AECOM
1220 Avenida Acaso
Camarillo, CA 93012

(805)388-3775 tel
(805)388-3577 fax

DOCKET
09-AFC-8C
DATE APR 25 2012
RECD. MAY 02 2012

Memorandum

To	Jenny Field, NextEra Energy Resources, LLC
From	Sara Head, AECOM
Subject	**Genesis Solar Energy Project** **Summary of Commissioning Emission Calculations and Modeling Results**
cc	Matt McCord, NextEra Energy Resources, LLC Karin Fickerson and Rich Hamel, AECOM
Date	April 25, 2012

Introduction

An Amendment Petition was filed by Genesis Solar, LLC (Genesis Solar) in April 2012, in order to obtain approval of various proposed changes to the Genesis Solar Energy Project (GSEP or Project). That Petition to Amend (PTA) provided some summary information on the analysis methodology related to the use of portable generators for commissioning, but indicated that more detailed modeling results would follow at a later time. This memorandum contains the results of that analysis.

As noted in the April 2012 PTA, Southern California Edison (SCE) has changed the location of the proposed Colorado River Substation (CRS). This relocation of the CRS and the Large Generator Interconnect Agreement (LGIA) require differences in the line configuration and results in a delay of the online date for the CRS of approximately eight months. Additionally, due to uncertainty in the ability of Genesis Solar to reach an agreement for back-feed power from the Blythe Energy Transmission Line, Genesis Solar proposes an alternate means to obtain power for plant commissioning through the use of portable generators.

The use of portable, temporary generators will provide an alternate source for supplying the necessary power for commissioning activities if the CRS is not yet available. These activities will begin in the first quarter of 2013 and will initially require about 0.5 megawatts (MW) of power. The commissioning period is projected to last about 7 months (up to 31 weeks). The load requirements will slowly ramp up through the following months peaking at the beginning of July up to approximately 9.5 MWs if no back-feed power is available. These generators will be used to supply electrical loads for startup and commissioning activities. Power needs during this period will include the water treatment plant, heat transfer fluid (HTF) freeze protection pumps, overflow return pumps and solar collectors. Commissioning activities will include dewatering, HTP pump commissioning, and steam blows.

The GSEP has access to portable diesel and natural gas fired generators ranging in size from 250 kilowatts (kW) up to 1.5 MW each. A mix of engine fuel types and sizes is expected to be used based

on the varied load requirements throughout the commissioning period, the availability of engines and fuels, and emissions considerations. The generators will be located in the power block area closest to the loads requiring power. The use of portable generators will be discontinued when a back-feed source and associated downstream switchgear becomes available.

Genesis Solar proposes to use portable engines driving generators for the initial commissioning period of the first of the two power generation Units. A number of engines will be used depending on the load profile each week. Three engine types have been analyzed for use during this period: 500 kilowatt (kW) diesel fired engines; 1,500 kW diesel fired engines; and 1,300 kW natural gas fired engines. Engines used for the Project will meet required emissions standards and be registered under the California Air Resources Board Portable Equipment Registration Program (PERP).

This analysis looks at two facets of the use of these engines with respect to compliance with air quality regulations: 1) the total emissions during the commissioning period for comparison to potentially applicable offset thresholds and 2) a dispersion modeling analysis to assess the impacts with respect to National and California ambient air quality standards (NAAQS and CAAQS).

Emission Calculations

Based on power generation needs during this period and in order to assess impacts, a load profile was prepared by Genesis Solar and is included in Table A-2 of Attachment A. The load profile is broken into daytime and nighttime duties, since most power needs will occur during the day with a minimal draw at night associated with freeze protection and other miscellaneous requirements. Commissioning activities will occur Monday through Saturday on a 10 to 12 hour work schedule. However, as is common during plant commissioning activities, a need for overnight work may be necessary so fractional loads may be required for longer periods and may include Sundays. Power at a lower load will also be needed at night to maintain freeze protection and other limited activities. The load profile developed as shown in Attachment A provides a total kW load needed for eleven daytime hours (7 am -- 6 pm) and thirteen nighttime hours (6 pm -- 7 am) by week. Then the number of 500 kW diesel, 1,500 kW diesel, and 1,300 kW natural gas generators to meet the load demand is specified. The 500 kW diesel and 1,500 kW diesel generators have been assumed to operate up to 68% of the daytime hours. The 1,300 kW natural gas generators were assumed to operate up to 100% of the daytime hours.

The PERP-compliant engines will satisfy the U.S. Environmental Protection Agency (EPA) non-road engine Tier 3 and Tier 2 requirements for the 500 kW diesel and 1,500 kW diesel generators, respectively. While actual engine emission rates may be below the emission standards, the criteria pollutant emission factors used as the basis of the calculations were set at the maximum levels allowed for the specific size of engine for the diesel generators to be conservative. Tier 3 criteria pollutant emission factors were used for the 500 kW diesel generators and calculated hourly emissions for these engines are shown in Table A-3 of Attachment A. The Tier 2 criteria pollutant emission factors were used for the 1,500 kW diesel generators, and calculated hourly emissions for the 1,500 kW diesel generators are shown in Table A-4 of Attachment A. The hourly emission rates for the 1,300 kW natural gas generators were provided by the engine manufacturer and are shown in Table A-5 of Attachment A. Using these emission factors and the specified load profiles, criteria pollutant emissions were calculated for each week of the commissioning period. The emissions for each criteria pollutant were summed for the commissioning period as shown in Table A-2 of Attachment A.

Since one auxiliary boiler may be operating during commissioning of the Unit, annual operational emissions associated with the auxiliary boiler have been calculated as shown in Table A-6 of Attachment A. The annual auxiliary boiler emissions were added to the total commissioning period emissions and this sum was compared to the offset thresholds as specified in Mojave Desert Air Quality Management District (MDAQMD) Rule 1303 New Source Review Requirements. As shown in Table 1 below, the estimated emissions during commissioning, including operation of the boiler, would not exceed the offset thresholds.

While the actual engine sizes, types, and numbers used would vary during this period, Genesis will carefully monitor NOx emissions to ensure that this cumulative annual emission rate is not exceeded during the commissioning period.

Table 1
Comparison of Total Commissioning Emissions to MDAQMD Offset Threshold

Pollutant	Total Commissioning Emissions (tons)	Auxiliary Boiler Operating Emissions (tpy)	Total Emissions (tons)	Offset Threshold (tpy)	Exceed Offset Threshold (Y/N)?
NOx	24.6	0.2	24.8	25	NO
ROC	3.5	0.04	3.5	25	NO
CO	19.8	0.3	20.1	100	NO
SOx	0.03	0.004	0.04	25	NO
PM10	1.0	0.1	1.1	15	NO
There is not a separate offset threshold for PM2.5 in the MDAQMD					

Modeling Analysis

Dispersion modeling was performed to determine the ambient air quality impacts during the commissioning period. The peak emissions scenario was modeled by AECOM using the following methodology:

- The most recent version of the EPA guideline model AERMOD (version 12060) was used to evaluate compliance with the applicable California and National Ambient Air Quality Standards. The model default settings were used with the exception of the NO_2 modeling, for which the Tier 3 Ozone Limiting Method (OLM) refinement was used.
- The meteorological data used were the same data set developed for prior GSEP submittals, and included surface data from Blythe Airport, in Blythe, CA and upper-air data from Tucson, AZ. The 5 year period modeled was 2002 through 2006.
- The receptor grid used in prior modeling assessments was updated to reflect the updated site plan. The only significant change to the project fence line occurs at the farthest east end of the

project site. The receptor grid included fence line receptors every 50 meters, supplemented by a fence line receptor grid with receptors every 100 meters from the fence line out to 500 meters and additional receptors placed every 250 meters out to 5 kilometers from the project fence line. As expected, the maximum modeled concentrations occurred at or near the fenceline for all pollutants.

- The background data used in prior assessments were updated to the most recent 3 years available, from 2008 to 2010. The data were obtained from Palm Springs for NO_2 and CO, Victorville for SO_2 and PM2.5, and Lucerne Valley Middle School for PM10. For nitric oxide, the backgrounds were generated based on the form of the standard, i.e., highest concentration from the previous 3 years for the CAAQS, and the 3-year average of the 98th percentile daily maxima for the NAAQS. The hourly ozone data used for the Tier 3 OLM refinement for NO_2 modeling were obtained from Indio.

As noted previously, it is expected that initially the load requirements will be small (< 500 kW) but then will ramp-up by mid-summer. Power needs will peak during a roughly one to two month period when steam blows and other equipment testing will occur. It is expected that diesel generators will be used primarily, with natural gas generators mixed in during peak load periods if necessary. A peak emissions scenario was identified for the period when the most power will be needed, i.e., during steam blows. Emissions were calculated by AECOM based on manufacturer's data and based on compliance with current emissions standards for diesel and natural gas-fired engines.

The GSEP consists of two independent solar electric generating facilities, Unit 1 and Unit 2, with a nominal net electrical output of 125 MW each, for a total net electrical output of 250 MW. Beside the portable generators and one of the boilers in operation, it is also likely that some construction activities at the other unit will still be underway. To allow for construction flexibility, the following two scenarios were modeled.

1) Unit 1 is being commissioned while Unit 2 is under construction.
2) Unit 2 is being commissioned while Unit 1 is under construction.

Given the unforeseen issues with cultural resources on the site, Unit 2 grading has been expedited and will be complete prior to commissioning of Unit 1. In fact, all major earth-work is anticipated to be complete on both Units prior to commissioning. Therefore, AECOM modeled the two scenarios with commissioning consisting of a mix of eight diesel and natural gas generators at one Unit and with concurrent post-grading construction activities at the other Unit. The construction emissions were modeled with the same parameters and emissions as presented in the GSEP Application for Certification (AFC), except that the fugitive dust emissions caused by site grading were excluded because that phase will be complete by the time commissioning begins, and the construction sources were moved to maximize the potential crossover of construction impacts and commissioning impacts from the two Units. Those sources were assumed to be immediately adjacent to the western boundary of Unit 2 to place them as close to the Unit 1 power block as possible in the Unit 1 commissioning case, and immediately adjacent to the eastern boundary of Unit 1 in the Unit 2 commissioning case.

Additionally, during project commissioning, the auxiliary boiler for the first Unit constructed will already be online. Therefore, the auxiliary boiler for the Unit being commissioned was also included in the modeling with the conservative assumption that the boiler was online 24 hours a day throughout the

period of peak commissioning emissions. The auxiliary boiler was modeled using the stack parameters and emissions presented in the AFC for the Project.

The modeled emissions included those from the portable generators used for commissioning, operational emissions from one auxiliary boiler, and emissions from the construction equipment. The maximum modeled emission rates are summarized in Table 2 below.

Table 2
Maximum Short-Term Emission Rates By Source Group
During Worst-Case Commissioning Scenario

Pollutant	Averaging Period	Peak Daily Generator Modeling Rate (lb/hr)	Auxiliary Boiler (lb/hr)	Construction Sources (lb/hr)	Total Modeling Emission Rate (lb/hr)
NO_2	1-hr	86.95	0.33	44.58	131.86
CO	1-hr	63.76	0.56	22.03	86.35
	8-hr	63.76	0.56	22.03	86.35
SO_2	1-hr	0.11	0.01	0.05	0.17
	3-hr	0.11	0.01	0.05	0.17
	24-hr	0.11	0.01	0.05	0.17
PM10	24-hr	3.27	0.08	2.54	5.89
PM2.5	24-hr	3.27	0.08	2.51	5.86

1) Totals are representative of peak daytime emission rates for the engines along with maximum lb/hr of all construction sources and one auxiliary boiler operating simultaneously.
2) Construction emissions do not include fugitive emissions as grading is assumed to be complete prior to the commencement of commissioning.

The power generators were modeled with daytime emission rates during the hours of 8 am -- 5 pm and with the reduced emission rates during the hours of 5 pm – 8 am. The peak operations occurred during four consecutive weeks, during which it was assumed two 500 kW diesel engines, three 1,500 kW diesel engines, and three 1,300 kW natural gas engines will be operated during the day; and one 1,300 kW natural gas engine would be operated at night.

The 1,500 kW diesel engine and 1,300 natural gas engine were both modeled with a stack release height of 30 feet; and the 500 kW diesel engine was modeled with a stack release height of 8.5 feet. The engines were placed as shown in Figure 1, just to the northwest of the ACC. In each scenario, the auxiliary boiler for the unit being modeled was assumed to be running full time at the permitted emission rates.

In addition to the engines and the auxiliary boiler, construction emissions at Unit 2 (for the Unit 1 commissioning case and Unit 1 for the Unit 2 commissioning case) were included in the modeling.

The modeling of the construction sources was modeled with the same source configuration and emissions as provided in the AFC and later supplemental submittals with the exception that the fugitive dust portion of the PM10/PM2.5 emissions was excluded because site grading and preparation will be complete prior to the beginning of commissioning. The construction sources were modeled at the location that would be worst case in terms of potential crossover of impacts with commissioning activities at the unit being commissioned in each modeled scenario. Those sources were assumed to be immediately adjacent to the western boundary of Unit 2 to place them as close to the Unit 1 power block as possible in the Unit 1 commissioning case, and immediately adjacent to the eastern boundary of Unit 1 in the Unit 2 commissioning case.

Because peak commissioning is only expected to occur for 4 to 8 weeks in the summer, only short term (24 hours or less) ambient air quality impacts were analyzed. The modeling results in Table 3 (CAAQS) and Table 4 (NAAQS) below represent the worst case of either of the two cases modeled. The modeling files from this analysis are provided in Attachment B (on a separate CD).

The results show that all gaseous criteria pollutants are expected to be below the applicable NAAQS and CAAQS. While CO and SO_2 are well below the applicable standards, NO_2 is close to (but still below) both the NAAQS and CAAQS 1-hour standards. Note, the relatively new 1-hour NO_2 and SO_2 NAAQS were not analyzed in the GSEP AFC.

The results for the 24-hour PM10 CAAQS and PM2.5 NAAQS both exceed their respective standards. However, in both cases this is because the ambient background already exceeds the standard. In the case of the 24-hour PM10 CAAQS, impacts caused by all sources during commissioning are only 2.1 $\mu g/m^3$, or just 4% of the standard. For the PM2.5 NAAQS, the impacts from all sources during commissioning are only 1.7 mg/m^3, or just under 5% of the standard.

Table 3
Short-Term CAAQS Modeling Results ($\mu g/m^3$)

Pollutant	Averaging Period	Maximum Conc.	Ambient Background	Total Conc.	CAAQS	Percent of CAAQS
NO_2	1-hour	237.7	77.5	315.2	339	93.0%
CO	1-hour	639.6	2,300	2,940	23,000	12.8%
	8-hour	102.8	770.5	873.3	10,000	8.7%
SO_2	1-hour	1.2	136.2	137.4	655	21.0%
	24-hour	0.07	18.3	18.4	105	17.5%
PM10	24-hour	2.1	96.0	98.1	50	196.2%
Note: There is no SO_2 3-hour or PM2.5 24-hour CAAQS						

Table 4

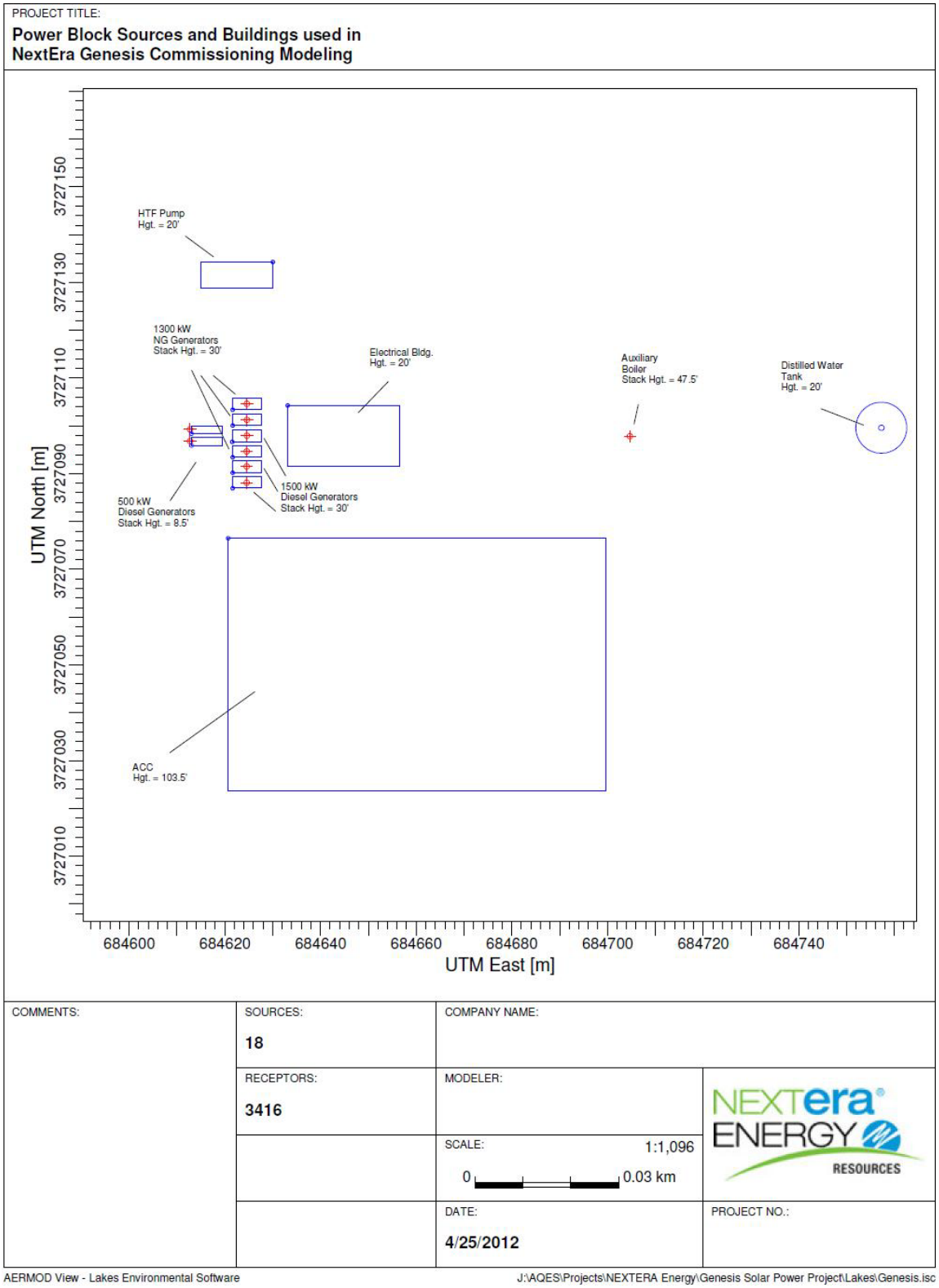
Short-Term NAAQS Modeling Results ($\mu g/m^3$)

Pollutant	Averaging Period	Modeled Project Conc.*	Ambient Background	Total Conc.	NAAQS	Percent of NAAQS
NO_2	1-hour	107.3	77.5	184.8	188	98.3%
CO	1-hour	592.8	2,300	2,893	40,000	7.2%
	8-hour	85.7	770.5	856.2	10,000	8.6%
SO_2	1-hour	0.4	136.2	136.6	196	69.5%
	3-hour	0.4	136.2	136.6	1,300	10.5%
	24-hour	0.06	18.3	18.4	365	5.2%
PM10	24-hour	1.5	96.0	97.53	150	65.0%
PM2.5	24-hour	1.7	41.9	43.6	35	124.5%

* All values are in the form of their respective standard: high-2nd-high for CO, 3- and 24- hour SO_2, high-6th high over 5 years for PM10, high-1st-high averaged over 5 years for PM2.5, and the 98th for 99th percentile of the 5-year average daily maximum for 1-hour NO_2 and SO_2, respectively.

As typically is noted, this modeling is considered to be very conservative, as the atmospheric conditions (low wind speed and high stability) that lead to maximum project impacts are not the same conditions that lead to high background values for particulates (high winds). Therefore, the pairing of worst case impacts with worst case background values in the case of fugitive dust leads to unrealistically high values. The commissioning period is short term, with the peak activity occurring only over a month or two. There are many other such assumptions that lead to an overly conservative estimate. These commissioning impacts are well below the peak construction impacts during the grading phase. As concluded in the GSEP Final Staff Assessment, with the implementation of the required mitigation measures during construction, impacts were concluded to not be significant. Since the commissioning phase PM10 and PM2.5 impacts are substantially less than the construction grading phase, these impacts are also concluded to not be significant.

Figure 1: Location of Commissioning Sources at NextEra Genesis Power Block



Attachment A

Emissions Calculation

Table A-1

Comparison of Total Commissioning Emissions to MDAQMD Offset Threshold

Pollutant	Total Commissioning Emissions (tons)	Auxiliary Boiler Operating Emissions (tpy)	Total Emissions (tons)	Offset Threshold (tpy)	Exceed Offset Threshold (Y/N)?
CO	19.8	0.3	20.1	100	NO
NOx	24.6	0.2	24.8	25	NO
PM10	1.0	0.1	1.1	15	NO
SOx	0.03	0.004	0.04	25	NO
ROC	3.5	0.04	3.5	25	NO

Table A-2
Emission Calculations for Total Commissioning Period

Load/Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Peak Max Daily (kW)	0	0	0	0	0	0	0	0	500	500	500	500	1500	1500	1500	1500
Day Time (kW)	0	0	0	0	0	0	0	0	500	500	500	500	1500	1500	1500	1500
Night Time (kW)	0	0	0	0	0	0	0	0	0	0	0	0	500	500	500	500
Number of 500 kw DGs - Day	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0
Number of 500 kw DGs - Night	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Emission CO (lb/week)	0	0	0	0	0	0	0	0	173	173	173	173	300	300	300	300
Emissions NOx (lb/week)	0	0	0	0	0	0	0	0	199	199	199	199	346	346	346	346
Emissions PM10 (lb/week)	0	0	0	0	0	0	0	0	10	10	10	10	17	17	17	17
Emissions SOx (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Emissions ROC (lb/week)	0	0	0	0	0	0	0	0	20	20	20	20	35	35	35	35
Number of 1,500 kw DGs - Day	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Number of 1,500 kw DGs - Night	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emission CO (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	519	519	519	519
Emissions NOx (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	958	958	958	958
Emissions PM10 (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	30	30	30	30
Emissions SOx (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Emissions ROC (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of 1,300 kw NGs - Day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of 1,300 kw NGs - Night	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emission CO (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emissions NOx (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emissions PM10 (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emissions SOx (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emissions ROC (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Assumptions	Input
Day Time Hours - DG	7.5
Day Time Hours - NG	11
Night Time Hours	13
Days Per Week	6

Table A-2
Emission Calculations for Total Commissioning Period

Load/Week	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Peak Max Daily (kW)	2500	2500	2500	5500	5500	5500	9500	9500	9500	9500	3000	3000	1500	1500	1500	
Day Time (kW)	2500	2500	2500	5500	5500	5500	9500	9500	9500	9500	3000	3000	1500	1500	1500	
Night Time (kW)	500	500	1000	1300	1300	1300	1300	1300	1300	1300	1300	1000	1000	1000	1000	
Number of 500 kw DGs - Day	2	2	2	3	3	3	2	2	2	2	1	1	2	2	2	
Number of 500 kw DGs - Night	1	1	2	0	0	0	0	0	0	0	0	2	2	2	2	**Total (tons/project)**
Emission CO (lb/week)	645	645	945	518	518	518	346	346	346	346	173	772	945	945	945	5.4
Emissions NOx (lb/week)	744	744	1090	598	598	598	399	399	399	399	199	891	1090	1090	1090	6.3
Emissions PM10 (lb/week)	37	37	55	30	30	30	20	20	20	20	10	45	55	55	55	0.3
Emissions SOx (lb/week)	1	1	2	1	1	1	1	1	1	1	0	2	2	2	2	0.01
Emissions ROC (lb/week)	74	74	109	60	60	60	40	40	40	40	20	89	109	109	109	0.6
Number of 1,500 kw DGs - Day	1	1	1	2	2	2	3	3	3	3	1	1	0	0	0	
Number of 1,500 kw DGs - Night	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**Total (tons/project)**
Emission CO (lb/week)	519	519	519	1037	1037	1037	1556	1556	1556	1556	1418	519	0	0	0	7.5
Emissions NOx (lb/week)	958	958	958	1915	1915	1915	2873	2873	2873	2873	2617	958	0	0	0	13.8
Emissions PM10 (lb/week)	30	30	30	60	60	60	90	90	90	90	82	30	0	0	0	0.4
Emissions SOx (lb/week)	1	1	1	2	2	2	3	3	3	3	3	1	0	0	0	0.0
Emissions ROC (lb/week)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Number of 1,300 kw NGs - Day	0	0	0	3	3	3	3	3	3	3	0	0	0	0	0	
Number of 1,300 kw NGs - Night	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	**Total (tons/project)**
Emission CO (lb/week)	0	0	0	1978	1978	1978	1978	1978	1978	1978	0	0	0	0	0	6.9
Emissions NOx (lb/week)	0	0	0	1310	1310	1310	1310	1310	1310	1310	0	0	0	0	0	4.6
Emissions PM10 (lb/week)	0	0	0	77	77	77	77	77	77	77	0	0	0	0	0	0.3
Emissions SOx (lb/week)	0	0	0	2	2	2	2	2	2	2	0	0	0	0	0	0.0
Emissions ROC (lb/week)	0	0	0	821	821	821	821	821	821	821	0	0	0	0	0	2.9

Assumptions
Day Time Hours - DG
Day Time Hours - NG
Night Time Hours
Days Per Week

Table A-3
Criteria Pollutant Emissions from 500 kW Diesel IC Engine

Pollutant	Emission Factor (g/bhp-hr) [1]	Hourly (lb/hr) [2]
CO	2.60	3.84
NOx + NMHC	3.00	4.43
NOx [3]	3.00	4.43
PM10	0.15	0.22
SOx	---	0.008
ROC [4]	---	0.443

Supplemental Information	
Value	**Units**
670	HP
453.6	g/lb
15	ppm sulfur
7.08	lb/gal diesel
36.2	gal/hr [5]

Notes:
1. Tier 3 Emission Standards for 2006 - 2010 Model Year Engines (between 600 hp and 750 hp)
2. 500 kW engine (670 bhp)
3. Assumed 100% of NOx + NMHC standard is NOx to be conservative
4. Assumed 10% of NOx + NMHC standard is ROC to be conservative
5. Fuel use based on sample 500 kW Aggreko Generator in Standby Mode

Table A-4
Criteria Pollutant Emissions from 1,500 kW Diesel IC Engine

Pollutant	Emission Factor (g/bhp-hr) [1]	Hourly (lb/hr) [2]
CO	2.60	11.53
NOx + NMHC	4.80	21.28
NOx [3]	4.80	21.28
PM10	0.15	0.67
SOx	---	0.023
ROC [4]	---	2.128

Supplemental Information	
Value	**Units**
2011	HP
453.6	g/lb
15	ppm sulfur
7.08	lb/gal diesel
109.6	gal/hr [5]

Notes:
1. Tier 2 Emission Standards for 2006 - 2010 Model Year Engines (greater than 750 hp)
2. 1,500 kW engine (2011 bhp)
3. Assumed 100% of NOx + NMHC standard is NOx to be conservative
4. Assumed 10% of NOx + NMHC standard is ROC to be conservative
5. Fuel use based on sample 1,500 kW Aggreko Generator in Standby Mode

Table A-5

Criteria Pollutant Emissions from 1,300 kW Natural Gas IC Engine

Pollutant	Hourly (lb/hr)
CO [1]	7.17
NOx [1]	4.75
PM10 [2]	0.28
SOx [2]	0.009
ROC [1]	2.98

Notes:
1. Based on manufacturer's emissions specification sheet
2. Based on AP-42 Table 3.2-2 "Uncontrolled Emissions Factors for Engines"

Table A-6

Criteria Pollutant Emissions from Auxiliary Boiler

Pollutant	Hourly (lb/hr)	Annual (tpy)[1]
CO	0.563	0.2815
NOx	0.330	0.165
PM10	0.150	0.075
SOx	0.008	0.004
ROC	0.088	0.044

Notes:

1. Annual emissions based on permit limit of 1,000 hours per year of operation

Table A-7

Emission Rates for Modeling of Generators

Pollutant	Averaging Period	Peak Daytime Modeling Rate (lb/hr)	Peak Nighttime Modeling Rate (lb/hr)
CO	1-hr	63.76	7.17
CO	8-hr	63.76	7.17
NO2	1-hr	86.95	4.75
SO2	1-hr	0.11	0.01
SO2	3-hr	0.11	0.01
SO2	24-hr	0.11	0.01
PM10	24-hr	3.27	0.28
PM2.5	24-hr	3.27	0.28

Notes:

1) All modeling assumes that during daytime hours (8 AM-5 PM), 3 1500 kW diesel, 2 500 kw diesel, and 3 1300 kW NG engines are operating simultaneously.
2) All modeling assumes that during remaining hours (5 PM-8 AM), a single 1300 kW NG engine is operating
3) Assumes 100% of PM10 is PM2.5

Peak Day Assumptions	Number of 1500 kW Diesel Units	Number of 1300 kW NG Units	Number of 500 kW Diesel Units
Day Time	3	3	2
Night Time	0	1	0

Table A-8

Max. Emission Rates for All Sources

Pollutant	Averaging Period	Peak Daily Generator Modeling Rate (lb/hr)	Auxiliary Boiler (lb/hr)	Construction Sources (lb/hr)	Total Max Daily Emissions (lb/hr)
CO	1-hr	63.76	0.56	22.03	86.35
CO	8-hr	63.76	0.56	22.03	86.35
NO2	1-hr	86.95	0.33	44.58	131.86
SO2	1-hr	0.11	0.01	0.05	0.17
SO2	3-hr	0.11	0.01	0.05	0.17
SO2	24-hr	0.11	0.01	0.05	0.17
PM10	24-hr	3.27	0.08	2.54	5.89
PM2.5	24-hr	3.27	0.08	2.51	5.86

Notes:

1) Totals are representative of daily emission rates for the engines along with maximum lb/hr of construction and 1 auxiliary boiler operating simultaneously.

2) Construction emissions do not include fugitive emissions as grading is assumed to be complete prior to the commencement of commissioning.

Attachment B

Modeling Files

(Provided via CD)