0	0	0	0
lb/day	0	0	0	0	0	0	0
ton/year	0	0	0	0	0	0	0
Revised							
lb/hr	0	0	0	0	0.002	0.002	0
lb/day	0	0	0	0	0.04	0.04	0
ton/year	0	0	0	0	0.007	0.007	0
Net Change							
lb/hr	0	0	0	0	0.002	0.002	0
lb/day	0	0	0	0	0.04	0.04	0
ton/year	0	0	0	0	0.007	0.007	0

3.7 Summary of Emissions Changes from Proposed Amendment

Table 13 summarizes the annual emissions changes from the proposed equipment changes and shows that the proposed amendment will result in an overall reduction in annual emissions from the facility.

Table 13
Effect of Permit Application on Facility Emissions—Summary
(TPY)

Timeframe	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	GHGs
Boilers							
Ivanpah 1	N/C	N/C	N/C	N/C	N/C	N/C	N/C
Ivanpah 2	N/C	N/C	N/C	N/C	N/C	N/C	N/C
Ivanpah 3	N/C	N/C	N/C	N/C	N/C	N/C	N/C
NighttimeBoilers[a]							
Ivanpah 1	N/C	0.526	N/C	N/C	N/C	N/C	N/C
Ivanpah 2	N/C	0.526	N/C	N/C	N/C	N/C	N/C
Ivanpah 3	N/C	0.526	N/C	N/C	N/C	N/C	N/C
Emergency Engines and Fire Pumps							
Ivanpah 1	-0.397	-0.215	-0.009	0.000	-0.012	-0.012	-16
Ivanpah 2	-0.397	-0.215	-0.009	0.000	-0.012	-0.012	-16
Ivanpah 3	-0.397	-0.215	-0.009	0.000	-0.012	-0.012	-16
Cooling Systems							
Ivanpah 1	0.000	0.000	0.000	0.000	0.007	0.007	0
Ivanpah 2	0.000	0.000	0.000	0.000	0.007	0.007	0
Ivanpah 3	0.000	0.000	0.000	0.000	0.007	0.007	0
Common Logistics Area Emergency Engine							
	0.055	0.048	0.009	0.000	0.003	0.003	9
Common Logistics Area Fire Pump							
	0.017	0.020	0.003	0.000	0.001	0.001	3
TOTAL							
	-1.118	1.000	-0.014	-0.001	-0.012	-0.012	-37

Note:
a. The nighttime preservation boilers do not increase annual emissions for pollutants (except for CO) because NPB fuel use is combined with auxiliary boiler fuel use, the total fuel use is not changing, and the emission factors for each pollutant except CO is the same. There is an increase in annual emissions for CO because the CO emission factor for NPBs is 50 ppm, whereas the emission factor for auxiliary boilers is 25 ppm.

3.8. Dispersion Modeling

Dispersion modeling was performed to demonstrate that the proposed revisions do not affect the conclusions reached in the previous analysis. The results of the modeling analysis are summarized in Table 14.

Table 14 shows that the project impacts are lower than the levels previously evaluated for one-hour averaging times for all pollutants. This is because one-hour impacts are dominated by emergency engine testing emission, which are reduced because of the smaller engines.

Table 14 shows that the project impacts are lower than the levels previously evaluated for annual averaging times for all pollutants. This is also the result of reducing the size of the emergency engines.

Table 14 shows increased impacts for 24-hour and 8-hour averaging times. This is due to the proposed increase in maximum allowable daily emissions from the auxiliary boilers.

Table 14
Modeled Emission Impacts ($\mu g/m^3$) –

Pollutant	Averaging Time	Normal Operations AERMOD		Fumigation SCREEN3
		Old[a]	New[b]	
NO_2	1-hour	126.7	99.1	4.0
	Annual	0.0	0.0	Note c
SO_2	1-hour	4.1	3.0	1.1
	3-hour	1.1	1.0	0.9
	24-hour	0.0	0.1	0.3
	Annual	0.0	0.0	Note c
CO	1-hour	73.3	80.0	6.7
	8-hour	1.6	3.5	2.3
PM_{10}	24-hour	0.1	0.4	0.2
	Annual	0.0	0.0	Note c
$PM_{2.5}$	24-hour	0.1	0.4	0.2
	Annual	0.0	0.0	Note c

Note:
a. Old impacts are the maximum offsite impacts from the approved project.
b. New impacts are the maximum offsite impacts from amended project.
c. Not applicable, because inversion breakup is a short-term phenomenon and as such is evaluated only for short-term averaging periods.

Table 15 compares the maximum-plus-background concentrations with the applicable state and federal standards for those pollutants with increased impacts, as shown in Table 14. All of the total impacts are below applicable state and federal standards except for 24-hour PM_{10}. Existing 24-hour average PM_{10} background concentrations already exceed state standards. However, PM_{10} impacts from Ivanpah operations are very small, and will not contribute significantly to the exceedance of an AAQS.

Table 15 Project plus background ($\mu g/m^3$)[a]								
Pollutant	Averaging Time	Normal Operations AERMOD		Fumigation SCREEN3	Background[d]	Total Impact	State Ambient Air Quality Standard	National Ambient Air Quality Standard
		Old[b]	New[c]					
SO_2	24-hour	0.0	0.1	0.3	13.1	13.4	105	--
CO	8-hour	1.6	3.5	2.3	1,535	1,539	10,000	10,000
PM_{10}	24-hour	0.1	0.4	0.2	**184**	**184**	**50**	150
$PM_{2.5}$	24-hour	0.1	0.4	0.2	28.8	29.2	-	35

Note:
a. Table shows modeled impacts for pollutants which have an increase in project impact in an averaging time period for which a state or federal standard applies.
b. "Old" modeling results reflect the project as described in FDOC Rev C.
c. "New" modeling results reflect the project as described in this application.
d. Background concentrations are the maximum concentrations for the baseline years (2003-2006), as measured at the ambient monitoring station (Trona for SO_2 and PM_{10}; Barstow for CO; and Big Bear for $PM_{2.5}$)

4. Proposed Permit Conditions

CONDITIONS APPLICABLE TO IVANPAH 1, 2 & 3 (Three - 3) AUXILIARY BOILERS, MDAQMD APPLICATION NUMBERS/PERMIT NUMBERS; 00009311 (B010375), 00009314 (B010376) & 00009320 (B010377), each consisting of:

~~Nebraska~~ Rentech D-type water tube boilers, ~~Model NSX-G-120,~~ each equipped with ~~Natcom~~ Todd-Coen Ultra Low-NOx Burners rated at a maximum heat input of ~~231.1~~249 MMBTU/hr, and flue gas recirculation (FGR or EGR) ~~operating at 13.9 % excess air~~, fueled exclusively on utility grade natural gas. Equipment shall use ~~225,000~~ 242,500cu-ft/hr of fuel and provide ~~220,000~~175,000 lb/hr of steam. Each boiler is equipped with a stack that is 130 feet high and ~~40~~60 inches in diameter.

...

5. Not later than 180 days after initial startup, the owner/operator shall perform an initial compliance test on this boiler in accordance with the District Compliance Test Procedural Manual. This test shall demonstrate that this equipment does not exceed the following emission maximums:

Pollutant	ppmv	Lb/MMBTU	Lb/hr
*NOx	9.0	0.011	2.75 (Per USEPA Methods 19 and 20)
SO2	1.7	0.003	0.76
*CO	25.0	0.018	4.52 (Per USEPA Method 10)
VOC	12.6	0.0054	1.32 (Per USEPA Methods 25A and 18)
PM10	n/a	0.007	1.7 (Per USEPA Methods 5 and 202 or CARB Method 5)

*corrected to 3% oxygen, on a dry basis, averaged over one hour

Opacity shall be conducted per Method 9; Flue gas flow rate shall be quantified in dscf per USEPA Methods 1 through 5

6. The owner/operator shall perform annual compliance tests in accordance with the District Compliance Test Procedural Manual. Prior to performing these annual tests, the boiler shall be tuned in accord with the manufacturer's specified turn-up procedure, by a qualified technician. Subsequent tests shall demonstrate that this equipment does not exceed the following emission maximums:

Pollutant	ppmv	Lb/MMBTU	Lb/hr
*NOx	9.0	0.011	2.75 (Per USEPA Methods 19 and 20)
SO2	1.7	0.003	0.76
*CO	25.0	0.018	4.52 (Per USEPA Method 10)
VOC	12.6	0.0054	1.32 (Per USEPA Methods 25A and 18)
PM10	n/a	0.007	1.7 (Per USEPA Methods 5 and 202 or CARB Method 5)

*corrected to 3% oxygen, on a dry basis, averaged over one hour

Opacity shall be conducted per Method 9; Flue gas flow rate shall be quantified in dscf per USEPA Methods 1 through 5

...

12. ~~This boiler shall not burn more than~~The combined fuel use at the auxiliary boiler and the nighttime preservation boiler shall not exceed 5.40~~.9~~ MMSCF of natural gas in any single calendar day, and no more than 328 MMSCF in any calendar year.
a. These limits shall not apply during the facility commissioning period. The commissioning period shall begin the first time fuel is fired in the boiler. The

commissioning period shall end when the facility achieves commercial operation, but no later than 180 days after first fire.

CONDITIONS APPLICABLE TO IVANPAH I, II, and III (Three - 3) EMERGENCY GENERATORS, MDAQMD APPLICATION NUMBERS/PERMIT NUMBERS; 00009313 (E010381), 00009316 (E010379), AND 00009317 (E010382), each consisting of:
Year of Manufacture ~~2008~~2010, Tier II, One Caterpillar, Diesel fired internal combustion engine, Model No. 3512~~6~~C ~~HD~~, and Serial No. tbd, After Cooled, Direct Injected, Turbo Charged, producing 2250~~3750~~ bhp with 16 cylinders at 1800 rpm while consuming a maximum of ~~173~~105 gal/hr. This equipment powers a Generator.

...

CONDITIONS APPLICABLE TO IVANPAH 1, 2, & 3 (Three - 3) NIGHTTIME PRESERVATION BOILERs, MDAQMD APPLICATION NUMBERS/PERMIT NUMBERS; AAA (BBB), CCC (DDD) & EEE (FFF), each consisting of:

Boilers, each equipped with Low-NOx Burners rated at a maximum heat input of 10.0 MMBTU/hr, and flue gas recirculation (FGR or EGR), fueled exclusively on utility grade natural gas. Equipment shall use 9,730 cu-ft/hr of fuel and provide 5,000 lb/hr of steam.

1. Operation of this equipment must be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted below.

2. The owner/operator shall operate this equipment in strict accord with the recommendations of the manufacturer or supplier and/or sound engineering principles and consistent with all information submitted with the application for this permit, which produce the minimum emission of air contaminants.

3. This boiler shall use only natural gas as fuel and shall be equipped with a meter measuring fuel consumption in standard cubic feet.

4. The owner/operator shall maintain a current, on-site (at a central location if necessary) log for this equipment for five (5) years, which shall be provided to District, state, or federal personnel upon request. This log shall include calendar year fuel use for this equipment in standard cubic feet, or BTUs, and daily hours of operation.

5. The owner/operator shall perform annual tune-ups in accordance with the unit manufacturer's specified tune-up procedure, by a qualified technician.

6. Records of fuel supplier certifications of fuel sulfur content shall be maintained to demonstrate compliance with the sulfur dioxide and particulate matter emission limits.

7. The owner/operator shall continuously monitor and record fuel flow rate .

8. The combined fuel use at the auxiliary boiler and the nighttime preservation boiler shall not exceed 5.4 MMSCF of natural gas in any single calendar day, and no more than 328 MMSCF in any calendar year.

a. These limits shall not apply during the facility commissioning period. The commissioning period shall begin the first time fuel is fired in the boiler. The commissioning period shall end when the facility achieves commercial operation, but no later than 180 days after first fire.

CONDITIONS APPLICABLE TO COMMON AREA EMERGENCY GENERATOR, MDAQMD APPLICATION NUMBERS/PERMIT NUMBER; GGG (HHH)

Year of Manufacture 2010, Tier III, One Diesel fired internal combustion engine, Make, Model and Serial No. tbd, After Cooled, Direct Injected, Turbo Charged, producing 335 bhp. This equipment powers a Generator.

1. Engine may operate in response to notification of impending rotating outage if the area utility has ordered rotating outages in the area where the engine is located or expects to order such outages at a particular time, the engine is located in the area subject to the rotating outage, the engine is operated no more than 30 minutes prior to the forecasted outage, and the engine is shut down immediately after the utility advises that the outage is no longer imminent or in effect.

2. This unit shall be fired only on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15ppm) on a weight per weight basis per CARB diesel or equivalent requirements.

3. This equipment shall be installed, operated, and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.

4. A non-resettable four-digit (9,999) hour timer shall be installed and maintained on this unit to indicate elapsed engine operating time.

5. This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 50 hours per year, and no more than 0.5 hours per day for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the 50 hour per year limit.

6. The owner/operator shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, state, and federal personnel upon request. The log shall include, at a minimum, the information specified below.

a. Date of each use and duration of each use (in hours)
b. Reason for use (testing & maintenance, emergency, required emission testing)
c. Calendar year operation in terms of fuel consumption (in gallons) and total hours
d. Fuel sulfur concentration (the owner/operator may use the supplier's certification of sulfur content if it is maintained as part of this log)
e. Documentation of maintenance as per manufacturer's recommendations and good maintenance practices.

7. This genset is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115). In the event of conflict between these conditions and the ATCM, the more stringent requirements shall govern.

8. This unit shall not be used to provide power during a voluntary agreed to power outage and/or power reduction initiated under an Interruptible Service Contract (ISC), Demand Response Program (DRP), Load Reduction Program (LRP), and/or similar arrangement(s) with the electrical power supplier.

CONDITIONS APPLICABLE TO COMMON AREA FIRE PUMP; III (JJJ), consisting of:
Year of Manufacture 2010, Tier III, One Clarke, Diesel fired internal combustion engine, Model No. JU4H-UFAD4G (or equivalent), and Serial number tbd, After Cooled, Direct Injected, Turbo Charged, producing 100 bhp. This equipment powers a Pump.

1. This system shall be installed, operated, and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.

2. This engine may operate in response to notification of impending rotating outage if the area utility has ordered rotating outages in the area where the engines are located or expects to order such outages at a particular time, the engines are located in the area subject to the rotating outage, the engines are operated no more than 30 minutes prior to the forecasted outage, and the engines are shut down immediately after the utility advises that the outage is no longer imminent or in effect.

3. This engine may operate in response to fire suppression requirements and needs.

4. This unit shall be fired only on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15) on a weight per weight basis per CARB diesel or equivalent requirements.

5. A non-resettable four-digit (9,999) hour timer shall be installed and maintained on this unit to indicate elapsed engine operating time.

6. This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 50 hours per year for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the 50 hour per year limit.

7. The hour limit of Condition AQ-53 can be exceeded when the emergency fire pump assembly is driven directly by a stationary diesel fueled CI engine when operated per and in accord with the National Fire Protection Association (NFPA) 25 – "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," 2006 edition or the most current edition approved by the CARB Executive Officer. {Title 17 CCR 93115(c)16}

8. The owner/operator shall maintain an operations log for these units current and on-site, either at the engine location or at an on-site location, for a minimum of two (2) years, and for another year where it can be made available to the District staff within 5 working days from the District's request, and this log shall be provided to District, state, and federal personnel upon request. The log shall include, at a minimum, the information specified below.

   a. Date of each use and duration of each use (in hours)
   b. Reason for use (testing & maintenance, emergency, required emission testing)
   c. Calendar year operation in terms of fuel consumption (in gallons) and total hours
   d. Fuel sulfur concentration (the owner/operator may use the supplier's certification of sulfur content if it is maintained as part of this log)
   e. Documentation of maintenance as per manufacturer's recommendations and good maintenance practices

9. This fire protection unit is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115). In the event of conflict between these conditions and the ATCM, the more stringent requirements shall govern.

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
14306 Park Avenue, Victorville, CA 92392-2310
(760) 245-1661 Facsimile: (760) 245-2022
www.mdaqmd.ca.gov
Eldon Heaston
Executive Director

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APPLICATION FOR INTERNAL COMBUSTION ENGINE (I.C.E.) ONLY

Page 1 of 2: please type or print

REMIT $236.00 WITH THIS DOCUMENT ($135.00 FOR CHANGE OF OWNER)

1. Permit To Be Issued To (company name to receive permit): Solar Partners II, LLC	1a. Federal Tax ID No.: 36-46018152
2. Mailing/Billing Address (for above company name): 1999 Harrison Street, Suite #500, Oakland, CA 94612	
3. Facility or Business License Name (for equipment location): Ivanpah 1	
4. Facility Address - Location of Equipment (if same as for company, enter "Same"): San Berardino County near the California/Nevada border at Primm, NV	Facility UTM or Lat/Long: UTME 640416 UTMN 3933369
5. Contact Name/Title: Doug Davis, Site Compliance Manager; Email Address: ddavis@brightsourceenergy.com	Phone/Fax Nos.: 510-250-6974
6. Application is hereby made for Authority To Construct (ATC) and Permit To Operate (PTO) the following equipment: Emergency Engine	
7. Application is for: [X] New Construction [ ] Modification* [ ] Change of Owner*	For modification or change of owner: *Current Permit Number: _____
8. Type of Organization (check one): [ ] Individual Owner [ ] Partnership [X] Corporation [ ] Utility [ ] Local Agency [ ] State Agency [ ] Federal Agency	
9. Distances (feet and direction to closest): 2500 ft Fenceline; 5.8 miles Residence; 6700 feet Business; 40 miles School	
10. General Nature of Business: Power Generation	11. Principal Product: Electricity
12. Facility Annual Throughput by Quarters (percent): 25 % Jan-Mar; 25 % Apr-Jun; 25 % Jul-Sep; 25 % Oct-Dec	13. Expected Operating Hours of IC Engine: 0.5 Hrs/Day; 50 Days/Wk; 50 Wks/Yr; 25 Total Hrs/Yr
14. Do you claim Confidentiality of Data (if yes, state nature of data in attachment)? [ ] Yes [X] No	
15. Signature of Responsible Official:	Official Title: Site Compliance Manager
Typed or Printed Name of Responsible Official: Doug Davis	Phone Number: 510-250-6974; Date Signed: 2-8-2012

- For District Use Only -

Application Number:	*Invoice Number:*	*Permit Number:*	*Company/Facility Number:*

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
I.C.E. APPLICATION, continued

Page 2 of 2: please type or print

16. INFORMATION ON I.C.E.:

Manufacturer: tbd

Model No.: tbd Serial No.: tbd

Number of Cylinders: tbd Year of Manufacture: 2011

Rating: 333 BHP Speed: tbd RPM

I.C.E. is? [x] New [ ] Existing Date Installed (MM/YYYY): ____

Prime [ ] Standby [ ] Emergency [x] Portable (Yes or No)?: no

CARB engine certification: Family: tbd Certification EO#: ____

Is this engine included in a Demand Response plan?: Yes [ ] No [x]

Type of Fuel(s): Natural Gas [ ] Digester Gas [ ] Ethanol [ ] Landfill Gas [ ]
Propane [ ] CARB Diesel [x] Methanol [ ] Other: ____

Max fuel usage per hour: ____ Fuel units (ft^3, gal, etc.): gal

Engine Lat/Long or UTM Coordinates: UTME 639330 UTMN 3934730

Exhaust Stack Height (feet): 30 Inside Diameter (inches): 5 Y/N: Vertical? Y Capped? N

Is this I.C.E. (select all that apply):

Direct Injected? [ ] After Cooled? [ ]
Turbo Charged? [ ] Inter Cooled? [ ]
Timing Retarded? [ ] Other - Please specify: ____

17. EMISSION RATES:

Pollutant	at Max.Load	Units	Origin of Emission Rate data: Manufacturer or Source Test	
Oxides of Nitrogen (NOx)	3	gm/hp-hr	Tier 3 standard	
Oxides of Sulfur (SOx)	0.004	gm/hp-hr	0.0015% S Diesel	
Carbon Monoxide (CO)	2.6	gm/hp-hr	Tier 3 standard	
Particulates (PM10)	0.15	gm/hp-hr	CARB ATCM	
Total Hydrocarbons (VOC)	0.1	gm/hp-hr		

18. EMISSION CONTROL EQUIPMENT: Add on emission control equipment? [ ] Yes [X] No

If yes: Manufacturer: ____ Model No.: ____

Serial No.: ____ *CARB EO#: ____

Type: SCR: [ ] Particulate Trap*: [ ] Ammonia Injection: [ ] Water Injection: [ ]
Non-S CR: [ ] Exhaust Gas Recirc*: [ ] Oxidation Catalyst*: [ ]

Other - Please specify: ____

19. INFORMATION OF ITEM BEING POWERED: This I.C.E. is used to power:

Electrical Generator [X] Compressor [ ] Pump [ ]
Paint Spray Gun [ ] Conveyor or Drive [ ] Fire Pump [ ]

Other - Please specify: ____

Manufacturer: TBD

Model No.: TBD Serial No.: TBD

Type, Size or Rating: 250 KW

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MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT www.mdaqmd.ca.gov
14306 Park Avenue, Victorville, CA 92392-2310 *Eldon Heaston*
(760) 245-1661 Facsimile: (760) 245-2022 Executive Director

APPLICATION FOR INTERNAL COMBUSTION ENGINE (I.C.E.) ONLY

Page 1 of 2: please type or print — REMIT $236.00 WITH THIS DOCUMENT ($135.00 FOR CHANGE OF OWNER)

1. Permit To Be Issued To (company name to receive permit): Solar Partners II, LLC	1a. Federal Tax ID No.: 36-46018152
2. Mailing/Billing Address (for above company name): 1999 Harrison Street, Suite #500, Oakland, CA 94612	
3. Facility or Business License Name (for equipment location): Ivanpah 1	
4. Facility Address - Location of Equipment (if same as for company, enter "Same"): San Berardino County near the California/Nevada border at Primm, NV	Facility UTM or Lat/Long: UTME 640416 UTMN 3933369
5. Contact Name/Title: Doug Davis, Site Compliance Manager — Email Address: ddavis@brightsourceenergy.com	Phone/Fax Nos.: 510-250-6974
6. Application is hereby made for Authority To Construct (ATC) and Permit To Operate (PTO) the following equipment: Fire Pump Engine	
7. Application is for: [X] New Construction [ ] Modification* [ ] Change of Owner*	For modification or change of owner: *Current Permit Number:
8. Type of Organization (check one): [ ] Individual Owner [ ] Partnership [X] Corporation [ ] Utility [ ] Local Agency [ ] State Agency [ ] Federal Agency	
9. Distances (feet and direction to closest): 2500 ft Fenceline — 5.8 miles Residence — 6700 feet Business — 40 miles School	
10. General Nature of Business: Power Generation	11. Principal Product: Electricity
12. Facility Annual Throughput by Quarters (percent): 25 % Jan-Mar — 25 % Apr-Jun — 25 % Jul-Sep — 25 % Oct-Dec	13. Expected Operating Hours of IC Engine: 0.5 Hrs/Day — 50 Days/Wk — 50 Wks/Yr — 25 Total Hrs/Yr
14. Do you claim Confidentiality of Data (if yes, state nature of data in attachment)? [ ] Yes [X] No	
15. Signature of Responsible Official:	Official Title: Site Compliance Manager
Typed or Printed Name of Responsible Official: Doug Davis	Phone Number: 510-250-6974 — Date Signed: 2-8-2012

- For District Use Only -

Application Number:	*Invoice Number:*	*Permit Number:*	*Company/Facility Number:*

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
I.C.E. APPLICATION, continued

Page 2 of 2: please type or print

16. INFORMATION ON I.C.E.:

Manufacturer: Clarke (or equiv.)

Model No.: JU4H-UFAD4G (or equiv.) Serial No.: tbd

Number of Cylinders: 4 Year of Manufacture: 2011

Rating: 100 BHP Speed: 1760 RPM

I.C.E. is? [x] New [ ] Existing Date Installed (MM/YYYY): ____

Prime [ ] Standby [ ] Emergency [X] Portable (Yes or No)?: N

CARB engine certification:Family: TBD Certification EO#: TBD

Is this engine included in a Demand Response plan?: Yes [ ] No [X]

Type of Fuel(s): Natural Gas [ ] Digester Gas [ ] Ethanol [ ] Landfill Gas [ ]
Propane [ ] CARB Diesel [X] Methanol [ ] Other: ____

Max fuel usage per hour: 8.5 Fuel units (ft^3, gal, etc.): gal

Engine Lat/Long or UTM Coordinates: UTME 639330 UTMN 3934730

Exhaust Stack Height (feet): 30 Inside Diameter (inches): 3 Y/N: Vertical? Y Capped? N

Is this I.C.E. (select all that apply):

Direct Injected? [x] After Cooled? [ ]
Turbo Charged? [x] Inter Cooled? [ ]
Timing Retarded? [ ] Other - Please specify: ____

17. EMISSION RATES:

Pollutant	at Max.Load	Units	Origin of Emission Rate data: Manufacturer or Source Test	
Oxides of Nitrogen (NOx)	3	gm/hp-hr	Tier 3 standard	
Oxides of Sulfur (SOx)	0.004	gm/hp-hr	0.0015% S Diesel	
Carbon Monoxide (CO)	3.7	gm/hp-hr	Tier 3 standard	
Particulates (PM10)	0.15	gm/hp-hr	CARB ATCM	
Total Hydrocarbons (VOC)	0.1	gm/hp-hr		

18. EMISSION CONTROL EQUIPMENT: Add on emission control equipment? [ ] Yes [ ] No

If yes: Manufacturer: ____ Model No.: ____

Serial No.: ____ *CARB EO#: ____

Type: SCR: [ ] Particulate Trap*: [ ] Ammonia Injection: [ ] Water Injection: [ ]
Non-S CR: [ ] Exhaust Gas Recirc*: [ ] Oxidation Catalyst*: [ ]

Other - Please specify: ____

19. INFORMATION OF ITEM BEING POWERED: This I.C.E. is used to power:

Electrical Generator [ ] Compressor [ ] Pump [ ]
Paint Spray Gun [ ] Conveyor or Drive [ ] Fire Pump [X]

Other - Please specify: ____

Manufacturer: ____

Model No.: ____ Serial No.: ____

Type, Size or Rating: ____

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14306 Park Avenue, Victorville, CA 92392-2310
(760) 245-1661 Facsimile: (760) 245-2022
www.mdaqmd.ca.gov
Eldon Heaston
Executive Director

APPLICATION FOR EXTERNAL COMBUSTION ENGINE (BOILER, ETC.) ONLY

Page 1 of 2: please type or print

REMIT $236.00 WITH THIS DOCUMENT ($135.00 FOR CHANGE OF OWNER)

1. Permit To Be Issued To (company name to receive permit): Solar Partners II, LLC	1a. Federal Tax ID No.: 36-46018152
2. Mailing/Billing Address (for above company name): 1999 Harrison Street, Suite #500, Oakland, CA 94612	
3. Facility or Business License Name (for equipment location): Ivanpah 1	
4. Facility Address - Location of Equipment (if same as for company, enter "Same"): San Berardino County near the California/Nevada border at Primm, NV	Facility UTM or Lat/Long: UTME 640416 UTMN 3933369
5. Contact Name/Title: Doug Davis, Site Compliance Manager; Email Address: ddavis@brightsourceenergy.com	Phone/Fax Nos.: 510-250-6974
6. Application is hereby made for Authority To Construct (ATC) and Permit To Operate (PTO) the following equipment: Nighttime Preservation Boiler	
7. Application is for: [X] New Construction [ ] Modification* [ ] Change of Owner*	For modification or change of owner: *Current Permit Number: _____
8. Type of Organization (check one): [ ] Individual Owner [ ] Partnership [X] Corporation [ ] Utility [ ] Local Agency [ ] State Agency [ ] Federal Agency	
9. Distances (feet and direction to closest): 3000 ft Fenceline; 5.8 miles Residence; 6700 feet Business; 40 miles School	
10. General Nature of Business: Power Generation	11. Principal Product: Electricity
12. Facility Annual Throughput by Quarters (percent): 25 % Jan-Mar; 25 % Apr-Jun; 25 % Jul-Sep; 25 % Oct-Dec	13. Facility Operating Hours: 16 Hrs/Day; 7 Days/Wk; 52 Wks/Yr; 5840 Total Hrs/Yr
14. Do you claim Confidentiality of Data (if yes, state nature of data in attachment)? [ ] Yes [X] No	
15. Signature of Responsible Official:	Official Title: Site Compliance Manager
Typed or Printed Name of Responsible Official: Doug Davis	Phone Number: 510-250-6974; Date Signed: 2-8-2012

- For District Use Only -

Application Number:	*Invoice Number:*	*Permit Number:*	*Company/Facility Number:*

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
EXTERNAL COMBUSTION APPLICATION, continued

16. INFORMATION ON EQUIPMENT:

[X] Boiler [ ] Dryer [ ] Furnace [ ] Heater [ ] Kiln [ ] Oven [ ] Other, specify: _____

Manufacturer: tbd

Model No.: tbd Serial No. tbd

Maximum heat input rating (use Higher Heating Value): 10 MMBtu/hr or kW

Burner Manufacturer: tbd Burner Model No.: _____

Number of burners: 1 Burner max heat input rating: 10 MMBtu/hr or kW

Percent excess air (or n/a): 15% Operating temps (C or F): _____ Av. _____ Max

Specify Primary Fuel (*attach fuel analysis for these fuels specifying HHV and sulfur content):

[X] Natural Gas [ ] LPG (Propane) [ ] CARB Diesel [ ] Coal* [ ] Petroleum Coke*

[ ] Digester Gas* [ ] Landfill Gas* [ ] Refinery Gas* [ ] Other,* specify: _____

Max hourly primary fuel usage: 9800 Fuel units (ft^3, gal, etc.): cu ft

If secondary fuel is proposed, specify: _____ Max hourly usage: _____

Feedstock type and max process rate (specify units): _____

Unit Lat/Long or UTM Coordinates: UTME 640416 UTMN 3933369

Max annual hours: 5,840 Exhaust Stack Height (feet): tbd Inside Diameter (inches): tbd

17. EMISSION CONTROLS: Check all that apply:

[X] Low NOx Burner [ ] Oxygen Trim [ ] Flue or Exhaust Gas Recirculation (FGR or EGR)

[ ] Oxidation Catalyst [ ] Selective Catalytic Reduction (SCR) [ ] Selective Non-Catalytic Reduction (SNCR)

[ ] Afterburner [ ] ESP [ ] Baghouse [ ] Other - Please specify: _____

18. MAX EMISSION RATES (CONTROLLED):

Pollutant	Concentration ppmvd or gr/dscf	Mass pounds/hour
Oxides of Nitrogen (NOx)	9 ppmvd	0.11
Oxides of Sulfur (SOx)		0.03
Carbon Monoxide (CO)	50 ppmvd	0.36
Total Particulates (TSP or PM30)		0.07
Coarse Respirable Particulates (PM10)		0.07
Fine Respirable Particulates (PM2.5)		0.07
Total Organics (TOG)	10 ppmvd	0.05
Volatile Organic Compounds (VOC, ROG or NMOG)	10 ppmvd	0.05

19. DRYERS ONLY Check one:

[ ] Centrifugal [ ] Chip [ ] Fluidized Bed [ ] Rotary [ ] Spray [ ] Other, specify: _____

20. FURNACE ONLY Check one:

[ ] Annealing [ ] Burnoff [ ] Calcining [ ] Crucible [ ] Cupola [ ] Diffusion [ ] Electric [ ] Forge [ ] Pot

[ ] Holding [ ] Heat Treating [ ] Melting [ ] Reverbatory [ ] Rotary [ ] Sweating [ ] Oxide Growth

21. OVEN ONLY Check one:

[ ] Bakery [ ] Baking [ ] Curing [ ] Drying [ ] Fluidized Bed [ ] Stripping [ ] Solder Reflow

[ ] Roasting, specify type: _____ Firing Method: [ ] Direct [ ] Indirect

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
14306 Park Avenue, Victorville, CA 92392-2310
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Eldon Heaston
Executive Director

APPLICATION FOR EXTERNAL COMBUSTION ENGINE (BOILER, ETC.) ONLY

 REMIT $236.00 WITH THIS DOCUMENT ($135.00 FOR CHANGE OF OWNER)

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2. Mailing/Billing Address (for above company name): 1999 Harrison Street, Suite #500, Oakland, CA 94612	
3. Facility or Business License Name (for equipment location): Ivanpah 2	
4. Facility Address - Location of Equipment (if same as for company, enter "Same"): San Berardino County near the California/Nevada border at Primm, NV	Facility UTM or Lat/Long: UTME 640416 UTMN 3933369
5. Contact Name/Title: Doug Davis, Site Compliance Manager — Email Address: ddavis@brightsourceenergy.com	Phone/Fax Nos.: 510-250-6974
6. Application is hereby made for Authority To Construct (ATC) and Permit To Operate (PTO) the following equipment: Nighttime Preservation Boiler	
7. Application is for: [X] New Construction [ ] Modification* [ ] Change of Owner*	For modification or change of owner: *Current Permit Number:
8. Type of Organization (check one): [ ] Individual Owner [ ] Partnership [X] Corporation [ ] Utility [ ] Local Agency [ ] State Agency [ ] Federal Agency	
9. Distances (feet and direction to closest): 3000 ft Fenceline — 5.8 miles Residence — 6700 feet Business — 40 miles School	
10. General Nature of Business: Power Generation	11. Principal Product: Electricity
12. Facility Annual Throughput by Quarters (percent): 25 % Jan-Mar — 25 % Apr-Jun — 25 % Jul-Sep — 25 % Oct-Dec	13. Facility Operating Hours: 16 Hrs/Day — 7 Days/Wk — 52 Wks/Yr — 5840 Total Hrs/Yr
14. Do you claim Confidentiality of Data (if yes, state nature of data in attachment)? [ ] Yes [X] No	
15. Signature of Responsible Official:	Official Title: Site Compliance Manager
Typed or Printed Name of Responsible Official: Doug Davis	Phone Number: 510-250-6974 — Date Signed: 2-8-2012

- For District Use Only -

Application Number:	*Invoice Number:*	*Permit Number:*	*Company/Facility Number:*

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
EXTERNAL COMBUSTION APPLICATION, continued

16. INFORMATION ON EQUIPMENT:

[X] Boiler [ ] Dryer [ ] Furnace [ ] Heater [ ] Kiln [ ] Oven [ ] Other, specify: _____

Manufacturer: tbd

Model No.: tbd Serial No. tbd

Maximum heat input rating (use Higher Heating Value): 10 MMBtu/hr or kW

Burner Manufacturer: tbd Burner Model No.: _____

Number of burners: 1 Burner max heat input rating: 10 MMBtu/hr or kW

Percent excess air (or n/a): 15% Operating temps (C or F): _____ Av. _____ Max

Specify Primary Fuel (*attach fuel analysis for these fuels specifying HHV and sulfur content):

[X] Natural Gas [ ] LPG (Propane) [ ] CARB Diesel [ ] Coal* [ ] Petroleum Coke*

[ ] Digester Gas* [ ] Landfill Gas* [ ] Refinery Gas* [ ] Other,* specify: _____

Max hourly primary fuel usage: 9800 Fuel units (ft^3, gal, etc.): cu ft

If secondary fuel is proposed, specify: _____ Max hourly usage: _____

Feedstock type and max process rate (specify units): _____

Unit Lat/Long or UTM Coordinates: UTME 638785 UTMN 3935664

Max annual hours: 5,840 Exhaust Stack Height (feet): tbd Inside Diameter (inches): tbd

17. EMISSION CONTROLS: Check all that apply:

[X] Low NOx Burner [ ] Oxygen Trim [ ] Flue or Exhaust Gas Recirculation (FGR or EGR)

[ ] Oxidation Catalyst [ ] Selective Catalytic Reduction (SCR) [ ] Selective Non-Catalytic Reduction (SNCR)

[ ] Afterburner [ ] ESP [ ] Baghouse [ ] Other - Please specify: _____

18. MAX EMISSION RATES (CONTROLLED):

Pollutant	Concentration ppmvd or gr/dscf	Mass pounds/hour
Oxides of Nitrogen (NOx)	9 ppmvd	0.11
Oxides of Sulfur (SOx)		0.03
Carbon Monoxide (CO)	50 ppmvd	0.36
Total Particulates (TSP or PM30)		0.07
Coarse Respirable Particulates (PM10)		0.07
Fine Respirable Particulates (PM2.5)		0.07
Total Organics (TOG)	10 ppmvd	0.05
Volatile Organic Compounds (VOC, ROG or NMOG)	10 ppmvd	0.05

19. DRYERS ONLY Check one:

[ ] Centrifugal [ ] Chip [ ] Fluidized Bed [ ] Rotary [ ] Spray [ ] Other, specify: _____

20. FURNACE ONLY Check one:

[ ] Annealing [ ] Burnoff [ ] Calcining [ ] Crucible [ ] Cupola [ ] Diffusion [ ] Electric [ ] Forge [ ] Pot

[ ] Holding [ ] Heat Treating [ ] Melting [ ] Reverbatory [ ] Rotary [ ] Sweating [ ] Oxide Growth

21. OVEN ONLY Check one:

[ ] Bakery [ ] Baking [ ] Curing [ ] Drying [ ] Fluidized Bed [ ] Stripping [ ] Solder Reflow

[ ] Roasting, specify type: _____ Firing Method: [ ] Direct [ ] Indirect

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
14306 Park Avenue, Victorville, CA 92392-2310
(760) 245-1661 Facsimile: (760) 245-2022
www.mdaqmd.ca.gov
Eldon Heaston
Executive Director

APPLICATION FOR EXTERNAL COMBUSTION ENGINE (BOILER, ETC.) ONLY

Page 1 of 2: please type or print

REMIT $236.00 WITH THIS DOCUMENT ($135.00 FOR CHANGE OF OWNER)

1. Permit To Be Issued To (company name to receive permit): Solar Partners VIII, LLC	1a. Federal Tax ID No.: 36-4608159
2. Mailing/Billing Address (for above company name): 1999 Harrison Street, Suite #500, Oakland, CA 94612	
3. Facility or Business License Name (for equipment location): Ivanpah 3	
4. Facility Address - Location of Equipment (if same as for company, enter "Same"): San Berardino County near the California/Nevada border at Primm, NV	Facility UTM or Lat/Long: UTME 640416 UTMN 3933369
5. Contact Name/Title: Doug Davis, Site Compliance Manager; Email Address: ddavis@brightsourceenegry.com	Phone/Fax Nos.: 510-250-6974
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14. Do you claim Confidentiality of Data (if yes, state nature of data in attachment)? [ ] Yes [X] No	
15. Signature of Responsible Official:	Official Title: Site Compliance Manager
Typed or Printed Name of Responsible Official: Doug Davis	Phone Number: 510-250-6974; Date Signed: 2-8-2012

- For District Use Only -

Application Number:	*Invoice Number:*	*Permit Number:*	*Company/Facility Number:*

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
EXTERNAL COMBUSTION APPLICATION, continued

16. INFORMATION ON EQUIPMENT:

[X] Boiler [ ] Dryer [ ] Furnace [ ] Heater [ ] Kiln [ ] Oven [ ] Other, specify: _____

Manufacturer: tbd

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Maximum heat input rating (use Higher Heating Value): 10 MMBtu/hr or kW

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Number of burners: 1 Burner max heat input rating: 10 MMBtu/hr or kW

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Max hourly primary fuel usage: 9800 Fuel units (ft^3, gal, etc.): cu ft

If secondary fuel is proposed, specify: _____ Max hourly usage: _____

Feedstock type and max process rate (specify units): _____

Unit Lat/Long or UTM Coordinates: UTME 637550 UTMN 3937870

Max annual hours: 5,840 Exhaust Stack Height (feet): tbd Inside Diameter (inches): tbd

17. EMISSION CONTROLS: Check all that apply:

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[ ] Roasting, specify type: _____ Firing Method: [ ] Direct [ ] Indirect