DR-AIR-1

Information Required:

> Please describe the types of activities that emit combustion and fugitive dust emissions on the site currently and the quantities of those emissions that occur from those activities.

Response:

The 9,400-acre Project site is composed of undeveloped desert with naturally-vegetated areas; there are no existing structures or stationary emission sources on the Project site. Currently, there are no anthropogenic activities on this site that would create combustion or fugitive dust emissions, with the possible exception of off-road recreational vehicle use. BLM does not currently monitor off-road recreational vehicle use, making it impossible to predict emissions from this activity. However, off-road vehicle use is believed to be relatively infrequent.

The site also is subject to natural wind erosion effects which would cause fugitive dust emissions. Pre-project fugitive dust emissions from wind erosion are discussed and estimated in association with the response to DR-AIR-2.

DR-AIR-2

Information Required:

> Please describe whether those activities will be permanently discontinued when the project is completed and estimate the reductions from the current onsite baseline emissions.

Response:

Off-road recreational vehicle use, however limited, will cease following construction of the Project, and any emissions associated with those activities would cease as well.

The Preliminary Geotechnical Investigational Report for the Project site was completed after the AFC was filed in August 2009 and was submitted to the CEC as part of the October 2009 Data Adequacy submittal. As described in Attachment C of the BSPP Geotechnical Report, this site has a high potential for wind erosion. The Wind Erosion Prediction System (WEPS) model was used to estimate the potential for wind erosion and soil loss at the BSPP site. The WEPS model is a process-based, continuous, daily time-step model that simulates weather, field conditions, management and erosion. The model results are highly dependent upon the input parameters, which are supplied in Attachment C.4.2 of the Geotechnical Report. The WEPS model was applied for BSPP with climate data and surface elevations from the nearest climate and weather stations, representative soil profiles for the site, and a representative area for the Project. The Project site consists of three different soil types represented with three different map units: the Rositas-Orita-Carrizo-Acro map unit, the Rillito-Gunsight map unit and the Vaiva-Quilotoas-Hyder-Cipriano-Cherioni map unit. The WEPS model was applied for each of these map units to determine the wind erosion for each soil type from the entire site.

Since the WEPS model treats the field input as an idealized rectangle, the total Project area was modeled as a larger area calculated with the widest site dimensions and does not match the area of the exact

Project outline. Each of these map units represent a percentage of the BSPP; these percentages and the results from the WEPS model were used to create normalized emission factors for the entire Project site.

The WEPS model predicted that the normalized fugitive PM10 emission rate for the entire undisturbed site is 19.046 tons/acre-year. The WEPS model PM10 emission rate was multiplied by the total Project area of 9,400 acres to calculate the annual wind erosion of the Project site according to Equation AQ-1. This calculation yields a baseline (i.e., pre-Project) mass emission rate of 179,036 tons per year (tpy) of fugitive PM10 due to wind erosion on the currently undisturbed Project site.

$$\textbf{Total PM} = WEPS_u * Area_P \qquad \text{(Eq. AQ-1)}$$

Where: Total PM = PM10 emissions from the entire undisturbed site (tpy)

$WEPS_u$ = undisturbed PM10 emission factor from the WEPS model ($WEPS_u$ = 19.046 tons/acre-year)

$Area_P$ = Total Project site area ($Area_P$ = 9,400 acres)

Wind erosion following Project construction will be lower than present levels on the undisturbed site. This will be because of site compaction, the use of soil stabilizers, and paving some portions of the site.

Similar to the undisturbed site, the WEPS model was used to predict wind erosion from the future planned disturbed site. The total predicted disturbance area for the Project is 7,030 acres during the construction phase, which is approximately 75 percent of the total Project area. The closest approximation to the site management practices at the BSPP available in the WEPS input parameters are the management operations that describe the conditions expected in the aftermath of grazing with complete removal of crop residue. The decrease in wind erosion due to road paving and application of dust suppressants are not accounted for the in the WEPS model for the planned disturbed site. Also, no distinction was made between the total disturbance area and the controlled areas within the Project site. The WEPS model used an idealized rectangle with an area of 826 acres, which is the area of one solar field array, to calculate the wind erosion from the planned disturbed area. The WEPS model predicted that the normalized uncontrolled fugitive PM10 emission rate for the planned disturbed site would be 16.867 tons/acre-year.

To predict post-Project controlled emissions, the total area of the solar field and power block areas for all four units was taken as the controlled area. This is a total of 5,600 acres that is either paved, covered with gravel, or treated with soil stabilizers. Soil stabilizers (dust suppressants) are assumed to provide 80 percent control efficiency compared to untreated soil. Gravel and paving would have a higher control efficiency; however, the lower value of 80 percent is used in the calculations to ensure that emissions are not underestimated. With these assumptions, the controlled PM10 emissions from the Project site following construction can be calculated using Equation AQ-2 below.

$$\textbf{Project PM}_C = (WEPS_u * (Area_P - Area_d)) + (WEPS_d * (Area_d – Area_C))+ (WEPS_d * Area_C * (1 - CE)) \qquad \text{(Eq. AQ-2)}$$

Where: Project PM_C = Controlled, post-Project PM10 emissions from the BSPP site (tpy)

$WEPS_u$ = normalized undisturbed PM10 emission factor from the WEPS model ($WEPS_u$ = 19.046 tons/acre-year)

$WEPS_d$ = normalized disturbed site PM10 emission factor from the WEPS model ($WEPS_d$ = 16.867 tons/acre-year)

$Area_P$ = Total Project ROW ($Area_P$ = 9,400 acres)

$Area_d$ = Total disturbed facility footprint ($Area_d$ = 7,030 acres)

$Area_C$ = Total controlled area of the solar fields and power blocks ($Area_F$ = 5,600 acres)

CE = Control Efficiency of soil stabilizer (CE = 80 percent)

Controlled, post-Project PM10 emissions are calculated to be 88,151 tpy. The net change in fugitive dust emissions due strictly to wind erosion is calculated by subtracting the controlled, post-Project emissions from the pre-Project, undisturbed emissions using Equation AQ-3.

Emission Change = Total PM - Project PM_C (Eq. AQ-3)

As shown in Table DR-AQ-2-1, there is a net reduction in fugitive PM10 emissions due to wind erosion following construction of the Project of 90,885 tpy. Note that this calculation does not include the emissions associated with operations of the solar facility (please see DR-AQ-4 for those calculations). The detailed wind erosion fugitive dust emission calculations are provided in Table E.2-18b in the spreadsheet with filename *Blythe DR Operating Emissions.xlsx* on the CD-ROM in Attachment DR-AIR-2, Emission Calculations.

Table DR-AIR-2-1 Fugitive PM10 Emissions from Wind Erosion

Site Condition	Annual PM10 Emissions (tpy)
Pre-Project Undisturbed Site	179,036
Controlled Post-Project	88,151
Emission Change	(90,885)

As noted, the wind erosion estimates for before and after construction of the BSPP were developed using WEPS, a sophisticated numerical model developed by the U.S. Department of Agriculture – Agricultural Research Service. The WEPS model was designed to simulate wind erosion potential in an agricultural setting. Because soil conditions would be different in an industrial setting such as a solar thermal power plant, the model was run making conservative assumptions to ensure that estimates of wind erosion were not underestimated. When used to estimate emissions during the operational phase of the Project, the model is expected to significantly overestimate the amount of particulate matter emissions from the solar field due to wind erosion. If the mass emission levels estimated by WEPS during operations were to actually occur, the blowing sand and dust would quickly pit the mirror surfaces, and would significantly degrade the efficiency of power production to unacceptable levels. However, the control measures to be implemented at the site including initial site compaction, application of dust suppressant as needed, and regular application of water during mirror washing, are sufficient to lower potential wind erosion to acceptable levels.

Several features of the BSPP compared to the scenario modeled point to a significant overestimate in estimated operational wind erosion. These attributes include:

1. The whole solar array field is compacted during construction to a significant depth that will significantly alter the native soil characteristics assumed in the model. A 40% increase in soil density was assumed in the model run but this is only an unsupported assumption not based on any empirical data.

2. Ongoing operations involving mirror washing, dust suppressant application, and water/dust suppressant trucks traffic through the solar array field will produce additional compaction and cementation of the soil, further altering the soil characteristics to become less erodible, compared to the soil simulated in the model.

3. The model run for post construction assumes free airflow across the entire site. In actuality, the mirror arrays will act as wind breaks and will significantly affect the wind flow near the ground. The mirror structures will most likely reduce the effective surface friction velocity in the solar field. With a lower friction velocity, there will be less energy available to produce suspension of dust particles from the solar array, resulting in a significant reduction in the potential for generating windblown dust compared to that modeled.

Given the above differences between what was modeled and what is actually expected in the operation phase of the BSPP, the WEPS model estimates of wind erosion are expected to significantly overestimate the wind erosion during facility operation. However, the conservative (high) estimate of operational emissions results in a minimum estimate of the reduction in windblown dust emissions from the pre-construction baseline scenario to operational activities. In other words, the expected potential reduction in windblown dust by construction of the BSPP, estimated using the WEPS model, is a minimum value and the reduction in emissions from the pre- to post-Project will likely be much larger than presented.

DR-AIR-3

Information Required:

> Please provide data to obtain an estimate of the actual surface silt content at the site, which can be from the geotechnical report not submitted as part of the AFC.

Response:

The silt content used to estimate construction and operational emissions for this Data Response submittal are based on the average silt content for all samples that were analyzed for silt content during the recent site geotechnical study (see Attachment B of the Preliminary Geotechnical Investigation Report [Kleinfelder 2009] submitted to the CEC in October 2009), and summarized in Table DR-AIR-3-1 below. As shown in the table, the silt content ranged from 5.6 percent to 41.9 percent, with an average of 18.03 percent. The emission calculations used the average silt content.

Table DR-AIR-3-1 Silt Content Based on BSPP Geotechnical Report

Sample Identification	Percent Fines used as "Silt Content" (%)	Sample Identification	Percent Fines used as "Silt Content" (%)
B-2	12.7	B-28	5.6
B-4	16.4	B-30	15.9
B-8	30.3	TP-1	16.1
B-11	23.0	TP-3	18.9
B-16	12.5	TP-5	41.9
B-23	12.7	TP-7	16.7
B-18	20.0	TP-9	20.6
B-25	22.3	TP-11	13.1
B-27	16.1	TP-16	9.7
		Average Silt Content:	**18.03**

DR-AIR-4

Information Required:

Please update the construction and operations fugitive dust emissions calculations as appropriate based on the site specific surface silt content estimate.

Response:

The construction and operations fugitive dust emissions calculations were updated with a site specific surface silt content of 18.03 percent as determined in response to DR-AIR-3. The updated construction emissions are presented in Tables DR-AIR-4-1 and DR-AIR-4-2 and the updated operating emissions are shown in Table DR-AIR-4-3. Detailed operating emission calculations are provided in the spreadsheet with filename *Blythe DR Operating Emissions.xlsx* and the construction emissions are provided on the spreadsheet with the filename *Blythe DR Construction Emissions.xlsx*, both on the CD-ROM in Attachment DR-AIR-2, Emission Calculations.

Table DR-AIR-4-1 Maximum Daily Construction Emissions[1]

Phase of Construction	NOx (lb/day)	VOC (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Power Plant (onsite)	860.38	90.48	478.98	1.86	903.43	168.67
Pipeline (offsite)	14.83	1.99	8.79	0.03	7.85	2.78
Roadway (offsite)	211.84	24.20	92.78	0.45	114.92	39.87
Transmission and Communication Line (offsite)	13.67	1.55	15.81	0.03	8.30	3.02

1. The emissions presented in this table reflect the change in the silt content as explained in the response to DR-AIR-4, and include changes to the equipment (i.e., tailpipe) emission factors as explained in the responses to DR-AIR-8 and DR-AIR-9.

Table DR-AIR-4-2 Maximum Annual Construction Emissions1

Phase of Construction	NOx (tpy)	VOC (tpy)	CO (tpy)	SOx (tpy)	PM10 (tpy)	PM2.5 (tpy)
Power Plant (onsite)	99.72	10.66	56.51	0.22	100.89	18.90

1. The emissions presented in this table reflect the change in the silt content as explained in the response to DR-AIR-4, and include changes to the equipment (i.e., tailpipe) emission factors as explained in the responses to DR-AIR-8 and DR-AIR-9.

Table DR-AIR-4-3 Summary of Project Criteria Pollutant Emissions

Emissions	NOx	VOC	CO	SOx	PM10	PM2.5
Hourly Emissions (lb/hr)	128.09	11.71	84.36	0.21	22.96	8.76
Daily Emissions (lb/day)	149.70	41.14	156.85	0.74	129.35	38.36
Annual Emissions (tpy)	4.92	4.72	7.52	0.05	44.59	6.10

Note: Operating emissions were updated (compared to the emissions presented in the AFC) to address four Project refinements or Data Requests:

Silt content of soils (impacts PM10 and PM2.5 emissions only),

Model year 2013 vehicle emission standards (all pollutants),

the increase in onsite maintenance vehicle mileage per DR-AIR-14 and -15, and

a larger diesel-fired emergency generator (all pollutants).

The emissions shown in this table reflect these four changes to emissions compared to the AFC.

DR-AIR-5

Information Required:

Please update the construction and operations particulate modeling analysis, as necessary, based on the revised fugitive dust emission calculations.

Response:

The particulate modeling analyses based on the revised construction and operational emissions are provided in Attachment DR-AIR-5, Air Quality Impacts Assessment.

DR-AIR-6

Information Required:

Please provide a GHG emissions estimate for the project construction in CO2-equivalent tons for the entire construction period.

Response:

GHG emissions for the construction period are summarized in Table DR-AIR-6-1. A detailed explanation of the GHG emissions calculation procedure is provided as Attachment DR-AIR-6, Construction Greenhouse Gas Emission Calculations, and detailed calculations are provided in the spreadsheet with filename *Blythe DR Construction Emissions.xlsx* on the CD-ROM in Attachment DR-AIR-2, Emission Calculations.

Table DR-AIR-6-1 Construction GHG Emissions

Element of Construction	**Project Total (metric tons CO_2 equivalent)**
Construction Equipment Total	74,384
Onsite Motor Vehicle Total	1,801
Offsite Motor Vehicle Total	31,332
Project Total (metric tons CO_2e)	**107,517**
Annualized over Project Life (30 years) (metric tons CO_2 equivalent/yr)	3,584

DR-AIR-7

Information Required:

Please provide the spreadsheet version of the Appendix E-2 Construction Emission Worksheets with the embedded calculations intact.

Response:

The detailed emission calculations are provided in the spreadsheet with filename Blythe DR Construction Emissions.xlsx on the CD-ROM in Attachment DR-AIR-2, Emission Calculations.

DR-AIR-8

Information Required:

> Please identify whether all of the off-road equipment emission factors are based on Tier 3 engines, or if Tier 3 engines are only assumed for the engines listed with Tier 3 in the equipment name column.

Response:

All of the off road equipment emission factors are based on engines that meet Tier 3 emission standards. Please see DR-AIR-9 for a description of how the emission factors were derived.

DR-AIR-9

Information Required:

> Please provide the input assumptions to obtain the OFF ROAD Model raw engine emission factors, the assumptions used to derive the equipment specific emission factors, and please provide the spreadsheets used to create the emission factors shown in Appendix E-2.

Response:

The OFFROAD2007 Model was run with the input options shown in Table DR-AIR-9-1.

Table DR-AIR-9-1 OFFROAD Model Options

Variable	Selected Option
Episode Period	Calendar Year: 2010 Averaging Days: Monday – Sunday Month or Season: Annual
Report Options	HC Emissions as ROG Report by Model Year: Exhaust, Evaporative and Toxics
Filter Options: Area	State
Filter Options: Equipment Categories	All
Filter Options: Fuel and Horsepower	Fuel: Diesel Horsepower Class: All horsepowers

The model produced a tab-delimited text file that contained annual average daily diesel equipment exhaust emissions, in tons per day, and average daily operating time, in hours per day, for calendar year 2010, by equipment type (e.g., rubber-tired loaders, cranes, etc.), horsepower range (e.g., 0 to 25 horsepower, 26 to 50 horsepower, etc.) and model year for each combination of equipment type, horsepower range, and model year. This information was listed for every combination of county, air district and air basin within the state. For example, one line of output listed average annual daily operating hours and daily exhaust emissions of ROG, CO, NOx, CO_2, SO_2, PM, N_2O and CH_4 from model year 2008 air compressors with horsepower ratings from 26 to 50 horsepower in the portion of Riverside County located within the Mojave Desert Air Basin that is in the Mojave Desert Air Quality Management District's jurisdiction. The model output file was imported into a Microsoft Access database, and a query was used to calculate total emissions and operating hours by equipment type, horsepower range and model year.

Emission factors, in pounds per operating hour, were calculated by dividing the annual average daily emissions, converted from tons per day to pounds per day, by the annual average daily operating hours. These emission factors were calculated for each combination of equipment type, horsepower range and model year. The emission factors used to calculate exhaust emissions presented in the AFC were based on the model outputs for the portion of Riverside County located within the Mojave Desert Air Basin that is in the Mojave Desert Air Quality Management District's jurisdiction. However, in preparing the response to this Data Request, it was concluded that it is more appropriate to use statewide totals because of the relative small equipment populations within the local geographic area. Therefore, the emission factors and construction emission calculations have been revised.

The emission factors for the specific equipment shown in Appendix E.2, Table E.2-1 (of the AFC), are the emission factors calculated from the OFFROAD2007 Model output for the corresponding OFFROAD2007 Model equipment category, horsepower range that encompasses the specific equipment, and the model year that is the earliest model year required to comply with Tier 3 emission standards, which depends on engine horsepower.

The tab-delimited output file from the OFFROAD2007 Model is provided in the textfile with filename *2010 Offroad BMY State.BmyExh* and revised construction emission calculations are provided on spreadsheets with the filename *Blythe DR Construction Emissions.xlsx*, both on the CD-ROM in Attachment DR-AIR-2, Emission Calculations. Revised maximum daily and annual construction emissions are provided in Data Response DR-AIR-4.

DR-AIR-10

Information Required:

> Please provide a defensible rationale as to why the locations for the area source emission inputs did not change from short-term to annual modeling, or please provide annual construction modeling that matches the extent of annual construction activities.

Response:

The choice of location for the construction sources is discussed in the response to DR-AIR-11 below. The choices of source location were intended to demonstrate the worst-case scenario for construction phase modeling. Keeping the construction emission sources in the worst-case location for the entire year for the annual period model runs is a more conservative (worst-case) approach compared to keeping the sources in the worst-case location for the shorter period of time. By increasing the size of the area sources to cover the entire area to be worked over the course of a year and thus distributing the annual construction emissions over a much wider area, the modeled impacts would decrease significantly. The annual impacts were assessed using the entire area to be worked over the course of a year; the modeled impacts are provided in Attachment DR-AIR-5, Air Quality Impacts Assessment.

DR-AIR-11

Information Required:

> Please provide a defensible rationale why the modeling analysis focuses on the construction for the northwest Unit and not the other three units' construction.

Response:

The area sources used for modeling the short term construction activities were placed such that they would represent the worst case construction modeling scenario. As was discussed in the AFC regarding the selection of source location:

> "...the northwestern power block (Solar Unit #2) was used as the worst-case scenario since it is the closest of the four power blocks to the location modeled for the solar field construction sources, which were located in the northwest quadrant of the site in order to be downwind of the predominant wind direction, which is from the south-southeast. Choosing the northwestern of the four power blocks thus maximized the interaction of construction sources impacts, resulting in a "worst case" conservative estimate of construction impacts.."

The worst case modeling scenario for the solar field construction sources was to place them against the fence line in the northwest part of the site (based on the wind rose for Blythe Airport, see Figure 5.2-8 of the AFC), which shows the predominant winds blowing from the south to southeast. For this reason, the power block that would yield the greatest overlap of impacts with the solar field construction sources, in this case the northwest Unit power block, was chosen for the modeling analysis. The sources used in the construction modeling analysis are shown in Figure 5.2-10 of the AFC. In the AERMOD modeling system, the worst impacts typically occur when sources are "lined up" with regard to the wind. Placing the construction sources for the solar array against the northwest fence line as described above, and also choosing the northwest Unit power block to represent power block construction, maximizes the possibility of those sources being aligned with each other and the predominant wind direction.

DR-AIR-12

Information Required:

> Please provide an analysis that indicates whether the meteorological data shows that this would be a conservative modeling assumption for predicting worst-case fence line impacts.

Response:

Low level area and volume sources in AERMOD tend to have their highest impacts just downwind of the edge of the sources, with the highest impacts occurring in low wind scenarios in a stable atmospheric condition. This has more to do with the way the model works than reality, since, in many cases, the low winds causing the model to generate the highest impacts would not be sufficiently strong to lift the material (i.e., fugitive dust) being modeled.

The three primary considerations when creating a worst-case modeling scenario using area sources are: 1) proximity of the source to the fence line, 2) orientation of the source relative to the predominant wind direction, and 3) orientation of the sources relative to each other. These three factors were used in placing the construction sources, which were modeled against the fence line immediately upwind from the fence relative to the predominant wind direction so as to maximize the overlap of their impacts with each other. Since the three solar array construction stages: surveying and grubbing, scraping and grading, and equipment installation, will typically occur on adjacent blocks of the construction site, the sources representing each of these activity stages were placed in a line that would be roughly parallel to the prevailing wind direction. The sources were also placed so as to maximize their interaction with both power block construction, and the sources representing vehicular traffic to and from the equipment laydown area. Further, the modeling assumed that all five of these sources were emitting at their maximum potential for the entire modeling period, a conservative condition that will almost certainly not actually occur during construction.

DR-AIR-13

Information Required:

> Please provide a revised construction emissions NO_2 modeling analysis that uses the NOx_OLM option with an OLM source group, and if necessary or desired, that uses actual hourly background NO_2 data.

Response:

The Applicant revised construction emissions NO_2 modeling analysis using both the NOx_OLM option with an OLM source group and actual hourly background NO_2 data. The results of the modeling analysis incorporating the suggested changes are provided in Attachment DR-AIR-5, Air Quality Impacts Assessment.

DR-AIR-14

Information Required:

> Please clarify the estimations and assumptions used in determining the number of mirror washing events per year.

Response:

The mirrors will be washed on an as-needed basis. For the purpose of estimating the wash truck vehicle mileage and wash water consumption, the Applicant estimates that the mirrors will be washed once monthly in the six months surrounding winter (assumed to be October through March) and twice monthly from mid-spring through mid-fall (assumed to be April through September). This schedule estimates 18 mirror washing events per year. However, as noted, the mirrors would be washed as-needed to maintain optimum performance.

DR-AIR-15

Information Required:

> Please provide a clear and defensible explanation of why the amount of parabolic trough pipe length is equivalent to the mirror washing vehicle mileage for each washing cycle event, or revise this estimate as necessary to obtain a more reasonable total vehicle mileage estimate for mirror washing.

Response:

The vehicle travel distance has been revised to account for the additional distances required for refilling the water tank, refilling the soil stabilizer tank, refueling, and activity-specific considerations. The assumptions used to develop the revised travel distance for each of the required maintenance activities is explained briefly below and summarized in Table DR-AIR-15-1. Detailed step-by-step calculations are provided in Table E.3-20 in the spreadsheet with filename *Blythe DR Operating Emissions.xlsx* on the CD-ROM in Attachment DR-AIR-2, Emission Calculations.

Mirror Wash Vehicle Travel

The total number of individual rows of mirrors is multiplied by the length of an individual row; added to this figure is the perpendicular length through the solar field to account for travel from row to row. This sum is the minimum travel distance in the solar field for a single pass. As the washing process is currently proposed, only one-half of the mirror is washed per day. The mirror is stowed in the vertical upright position facing east and the bottom half of the mirror is washed on the first day. The following day, the mirror is stowed facing west and the other half is washed. Thus, the minimum travel distance is doubled to account for the actual physical washing process.

The mirror wash truck is assumed to have a capacity of 5,000 gallons of water, and the washing activity itself requires about 0.7 gallons per linear foot of mirror. Based on these values, the water truck can wash five full rows of mirrors before a truck refill is required. The average travel distance to refill the truck was calculated from the solar field back to the power block where the water storage tank is located. Each refill trip would require travel from the solar field to the power block and back to the solar field, thus for every refill trip, the average distance is doubled.

The travel distance through the solar field for washing is added to the travel distance for the refill trips to determine the total travel distance required for the mirror washing activity with water refill. It is assumed that the water wash truck would be refueled at the power block by a mobile fueling truck during a water refill stop, thus additional travel for fueling is not required. It was assumed that more than one water truck will be needed onsite and that one mirror washing event can be completed in 10 days.

Weed Abatement Application

Weed abatement is performed four times per year. Similar to the travel for mirror washing, the total number of individual rows of mirrors is multiplied by the length of an individual row; added to this figure is the perpendicular length through the solar field to account for travel from row to row. Additional travel is assumed along the ends of the mirror rows. It is assumed that the weed abatement truck will not require refilling, as the herbicide would be applied to living plants only, and based on observations of the Kramer Junction SEGS facility, vegetation growth is minimal. Refueling is assumed to occur offsite by the contractor prior to arrival at the site; thus no additional mileage for refueling is included in the distance estimate. It was assumed that one weed abatement application for the entire facility will take 10 days to complete.

Soil Stabilizer Application

Soil stabilizers are applied four times per year to the normal travel paths used by maintenance vehicles. Similar to the travel for mirror washing, the total number of individual rows of mirrors is multiplied by the length of an individual row; added to this figure is the perpendicular length through the field to account for travel from row to row. In addition to the travel in a single pass, it was also assumed that the perpendicular lengths would be stabilized a second time for stabilization of the path of travel required for header inspections.

The soil stabilizer truck is assumed to hold 5,000 gallons of solution, and the stabilizing activity itself requires about 0.8 gallons per linear foot of roadway. Based on these figures, the soil stabilizer truck can treat the roadway between four full rows of mirrors before a refill is required. The average distance of travel was calculated from the solar field back to the power block where the stabilizer supply is located. Each refill trip would require travel from the solar field to the power block and back to the solar field, thus for every refill trip, the average distance is doubled.

The travel distance through the solar field for soil stabilizer application is added to the travel distance for the refill trips to determine the total travel distance required for the soil stabilizer application activity plus refill. It is assumed that the soil stabilizer truck will be refueled at the power block by a mobile fueling truck during a refill stop, thus additional travel for fueling is not required. It was assumed that one soil stabilizer application for the entire facility will take 10 days to complete.

Water Truck

Water truck travel distance is calculated based on the volume of RO reject water generated per day that would be applied for dust suppression, and an application rate of three gallons per linear foot. RO reject water would be generated and applied to the solar field up to 365 days per year.

Maintenance Truck Travel

The piping headers will be physically inspected once per operating day, assumed to be 365 days per year; the distance traveled is equal to the piping length of the header itself, with some additional distance included to account for backtracking, as the HTF header is not a simple loop. In addition, the mirrors would have to be physically inspected following every high wind event. For the purpose of this estimate, 18 high wind events are assumed to occur per year, and the travel distance is equal to the minimum travel distance calculated for the solar field, as explained in the mirror wash description above. Maintenance vehicles are assumed to have the spare parts and supplies necessary to effect repairs without additional travel to the maintenance stores area at the power block. Refueling is assumed to occur offsite; mileage is calculated based on the refueling frequency and the distance to the nearest offsite refueling facility. Similar to the weed abatement and soil stabilizer application, it was assumed that more than one maintenance vehicle will be required for the facility, and a full field inspection will require 10 days to complete.

Table DR-AIR-15-1 Maintenance Vehicle Travel Distance

Vehicle Use	Vehicle Type	Distance		
		Miles/task	Miles/day	Miles/year
Mirror Wash Truck	Water Trucks, Freightliner 5,000 gallon	3,076	308	55,365
Soil Stabilizer Application	Water Trucks, Freightliner 5,000 gallon	1,918	192	7,673
Weed Abatement	Water Trucks, Freightliner 5,000 gallon	599	60	2,395
Water Trucks	Water Trucks, Freightliner 5,000 gallon	6	6	2,143
Maintenance Vehicles	On-Site Pick Up Truck 1/2 Ton	---	60	19,058

DR-AIR-16

Information Required:

Please revise the emissions calculations for the onsite dedicated vehicle exhaust emissions assuming only new model year vehicles are used.

Response:

Exhaust emissions for gasoline powered maintenance trucks have been revised using model year 2013 emission factors, which will be the new model year when operations begin. The specific emission factors used are shown in Table DR-AIR-16-1 and the corresponding emissions are shown in Table DR-AIR-16-2. The emission factors and emissions also appear in Tables E-3.7a and E-3.7c in the spreadsheet with filename *Blythe DR Operating Emissions.xlsx* on the CD-ROM in Attachment DR-AIR-2, Emission Calculations.

Table DR-AIR-16-1 Gasoline and Diesel Powered Maintenance Vehicle Emission Factors

Vehicle Type	NOx (lb/mi)	VOC (lb/mi)	CO (lb/mi)	SOx (lb/mi)	Exh. PM10 (lb/mi)	Tire + Brake PM10 (lb/mi)	Exh. PM2.5 (lb/mi)	Tire + Brake PM2.5 (lb/mi)
Gasoline	9.18E-05	4.16E-05	1.20E-03	1.07E-05	1.07E-05	4.59E-05	9.90E-06	1.64E-05
Diesel	4.16E-03	4.24E-04	2.12E-03	4.14E-05	1.19E-04	1.40E-04	1.09E-04	4.60E-05

Table DR-AIR-16-2 Maintenance Vehicle Emissions

Period	NOx	VOC	CO	SOx	PM10[1]	PM2.5[1]
Maximum Hourly Emissions (lb/hr)	0.05	0.01	0.03	0.00	0.002	0.001
Maximum Daily Emissions (lb/day)	0.28	0.03	0.21	0.003	0.008	0.008
Annual Emissions (tpy)	0.141	0.015	0.083	0.002	0.004	0.004

1. Only exhaust PM10 and exhaust PM2.5 emissions are presented in this table; fugitive emissions are not included in these emissions estimates. These estimates also incorporate revised vehicle travel distances as discussed in the responses to DR-AIR-16 and DR-AIR-19. More detailed emissions calculations, including fugitive emissions can be found in Table E.3-7c in the spreadsheet with filename *Blythe DR Operating Emissions.xlsx* on the CD-ROM in Attachment DR-AIR-2, Emission Calculations.

DR-AIR-17

Information Required:

> Please identify if the applicant would be willing to stipulate to a condition of certification that would require a review of available alternative low-emission vehicle technologies, including electric and hydrogen fueled vehicles, and use of those technologies to replace the proposed diesel and gasoline fueled vehicles used for operations maintenance if lower emission alternative technology vehicles are both available and not cost prohibitive.

Response:

The BSPP is not currently exploring using alternative-fuel vehicle technologies such as electric or hydrogen fueled vehicles. As shown in Table DR-AIR-16-2 above, vehicle (tailpipe) emissions during facility operations are estimated to be well below one ton per year of all criteria pollutants. While entrained road dust fugitive emissions are expected to exceed one ton per year, the use of alternative fueled vehicles will not reduce the fugitive dust emissions. As concluded in the AFC, the BSPP has not identified any direct or indirect significant adverse air quality impacts from the use of on-site vehicles and, therefore, mitigation as suggested in this data request is not warranted. As an alternative, the Applicant would be willing to accept a condition similar to that recommended by Staff for the Beacon Solar Energy Project, as follows:

The project owner shall use 2013 model year or newer vehicles, meeting California model year on-road vehicle emission standards, for onsite parabolic mirror washing activities and all other facility maintenance activities. Other vehicle/fuel types may be allowed assuming that the emission profile for those vehicles, including fugitive dust generation emissions, is comparable to the vehicles types identified above.

DR-AIR-18

Information Required:

Please indicate what will be proposed for refueling the dedicated on-site gasoline and diesel fueled equipment fleet.

Response:

The diesel-fueled equipment (i.e., mirror wash trucks, soil stabilizer application trucks, and emergency fire water pump and generator engines) will be refueled by a mobile fuel truck that will travel to the Project site. The gasoline powered maintenance trucks will be refueled at the nearest retail gasoline station. There are no fuel storage facilities planned for the Project.

DR-AIR-19

Information Required:

Please indicate if the additional vehicle mileage required for refueling off site, either driving vehicles to nearby retail gasoline stations or contracting fuel/lube trucks for onsite refueling, is considered in the total vehicle miles estimates and emissions estimates, or please correct the estimates accordingly.

Response:

As noted above, the diesel-fueled equipment will be refueled by a mobile fuel truck that will travel to the Project site. The gasoline powered maintenance trucks will be refueled at the nearest retail gasoline station. The vehicle miles traveled for fueling operations are summarized in Table DR-AIR-19-1.

Emission estimates have been revised to include emissions from periodic delivery of diesel fuel to the Project site via a mobile refueling truck. The mobile refueler is assumed to travel from Riverside, a one-way travel distance of 172 miles. The mobile refueler is assumed to make 12 fuel deliveries per year. The number of mobile refueler trips to the site is based on the assumption that the diesel-fueled vehicles would have fuel tanks large enough for the travel required for one full month of activities.

Maintenance vehicle emission estimates have been revised to reflect periodic refueling at a local retail gasoline station, assumed to be located in Blythe, a roundtrip travel distance of approximately 10 miles. Refueling is assumed to be a total of 52 times per year and a maximum of twice per day. The number of refueling trips to a retail gasoline station is based on the assumption that the gasoline-fueled vehicles would have fuel tanks large enough for the travel required for one full week of activities.

Detailed calculations of the refueling mileage are provided in Table E.3-8a in the spreadsheet with filename *Blythe DR Operating Emissions.xlsx* on the CD-ROM in Attachment DR-AIR-2, Emission Calculations. Emissions associated with this offsite vehicle travel are summarized in Table DR-AIR-19-2, and detailed calculations are provided in Table E.3-8 on the CD-ROM.

Table DR-AIR-19-1 Refueling Mileage Summary

Vehicle Use		Miscellaneous Solar Vehicle Refueling	Maintenance Truck Refueling
Vehicle Type		Water Trucks, Freightliner 5,000 gallon	On-Site 1/2-Ton Pickup Trucks
Fuel Type		Diesel	Gasoline
Number of Refueling Trips (maximum)	Trips per day	1	2
	Trips per month	1	4
	Trips per year	12	52
Point of Origin / Destination		Riverside	Blythe
Round Trip Distance	miles/trip	344	10
Miles Traveled	miles/month	344	40
	miles/year	4,128	520

Table DR-AIR-19-2 Refueling Emissions Summary

Vehicle Type	NOx	VOC	CO	SOx	Exh. PM10	Fug. PM10	Exh. PM2.5	Fug. PM2.5
	Monthly Emissions (lb/month)							
Miscellaneous Delivery	240.50	17.75	67.29	0.27	10.35	3.92	9.52	3.27
Diesel Refueling Truck	12.025	0.888	3.365	0.013	0.518	0.372	0.476	0.163
Maintenance Vehicles	0.004	0.002	0.048	0.000	0.000	0.039	0.000	0.018
Total	**252.53**	**18.64**	**70.71**	**0.28**	**10.87**	**4.33**	**10.00**	**3.45**
	Annual Emissions (tpy)							
Miscellaneous Delivery	1.443	0.107	0.404	0.002	0.062	0.006	0.057	0.020
Diesel Refueling Truck	0.007	0.001	0.002	0.0001	0.0003	0.0002	0.0003	0.0001
Maintenance Vehicles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**1.52**	**0.11**	**0.42**	**0.00**	**0.07**	**0.01**	**0.06**	**0.02**

DR-AIR-20

Information Required:

Please provide an estimate of the SF_6 onsite inventory and leakage emissions both in operation and construction phases to complete the GHG emission estimates.

Response:

Sulfur hexafluoride (SF_6) will not be used during the Project construction period. The onsite inventory of SF_6 during operations will be located entirely in the circuit breakers and will be not more than 100 pounds per power block for a total of not more than 400 pounds for the Project. The SF_6 leakage rate from operating equipment is guaranteed at 0.5 percent per year and can be less than 0.2 percent per year with current best technology. At the maximum guaranteed leak rate of 0.5 percent, this corresponds to 2.0 pounds per year of SF_6 emissions, or 23.92 metric tpy of CO_2 equivalent (CO_2e) for the Project. The more probable, technically feasible leak rate is 0.2 percent, which corresponds to approximately 9.6 tpy or 286.8 metric tons CO_2e emissions over the 30-year plant lifetime.

DR-AIR-21

Information Required:

Please confirm the emergency generator engines size.

Response:

The emergency generator will be a 2 MW (output) diesel-fired unit. The engine driving the generator is 2,922 Hp. The engine will meet EPA Tier 2 emission standards.

DR-AIR-22

Information Required:

Please describe what facilities the emergency generators will support in an emergency.

Response:

The emergency generator is required to provide motive power to three principle areas of the facility: 1) Freeze Protection Pump, 2) Balance of Plant (BOP) Motor Control Center (MCC), and 3) HTF MCC. The BOP MCC and HTF MCC equipment items that will require emergency power are shown in Table DR-AIR-22-1; there may be other small loads connected to the power supply to allow the facility to shut down safely.

Table DR-AIR-22-1 Emergency Loads

BOP MCC	HTF MCCs	
Heat Trace XFMR	Power supply cabinet channel A - H	Anticondensation heater LV-motors
Main Fire Alarm Panel	Nitrogen system Heater switchboard	HTF control valve behind reheater 1 to 4
CEMS HVAC	Nitrogen system Junction Box-Power	Centralization box signals
480V Power Panel	PLC Main nitrogen supply	Anticondensation heater LV-motor
STG Turning Gear	Field Supervisory Control 1 and 2	Fire alarm control panel supply 1 and 2
ST Turbine Lube Oil Pump	Fiber optic termination cabinet	Centralization box signals
Fire Water Jockey Pump	HTF control system supply 1 and 2	Distribution box heaters
Battery Charger A	Nitrogen control valves in front of expansion vessels	Filler valve of HTF system
UPS Bypass	Tracing of main service water pipe	Tracing of overflow vessel 1 to 8
CEMS Skid	Control valve in ullage pipe	Control valve in ullage pipe
Gen Breaker	Transformer temperature monitoring cabinet	Anticondensation heater LV-motors
GSU Fans Feeder	Shutoff devices	Overflow return pumps
	Control valve in front of reclamation flash vessel	HTF drain pumps

DR-AIR-23

Information Required:

Please confirm that 500 hours of operation is sufficient for HTF freeze protection.

Response:

Based on the system performance modeling and historical ambient temperature data, 500 hours of operation for the HTF heater is expected to be sufficient for HTF freeze protection.

DR-AIR-24

Information Required:

Please confirm that the sole purpose of the auxiliary heaters is for HTF freeze protection and that they will not be used directly for power generation or for rapid start support.

Response:

The sole purpose of the HTF heater is to ensure the HTF fluid temperature is maintained at or above a minimum of 54°F for HTF freeze protection. This unit will not be used for direct power generation or for rapid start support.

DR-AIR-25

Information Required:

Please confirm that the use of the auxiliary boilers is strictly for rapid start support through overnight low load (25 percent) operation and early morning full load operation and that they will not be used directly for power generation or for HTF freeze protection.

Response:

The auxiliary boiler will be used to support rapid startup each morning, specifically to establish the steam seals in the steam turbine and maintain the air-cooled condenser (ACC) in an evacuated condition so that the facility can generate power as soon as the solar-generated steam is sufficient to drive the steam turbine. The auxiliary boiler will not be used directly for power generation or for HTF freeze protection. The maximum daily operation of the boiler is expected to be 15 hours per day at 25 percent load and two hours per day at full load.

DR-AIR-26

Information Required:

Please identify the equivalent MWh generated or enabled by the rapid start support use of these boilers.

Response:

The equivalent MWh generated or enabled by the rapid start support use of these boilers is determined by estimating the time required to evacuate the ACC if the seal steam was lost, as steam is required to establish the seal. According to the ACC equipment manufacturer, approximately one hour is required to evacuate the ACC. Based on this duration, use of the auxiliary boiler enables an additional net output of 27 Gigawatt-hours per year per power block, for a total of 108 GWh per year for the Project.

In addition, use of the auxiliary boiler reduces the wear and tear on the steam turbine by avoiding the heat-up/cool-down cycle that would occur without the boiler. This provides the direct benefit of longer service intervals and less downtime.

DR-AIR-27

Information Required:

Please provide a list from the MDAQMD of large stationary source projects with permitted emissions, for projects with greater than 5 tons of permitted emissions of any single criteria pollutant, located within six miles of the project site that have been recently permitted, but did not start operation prior to 2009 such as the Blythe Energy Project Phase II, or are in the process of being permitted.

Response:

The project list is provided with the modeling results in Attachment DR-AIR-5, Air Quality Impacts Assessment.

DR-AIR-28

Information Required:

Please provide a cumulative impacts modeling analysis in consultation with Energy Commission staff, if necessary, based on the project list provided by MDAQMD.

Response:

The cumulative impact assessment using the project list provided by MDAQMD is provided in Attachment DR-AIR-5, Air Quality Impacts Assessment.

DR-AIR-29

Information Required:

Please provide copies of any official submittals and correspondence to or from the MDAQMD within 5 days of their submittal to or their receipt from the District.

Response:

The correspondence with the MDAQMD regarding this Project since the submittal of the AFC in August 2009 is limited to the submittal of the permit application forms; copies of which have been provided to CEC. As requested, future correspondence will be provided in a timely manner.

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Attachment DR-Air-2
Emissions Calculations
(CD Only)

Attachment DR-AIR-5

Air Quality Impacts Assessments
To be provided by January 13, 2010

Attachment DR-AIR-18

Construction GHG Emissions Calculations

Prepared for:
Solar Millennium
Blythe Solar Power Project

Attachment DR-AIR-18 Construction Greenhouse Gas Emissions Calculations

AECOM, Inc.
December 2009
Document No.: DR-Air-18

Prepared for:
Solar Millennium
Blythe Solar Power Project

Attachment DR-AIR-18 Construction Greenhouse Gas Emissions Calculations

Prepared By Howard Balentine

Reviewed By Russ Kingsley

AECOM, Inc.
December 2009
Document No.: DR-AIR-18

AECOM

Contents

1.0 Introduction

This Document contains a description of greenhouse gas (GHG) emissions calculated for construction of the Blythe Solar Power Project (BSPP, or Project). Section 2 describes the methodology used to calculate emissions, results are presented in Section 3, and references are provided in Section 4. Table 1 at the end of this document provides the computed GHG emissions factors for construction equipment obtained from the OFFROAD2007 Burden model output. Table 2 provides the computed GHG emission factors for motor vehicles obtained from the EMFAC2007 BURDEN model output

2.0 Construction Greenhouse Gas Emissions

GHG emissions will arise from the operation of construction equipment and motor vehicles. This report describes the calculation methodology for the GHG emissions associated with Project construction. GHG emissions during each month of construction were calculated separately and the monthly emissions were summed over the construction duration for each Project component to calculate total GHG emissions.

2.1 Overview of Calculation Methodology

Emissions were computed for three GHGs: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). When the respective emissions for a given GHG is multiplied by the corresponding global warming potential (GWP), the emissions of each gas is expressed as its equivalent amount of CO_2 emissions, assuming a 100-year quantification period. The sum of the individual CO_2 equivalent (CO_2e) emissions for each of the three gases results in the project total CO_2 equivalent emissions.

There are multiple emission factors available in the literature and published protocols for computation of GHG emissions from fuel combustion. These factors tend to differ by the units of the emission factors and the assumptions of a given heat (or carbon) content of the fuel. However, almost all of these emission factors are ultimately based on a standard set of emission factors published by the Intergovernmental Panel on Climate Change (IPCC, 2006). For example, the Air Resources Board (ARB) reporting guidance for mandatory GHG reporting (ARB, 2008) references the ARB AB-32 Mandatory Reporting Guidance document (ARB, 2008) which, in turn, references an EPA GHG inventory guidance document (EPA, 2003), which, in turn, states that EPA GHG calculation methodology for mobile sources is consistent with IPCC 2006 guidance.

The GHG emissions for construction are based on output from the OFFROAD2007 (ARB, 2007a) and EMFAC2007 (ARB, 2007b) BURDEN models. These models were used to compute the criteria pollutant emissions during construction for the BSPP. The same model runs are used as a basis for estimating GHG emissions during construction because both models produce estimates of CO_2 emissions. In addition, the OFFROAD2007 model directly provides estimates of N_2O and CH_4 emissions from diesel equipment[1].

[1] While OFFROAD2007 output provides N_2O emissions as an output, the N_2O values output by OFFROAD2007 for all equipment sizes and equipment types are zero. However, N_2O emissions are a small fraction of CO_2e emissions from equipment during construction activities, even when the much larger GWP of N_2O compared to CO_2 is taken into account. Therefore, the zero values for N_2O emissions are used without modification or adjustment. The assumption of zero for N_2O emissions from construction equipment is well within the very large uncertainty associated with the quantification process for estimating construction emissions and has an insignificant impact on the overall GHG emission estimates during construction of the facility.

For past projects, the CEC has requested that the GHG emission computations for mobile sources follow the methodology contained in the ARB mandatory reporting guidance document. These emission factors are in terms of kilograms of CO_2 per gallon for motor fuels and gram per mile for N_2O and CH_4. For the BSPP, the GHG emission estimates from construction activities are based on the ARB OFFROAD2007 and EMFAC2007 BURDEN models, which as discussed above, are ultimately based on IPCC 2006 emission factors.

The composite GHG emission factors used for a given run of OFFROAD2007 and EMFAC2007 are not explicitly listed in the model output but can be readily computed from model output. The emission factors can be computed on either 1) an hours of operation (or mileage) basis or 2) a fuel consumption basis, because total GHG emissions by GHG are listed, along with hours of operation or mileage accumulation for a given equipment/vehicle type, and the fuel consumption. Both sets of emission factors are ultimately the same with only unit conversions applied, along with assumptions of energy content per unit volume and fuel consumption/fuel economy assumptions. In other words, the OFFROAD2007 and EMFAC2007 output data can be used to compute GHG emission factors on different bases, depending on the intended use. As needed, the emission factors can be readily converted from one basis to the other using output data from the model. For example, if the on-road emission factors are computed on a per-volume of fuel used basis, they are easily converted to a mileage basis by dividing by the fuel economies used by EMFAC2007. Likewise, if the emission factors are on a per-hour-of-operation basis, they can readily be converted to units of emissions per volume of fuel consumed by dividing by the default specific fuel consumption provided in the OFFROAD2007 output.

The activity data developed to estimate emissions from equipment and vehicles for the BSPP are naturally compiled in terms of hours of operation (equipment) and miles traveled (vehicles). Therefore, the most direct method for using OFFROAD2007 and EMFAC2007 output to compute GHG emissions is to use the model output to compute composite GHG emission factors that are on a per-hour-of-operation basis for equipment and on a per-mile basis for vehicles.

Therefore, for this analysis, the construction equipment GHG emission factors are derived from OFFROAD2007 output by dividing the total emissions for each GHG and equipment class by the hours of operation for that GHG and equipment class. Likewise, GHG emission factors for motor vehicles are derived from EMFAC2007 output by dividing the total CO_2 emissions for each vehicle type by the output activity (miles) for that vehicle type. Once computed, unit conversions are applied to adjust the emission factors to the desired metric units (kg/mile). This straight forward approach avoids the necessity of assuming a specific fuel consumption or fuel economy that may differ from that used in OFFROAD2007 or EMFAC2007, thereby potentially biasing the estimate of the total GHG emissions.

EMFAC2007 only provides estimates of CO_2 emissions. To estimate N_2O and CH_4 emissions, the mobile source emission factors in the California Climate Action Registry (CCAR) General Reporting Protocol Version 3.1 (CCAR, 2009) was used. These emission factors are on a gram-per-mile basis, are ultimately based on the IPCC 2006 emission factors, and are identical to those contained in the ARB mandatory reporting regulation.

2.2 Construction Equipment Exhaust GHG Emissions

The combustion of fuel to provide power for the operation of various construction activities and equipment results in the generation of GHG, including CO_2, CH_4, and N_2O. The following predictive emission equation was used to calculate exhaust emissions from construction equipment:

$$\text{Exhaust Emissions}_{ij}\,(\text{MT}) = EF_{ij} \times T_j / 1000 \qquad \text{(Eq. 2-1)}$$

Where:

$EF_{,i,j}$ = Emission factor for specific GHG *i* from construction equipment type *j* (kg/hour)

T_j = Operating time for equipment of type *j* (hr)

1000 = kilograms per metric tonne (kg/MT)

The exhaust emission factor E_{ij} is computed from the OFFROAD2007 output by dividing the total emissions for a given GHG *i* and equipment type *j* by the operating hours of that equipment type in the OFFROAD2007 run. The OFFROAD2007 model calculates total daily emissions of CO_2, N_2O, and CH_4 by equipment category (crane, dozer, grader, etc.) and type of fuel (diesel, gasoline, etc.) within engine horsepower ranges in a geographic area, such as statewide or within a given jurisdiction (e.g., Mojave Desert Air Quality Management District). The model also calculates total daily operating hours within the geographic area by equipment category, fuel and horsepower range. For the BSPP, OFFROAD2007 was run to generate statewide average emissions and activity data for 2010 for equipment with engines meeting Tier 3 emission standards, consistent with the revised construction criteria pollutant analysis for the BSPP prepared in Data Response DR-AIR-8 and -9.

The total GHG emissions are the summation over all of the operating equipment with application of the appropriate GWP for each GHG. The GWP used for this analysis are those required by the ARB mandatory reporting rule and are equal to 1 for CO_2, 21 for CH_4, and 310 for N_2O.

The OFFROAD2007 GHG emission estimates, the hours of operation, the computed emission factors, and the projected hours of operation for the diesel off-road equipment anticipated to be used during construction of the BSPP are provided in Table 1 at the end of this document.

2.3 Motor Vehicle Exhaust Emissions

The combustion of fuel in motor vehicle engines results in the generation of GHGs, including CO_2, CH_4 and N_2O. The following predictive equation was used to calculate exhaust emissions from motor vehicles:

$$\text{Exhaust Emissions}_{ij}\text{ (MT)} = EF_{ij} \times VMT_j \times CF_i / 1000 \qquad \text{(Eq. 2-1)}$$

Where:

$EF_{i,j}$ = Emission factor for specific GHG *i* from motor vehicles type *j* (kg/mile or g/mile)

VMT_j = Mileage for vehicle type *j* (miles)

CF_i = EF units conversion factor (1.0 for CO2, 0.001 for CH4 and N2O to convert from g/mi to kg/mi)

1000 = kilograms per metric tonne (kg/MT)

The exhaust emission factor E_{ij} for CO_2 is computed from the EMFAC2007 BURDEN output by dividing the total emissions for a given GHG *i* and vehicle type *j* by the mileage accumulation for that vehicle type in the EMFAC2007 run. For the BSPP, EMFAC2007 was run to generate statewide emissions and activity data for 2010. The EMFAC2007 Model calculates total daily emissions of CO_2, N_2O, and CH_4 by vehicle type (light-duty truck, heavy-heavy duty diesel vehicle, etc.) and type of fuel (diesel, gasoline, etc.) in a geographic area, such as the Mojave Desert Air Quality Management District jurisdiction. For N_2O and CH_4, the exhaust emission factors come from the CCAR General Reporting Protocol Table C.6 (CCAR, 2009). As stated above, these N_2O and CH_4 emission factors are identical to those required by ARB under the AB-32 mandatory GHG reporting.

The total GHG emissions are the summation over all of the operating vehicle types with application of the appropriate GWP for each GHG. The GWP used for this analysis are those required by the ARB mandatory reporting rule and are equal to 1 for CO_2, 21 for CH_4, and 310 for N_2O.

The 2009 OFFROAD2007 BURDEN GHG emission estimates, accumulated mileage, the computed emission factors, and the projected operating miles for vehicles anticipated to be used during construction of the BSPP are in Table 2 at the end of this document.

Emissions were calculated from estimates of 1) the types, number, horsepower rating and daily operating hours for construction equipment; and 2) the types, number and daily miles traveled by on site and offsite motor vehicles. These estimates were made by construction month for construction of the solar facility. The monthly emissions are based on 22 working days per month, consistent with the emission calculations for the criteria pollutants emitted during construction activities. The monthly emissions for equipment and vehicles for each GHG were summed to produce monthly and project total CO_2e emissions estimates.

Detailed GHG construction emission calculations are provided in the spreadsheet with filename DR-AIR-8 and 18 Blythe Construction Emissions on the CD-ROM in Attachment DR2, Emission Calculations.

3.0 GHG Emission Calculation Results and Context

Global warming is a global issue, not a local issue, and there is no significance criterion yet established by the CEC for CO_2e emissions. Lacking a significance criterion for construction emissions, a more robust evaluation of the potential impact of construction CO_2e emissions for a solar power plant is to compute the emissions for construction and operation over the lifetime of the facility and compare those total emissions to the emissions that would be emitted from an alternative source of electrical power generation. An appropriate alternative to consider for comparison would be a modern combustion turbine combined cycle (CTCC) natural gas fired power plant.

To this end, the emissions from construction and operation of a CTCC facility based on a 30-year lifetime were estimated from information provided in the Application for Certification (AFC) for a current CTCC power plant seeking licensing approval before the CEC. The facility chosen is the Oakley Generating Station (Docket 09-AFC-04, previously named the Contra Costa Generating Station) (CEC, 2009), a nominal 624 MW greenfield facility. For this 2x1 facility (two combustion turbines with one steam turbine), the reported CO_2e emissions from the 33 month construction period is 10,524 metric tons (MT).

The appropriate operational CO_2 emissions factor to apply to a modern CTCC facility is the California Public Utility Commission limit on new power plant, i.e., CO_2 emissions of 1,100 pounds-per-megawatt-hour of electrical generation. The AFC for the Oakley Generating Station provides an equivalent availability factor for the facility of 92 percent to 98 percent, with an average of 95 percent. The equivalent availability factor takes into account both the hours of operation and the operating load for the facility.

Table 4 presents the estimated GHG emissions (CO_2e) from construction and operation over a 30-year lifetime for the BSPP and an equivalent CTCC plant providing the same nominal generating capacity (1000 MW). From Table 4, the construction emissions for the BSPP are 104,000 MT, including emissions from on-site and off-site construction activities, compared to the construction emissions for the Oakley Generating Station of 10,500 MT. Both quantities are rounded to the nearest 100 MT. Please note that no adjustment was made to the construction emission estimate for Oakley to adjust for the size of the facility compared to that for the BSPP. There are larger GHG emissions associated with the solar plant construction due to a much larger area requiring scraping and grading, cut and fill, and assembly and installation, etc., during construction of the facility. However, the operational GHG emissions from a CTCC plant dwarf the operational GHG emissions from a solar plant. Overall, the lifetime emission burden for the solar facility is 0.5 percent of the lifetime emission burden of the equivalent CTCC power plant.

4.0 References

ARB, 2007a. California Air Resources Board OFFROAD2007 Model, version 2.0.1.2, http://www.arb.ca.gov/msei/offroad/offroad.htm, December 15.

ARB, 2007b. California Air Resources Board EMFAC2007 (version 2.3) Burden Model available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm.

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IPCC, 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006), Volume 2 (Energy) , Available online at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html as of 12/15/2009.

EPA, 2003 Introduction to Estimating Greenhouse Gas Emissions. June 2003, and subsequent updates.

TABLES

Table 1. OFFROAD GHG EF Documentation

Equipment Description					OFFROAD Emissions (tons/day)			OFFROAD Activity (hrs/day)	Computed OFFROAD Emission Factor (kg/hr)			Composite Emissions Factor (CO2e)
Equipment Type	Fuel	Size (hp)	Model Year	ARB Off-Road Model Category	CO2	N2O	CH4	Activity (hrs)	CO2	N2O	CH4	CO2e (kg/hr)[a]
375 cfm Compressor	Diesel	20	2008	Air Compressors	9.56E-02	0.00E+00	1.04E-05	13	6.54E+00	0.00E+00	7.12E-04	6.55E+00
Air Compressor Ingersol Rand, P65WK	Diesel	23.5	2008	Air Compressors	9.56E-02	0.00E+00	1.04E-05	13	6.54E+00	0.00E+00	7.12E-04	6.55E+00
Backhoe, 450E	Diesel	124	2007	Tractors/Loaders/Backhoes	2.29E+01	0.00E+00	1.08E-03	452	4.59E+01	0.00E+00	2.17E-03	4.60E+01
Concrete Pump Rig, B50	Diesel	130	2007	Other Construction Equipment	2.00E+00	0.00E+00	7.35E-05	38	4.83E+01	0.00E+00	1.78E-03	4.84E+01
Crane 20 Tn Grove, YB7722	Diesel	130	2007	Cranes	3.91E+00	0.00E+00	1.82E-04	98	3.64E+01	0.00E+00	1.70E-03	3.64E+01
Dozer,Cat, D10T	Diesel	580	2006	Crawler Tractors	3.59E+00	0.00E+00	2.05E-04	15	2.11E+02	0.00E+00	1.20E-02	2.11E+02
Excavator, 365C	Diesel	404	2006	Excavators	8.81E+01	0.00E+00	5.69E-03	754	1.06E+02	0.00E+00	6.85E-03	1.06E+02
Folklift, DP45K	Diesel	124	2007	Forklifts	1.47E+01	0.00E+00	7.85E-04	524	2.54E+01	0.00E+00	1.36E-03	2.54E+01
Generator, XQ400	Diesel	328	2006	Generator Sets	5.00E+00	0.00E+00	1.36E-04	30	1.53E+02	0.00E+00	4.15E-03	1.53E+02
Grade-All, TL1055	Diesel	125	2007	Rough Terrain Forklifts	1.19E+01	0.00E+00	5.22E-04	190	5.66E+01	0.00E+00	2.50E-03	5.67E+01
Loader, 972H	Diesel	287	2006	Rubber Tired Loaders	4.26E+01	0.00E+00	2.20E-03	360	1.07E+02	0.00E+00	5.55E-03	1.08E+02
Motor Grader, 160M	Diesel	213	2006	Graders	3.47E+01	0.00E+00	1.93E-03	403	7.80E+01	0.00E+00	4.34E-03	7.81E+01
Paving Machine, AP1055D	Diesel	224	2006	Pavers	1.08E+00	0.00E+00	5.15E-05	11	8.83E+01	0.00E+00	4.20E-03	8.84E+01
Roller, CB-534D	Diesel	130	2007	Rollers	1.33E+01	0.00E+00	4.70E-04	247	4.90E+01	0.00E+00	1.73E-03	4.90E+01
Scraper Cat, 657G	Diesel	564	2006	Scrapers	8.76E+00	0.00E+00	4.81E-04	32	2.51E+02	0.00E+00	1.38E-02	2.52E+02
Scraper Cat, 657G, Blade Engine	Diesel	410	2006	Other Construction Equipment	1.03E+01	0.00E+00	4.21E-04	81	1.15E+02	0.00E+00	4.69E-03	1.15E+02
Sheeps Foot, 825G	Diesel	315	2006	Rollers	2.54E+00	0.00E+00	9.95E-05	23	9.93E+01	0.00E+00	3.89E-03	9.94E+01
Vibratory Roller, 825H	Diesel	354	2006	Rollers	2.54E+00	0.00E+00	9.95E-05	23	9.93E+01	0.00E+00	3.89E-03	9.94E+01
Scraper Cat 623	Diesel	330	2006	Scrapers	3.09E+01	0.00E+00	1.70E-03	193	1.46E+02	0.00E+00	8.00E-03	1.46E+02
Asphalt Paver, Cat AP1055B	Diesel	174	2007	Pavers	6.20E+00	0.00E+00	2.47E-04	97	5.81E+01	0.00E+00	2.32E-03	5.82E+01
Backhoe, Cat, 430E	Diesel	97	2008	Tractors/Loaders/Backhoes	1.70E+02	0.00E+00	6.91E-03	6575	2.34E+01	0.00E+00	9.54E-04	2.35E+01
175-250 kW Gen Set	Diesel	400	2006	Generator Sets	5.00E+00	0.00E+00	1.36E-04	30	1.53E+02	0.00E+00	4.15E-03	1.53E+02
Light Tower 5 KW	Diesel	8	2008	Generator Sets	1.38E+00	0.00E+00	1.29E-04	271	4.63E+00	0.00E+00	4.33E-04	4.63E+00
600 A Temp Power	Diesel	400	2006	Generator Sets	5.00E+00	0.00E+00	1.36E-04	30	1.53E+02	0.00E+00	4.15E-03	1.53E+02
200 A Temp Power	Diesel	135	2007	Generator Sets	1.58E+00	0.00E+00	4.03E-05	22	6.45E+01	0.00E+00	1.65E-03	6.45E+01
Compactor, Cat 826H	Diesel	410	2006	Rollers	2.54E+00	0.00E+00	9.95E-05	23	9.93E+01	0.00E+00	3.89E-03	9.94E+01
185 cfm Compressor	Diesel	20	2008	Air Compressors	9.56E-02	0.00E+00	1.04E-05	13	6.54E+00	0.00E+00	7.12E-04	6.55E+00
999 Manitiwoc	Diesel	390	2006	Cranes	5.91E+00	0.00E+00	3.14E-04	66	8.16E+01	0.00E+00	4.34E-03	8.17E+01
2250 Manitiwoc 300 Ton-Upper engine	Diesel	450	2006	Cranes	5.91E+00	0.00E+00	3.14E-04	66	8.16E+01	0.00E+00	4.34E-03	8.17E+01
2250 Manitiwoc 300 Ton -carrier engine	Diesel	460	2006	Cranes	5.91E+00	0.00E+00	3.14E-04	66	8.16E+01	0.00E+00	4.34E-03	8.17E+01
Crane, 40-Ton, Grove, RT600	Diesel	173	2007	Cranes	3.91E+00	0.00E+00	1.82E-04	98	3.64E+01	0.00E+00	1.70E-03	3.64E+01
Dozer, Cat D-9	Diesel	410	2006	Crawler Tractors	3.96E+01	0.00E+00	2.26E-03	306	1.17E+02	0.00E+00	6.72E-03	1.18E+02
Dozer, Cat D-6	Diesel	150	2007	Crawler Tractors	3.32E+01	0.00E+00	1.66E-03	548	5.49E+01	0.00E+00	2.75E-03	5.50E+01
Dozer, Cat 824	Diesel	354	2006	Rubber Tired Dozers	1.23E+01	0.00E+00	8.75E-04	93	1.20E+02	0.00E+00	8.51E-03	1.20E+02
Loader, Cat, 972G	Diesel	275	2006	Rubber Tired Loaders	4.26E+01	0.00E+00	2.20E-03	360	1.07E+02	0.00E+00	5.55E-03	1.08E+02
Motor Grader, Cat 140H	Diesel	150	2007	Graders	4.27E+01	0.00E+00	2.00E-03	690	5.62E+01	0.00E+00	2.63E-03	5.62E+01
Diesel Welder 400 Amp	Diesel	31	2008	Welders	6.15E+00	0.00E+00	2.08E-04	475	1.18E+01	0.00E+00	3.98E-04	1.18E+01
Hydro Crane 70-75 Ton RT	Diesel	275	2006	Cranes	5.91E+00	0.00E+00	3.14E-04	66	8.16E+01	0.00E+00	4.34E-03	8.17E+01
Hydro Crane 30-35 Ton RT	Diesel	155	2007	Cranes	3.91E+00	0.00E+00	1.82E-04	98	3.64E+01	0.00E+00	1.70E-03	3.64E+01
Tower Crane (Lieberr 630)	Diesel	275	2006	Cranes	5.91E+00	0.00E+00	3.14E-04	66	8.16E+01	0.00E+00	4.34E-03	8.17E+01
Forklift 10000# RT	Diesel	100	2007	Forklifts	8.14E+00	0.00E+00	5.99E-04	522	1.42E+01	0.00E+00	1.04E-03	1.42E+01
Forklift 30000#	Diesel	130	2007	Forklifts	1.47E+01	0.00E+00	7.85E-04	524	2.54E+01	0.00E+00	1.36E-03	2.54E+01
CAT IT 28 Utility Loader	Diesel	50	2008	Rubber Tired Loaders	1.00E+00	0.00E+00	5.16E-05	65	1.41E+01	0.00E+00	7.26E-04	1.41E+01
Truck Crane	Diesel	130	2007	Cranes	3.91E+00	0.00E+00	1.82E-04	98	3.64E+01	0.00E+00	1.70E-03	3.64E+01
40'- 60' Manlift	Diesel	50	2008	Aerial Lifts	1.44E+00	0.00E+00	4.01E-05	147	8.89E+00	0.00E+00	2.48E-04	8.89E+00
90' Manlift	Diesel	70	2008	Aerial Lifts	2.47E+00	0.00E+00	6.08E-05	130	1.73E+01	0.00E+00	4.24E-04	1.73E+01
Scissor Lift	Diesel	50	2008	Aerial Lifts	1.44E+00	0.00E+00	4.01E-05	147	8.89E+00	0.00E+00	2.48E-04	8.89E+00

Global warming potentials: CO2 = 1.0, CH4 = 21, N2O = 310

Table 2. EMFAC GHG EF

Vehicle Description		EMFAC BURDEN Emissions (tons/day)	EMFAC BURDEN Activity (1000 mi /day)	Computed OFFROAD Emission Factor (kg/mi)	N2O Emission Factor (kg/mi)	CH4 Emission Factor (kg/mi)	Composite Emissions Factor (CO2e) (kg/hr)
Equipment Type	Vehicle Class	CO2	Activity	CO2	N2O	CH4	CO2e
On-Site Welding Truck	MHD-CAT	8.05E+01	108	6.76E-01	1.77E-05	3.26E-05	6.82E-01
On-Site Oil/Lube Truck International	LHD2-DSL	1.08E+02	185	5.29E-01	4.80E-06	5.10E-06	5.31E-01
On-Site Fuel Truck	MHD-DSL	9.60E+02	576	1.51E+00	4.80E-06	5.10E-06	1.51E+00
On-Site Flatbed Truck, 1 Ton	MHD-CAT	8.05E+01	108	6.76E-01	1.77E-05	3.26E-05	6.82E-01
On-Site Flatbed Truck	MHD-DSL	9.60E+02	576	1.51E+00	4.80E-06	5.10E-06	1.51E+00
On-Site Pick Up Truck	LDT1-CAT	3.19E+03	5893	4.92E-01	1.01E-05	1.57E-05	4.95E-01
On-Site Stake Truck	LDT2-CAT	7.26E+03	13429	4.90E-01	1.01E-05	1.57E-05	4.94E-01
On-Site Utility Truck	LHD2-DSL	1.08E+02	185	5.29E-01	4.80E-06	5.10E-06	5.31E-01
On-Site Concrete Trucks	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00
On-Site Concrete Trucks BOP	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00
On-Site Watering Trucks	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00
On-Site Watering Truck BOP	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00
On-Site Dump Truck	MHD-DSL	9.60E+02	576	1.51E+00	4.80E-06	5.10E-06	1.51E+00
On-Site Pick Up Truck 1/2 Ton	LDT2-CAT	7.26E+03	13429	4.90E-01	1.01E-05	1.57E-05	4.94E-01
On-Site Pick Up Truck 3/4 Ton	LDT2-CAT	7.26E+03	13429	4.90E-01	1.01E-05	1.57E-05	4.94E-01
On-Site Transportation Tractor	LDT2-DSL	7.98E+00	21	3.45E-01	1.50E-06	1.00E-06	3.45E-01
On-Site Small Tow Tractors	LDT1-DSL	1.14E+02	298	3.46E-01	1.50E-06	1.00E-06	3.46E-01
On-Site Special Trucks	LDT2-CAT	7.26E+03	13429	4.90E-01	1.01E-05	1.57E-05	4.94E-01
On-Site Gators	LDT1-CAT	3.19E+03	5893	4.92E-01	1.01E-05	1.57E-05	4.95E-01
Off-Site Flat Bed Trucks	MHD-DSL	9.60E+02	576	1.51E+00	4.80E-06	5.10E-06	1.51E+00
Off-Site Asphalt Trucks	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00
Off-Site Cement Trucks	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00
Off-Site Construction Worker Commute	LDA-CAT	1.22E+04	28099	3.93E-01	7.90E-06	1.47E-05	3.96E-01
Off-Site Dump Trucks	MHD-DSL	9.60E+02	576	1.51E+00	4.80E-06	5.10E-06	1.51E+00
Off-Site Equipment/Material Delivery Truck	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00
Off-Site Low Boy Trucks	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00
Off-Site Pickup Trucks	LDT1-CAT	3.19E+03	5893	4.92E-01	1.01E-05	1.57E-05	4.95E-01
Off-Site Pipe Hauling Trucks	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00
Off-Site Fuel Trucks	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00
Off-Site Watering Trucks	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00
Off-Site Concrete Trucks	HHD-DSL	7.15E+03	3473	1.87E+00	4.80E-06	5.10E-06	1.87E+00

On-Road Vehicle CH4 and N2O Emission Factors

Vehicle Class	EF (g/mi)		Table Entry
	N2O	CH4	
LDA-NCAT	0.0647	0.0704	Gasoline Passenger Cars, Model Years 1984-1993
LDA-CAT	0.0079	0.0147	Gasoline Passenger Cars, Model Year 2005
LDA-DSL	0.0010	0.0005	Diesel Passenger Cars, Model Years 1983-2004
LDT1-NCAT	0.1035	0.0813	Gasoline Light Trucks, Model Years 1987-1993
LDT1-CAT	0.0101	0.0157	Gasoline Light Trucks, Model Year 2005
LDT1-DSL	0.0015	0.0010	Light Duty Diesel Trucks, Model Years 1996-2004
LDT2-NCAT	0.1035	0.0813	Gasoline Light Trucks, Model Years 1987-1993
LDT2-CAT	0.0101	0.0157	Gasoline Light Trucks, Model Year 2005
LDT2-DSL	0.0015	0.0010	Light Duty Diesel Trucks, Model Years 1996-2004
MDV-NCAT	0.1035	0.0813	Gasoline Light Trucks, Model Years 1987-1993
MDV-CAT	0.0101	0.0157	Gasoline Light Trucks, Model Year 2005
MDV-DSL	0.0015	0.0010	Light Duty Diesel Trucks, Model Years 1996-2004
LHD1-NCAT	0.0515	0.4090	Gasoline Heavy Duty Vehicles, Model Years 1985-1996
LHD1-CAT	0.0177	0.0326	Gasoline Heavy Duty Vehicles, Model Year 2005
LHD1-DSL	0.0048	0.0051	Diesel Heavy Duty Vehicles, All Model Years
LHD2-NCAT	0.0515	0.4090	Gasoline Heavy Duty Vehicles, Model Years 1985-1996
LHD2-CAT	0.0177	0.0326	Gasoline Heavy Duty Vehicles, Model Year 2005
LHD2-DSL	0.0048	0.0051	Diesel Heavy Duty Vehicles, All Model Years
MHD-NCAT	0.0515	0.4090	Gasoline Heavy Duty Vehicles, Model Years 1985-1996
MHD-CAT	0.0177	0.0326	Gasoline Heavy Duty Vehicles, Model Year 2005
MHD-DSL	0.0048	0.0051	Diesel Heavy Duty Vehicles, All Model Years
HHD-NCAT	0.0515	0.4090	Gasoline Heavy Duty Vehicles, Model Years 1985-1996
HHD-CAT	0.0177	0.0326	Gasoline Heavy Duty Vehicles, Model Year 2005
HHD-DSL	0.0048	0.0051	Diesel Heavy Duty Vehicles, All Model Years

Source: Table 13.4, The Climate Registry, General Reporting Protocol, Ver 1.0.

Table 3. BSPP and Equivalent CTCC Power Plant Construction and Operation GHG Emissions Over a Projected 30-Year Operational Lifetime

Project	Nominal Size (MW)	Construction Period (months)	Construction GHG Emissions (MT CO2e)	Annual Operational GHG Emissions (MT CO2e / year)	30-Year Facility Lifetime GHG Emission Burden (MT CO2e)	BSPP Emissions as Percent of CTCC Plant (%)
BSPP	1,000	69	104,000	16,100	587,000	0.5%
Generic CTCC	1,000	33	10,500	4,152,300	124,579,500	

All GHG emissions rounded to the nearest 100 MT. BSPP emissions include emissions from on-site and off-site construction activities. Generic CTCC operational emissions based on CPUC limit of 1,100 lbs CO_2/MWh, yearly operation of 8760 hours, and an equivalent availability factor of 95%. The construction emission estimates are representative of those for the Oakley Generating Station (09-AFC-04), a nominal 624 MW CTCC facility. The Generic CTCC facility emission estimate is underestimated because it does not include CH_4 or N_2O emissions from facility operation.