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Sonoran Energy Project

(02-AFC-01C)

Data Responses, Set 1

(Responses to Data Requests 1 to 58)

Submitted to

California Energy Commission

Prepared by

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Contents

SECTION 1

Introduction

Attached are AltaGas Sonoran Energy Inc.'s (AltaGas or the Project Owner) responses to the California Energy Commission (CEC) Data Request, Set 1 regarding the Sonoran Energy Project (SEP) (02-AFC-01C) Petition to Amend (PTA). Project Owner incorporates by reference herein the Objections to Certain Data Responses in CEC Staff's Data Requests, Set One (TN#206451).

The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as the CEC presented them and are keyed to the Data Request numbers.

New or revised graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 28 would be numbered Table DR28-1. The first figure used in response to Data Request 28 would be Figure DR28-1, and so on. Figures or tables from the SEP PTA that have been revised have "R1" following the original number, indicating revision 1.

Additional tables, figures, or documents submitted in response to a data request (for example, supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of each discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

SECTION 2

Air Quality (1–22)

BACKGROUND: CONSTRUCTION AND OPERATION EMISSION CALCULATIONS

The Petition to Amend (PTA) Appendix 3.1B and 3.1C are used to document project construction and operation emissions calculations. Staff needs the original spreadsheet files of these estimates with live, embedded calculations to complete their review.

DATA REQUEST

1. Please provide the spreadsheet versions of Appendix 3.1B and 3.1C worksheets with the embedded calculations live and intact.

Response: The requested "live" worksheets for project operational and construction emissions (PTA Appendices 3.1B and 3.1C) will be submitted separately under a request for confidentiality.

BACKGROUND: IN-STACK NO_2/NO_X RATIOS

The facility owner used the Ozone Limiting Method (OLM) to calculate the NO_2 impacts of the proposed project modification. The OLM requires an in-stack NO_2/NO_x ratio to determine how much of the NO_x in the exhaust is already in the form of NO_2 when the pollutants exit the stack.

Page 3-44 of the PTA shows that the facility owner used an in-stack NO_2/NO_x ratio of 13 percent during normal operating hours and 24 percent during startup/shutdown periods and commissioning tests when SCR is not fully operational for the proposed combustion turbine. The facility owner states that these ratios were recommended by the combustion turbine vendor, General Electric (GE). However, staff noticed that these ratios were for the GE LMS100 simple-cycle turbines for Pio Pico Energy Center and Carlsbad Energy Center projects. For the current amendment request, the facility owner proposed a combined-cycle unit using one-on-one single shaft arrangement with a different GE combustion turbine (a GE 7HA.02 gas turbine) and a D652 steam turbine. The proposed turbine technology is different than those approved for Pio Pico Energy Center and Carlsbad Energy Center projects. Staff needs adequately-justified in-stack NO_2/NO_x ratio data to be used for different operating scenarios suitable for the proposed combined-cycle unit.

For the auxiliary boiler, the facility owner used an in-stack NO_2/NO_x ratio of 29 percent for operation above 25 percent rated load (for normal operating hours) and 12.5 percent for operation below 25 percent rated load (during hours in which a startup/shutdown occurs). The facility owner states that these ratios were recommended by auxiliary boiler vendor (i.e. Babcock & Wilcox). However, for combustion turbines, staff has used higher in-stack NO_2/NO_x ratios during startup/shutdown than during normal operations. Staff needs justification to show why the in-stack NO_2/NO_x ratio for the auxiliary boiler would be lower during startup/shutdown than during normal operations.

The facility owner used an in-stack NO_2/NO_x ratio of 13 percent for each of the existing Blythe Energy Project combustion turbines. The existing Blythe Energy Project combustion turbines are from Siemens and also operate as a combined-cycle unit. Staff needs adequate justification for the data used for the in-stack NO_2/NO_x ratios for the existing Blythe Energy Project combustion turbines.

DATA REQUESTS

2. Please provide vendor or other reliable data showing the in-stack NO_2/NO_x ratios for different operating scenarios suitable for the proposed combined- cycle unit, the auxiliary boiler, and the existing Blythe Energy Project combustion turbines.

Response: The only manufacturer data that project owner has been able to obtain related to in-stack NO_2/NO_x ratios for gas turbines are the ratios used in the PTA: 13 percent during normal operating hours

and 24 percent during startup/shutdown periods and commissioning tests when SCR is not fully operational. The project owner acknowledges that these ratios are not specific to either the GE 7HA.02 gas turbine proposed for use at SEP or the Siemens F-class industrial gas turbines in operation at Blythe Energy Project (BEP). We requested NO_2/NO_x ratios for the SEP gas turbine, but the data were not provided. No comparable gas turbines are included in EPA's ISR database.[1] The project owner is not aware of any other source of in-stack NO_2/NO_x ratios for the gas turbines.

The NO_2/NO_x ratios for the auxiliary boiler were provided by the boiler supplier. Please see Attachment DR2-1.

3. Please explain why the in-stack NO_2/NO_x ratio for the auxiliary boiler would be lower during startup/shutdown than during normal operation.

Response: The data provided by the boiler supplier indicated that the NO_2/NO_x ratio during firing below 25% of rated load would be 2/16, or 12.5%. This ratio was used in our startup assessment as the boiler will be operated below 25% load until it reaches operating temperature (that is, during the startup period). We do not know why the boiler vendor believes that in-stack NO_2/NO_x ratio for the auxiliary boiler would be lower during startup/shutdown than during normal operation. In our experience, these values are empirically derived.

4. Please update the NO_2 modeling analysis for changes to the NO_2/NO_x ratios.

Response: As indicated in the response to Data Request 2, we are not aware of any other, better sources of data for NO_2/NO_x ratios than those used in the PTA. Therefore, we are not proposing any changes in the ratios and no updates to the NO_2 modeling analysis are required.

BACKGROUND: FUMIGATION ANALYSIS

The facility owner used the SCREEN3 model to evaluate combustion turbine and auxiliary boiler impacts under inversion breakup conditions because these are special cases of meteorological conditions. Page 3-41 of the PTA shows that the facility owner did not do the fumigation analysis for the emergency fire pump engine because the facility owner believes that emergency engine emissions are small compared to gas turbine emissions. Even though the emergency engine emissions are small compared to gas turbine emissions, there is a possibility that the emergency engine could cause higher impacts due to lower stack height and/or lower plume height. Staff believes that the fumigation impacts need to be analyzed for the emergency engine.

The petitioner used SCREEN3 to model the inversion break-up fumigation impacts. The SCREEN3 model is essentially a screening version of the ISCST3 model, which was replaced by AERMOD. U.S. EPA released a screening version of AERMOD, AERSCREEN, in 2010. AERSCREEN has replaced SCREEN3 as the recommended screening modeling tool. U.S. EPA has incorporated the fumigation algorithms in the new version of AERSCREEN (version 15181). The AERSCREEN (version 15181) model is capable of analyzing the fumigation impacts of the project.

[1] http://www3.epa.gov/scram001/no2_isr_database.htm. The only natural gas-fired gas turbines included in the ISR database are 12.9 MW Siemens SGT 400 gas turbines that are used in pipeline compressor engines and 1300 hp Solar Saturn gas turbines that are used on offshore energy platforms. Both turbines are simple-cycle units and neither turbine is equipped with SCR.

DATA REQUESTS

5. Please provide fumigation impacts analysis for the emergency fire pump engine.

Response: Neither AERSCREEN nor SCREEN3 will produce inversion breakup fumigation impact output for the emergency fire pump engine. The source code for each model includes a stack height test that is executed prior to evaluating fumigation impacts, as follows:

SCREEN3 source code:

```
IF [RURAL .AND. HS.GE.10. .AND. (POINT .OR. FLARE)] THEN
```

AERSCREEN source code:

```
if (larea .or. lcirc .or. lvolume
or. height .lt. 10) then !no fumigation, reset screen flag
```

Because the emergency fire pump stack height of 10 feet (3.048 meters) is less than 10 meters, no fumigation impacts are produced by either model for this unit.

6. Please update all fumigation impacts analyses using AERSCREEN (version 15181).

Response: The revised fumigation modeling results are provided in Attachment DR6-1 (Table 3.1F-5R1). The fumigation modeling results have also been updated in revised Table 3.1-39R1, which is provided in Attachment DR17-1 (see Data Response 17 below). Five copies of the air dispersion modeling results are being provided under separate cover, with additional copies provided upon request.

BACKGROUND: EMISSIONS OF THE AUXILIARY BOILER

Page 3-33 of the PTA shows that the facility owner expects the auxiliary boiler to undergo one startup/showdown event for each gas turbine startup as a worst case scenario. The facility owner assumes that the auxiliary boiler would require up to 2 hours to comply with the proposed NO_x, CO, and VOC limits. During boiler shutdowns, the facility owner does not expect the emissions to exceed normal limits on a three-hour average basis. The facility owner assumed 2 hours per day of elevated NO_x, CO and VOC emissions as a result of startup and shutdown activities.

Page 3-27 of the PTA shows that the facility owner estimated the maximum daily emissions of the gas turbine assuming 20 hours of full-load operation with duct firing and 2 startup/shutdown cycles. Based on the above assumptions, the auxiliary boiler would also undergo 2 startups per day, which would lead to 4 hours per day of elevated NO_x, CO and VOC emissions. Assuming only 2 hours per day of elevated emissions is inconsistent with the scenario described on page 3-27 and would thus underestimate the worst-case daily emissions of the auxiliary boiler.

DATA REQUEST

7. Please make sure conservative and consistent assumptions are made to describe the worst-case operating scenario and to estimate the worst-case emissions of the auxiliary boiler. Please provide the results of the revised estimate.

Response: The boiler vendor has indicated that the time it takes a cold boiler to warm up is generally one to two hours. For our emissions calculations we assumed that, as a worst case, a cold boiler would require two hours to reach operating temperature and pressure, at which point it could be operated at the 25% load point where guaranteed emission levels would be achieved. We further assumed that if the turbine was to experience more than one startup in a day, the auxiliary boiler would not be cold and so extended operation at low load would not be required. While we believe that it is unlikely that the auxiliary boiler would require four hours of low-load operation to support two gas turbine startups in one day, we have revised the daily NO_x, CO and VOC emissions as requested. The revised daily emissions

are shown in Table 3.1-28R below. The revised detailed calculations are provided in Table 3.1B-6R1, Attachment DR7-1.

TABLE 3.1-28R1
SEP Facility Emissions

	NO_x	SO_2	VOC	CO	PM_{10}/ $PM_{2.5}$
Maximum Hourly Emissions[a], lb/hr	188.1	5.0	12.5	138.4	12.1
Maximum Daily Facility Emissions[b], lb/day	~~919.6~~ 922.4	120.0	~~286.0~~ 286.8	~~966.6~~ 986.0	289.3
Maximum Annual Facility Emissions[c], tpy	85.6	8.8	24.2	78.0	40.1

BACKGROUND: COMMISSIONING MODELING

Page 3-46 of the PTA states that the facility owner assumed simultaneous commissioning of the auxiliary boiler and turbine for the commissioning modeling analysis. However, the modeling files show that the facility owner used emissions and stack parameters for normal operation of the auxiliary boiler while the turbine undergoes commissioning which implies that the auxiliary boiler would be commissioned first.

The facility owner did not provide emissions calculations or annual impacts analysis for the commissioning year. Emissions and annual impacts during the commissioning year would generally be higher than those during normal operation year.

DATA REQUESTS

8. Please confirm whether the auxiliary boiler will be commissioned before any turbines undergo commissioning, as stated on Page 3-46.

Response: The auxiliary boiler must be commissioned before the turbine undergoes commissioning because auxiliary boiler steam is needed for some of the gas turbine commissioning procedures.

9. If the auxiliary boiler and the turbines would not undergo commissioning simultaneously, please explain how onsite procedures would prevent simultaneous commissioning of the auxiliary boiler and turbines and provide a proposed condition of certification.

Response: As indicated in Data Response 8, the auxiliary boiler must be commissioned prior to the start of gas turbine commissioning. Following is a proposed Condition of Certification to ensure that the auxiliary boiler and gas turbine are not undergoing commissioning activities at the same time.

> AQ-X: Following an initial commissioning period of no more than 160 operating hours, commencing with the first firing of fuel in the auxiliary boiler, the NO_x, CO, and VOC concentration limits in Condition of Certification AQ-Y shall apply. The gas turbine shall not undergo first fire until all commissioning activities for the auxiliary boiler have been completed.

10. If the auxiliary boiler and the turbine would undergo commissioning simultaneously, please provide correct impact analysis for the commissioning phase.

Response: As indicated in Data Response 8, the auxiliary boiler must be commissioned prior to the start of gas turbine commissioning. Therefore no changes to the impact analysis for the gas turbine commissioning phase are required.

11. Please provide emissions calculations and annual impacts analysis for the commissioning year.

Response: The emissions calculations for the commissioning year are provided in Attachment DR11-1. The following Table DR11-1 compares maximum annual emissions during the commissioning year with maximum annual emissions during normal operating years.

TABLE DR11-1
Comparison of Annual Emissions, Commissioning vs Normal Operations (tpy)

	NO_x	SOx	CO	VOC	$PM_{10}/PM_{2.5}$
Normal Operations	85.6	8.8	78.0	24.2	40.1
Commissioning	140.1	8.8	87.7	22.7	38.8
Difference	+54.5	0.0	+9.7	-1.5	-1.3

The only pollutant with an annual standard for which higher annual emissions are expected during the commissioning year is NO_x. Modeled annual NO_2 impacts during a normal operating year are 0.18 µg/m^3. A 64% increase in annual NO_x emissions would result in annual NO_2 impacts of about 0.18 * 1.64 = 0.30 µg/m^3.

BACKGROUND: REFINED 24-HOUR $PM_{10}/PM_{2.5}$ ANALYSIS

The petitioner estimated the daily emissions based on the assumption of 20 hours of base load operation with duct firing, 2 startup hours and 2 shutdown hours. Based on the emission calculations shown in Table 3.1B-6 in Appendix 3.1B, staff calculated the daily $PM_{10}/PM_{2.5}$ emissions of the proposed combustion turbine to be 238.2 lb/day. In the modeling file for refined 24-hour $PM_{10}/PM_{2.5}$ analysis, the facility owner used emission rate of 1.008 g/s for the proposed gas turbine, which is equivalent to 8 lb/hr and 192 lb/day. The emission rate of 8 lb/hr is associated with base load operation without duct firing as shown in Table 3.1B-6 in Appendix 3.1B. The refined 24-hour $PM_{10}/PM_{2.5}$ modeling analysis is inconsistent with the daily emissions calculations shown in Table 3.1B-6.

DATA REQUEST

12. Please update the refined 24-hour $PM_{10}/PM_{2.5}$ modeling analysis using correct daily emission rates of the combustion turbine.

Response: The refined 24-hour $PM_{10}/PM_{2.5}$ modeling analysis has been updated using the correct daily emission rate of 1.2507 g/s. The maximum modeled turbine $PM_{10}/PM_{2.5}$ impacts increase from 1.14 µg/m^3 to 1.42 µg/m^3. The corrected modeled impacts are reflected in the revised modeling results tables in Attachment DR12-1. Five copies of the air dispersion modeling results are being provided under separate cover, with additional copies provided upon request.

BACKGROUND: DATA PROCESSING

The facility owner processed the meteorological data, ozone background data, and monthly hour-of-day NO_2 background data for the modeling analysis. The facility owner did not provide the input files and methods/procedures that were used for data processing. Staff needs these files to make sure that the facility owner has used appropriate data processing methods/procedures.

DATA REQUESTS

13. Please provide AERMET input files and AERMET model setup parameters that were used to process the AERMOD-ready meteorological data files.

Response: The requested files are being provided with the air dispersion modeling results under separate cover.

14. Please provide the raw data files for ozone and NO_2 background data and data processing programs/software as well as a detailed description of the methods/procedures used to process the data.

Response: The requested data files and procedures are being provided with the air dispersion modeling results are provided under separate cover. The missing data filling procedure is described in Attachment DR14-1.

BACKGROUND: CONSTRUCTION IMPACT ANALYSIS

The facility owner provided the detailed construction emissions calculations in Appendix 3.1C. Staff is not able to match the short term and long term emissions shown in Appendix 3.1C with those used in the modeling files. A detailed comparison is shown in the following table:

AIR QUALITY TABLE 1
Comparison of Construction Emissions in PTA and Modeling Files

Short-term impacts		NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Off Road Equipment and Onsite Vehicle Combustion (with fugitive dust for PM [lb/hr])	Appendix 1.C	5.92	8.95	0.02	1.39	0.17
	Sum of Modeled Volume Sources	8.53	16.86	0.03	1.44	0.20
Sum of Wind Erosion and Soil Movement Fugitive Dust(lbs/hr)	Appendix 1.C	NA	NA	NA	0.495	0.194
	Sum of Modeled Area Sources	NA	NA	NA	0.07	0.0278
Long-term impacts						
Off Road Equipment and Onsite Vehicle Combustion (with fugitive dust for PM [lb/hr])	Appendix 1.C	1.44	2.85	0.01	0.32	0.02
	Sum of Modeled Volume Sources	1.68	NA	0.01	0.34	0.03
Sum of Wind Erosion and Soil Movement Fugitive Dust (lbs/hr)	Appendix 1.C	NA	NA	NA	0.22	0.09
	Sum of Modeled Area Sources	NA	NA	NA	0.0544	0.0215

DATA REQUESTS

15. Please explain why the emission rates used in the modeling files are different from those shown in Appendix 3.1C.

Response: The modeled emission rates for the off road equipment and onsite vehicle combustion are higher than the calculated emission rates shown in Appendix 3.1C because the modeled emissions (that is, the sum of the modeled area sources shown in Air Quality Table 1) include emissions from construction of the substation that was eliminated from the proposed project before the PTA was filed (see footnote a to Appendix 3.1C, Table 3.1C-4 of the PTA).

A review of the soil movement modeling inputs verifies the staff's belief that there was an error in converting total emissions from soil movement activities (in lb/hr) to the modeled emission rates (in g/s per modeled area source) used for this source. The estimated emissions from this phase of construction activity have been refined and the emissions allocation error corrected.

A revised version of Appendix 3.1C (labeled Appendix C.1R1) is provided as Attachment DR15-1.

16. Please update the modeling analysis if any of the emission rates need to be changed.

Response: All of the construction impacts have been remodeled using the emission rates in Appendix 3.1C-1R1. The emissions allocation error has been corrected and the one-hour NO_2 and annual average impacts have been revised in response to Data Request 17. Five copies of the air dispersion modeling results are provided under a separate cover, with additional copies provided upon request. Revised construction modeling results are included with the other revised modeling results in Attachment DR17-1.

BACKGROUND: IMPACTS CALCULATIONS

The 1-hour NO_2 impacts shown in the impacts tables (e.g. Table 3.1-37 through Table 3.1-42) are the maximum 1-hour impacts averaged over 5 years. U.S. EPA suggests the use of 5-year averaged 98th percentile daily maximum 1-hour NO_2 impacts to demonstrate compliance with the federal 1-hour NO_2 standard. However, to demonstrate compliance with the state 1-hour NO_2 standard, staff uses the maximum 1- hour impacts modeled over 5 years, instead of an averaged value. For example, Table 3.1-40 shows that the maximum 1-hour NO_2 impacts averaged over 5 years would be 130.7 $\mu g/m^3$. However, staff uses the maximum modeled 1-hour NO_2 impact from the AERMOD output file (141.4 $\mu g/m^3$) plus the most representative background data to demonstrate compliance with the state 1-hour NO_2 standard.

Similarly, staff uses maximum annually averaged impacts to demonstrate compliance with annual standards. However, the impacts shown in the tables (e.g. Table 3.1-39 through Table 3.1-41) as well as in the modeling files are those averaged over the 5 years (43,824 hours).

DATA REQUEST

17. Please update the analysis using worst case project impacts for both the short- term and annual standards, plus corresponding representative background data to demonstrate compliance with each ambient air quality standard.

Response: The 1-hour NO_2 and annual averaging period modeling has been revised as requested. Five copies of the air dispersion modeling results are being provided under separate cover, with additional copies provided upon request. The revised results are shown in the revised summary modeling tables provided in Attachment DR17-1.

BACKGROUND: MISSING MODELING OUTPUT FILES

Staff is unable to find the output files for refined modeling analysis which evaluates 24-hour $PM_{10}/PM_{2.5}$, 1-hour SO_2, and 1-hour NO_2 combined impacts from the project and Blythe Energy Project. The output files would be named as "TR_PM10D.out", "TR_SO2_1b.out", and "TRNNO2_1.out". In addition, no impacts are shown in the refined modeling output file for the annual $PM_{10}/PM_{2.5}$ impact analysis of the project. The file is named "SR_TM10Y.out" but should be named as "SR_PM10Y.out", with the naming convention that the facility owner used.

DATA REQUEST

18. Please provide all output files mentioned above.

Response: The Project Owner has determined that additional output files beyond those listed above were inadvertently omitted from the DVD of modeling files that was submitted with the PTA. We apologize for the oversight and are providing the missing files as requested. Five copies of the air

dispersion modeling files are being provided under separate cover, with additional copies provided upon request.

BACKGROUND: CUMULATIVE AIR QUALITY IMPACTS

The PTA (Section 3.1.7 and Appendix 3.1G) describes the methodology for the cumulative effects analysis but does not include the analysis because no cumulative projects have been identified by the facility owner in this area. The cumulative analysis should include all reasonably foreseeable projects within a 6-mile radius, i.e. the projects that have received construction permits but are not yet operational, and those that are in the permitting process or can be expected to be in permitting in the near future. A complete cumulative impacts analysis should identify all existing and planned stationary sources that affect the baseline conditions and consider them in the modeling effort. Staff is aware that a new peaker project, known as "Irish", will be developed in this area under the common control of Altagas.

DATA REQUESTS

19. Please describe why the Irish project should or should not be included in the cumulative analysis.

Response: The Irish Energy Project should not be included in the cumulative impacts analysis because it is still being designed and, as a result, any projected environmental impacts from that project would be speculative at this time. If and when an application for the Irish Energy Project is filed, the application will contain a cumulative impacts analysis that includes existing and proposed projects, as appropriate.

20. If the Irish Energy Project should be included, please provide the cumulative modeling and impact analysis, including Blythe Energy Project, Sonoran Energy Project and Irish Energy Project.

Response: Please see Data Response 19.

BACKGROUND: DRY COOLING

As discussed in Section 3.16.4.1 of the PTA, the Project Owner contends that Energy Commission's 2005 conclusion to reject the use of dry cooling is still applicable to Sonoran project because it is feasible to meet project objectives without dry cooling. However, due to the current California drought, Energy Commission staff believes that the dry cooling option should be reevaluated.[1] Power plant projects using the same turbine technology (i.e., GE 7HA) in similar climates have been proposed to use air cooled technology, such as Exelon's Wolf Hollow and Colorado Bend generating stations in Texas.

DATA REQUESTS

21. Please provide the project emission estimates and impact modeling for a dry cooled alternative.

Response: The project owner respectfully disagrees that the locations of Exelon's Wolf Hollow and Colorado Bend generating stations in Texas have similar climates to that of the proposed Sonoran Energy Project. Because dry cooling systems operate with the ambient dry bulb temperature as the theoretical minimum attainable temperature, there are significant efficiency penalties associated with dry cooling when temperatures are high and relative humidities are low. Based on an analysis of 30 years of meteorological data representative of the project areas, it can be seen that the temperatures and relative humidities at the Texas locations are significantly different than those at Blythe, with higher temperatures and lower relative humidities (see Table DR21-1 below). As a result, the loss in capacity that would result from the use of dry cooling instead of wet cooling at the Sonoran Energy Project would be significantly higher than the loss in capacity experienced by the Texas projects.

TABLE DR21-1
Comparison of Temperatures and Relative Humidities for the Project Locations[a]

	Temperature, deg F			Average Humidity, %		
Statistic	**Blythe**	**Granbury[b]**	**Wharton[c]**	**Blythe**	**Granbury**	**Wharton**
Average	74.5	69.9	66.4	31.0	72.9	62.9
99%	109.8	93.8	101.2	12.9	42.0	28.0
Maximum	122.7	107.0	109.8	7.0	18.0	22.0

Notes:
[a] All statistics are 30-year averages for the period 1985 through 2014.
[b] Met data for Granbury (Wolf Hollow plant location) from Dallas-Fort Worth International Airport.
[c] Met data for Wharton (Colorado Bend plant location) from William Hobby Airport (Houston).

If dry cooling were feasible in Blythe, then the $PM_{10}/PM_{2.5}$ emissions from the cooling tower would be eliminated. Maximum annual $PM_{10}/PM_{2.5}$ emissions from the project would be reduced from 40.1 to 33.0 tons per year, and modeled $PM_{10}/PM_{2.5}$ ambient impacts would be reduced. However, emissions of all pollutants would be increased on a lbs/MWh basis due to the decreased efficiency of the plant.

22. Please provide an air cooled condenser thermal plume velocity analysis for a dry cooled alternative for the proposed SEP configuration.

Response: The Project Owner is not able to provide a thermal plume velocity analysis for a dry cooled alternative because such an analysis would require a fully designed dry cooling system and such a system is not feasible for the plant. Any analysis of a “typical” dry cooling system would be speculative and would not provide any information that was directly applicable to the proposed project.

Attachments DR2-1 to DR17-1:
Air Quality

Attachment DR2-1

NO_2/NOx Ratio Provided by the Boiler Supplier

From:	Nicholas Gritz
To:	Nancy Matthews
Subject:	FW: FW: AltaGas Sonoran Energy Project: auxiliary boiler exhaust temperature
Date:	Tuesday, February 10, 2015 9:56:14 AM

From: Bob Blanchard [mailto:bob@processcontrols.com]
Sent: Tuesday, February 10, 2015 11:13 AM
To: Nicholas Gritz 4471
Cc: Steve Harris 6408
Subject: Re: FW: AltaGas Sonoran Energy Project: auxiliary boiler exhaust temperature

Nick,

Nancy is correct, the NO2/NOx emission ratio provided was incorrect it should have been the following:

NO2/NOx 2/7 from 25-100% firing rate.
NO2/NOx = 2/16 from 10-25% firing rate.

Please let me know if you have any additional questions.

Thanks,

Bob Blanchard
President
908.269.8465/Office
908.938.3563/Mobile

Attachment DR6-1

AERSCREEN Fumigation Modeling Results

Table 3.1F-5R1
Sonoran Energy Project
AERSCREEN Fumigation Modeling Results

Case	Emission Rates, g/s NOx	CO	PM10	SO2
1. Hot 100% Load DF w/Evap Cooling	3.18	1.93	1.26	0.60
2. Hot 100% Load no DF w/Evap Cooling	2.95	1.80	1.01	0.56
3. Hot Min Load no Evap Cooling	1.81	1.10	1.01	0.34
4. Avg 100% Load DF w/Evap Cooling	3.15	1.92	1.26	0.59
5. Avg 100% Load no DF w/Evap Cooling	2.94	1.79	1.01	0.56
6. Avg. Min Load no Evap Cooling	1.61	0.98	1.01	0.31
7. ISO 100% Load w/ DF, w/ Evap Cooling	3.19	1.94	1.26	0.60
8. ISO 100% Load w/ DF, no Evap Cooling	3.14	1.90	1.26	0.59
9. Cold 100% Load w/ DF	3.28	1.99	1.26	0.62
10. Cold 100% Load no DF	3.05	1.86	1.01	0.58
11. Cold Min Load	1.63	0.99	1.01	0.31
Aux Boiler	0.0703	0.306	0.0584	0.0115

Inversion Breakup	Unit Impacts	Emissions, ug/m3 NOx	CO	PM10	SO2	Distance to Maxima (m)
1. Hot 100% Load DF w/Evap Cooling	***2.242***	7.12	4.32	2.82	1.34	***6,592***
2. Hot 100% Load no DF w/Evap Cooling	***1.788***	5.27	3.22	1.80	1.00	***7,796***
3. Hot Min Load no Evap Cooling	***2.805***	5.09	3.09	2.83	0.96	***5,579***
4. Avg 100% Load DF w/Evap Cooling	***2.558***	8.06	4.90	3.22	1.52	***5,976***
5. Avg 100% Load no DF w/Evap Cooling	***2.083***	6.12	3.73	2.10	1.16	***6,961***
6. Avg. Min Load no Evap Cooling	***3.962***	6.39	3.89	3.99	1.21	***4,307***
7. ISO 100% Load w/ DF, w/ Evap Cooling	***2.574***	4.15	2.53	2.59	0.79	***5,948***
8. ISO 100% Load w/ DF, no Evap Cooling	***2.660***	4.29	2.61	2.68	0.82	***5,804***
9. Cold 100% Load w/ DF	***2.683***	4.33	2.64	2.70	0.82	***5,768***
10. Cold 100% Load no DF	***2.219***	3.58	2.18	2.24	0.68	***6,643***
11. Cold Min Load	***4.414***	7.12	4.34	4.45	1.35	***3,969***
Aux Boiler	***45.27***	3.18	13.83	2.65	0.52	***925***

Table 3.1F-5R1 (cont'd)
AERSCREEN Fumigation Modeling Results

Flat Terrain	Unit Impacts	Emissions, ug/m3 NOx	CO	PM10	SO2	Distance to Maxima (m)
1. Hot 100% Load DF w/Evap Cooling	***2.709***	8.60	5.22	3.41	1.62	***374***
2. Hot 100% Load no DF w/Evap Cooling	***2.501***	7.37	4.51	2.52	1.40	***391***
3. Hot Min Load no Evap Cooling	***3.584***	6.50	3.95	3.61	1.23	***319***
4. Avg 100% Load DF w/Evap Cooling	***2.873***	9.05	5.50	3.62	1.71	***362***
5. Avg 100% Load no DF w/Evap Cooling	***2.689***	7.89	4.81	2.71	1.50	***375***
6. Avg. Min Load no Evap Cooling	***4.198***	6.77	4.13	4.23	1.29	***292***
7. ISO 100% Load w/ DF, w/ Evap Cooling	***2.866***	4.62	2.82	2.89	0.88	***362***
8. ISO 100% Load w/ DF, no Evap Cooling	***2.919***	4.71	2.87	2.94	0.89	***358***
9. Cold 100% Load w/ DF	***2.851***	4.60	2.80	2.87	0.87	***363***
10. Cold 100% Load no DF	***2.689***	4.34	2.64	2.71	0.82	***375***
11. Cold Min Load	***4.341***	7.00	4.27	4.38	1.33	***287***
Aux Boiler	***24.54***	1.72	7.50	1.43	0.28	***150***

Appropriate 1-hr unit impacts to use for longer averaging periods

	Unit Impact for Avg Period, ug/m3 per g/s 1 hour	3 hours	8 hours	24 hours
1. Hot 100% Load DF w/Evap Cooling	2.71	2.71	2.71	2.71
2. Hot 100% Load no DF w/Evap Cooling	2.50	2.50	2.50	2.50
3. Hot Min Load no Evap Cooling	3.58	3.58	3.58	3.58
4. Avg 100% Load DF w/Evap Cooling	2.87	2.87	2.87	2.87
5. Avg 100% Load no DF w/Evap Cooling	2.69	2.69	2.69	2.69
6. Avg. Min Load no Evap Cooling	4.20	4.20	4.20	4.20
7. ISO 100% Load w/ DF, w/ Evap Cooling	2.87	2.87	2.87	2.87
8. ISO 100% Load w/ DF, no Evap Cooling	2.92	2.92	2.92	2.92
9. Cold 100% Load w/ DF	2.85	2.85	2.85	2.85
10. Cold 100% Load no DF	2.69	2.69	2.69	2.69
11. Cold Min Load	4.41	4.38	4.35	4.35
Aux Boiler	45.27	34.91	28.43	25.84

Table 3.1F-5R1 (cont'd)
AERSCREEN Fumigation Modeling Results

	Unit	Emissions, ug/m3			
1-hr average	Impacts	NOx	CO	PM10	SO2
1. Hot 100% Load DF w/Evap Cooling	2.71	8.6	5.2	-	1.62
2. Hot 100% Load no DF w/Evap Cooling	2.50	7.4	4.5	-	1.40
3. Hot Min Load no Evap Cooling	3.58	6.5	4.0	-	1.23
4. Avg 100% Load DF w/Evap Cooling	2.87	9.0	5.5	-	1.71
5. Avg 100% Load no DF w/Evap Cooling	2.69	7.9	4.8	-	1.50
6. Avg. Min Load no Evap Cooling	4.20	6.8	4.1	-	1.29
7. ISO 100% Load w/ DF, w/ Evap Cooling	2.87	9.1	5.6	-	1.73
8. ISO 100% Load w/ DF, no Evap Cooling	2.92	9.2	5.6	-	1.73
9. Cold 100% Load w/ DF	2.85	**9.3**	**5.7**	-	**1.76**
10. Cold 100% Load no DF	2.69	8.2	5.0	-	1.56
11. Cold Min Load	4.41	7.2	4.4	-	1.36
Aux Boiler	45.27	3.2	13.8	-	0.52
3-hr average					
1. Hot 100% Load DF w/Evap Cooling	2.71	-	-	-	1.46
2. Hot 100% Load no DF w/Evap Cooling	2.50	-	-	-	1.26
3. Hot Min Load no Evap Cooling	3.58	-	-	-	1.11
4. Avg 100% Load DF w/Evap Cooling	2.87	-	-	-	1.54
5. Avg 100% Load no DF w/Evap Cooling	2.69	-	-	-	1.35
6. Avg. Min Load no Evap Cooling	4.20	-	-	-	1.16
7. ISO 100% Load w/ DF, w/ Evap Cooling	2.87	-	-	-	1.55
8. ISO 100% Load w/ DF, no Evap Cooling	2.92	-	-	-	1.56
9. Cold 100% Load w/ DF	2.85	-	-	-	**1.59**
10. Cold 100% Load no DF	2.69	-	-	-	1.40
11. Cold Min Load	4.38	-	-	-	1.21
Aux Boiler	34.91	-	-	-	0.36
8-hr average					
1. Hot 100% Load DF w/Evap Cooling	2.71	-	3.7	-	-
2. Hot 100% Load no DF w/Evap Cooling	2.50	-	3.2	-	-
3. Hot Min Load no Evap Cooling	3.58	-	2.8	-	-
4. Avg 100% Load DF w/Evap Cooling	2.87	-	3.9	-	-
5. Avg 100% Load no DF w/Evap Cooling	2.69	-	3.4	-	-
6. Avg. Min Load no Evap Cooling	4.20	-	2.9	-	-
7. ISO 100% Load w/ DF, w/ Evap Cooling	2.87	-	3.9	-	-
8. ISO 100% Load w/ DF, no Evap Cooling	2.92	-	3.9	-	-
9. Cold 100% Load w/ DF	2.85	-	**4.0**	-	-
10. Cold 100% Load no DF	2.69	-	3.5	-	-
11. Cold Min Load	4.35	-	3.0	-	-
Aux Boiler	28.43	-	6.1	-	-
24-hr average					
1. Hot 100% Load DF w/Evap Cooling	2.71	-	-	1.37	0.65
2. Hot 100% Load no DF w/Evap Cooling	2.50	-	-	1.01	0.56
3. Hot Min Load no Evap Cooling	3.58	-	-	1.45	0.49
4. Avg 100% Load DF w/Evap Cooling	2.87	-	-	1.45	0.68
5. Avg 100% Load no DF w/Evap Cooling	2.69	-	-	1.08	0.60
6. Avg. Min Load no Evap Cooling	4.20	-	-	**1.69**	0.51
7. ISO 100% Load w/ DF, w/ Evap Cooling	2.87	-	-	1.44	0.69
8. ISO 100% Load w/ DF, no Evap Cooling	2.92	-	-	1.47	0.69
9. Cold 100% Load w/ DF	2.85	-	-	1.44	**0.70**
10. Cold 100% Load no DF	2.69	-	-	1.08	0.62
11. Cold Min Load	4.35	-	-	0.10	0.02
Aux Boiler	25.84	-	-	0.60	0.12

Attachment DR7-1

Revised Daily Emissions from the Auxiliary Boiler

Table 3.1B-6R1
Sonoran Energy Project
Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions

Equipment	max. hour	hrs/day	hrs/yr	NOx lb/hr short-term (1)	NOx lb/hr annual avg (2)	SOx lb/hr short-term (1)	SOx lb/hr annual avg (2)	CO lb/hr short-term (1)	CO lb/hr annual avg (2)	VOC lb/hr	PM10/PM2.5 lb/hr	NH3 lb/hr (3)
Gas Turbine 1, base load, no duct firing	0	0	5500	24.2	18.1	4.4	2.3	14.8	11.0	4.2	8.0	22.4
Gas Turbine 1, base load w/ duct firing	0	20	1500	26.0	19.4	4.9	2.5	15.8	11.8	9.0	10.0	23.9
Gas Turbine 1, cold starts	1	1	50	187.5	187.5	4.9	2.5	136.0	136.0	12.3	9.1	11.2
Gas Turbine 1, warm starts	0	0	150	154.7	154.7	4.9	2.5	135.3	135.3	13.0	9.2	11.2
Gas Turbine 1, hot starts	0	1	0	113.9	113.9	4.9	2.5	133.3	133.3	14.9	9.6	11.2
Gas Turbine 1, shutdowns	0	2	200	24.8	24.8	4.9	2.5	148.1	148.1	34.9	9.8	11.2
Auxiliary Boiler normal ops	1	***20***	6600	0.56	0.56	0.09	0.05	2.43	2.43	0.28	0.46	0.00
Auxiliary Boiler startup	0	***4***	400	1.99	1.99	0.09	0.05	12.13	12.13	0.69	0.46	0.00
Emergency Firepump Engine	0	24	200	1.34	1.34	0.00	0.00	0.31	0.31	0.04	0.04	0.00
Cooling Tower 1	1	24	8760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.62	0.00

Table 3.1B-6R1 (cont'd)
Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions

	NOx			SOx			CO			VOC			PM10			NH3	
Equipment	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Total tpy
Gas Turbine 1, base load, no duct firing	0.0	0.0	49.90	0.0	0.0	6.3	0.0	0.0	30.4	0.0	0.0	11.6	0.0	0.0	22.0	0.0	61.6
Gas Turbine 1, base load w/ duct firing	0.0	520.0	14.52	0.0	98.1	1.8	0.0	316.0	8.8	0.0	180.6	6.8	10.0	200.0	7.5	0.0	17.9
Gas Turbine 1, cold starts	187.5	187.5	4.69	4.9	4.9	0.1	136.0	136.0	3.4	12.3	12.3	0.3	0.0	9.1	0.2	11.2	0.3
Gas Turbine 1, warm starts	0.0	0.0	11.60	0.0	0.0	0.2	0.0	0.0	10.1	0.0	0.0	1.0	0.0	0.0	0.7	0.0	0.8
Gas Turbine 1, hot starts	0.0	113.9	0.00	0.0	4.9	0.0	0.0	133.3	0.0	0.0	14.9	0.0	0.0	9.6	0.0	0.0	0.0
Gas Turbine 1, shutdowns	0.0	49.7	2.48	0.0	9.8	0.2	0.0	296.2	14.8	0.0	69.8	3.5	0.0	19.5	1.0	0.0	1.1
Auxiliary Boiler normal ops	0.6	***11.2***	1.84	0.09	1.83	0.15	2.4	***48.5***	8.00	0.28	5.6	***0.92***	0.46	9.28	1.5	0.00	0.00
Auxiliary Boiler startup	0.0	***8.0***	0.40	0.0	0.37	0.01	0.0	***48.5***	2.43	0.0	2.78	***0.14***	0.00	1.86	0.1	0.00	0.00
Emergency Firepump Engine	0.0	32.2	0.13	0.0	0.06	0.0002	0.0	7.6	0.03	0.0	0.9	0.00	0.00	1.01	4.20E-03	0.00	0.00
Cooling Tower	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.62	38.90	7.1	0.00	0.00
Total, SEP	188.1 lb/hr	***922.4*** lb/day	85.6 tpy	5.0 lb/hr	120.0 lb/day	8.8 tpy	138.4 lb/hr	***986.0*** lb/day	78.0 tpy	12.5 lb/hr	286.8 lb/day	***24.2*** tpy	12.1 lb/hr	289.3 lb/day	40.1 tpy	11.2 lb/hr	81.7 tpy
Gas turbine only	187.5	871.1	83.2	4.9	117.8	8.7	136.0	881.4	67.6	12.3	277.6	23.2	10.0	238.2	31.4	11.2	81.7

Attachment DR11-1

Emissions and Impacts for the Commissioning Year

Table DR11-1
Sonoran Energy Project
Emissions for the Commissioning Year

Equipment	Activity	Duration (1)		Emissions, tons (2) NOx	SO2	CO	VOC	PM10
Gas Turbine	commissioning	1220	hours	70.4	inc	22.3	3.0	4.9
	normal operation	5620	hours	66.8	8.7	54.3	18.6	25.2
Aux Boiler	commissioning	160	hours	0.64	inc	0.97	0.06	0.04
	normal operation	6840	hours	2.1	0.2	10.2	1.0	1.6
Emergency Generator	testing/normal operation	200	hours	0.13	0.0002	0.03	0.004	0.004
Cooling Tower	testing/normal operation	8760	hours	0.0	0.0	0.0	0.0	7.1
Total				140.1	8.8	87.7	22.7	38.8

Notes:
1. Duration derived as follows:
-- gas turbine commissioning hours from Table 3.1B-8
-- aux boiler commissioning: engineering estimate of up to 160 hours
-- gas turbine normal operation: 7000 hours minus aux boiler and gas turbine commissioning hours
-- aux boiler normal operation: 7000 hours minus aux boiler commissioning hours
-- emergency generator and cooling tower operation: same as normal operating year
2. Emissions derived as follows:
-- gas turbine commissioning emissions from Table 3.1B-8
-- aux boiler commissioning emission emission rates from Table 3.1B-3 (NOx for boiler tuning; CO and VOC for startup/shutdown)
-- gas turbine and aux boiler normal emissions: ratio of normal operating hours to total annual hours (7000 hrs/yr) times annual emissions from Table 3.1B-6 (includes startups and shutdowns)
-- emergency generator and cooling tower emissions: same as normal operating year

Attachment DR12-1

Revised 24-hour PM_{10}/$PM_{2.5}$ Modeling

Table 3.1F-2R1
Sonoran Energy Project
Emission Rates and Stack Parameters for Refined Modeling

	Stack Height, m	Stack Diam, m	Temp, deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	Emission Rates, g/s			
						NOx	SO2	CO	PM10
Averaging Period: One hour									
Gas Turbine	42.672	6.706	341.443	772.678	21.879	3.2760	0.6182	1.9908	n/a
Auxiliary Boiler	15.240	0.889	588.706	13.441	21.655	0.0703	1.151E-02	0.3056	n/a
Emergency Firepump	3.048	0.154	726.483	0.714	38.310	0.0846	1.548E-04	1.983E-02	n/a
Cooling Tower	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Averaging Period: Three hours									
Gas Turbine	42.672	6.706	341.443	772.678	21.879	n/a	0.6182	n/a	n/a
Auxiliary Boiler	15.240	0.889	588.706	13.441	21.655	n/a	1.151E-02	n/a	n/a
Emergency Firepump	3.048	0.154	726.483	0.714	38.310	n/a	5.160E-05	n/a	n/a
Cooling Tower	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Averaging Period: Eight hours									
Gas Turbine	42.672	6.706	341.443	772.678	21.879	n/a	n/a	5.967	n/a
Auxiliary Boiler	15.240	0.889	588.706	13.441	21.655	n/a	n/a	0.6112	n/a
Emergency Firepump	3.048	0.154	726.483	0.714	38.310	n/a	n/a	2.479E-03	n/a
Cooling Tower	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Averaging Period: 24-hour SOx									
Gas Turbine	42.672	6.706	341.443	772.678	21.879	n/a	0.6182	n/a	n/a
Auxiliary Boiler	15.240	0.889	588.706	13.441	21.655	n/a	1.151E-02	n/a	n/a
Emergency Firepump	3.048	0.154	726.483	0.714	38.310	n/a	6.450E-06	n/a	n/a
Cooling Tower	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Averaging Period: 24-hour PM10									
Gas Turbine	42.672	6.706	338.631	459.098	13.000	n/a	n/a	n/a	***1.2507***
Auxiliary Boiler	15.240	0.889	588.706	13.441	21.655	n/a	n/a	n/a	5.844E-02
Emergency Firepump	3.048	0.154	726.483	0.714	38.310	n/a	n/a	n/a	2.204E-04
Cooling Tower (each cell)	12.754	8.534	299.261	641.424	11.213	n/a	n/a	n/a	2.042E-02

Table 3.1F-2R1
Emission Rates and Stack Parameters for Refined Modeling (cont.)

	Stack Height, m	Stack Diam, m	Temp, deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	Emission Rates, g/s			
						NOx	SO2	CO	PM10
Averaging Period: Annual NOx and SOx									
Gas Turbine	42.672	6.706	341.443	772.678	21.879	2.3932	0.2490	n/a	n/a
Auxiliary Boiler	15.240	0.889	588.706	13.441	21.655	6.440E-02	4.60E-03	n/a	n/a
Emergency Firepump	3.048	0.154	726.483	0.714	38.310	3.86E-03	7.07E-06	n/a	n/a
Cooling Tower	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Averaging Period: Annual PM10									
Gas Turbine	42.672	6.706	342.460	744.871	21.092	n/a	n/a	n/a	0.9032
Auxiliary Boiler	15.240	0.889	588.706	13.441	21.655	n/a	n/a	n/a	4.670E-02
Emergency Firepump	3.048	0.154	726.483	0.714	38.310	n/a	n/a	n/a	1.208E-04
Cooling Tower (each cell)	12.754	8.534	299.261	641.424	11.213	n/a	n/a	n/a	2.042E-02

Attachment DR14-1

Missing Data Filling Procedure

Using the OLM method to model project-generated one-hour NO_2 concentrations requires the use of ambient monitored O_3 concentrations. Because the OLM method uses the ambient ozone concentration for each hour to limit the conversion of NO to NO_2 for that hour, it is important to have ozone concentrations for every hour. It is also important that any missing hourly ozone concentrations be filled in with a value that does not underestimate the ozone concentration for that hour, to avoid underestimating the resulting NO_2 concentration. In addition, computation of total hourly NO_2 concentrations requires use of the ambient monitored hourly NO_2 concentrations from the nearest monitoring station. As is the case for the hourly ozone data, it is important to have a background NO_2 value for every hour that does not underestimate actual background.

Background ambient hourly O_3 and NO_2 data were collected at the monitoring stations located at Blythe and Palm Springs, respectively. While these datasets meet or exceed USEPA's 90% completeness criterion (that is, more than 90% of the data values are present for each month), there were still occasional missing values. Missing NO_2 and O_3 data were filled in accordance with guidance developed by the San Joaquin Air Pollution Control District (SJVAPCD) in collaboration with CAPCOA (CAPCOA, 2011).[1] Following is a description of the steps that were followed to fill in missing hourly ozone and NO_2 data:

a. Any single missing hour was filled in with the maximum of the following:
   i. Preceding hour;
   ii. Succeeding hour;
   iii. Same hour of day on previous day; or
   iv. Same hour of day on succeeding day.

If there were missing data for either iii and/or iv, only the maximum of the available data were used to fill the missing hour (both i and ii are guaranteed to be present since only single missing hours are filled in this step).[2]

b. For hours that are not filled by step a (all periods with more than one hour missing), the missing hours were filled with the maximum for that hour of day for a 30-day rolling period centered on the hour (i.e., for the 15 preceding days and the 15 succeeding days). Note that 30-day rolling period extends into the preceding and succeeding year at the start or end, respectively, of the modeling period.

c. For hours not filled by step b, procedure b was repeated to fill in the remaining missing data with the value(s) that were filled in the preceding step. The result of this third step is that any remaining

[1] EPA's March 2011 guidance document on 1-hour NO_2 modeling does not address missing hourly NO_2 data. However, the CAPCOA guidance document indicates that the recommended technique for filling single missing hours of NO_2 is consistent with the gap filling technique established by EPA for filling a single hour of missing met data.

[2] Note that the most likely scenario for both iii and iv to be missing is for years when the monitor is calibrated at the same hour each day. In this case, the 30-day rolling average (see step b) for that hour was also not available.

missing hours (usually 2-hour calibration periods that occur every day) are filled with the maximum value for that hour of day for more than 30-day rolling period centered on the hour.

d. For the NO_2 file only – All filled hours for which the filled concentration is higher than the maximum monitored concentration recorded for that day were reviewed. If the filled concentration was higher than the appropriate nth highest daily maximum monitored concentration for the calendar year for determining compliance with federal 1-hour standard (e.g., for 351 or more days of valid data, the 8th highest daily maximum is the appropriate value), then the filled concentration was replaced with the appropriate nth highest daily maximum to fill that hour. Note: This prevents the filling procedure from changing the nth highest daily maximum for the year.

Attachment DR15-1

Appendix 3.1CR1

APPENDIX 3.1CR1

Construction Impacts

APPENDIX 3.1CR1

Construction Impacts

3.1C.1 Construction Emissions

Construction of the proposed project is expected to last approximately 22 months. Construction activities will occur in the following main phases:

- Site preparation;
- Foundation work;
- Installation of major equipment; and
- Construction/installation of major structures.

The transmission route for the electricity generated by the project would use existing transmission infrastructure to the extent possible and would entail a short, approximately 1,320-foot transmission connection. Construction emissions related to the transmission line have been evaluated separately.

The emissions and resulting ambient air quality impacts were calculated for each phase and for both project and transmission line construction. The results of this analysis are discussed below.

Construction Activities and Emissions Calculations

Construction of the project will begin with site preparation activities, which include installation of drainage systems, underground utilities and conduits, grading and backfilling operations, and installation of pilings. After site preparation is finished, construction of the foundations and structures is expected to begin. Once the foundations and structures are finished, installation and assembly of the mechanical and electrical equipment are scheduled to commence. During grading and backfilling, engineered fill will be brought onsite to fill low areas where heavy equipment will be placed and excess soil removed during grading will be moved to adjacent property owned by the Project Owner. The excess soil will be stored in piles at this adjacent property until needed.

The primary emission sources during construction will include exhaust from heavy construction equipment and vehicles, and fugitive dust generated by grading and excavating activities.

Combustion emissions during construction will result from the following:

- Exhaust from diesel construction equipment used for site preparation, grading, excavation, trenching, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from portable welding machines;
- Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site;
- Exhaust from diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site including the heavy hauling of major components using truck and/or rail; and
- Exhaust from vehicles used by workers to commute to the construction site.

Fugitive dust emissions from the construction will result from the following:

- Dust entrained during site preparation and grading/excavation at the construction site;

- Dust entrained during onsite travel on paved and unpaved surfaces;
- Dust entrained during aggregate and soil loading and unloading operations; and
- Wind erosion of areas disturbed during construction activities.

To determine the potential worst-case daily construction impacts, exhaust and dust emission rates have been evaluated for each source of emissions. Maximum short-term exhaust emissions impacts are calculated based on the equipment mix expected during Month 5 of the construction schedule, while maximum fugitive dust emissions are expected to occur during Month 13.[1] Annual emissions are based on the average equipment mix during the peak 12-month period out of the overall 22-month construction period. The detailed construction emissions calculations are shown in the tables attached to this analysis. As discussed in the modeling protocol submitted to the MDAQMD and CEC (see Appendix 3.1E), the CalEEMod model was used to calculate construction emissions for the proposed project. CalEEMod calculations were supplemented with manual calculations for windblown dust and some fugitive dust emissions, since those types of emissions are not handled well by the model. The following section provides additional details regarding the assumptions used in calculating emissions using CalEEMod, as well as the procedures used to calculate dust emissions external to the model.

Emissions of Fugitive Dust from Onsite Construction Activities. CalEEMod generates estimates for fugitive dust emissions only during the "grading" phase of the construction period. To ensure that fugitive dust emissions from onsite construction activities were not underestimated, the CalEEMod model phase type "Grading" was selected for the entire construction period. With this phase type selection, the CalEEMod model calculates dust emissions associated with various activities including grading, dozer operation, crawler tractor operation, and loader/loading activities.[2]

Emissions of Fugitive Dust from Soil Movement. Emissions from the import of fill material to SEP and the movement of excess soil from SEP to adjacent property owned by the Project Owner during Months 4-6 of the construction period were calculated manually. Dust emission from the soil movement activities result from several major activities, as described below.

- Loading of fill material onto storage piles. Emissions from adding material onto a receiving surface were calculated using EPA AP-42 methods. The amount of excess soil movement for these calculations was determined by estimating the amount of excess soil moved during each month. The material loaded onto the piles will be treated to control fugitive emissions.
- Haul truck traffic to the storage area. For the hauling of excess soil to the adjacent property, the haul trucks were assumed to travel on the access road between the two plants (BEP and SEP) and then via Riverside Avenue onto the dirt road that is west of Buck Blvd to the storage pile area (roughly halfway between the north and south boundary fences of the adjacent property). EPA AP-42 methods are used to calculate fugitive dust emissions for these unpaved haul truck travel.
- Windblown dust. Emissions of windblown dust from the soil storage pile at the adjacent property were estimated using the methods described in the SCAQMD CEQA air quality handbook.[3] The storage pile area was estimated by assuming a pile height of 15 feet and a rectangular surface area; the silt content was approximated as 4.3% (consistent with

[1] See calculations in Attachment 3.1C-1.

[2] Section 4.3 of the CalEEMod User Guide, Appendix A.

[3] CEQA Air Quality Handbook, South Coast Air Quality Management District, Table A9-9-E

the silt content of the soil). Dust suppression methods will be used to minimize windblown dust emissions from the soil storage pile until vegetation is established to hold the soil in place.

Detailed assumptions and calculations are documented in Attachment 3.1C-1.

Windblown Dust at the SEP Construction Site. Emissions of windblown dust are not accounted for in CalEEMod and must be calculated manually. The disturbed area for these calculations was determined by dividing the total active construction area (25 acres) by the months of construction. A PM_{10} emission factor of 0.011 ton/acre-month was used to estimate these emissions.[4]

Construction Access. As described in Section 2 of the Petition to Amend, primary construction access will be via a temporary construction access road off Hobson Way, at the southeast corner of the plant site. Additional construction access will be via the permanent plant access road to Hobson Way, at the southwest corner of the plant site. These primary construction access roads will be paved. Other portions of the SEP site will be graveled to provide internal access to project facilities and site buildings. The construction worker parking and laydown areas will be also be graveled to reduce the generation of fugitive dust. For the construction air quality impact analysis, onsite worker and delivery truck travel was assumed to occur on graveled surfaces (workers traveling to and from parking areas, delivery trucks traveling to and from laydown areas).

Onsite Vehicle Emissions. For delivery and haul vehicles, the onsite travel distance was taken as the distance from the plant entrance to the center of the laydown area. For worker vehicles, the onsite travel distance was taken as the distance from the plant entrance to the center of the parking area.

CalEEMod does not calculate exhaust emissions from delivery and worker vehicles traveling within the construction site, so these exhaust emissions were evaluated manually using the ratio of the onsite vehicle trip distance (one-way trip distances of 0.27 mile for worker travel and 0.46 mile for delivery and haul truck travel) to the offsite vehicle trip distances (one-way trip distances of 41 miles for workers and 60 miles for delivery and haul trucks).

For onsite vehicle fugitive dust emissions, EPA AP-42 methods were used to calculate dust emissions. As discussed above, onsite vehicle travel (workers, delivery and haul trucks) was assumed to occur on graveled surfaces.

Paved/Unpaved Surface Travel Emissions Calculation Assumptions. The CalEEMod model default silt content and silt loading values were used for the unpaved/paved surface travel emission calculations. As described in the CalEEMod model user guide (Section 4.4.3), EPA AP-42 methods are used to calculate fugitive dust emissions for paved and unpaved road travel. The CalEEMod model defaults for silt content/silt loading are based on statewide averages; these values are a silt content of 4.3% and a silt loading of 0.1 g/m2.

Exhaust Emission Source Assumptions. The number, type, and engine rating of the equipment used in the construction impact analysis were based on equipment schedules provided by the owner's engineer. The CalEEMod model default engine load factors were used for the construction emission calculations (a function of the type of construction equipment in question). Due to the large number of construction vehicles required for the project (which

[4] Source: Table ES-2, "Improvement of Specific Emission Factors (BACM Project No. 1), Final Report", prepared for South Coast AQMD by Midwest Research Institute, March 1996.

impacts the availability of Tier 4 engines), it was assumed that EPA Tier 4i engines would be used for the larger equipment (engines equal to greater than 75 hp) and EPA Tier 4 engines would be used for smaller equipment (engines <75 hp).

Available Mitigation Measures

Listed below are typical mitigation measures that will be used to control exhaust emissions from the diesel equipment and potential emissions of fugitive dust during construction activities.

- Dust suppressants will be applied to unpaved surface travel and disturbed areas in the project construction site as frequently as necessary to prevent fugitive dust plumes. The frequency of application can be reduced or eliminated during periods of precipitation.
- The vehicle speed limit will be 10 miles per hour within the construction site.
- The construction site entrances will be posted with visible speed limit signs.
- Construction equipment vehicle tires will be inspected and cleaned as necessary to be free of dirt prior to entering paved roadways.
- Gravel ramps at least 20 feet in length will be provided at the tire cleaning station.
- Unpaved exits from the construction site will be graveled or treated to prevent track-out to public roadways.
- Construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the Compliance Project Manager.
- Construction areas adjacent to any paved roadway will be provided with sandbags or other measures as specified in the Storm Water Pollution Prevention Plan (SWPPP) to prevent run-off to roadways.
- Paved roads within the construction site will be cleaned at least once per day (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.
- At least the first 500 feet of any public roadway exiting from the construction site will be cleaned at least once daily when dirt or runoff from the construction site is visible on public roadways.
- Soil storage piles and disturbed areas that remain inactive for longer than 10 days will be covered or treated with appropriate dust suppressant compounds.
- Vehicles used to transport solid bulk material on public roadways and having the potential to cause visible emissions will be provided with a cover, or the materials will be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.
- Wind erosion control techniques (such as windbreaks, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

An on-site Air Quality Construction Mitigation Manager will be responsible for directing and documenting compliance with construction-related mitigation conditions.

Estimates of Emissions with Mitigation Measures: Onsite Construction

Tables 3.1C-1R1 and 3.1C-2R2 show the estimated maximum daily and annual heavy equipment exhaust and fugitive dust emissions with the assumptions described above and the recommended mitigation measures for onsite construction activities. Detailed emission calculations are included as Attachment 3.1C-1R1.

TABLE 3.1C-1R1

Maximum Daily Emissions During Construction, Pounds per Day

	NOx	SO2	VOC	CO	PM10	PM2.5
Onsite						
Construction and Onsite Vehicle Exhaust	59.2	~~0.18~~ 0.2	~~2.8~~ 3.5	~~89.5~~ 114.6	~~0.28~~ 0.44	~~0.28~~ 0.44
Fugitive Dust	--	--	--	--	~~19.0~~ 15.1	~~3.5~~ 1.8
Total Onsite Emissions	59.2	0.2	~~2.8~~ 3.5	~~89.5~~ 114.6	~~19.3~~ 15.6	~~3.8~~ 2.2
Offsite						
Worker Travel, Delivery and Haul Trucks[a]						
-- Exhaust	106.1	~~0.25~~ 0.6	~~9.4~~ 10.2	~~162.4~~ 189.7	~~3.8~~ 2.9	~~3.6~~ 2.7
-- Fugitive Dust	--	--	--	--	25.8	7.0
Transmission Line Construction						
-- Exhaust	159.3	0.59	9.67	312.3	~~0.3~~ 1.1	~~0.3~~ 1.1
-- Fugitive Dust	--	--	--	--	~~7.3~~ 6.5	~~3.4~~ 2.6
Total Offsite Emissions	265.4	1.10	~~19.1~~ 19.9	~~474.6~~ 502.0	36.4	~~17.0~~ 13.4
Total Emissions	324.6	~~1.3~~ 1.4	~~21.9~~ 23.4	~~564.1~~ 616.6	~~58.0~~ 51.9	~~18.2~~ 15.7

a. Offsite activities.

TABLE 3.1C-2R1

Peak Annual Emissions During Construction, Tons per Year

	NOx	SO2	VOC	CO	PM10	PM2.5	GHG[b]
Onsite							
Construction and Onsite Vehicle Exhaust	6.3	0.02	0.38	12.5	0.04	0.04	2,245
Fugitive Dust	--	--	--	--	~~2.4~~ 1.7	~~0.43~~ 0.11	--
Total Onsite Emissions	6.3	0.02	0.4	12.5	~~2.4~~ 1.7	~~0.5~~ 0.2	2,245
Offsite							
Worker Travel, Delivery and Haul Trucks[a]							
-- Exhaust	5.4	0.036	0.6	13.3	0.14	0.13	2,861
-- Fugitive Dust	--	--	--	--	2.1	0.57	--
Transmission Line Construction							
-- Exhaust	4.00	0.015	0.25	8.0	0.03	0.03	1,397
-- Fugitive Dust	--	--	--	--	0.3	0.1	--
Total Offsite Emissions	9.4	0.1	0.9	21.3	2.5	0.8	4,258
Total Emissions	15.7	0.1	1.3	33.8	~~4.9~~ 4.2	~~1.3~~ 1.0	6,504

a. Offsite activities.

b. Metric tons of CO_2e.

3.1C.2 Greenhouse Gas Emissions During Construction

Greenhouse gas emissions (GHG) during construction were also evaluated. Total GHG emissions over the 22-month construction period are summarized in Table 3.1C-3 below. Detailed emissions calculations are provided in Attachment 3.1C-1R1.

TABLE 3.1C-3

GHG Emissions During the Construction Period, MT

	CO_2	CH_4	N_2O	CO_2e
Onsite				
Construction and Onsite Vehicle Exhaust	3,228	0.85	0.00	3,249
Offsite				
Worker Travel, Delivery and Haul Trucks	3,507	0.11	0.00	3,510
Transmission Line Construction	1,387	0.39	0.00	1,397
Total Emissions	8,123	1.35	0.00	8,157

3.1C.3 Air Quality Impact Analysis

A dispersion modeling analysis was conducted based on the emissions discussed above using the approach discussed in the modeling protocol submitted to the MDAQMD and CEC (see Appendix 3.1D).

As shown below in Table 3.1C-4R1, the results of the analysis indicate that construction activities are not expected to cause or contribute to exceedances of state or federal standards for criteria pollutants, with the exception of the state PM_{10} standards. For this pollutant and these averaging periods, existing background concentrations already exceed state standards. The best available emission control techniques will be used to minimize emissions during construction. The project construction impacts are not unusual in comparison to most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards.

A health risk assessment of construction impacts was performed in accordance with OEHHA guidance, which requires adjusting the 30-year lifetime dosage to an exposure period equal to that of the construction Period. At the point of maximum impact (along the property fenceline), the cancer risk is approximately 0.03 in one million. This is well below the significance threshold of 10 in one million. Because the offsite DPM impacts fall off sharply with distance from the project fenceline, the residential risk at the nearest residential receptor, approximately 0.75 mile away, is also expected to be below this significance threshold.

The adjacent Blythe Energy Project will be in operation during the construction of SEP, so potential cumulative impacts have also been evaluated. Because the construction impacts are so localized, they are not expected to overlap with any areas that are significantly impacted by BEP.

TABLE 3.1C-4R1
Modeled Maximum Impacts During the Construction Period[a]

Pollutant	Averaging Time	Maximum Impact, SEP ($\mu g/m^3$)	Maximum Impact, BEP[d] ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour[b]	~~130.7~~ 134.9	~~4.8~~ 8.7	77.1	~~196.2~~ 210.9	339	--
	Annual	~~3.6~~ 3.4	0.1	13.2	~~16.8~~ 16.7	57	100
SO_2	1-hour	~~1.9~~ 1.6	~~0.8~~ 1.3	22.9	~~24.8~~ 24.5	655	--
	3-hour	~~1.6~~ 1.3	~~0.7~~ 1.0	22.6	~~24.2~~ 23.9	--	1,300
	24-hour	~~0.4~~ 0.29	~~0.25~~ 0.29	2.6	~~3.0~~ 2.9	105	365
CO	1-hour	~~1,009.2~~ 849.6	~~5.1~~ 8.5	4,000	~~5,009.2~~ 4,849.6	23,000	40,000
	8-hour	~~504.6~~ 415.0	~~2.1~~ 4.2	1,698	~~2,202.6~~ 2,113.0	10,000	10,000
PM_{10}	24-hour	~~17.2~~ 19.3	~~0.8~~ 1.0	127	~~144.2~~ 146.4	50	150
	Annual	~~1.4~~ 1.2	~~0.1~~ 0.2	22.1	~~23.5~~ 23.4	20	--
$PM_{2.5}$[c]	24-hour	~~2.8~~ 2.7	~~0.8~~ 1.0	13.8	16.6	--	35
	Annual	~~0.2~~ 0.1	~~0.1~~ 0.2	6.5	6.8	12	12

~~a. Impacts shown are conservative because they include construction of the substation that is no longer part of the proposed project.~~

b. Only compliance with the state 1-hour NO_2 and SO_2 standards is evaluated. The federal 1-hour average standards for these pollutants are 3-year statistically based standards, while the construction period will last for less than 2 years.

c. 24-hr $PM_{2.5}$ background concentration reflects the 3-year average of the 98th percentile values based on the form of standard.

d. BEP impact at location of maximum SEP construction impact. Combined concentration does not necessarily equal the sum of the individual concentrations because the individual maxima may occur during different hours at the same receptor.

Attachment 3.1C-1R1

Detailed Construction Emissions Calculations from CalEEMod

Maximum Daily Emissions During Construction (lbs/day)						
	NOx	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
Onsite						
Off-Road Equipment and Onsite Vehicle Combustion [1]	59.19	**114.64**	**3.48**	**0.22**	**0.44**	**0.44**
Fugitive Dust, Project Site-Construction [2]					13.61	1.36
Wind Erosion, Project Site Construction [2]					0.83	0.33
Soil Movement, Project Site Construction - Fugitive Dust [2]					**0.70**	**0.11**
Total Onsite Emission (Project Site Construction)	59.2	**114.6**	**3.5**	**0.2**	**15.6**	**2.2**
Offsite						
Transmission Line Construction						
Off-Road Equipment and Vehicle Combustion [3]	151.0	298.2	8.9	0.5	0.9	0.9
Fugitive Dust [4]					3.3	1.6
Wind Erosion [4]					0.8	0.3
Worker Travel						
Project Site Workforce, Combustion [5]	11.01	**121.75**	**4.51**	**0.23**	**0.11**	**0.10**
Project Site Workforce - Fugitive Dust					17.52	4.67
T-Line Workforce, Combustion [6]	1.05	8.97	0.35	0.02	0.01	0.01
T-Line Workforce - Fugitive Dust					1.67	0.44
Delivery Trucks						
Project Site Deliveries, Combustion [5]	23.86	17.06	1.38	0.08	0.73	0.67
Project Site Deliveries - Fugitive Dust					2.52	0.72
T-Line Deliveries, Combustion [6]	7.16	5.12	0.41	0.02	0.22	0.20
T-Line Deliveries - Fugitive Dust					0.75	0.22
Haul Trucks						
Project Site Haul Trucks, Combustion [5]	71.28	50.93	4.34	0.25	2.09	1.92
Project Site Haul Trucks - Fugitive Dust					5.79	1.60
Total Offsite Emissions						
Total Offsite Emissions, Project Site Construction	106.1	**189.7**	**10.2**	**0.6**	**28.8**	**9.7**
Total Offsite Emissions, T-Line Construction [7]	159.2	312.3	9.7	0.6	7.6	3.7
Total Offsite Emissions	265.4	**502.0**	**19.9**	**1.1**	**36.4**	**13.4**
Maximum Daily Emissions	324.6	**616.6**	**23.4**	**1.4**	**51.9**	**15.7**

Notes:

1. Includes on-site construction activity. Maximum emissions occur in month 5.
2. Includes on-site construction activity. Maximum onsite fugitive dust emissions occur in month 13. wind erosion and soil movement dust emissions are taken from the same period.
3. Maximum transmission line construction emissions occur in month 11.
4. Maximum transmission line construction and vehicle fugitive emissions in month 11, wind erosion dust emissions are taken from the same period.
5. Maximum project site construction emissions for worker travel in month 13, deliveries truck in month 10 and haul trucks in month 7.
6. Maximum T-line construction emissions for worker travel and delivery trucks in month 9.
7. 7-month T-line construction occurs during months 7 to 13.

Peak Annual Emissions During Construction (tons/yr, rolling 12-month maximum)						
	NOx	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
Onsite						
Off-Road Equipment and Onsite Vehicle Combustion [1]	6.32	12.48	0.38	0.02	0.04	0.04
Fugitive Dust, Project Site-Construction [2]					1.38	0.03
Wind Erosion, Project Site Construction [2]					0.15	0.06
Soil Movement, Project Site Construction - Fugitive Dust [2]					**0.13**	**0.02**
Total Onsite Emission (Project Site Construction)	6.3	12.5	0.4	0.02	**1.7**	**0.2**
Offsite						
Transmission Line Construction						
T-Line Off-Road Equipment and Vehicle Combustion [4]	3.74	7.39	0.22	0.01	0.02	0.02
T-Line Construction Fugitive Dust [4]					0.08	0.04
T-Line Wind Erosion [4]					0.08	0.03
Worker Travel						
Project Site Workforce, Combustion [3]	1.14	10.20	0.39	0.02	0.01	0.01
Project Site Workforce - Fugitive Dust					1.69	0.45
T-Line Workforce, Combustion [5]	0.05	0.48	0.02	0.001	0.001	0.0005
T-Line Workforce - Fugitive Dust					0.08	0.02
Delivery Trucks						
Project Site Deliveries, Combustion (combustion) [3]	1.60	1.12	0.09	0.005	0.05	0.04
Project Site Deliveries - Fugitive Dust					0.16	0.05
T-Line Deliveries, Combustion [4]	0.21	0.15	0.01	0.00	0.01	0.01
T-Line Deliveries - Fugitive Dust					0.02	0.01
Haul Trucks						
Project Site Haul Trucks, Combustion [3]	2.67	1.99	0.17	0.01	0.08	0.07
Project Site Haul Trucks - Fugitive Dust					0.22	0.06
Total Offsite Emissions						
Total Offsite Emissions, Project Site Construction	5.4	13.3	0.6	0.04	2.2	0.7
Total Offsite Emissions, T-Line Construction [4]	4.0	8.0	0.3	0.0	0.3	0.1
Total Offsite Emissions	9.4	21.3	0.9	0.1	2.5	0.8
Maximum Annual Emissions	15.7	33.8	1.3	0.1	**4.2**	**1.0**

Notes:

1. Includes on-site construction activity. Maximum 12-month emissions occur for the period ending at month 15.
2. Includes on-site construction activity. Maximum 12-month emissions occur for the period ending at month 18, wind erosion and soil movement dust emissions are taken from the same period.
3. Maximum 12-month emissions for worker travel for the period ending at month 18, delivery truck for the period ending at month 13, and haul trucks for the period ending at month 12.
4. 7-month total transmission line construction emission from months 7 to 13 of the 22-month construction period

Construction of the Proposed SEP - Modeled emissions, Short-Term Impacts

Short Term Impacts (24 hours and less)					
Daily working hours (hrs/day)	10				
	NOx	CO	SOx	PM10	PM2.5
Project Site Construction Emissions					
Off Road Equipment and Onsite Vehicle Combustion (lbs/day)	59.19	**114.64**	**0.22**	**0.44**	**0.44**
Off Road Equipment and Onsite Vehicle Combustion (lbs/hr)	5.92	**11.46**	**0.02**	**0.04**	**0.04**
Off Road Equipment and Onsite Vehicle Combustion (g/sec)	0.75	**1.44**	**0.003**	**0.01**	**0.01**
Off Road Equipment and Onsite Vehicle Fugitive Dust (lb/day)				13.61	1.36
Off Road Equipment and Onsite Vehicle Fugitive Dust (lb/hr)				1.36	0.14
Off Road Equipment and Onsite Vehicle Fugitive Dust (g/sec)				0.17	0.02
Wind Erosion (lbs/day)				0.83	0.33
Wind Erosion (lbs/hr) [1]				0.035	0.014
Wind Erosion (g/sec)				0.004	0.002
Soil Movement Fugitive Dust (lbs/day)				**0.70**	**0.11**
Soil Movement Fugitive Dust (lbs/hr)				**0.07**	**0.01**
Soil Movement Fugitive Dust (g/sec)				**0.01**	**0.00**

Note:

1. Wind erosion occurs 24 hrs/day.

Construction of the Proposed SEP - Modeled emissions, Long - Term Impacts

Long Term Impacts (annual)					
Days/yr	365				
Hrs/day	24				
	NOx	CO	SOx	PM10	PM2.5
Project Site Construction Emissions					
Off Road Equipment and Onsite Vehicle (Combustion) (tons/yr)	6.32	12.48	0.02	0.04	0.04
Off Road Equipment and Onsite Vehicle (Combustion) (lbs/hr)	1.44	2.85	0.01	0.01	0.01
Off Road Equipment and Onsite Vehicle (Combustion) (g/sec)	0.18	0.36	0.0007	0.0012	0.0012
Off Road Equipment and Onsite Vehicle Fugitive Dust (tons/yr)				1.38	0.03
Off Road Equipment and Onsite Vehicle Fugitive Dust (lbs/hr)				0.31	0.01
Off Road Equipment and Onsite Vehicle Fugitive Dust (g/sec)				0.040	0.001
Wind Erosion (Fugitive Dust) (tons/yr)				0.15	0.06
Wind Erosion (Fugitive Dust) (lbs/hr)				0.03	0.01
Wind Erosion (Fugitive Dust) (g/sec)				0.004	0.002
Soil Movement Fugitive Dust (lbs/day)				**0.13**	**0.02**
Soil Movement Fugitive Dust (lbs/hr)				**0.029**	**0.004**
Soil Movement Fugitive Dust (g/sec)				**0.004**	**0.001**

Construction of the Proposed SEP - Greenhouse Gas Emission Calculations

Peak Annual GHG Emissions, Project Site Construction (MT/yr, rolling 12-month maximum)				
	CO2	CH4	N2O	CO2e
Off-Road Equipment and Onsite Vehicle	2,231	0.57	0.00	2,245
Worker Travel	1,513	0.09	0.00	1,515
Delivery Truck	477	0.002	0.00	477
Haul Truck	869	0.004	0.00	869
Total =	5,090	0.66	0.00	5,107

GHG Emissions, Project Site Construction (MT, Total for 22-month Construction Period)				
	CO2	CH4	N2O	CO2e
Off-Road Equipment and Onsite Vehicle	3,228	0.85	0.00	3,249
Worker Travel	1,857	0.11	0.00	1,860
Delivery Truck	525	0.00	0.00	526
Haul Truck	1,125	0.01	0.00	1,125
Total	6,735	0.97	0.00	6,759

GHG Emissions, Transmission Line Construction (MT, Total for 7-month Period)				
	CO2	CH4	N2O	CO2e
Off-Road Equipment and Onsite Vehicle	1,250	0.38	0.00	1,260
Worker Travel	72	0.00	0.00	72
Delivery Truck	65	0.0003	0.00	65
Total	1,387	0.39	0.00	1,397

Construction of the Proposed SEP Project Site - Monthly and Annual Emission Calculations

Project Month		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
		ROG																					
Onsite Off-Road Equipment	(tons/month)	1.80E-02	2.44E-02	1.98E-02	3.76E-02	3.62E-02	3.68E-02	2.64E-02	3.07E-02	2.77E-02	3.19E-02	2.73E-02	3.24E-02	3.32E-02	3.18E-02	2.71E-02	2.38E-02	2.50E-02	1.70E-02	1.32E-02	1.03E-02	9.67E-03	9.85E-03
Onsite Vehicle	(tons/month)	6.48E-05	8.06E-05	1.49E-04	1.38E-04	2.98E-04	4.06E-04	5.84E-04	3.37E-04	3.66E-04	4.18E-04	3.46E-04	3.84E-04	3.35E-04	2.76E-04	2.91E-04	2.48E-04	2.65E-04	2.46E-04	1.81E-04	7.45E-05	1.74E-05	7.69E-06
Onsite Off-Road + Onsite Vehicle	(tons/month)	1.81E-02	2.45E-02	1.99E-02	3.77E-02	3.65E-02	3.72E-02	2.70E-02	3.10E-02	2.81E-02	3.23E-02	2.76E-02	3.28E-02	3.35E-02	3.21E-02	2.74E-02	2.40E-02	2.53E-02	1.72E-02	1.34E-02	1.04E-02	9.69E-03	9.86E-03
Offsite Haul Truck	(tons/month)	4.76E-03	4.58E-03	9.88E-03	5.49E-03	1.83E-02	2.64E-02	4.76E-02	1.61E-02	1.54E-02	9.03E-03	4.18E-03	4.35E-03	4.35E-03	4.18E-03	4.52E-03	4.18E-03	8.36E-03	7.69E-03	8.36E-03	3.98E-03	0.00E+00	0.00E+00
Offsite Delivery Truck	(tons/month)	0.00E+00	1.60E-03	1.76E-03	1.68E-03	6.42E-03	1.01E-02	1.01E-02	9.04E-03	1.10E-02	1.58E-02	1.10E-02	9.45E-03	3.01E-03	1.44E-03	1.57E-03	1.44E-03	1.51E-03	1.51E-03	1.44E-03	0.00E+00	0.00E+00	0.00E+00
Offsite Worker Travel	(tons/month)	4.34E-03	5.10E-03	9.24E-03	1.27E-02	1.66E-02	1.94E-02	2.17E-02	2.21E-02	2.51E-02	3.50E-02	3.53E-02	4.27E-02	4.27E-02	3.58E-02	3.75E-02	3.15E-02	2.91E-02	2.69E-02	1.62E-02	6.76E-03	2.67E-03	1.18E-03
Onsite Off-Road Equipment	Rolling 12-month total (tons/year)												0.35	0.36	0.37	0.38	0.38	0.37	0.35	0.33	0.32	0.30	0.28	0.26
Onsite Off-Road + Onsite Vehicle	Rolling 12-month total (tons/year)												0.35	0.37	0.38	0.38	0.38	0.37	0.36	0.34	0.32	0.30	0.29	0.26
Offsite Haul Truck	Rolling 12-month total (tons/year)												0.17	0.17	0.17	0.16	0.16	0.15	0.13	0.09	0.08	0.06	0.05
Offsite Delivery Truck	Rolling 12-month total (tons/year)												0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.07	0.06	0.05	0.03
Offsite Worker Travel	Rolling 12-month total (tons/year)												0.25	0.29	0.32	0.35	0.37	0.38	0.39	0.38	0.36	0.34	0.31
		NOx																					
Onsite Off-Road Equipment	(tons/month)	0.30	0.40	0.33	0.64	0.62	0.61	0.44	0.50	0.45	0.52	0.44	0.53	0.54	0.54	0.44	0.39	0.41	0.28	0.21	0.17	0.17	0.16
Onsite Vehicle	(tons/month)	6.83E-04	8.94E-04	1.66E-03	8.79E-04	3.51E-03	5.09E-03	7.82E-03	3.58E-03	3.81E-03	3.87E-03	2.65E-03	2.62E-03	1.75E-03	1.39E-03	1.48E-03	1.31E-03	1.77E-03	1.65E-03	1.51E-03	5.89E-04	5.54E-05	2.44E-05
Onsite Off-Road + Onsite Vehicle	(tons/month)	0.30	0.40	0.33	0.64	0.62	0.61	0.45	0.51	0.46	0.53	0.45	0.53	0.54	0.55	0.44	0.39	0.41	0.28	0.21	0.17	0.17	0.16
Offsite Haul Truck	(tons/month)	0.0788	0.0758	0.1637	0.0545	0.3031	0.4365	0.7881	0.2528	0.2423	0.1422	0.0658	0.0685	0.0685	0.0658	0.0711	0.0658	0.1317	0.1212	0.1317	0.0585	0	0
Offsite Delivery Truck	(tons/month)	0.000	0.029	0.032	0.030	0.115	0.181	0.181	0.158	0.191	0.275	0.191	0.165	0.053	0.025	0.028	0.025	0.026	0.026	0.025	0.000	0.000	0.000
Offsite Worker Travel	(tons/month)	0.012	0.014	0.026	0.035	0.046	0.054	0.060	0.066	0.074	0.104	0.105	0.127	0.127	0.106	0.111	0.094	0.086	0.080	0.048	0.022	0.009	0.004
Onsite Off-Road Equipment	Rolling 12-month total (tons/year)												5.78	6.03	6.17	6.28	6.03	5.82	5.49	5.27	4.93	4.65	4.28
Onsite Off-Road + Onsite Vehicle	Rolling 12-month total (tons/year)												5.82	6.07	6.21	6.32	6.07	5.86	5.53	5.29	4.95	4.67	4.30
Offsite Haul Truck	Rolling 12-month total (tons/year)												2.67	2.66	2.65	2.56	2.57	2.40	2.08	1.43	1.23	0.99	0.85
Offsite Delivery Truck	Rolling 12-month total (tons/year)												1.55	1.60	1.60	1.59	1.59	1.50	1.34	1.19	1.03	0.84	0.56
Offsite Worker Travel	Rolling 12-month total (tons/year)												0.72	0.84	0.93	1.01	1.07	1.11	1.14	1.13	1.08	1.02	0.92
		CO																					
Onsite Off-Road Equipment	(tons/month)	0.584	0.793	0.642	1.246	1.198	1.194	0.859	0.997	0.901	1.036	0.886	1.053	1.079	1.072	0.881	0.773	0.810	0.552	0.428	0.335	0.335	0.320
Onsite Vehicle	(tons/month)	1.14E-03	1.40E-03	2.58E-03	2.81E-03	4.98E-03	6.51E-03	8.82E-03	6.19E-03	6.83E-03	8.40E-03	7.54E-03	8.70E-03	8.08E-03	6.72E-03	7.05E-03	5.98E-03	5.97E-03	5.52E-03	3.72E-03	1.62E-03	4.90E-04	2.16E-04
Onsite Off-Road + Onsite Vehicle	(tons/month)	0.585	0.794	0.645	1.249	1.203	1.200	0.868	1.003	0.908	1.045	0.894	1.061	1.087	1.078	0.888	0.779	0.816	0.557	0.431	0.336	0.336	0.320
Offsite Haul Truck	(tons/month)	0.056	0.054	0.117	0.075	0.217	0.312	0.563	0.196	0.188	0.111	0.051	0.053	0.053	0.051	0.055	0.051	0.102	0.094	0.102	0.049	0.000	0.000
Offsite Delivery Truck	(tons/month)	0.000	0.020	0.022	0.021	0.079	0.124	0.124	0.113	0.136	0.196	0.136	0.118	0.038	0.018	0.020	0.018	0.019	0.019	0.018	0.000	0.000	0.000
Offsite Worker Travel	(tons/month)	0.109	0.128	0.233	0.319	0.417	0.487	0.546	0.587	0.666	0.929	0.936	1.135	1.134	0.951	0.995	0.838	0.773	0.714	0.429	0.191	0.075	0.033
Onsite Off-Road Equipment	Rolling 12-month total (tons/year)												11.39	11.89	12.16	12.40	11.93	11.54	10.90	10.47	9.81	9.24	8.52
Onsite Off-Road + Onsite Vehicle	Rolling 12-month total (tons/year)												11.46	11.96	12.24	12.48	12.02	11.63	10.99	10.55	9.88	9.31	8.58
Offsite Haul Truck	Rolling 12-month total (tons/year)												1.99	1.99	1.99	1.93	1.90	1.79	1.57	1.11	0.96	0.77	0.66
Offsite Delivery Truck	Rolling 12-month total (tons/year)												1.09	1.12	1.12	1.12	1.12	1.06	0.95	0.85	0.73	0.60	0.40
Offsite Worker Travel	Rolling 12-month total (tons/year)												6.49	7.52	8.34	9.10	9.62	9.98	10.20	10.09	9.69	9.10	8.20
		SO2																					
Onsite Off-Road Equipment	(tons/month)	1.12E-03	1.51E-03	1.21E-03	2.37E-03	2.27E-03	2.31E-03	1.71E-03	1.97E-03	1.78E-03	2.05E-03	1.76E-03	2.08E-03	2.13E-03	2.09E-03	1.76E-03	1.55E-03	1.63E-03	1.07E-03	8.40E-04	6.60E-04	6.40E-04	6.00E-04
Onsite Vehicle	(tons/month)	3.37E-06	4.25E-06	7.86E-06	5.91E-06	1.57E-05	2.16E-05	3.14E-05	1.98E-05	2.13E-05	2.41E-05	1.97E-05	2.17E-05	1.88E-05	1.55E-05	1.63E-05	1.40E-05	1.51E-05	1.40E-05	1.05E-05	4.86E-06	1.17E-06	5.21E-07
Onsite Off-Road + Onsite Vehicle	(tons/month)	1.12E-03	1.51E-03	1.22E-03	2.38E-03	2.29E-03	2.33E-03	1.74E-03	1.99E-03	1.80E-03	2.07E-03	1.78E-03	2.10E-03	2.15E-03	2.11E-03	1.78E-03	1.56E-03	1.65E-03	1.08E-03	8.50E-04	6.65E-04	6.41E-04	6.01E-04
Offsite Haul Truck	(tons/month)	2.70E-04	2.60E-04	5.60E-04	1.80E-04	1.04E-03	1.50E-03	2.70E-03	1.00E-03	9.50E-04	5.60E-04	2.60E-04	2.70E-04	2.70E-04	2.60E-04	2.80E-04	2.60E-04	5.20E-04	4.80E-04	5.20E-04	2.60E-04	0.00E+00	0.00E+00
Offsite Delivery Truck	(tons/month)	0.00E+00	9.00E-05	1.00E-04	9.00E-05	3.50E-04	5.50E-04	5.50E-04	5.50E-04	6.60E-04	9.50E-04	6.60E-04	5.70E-04	1.80E-04	9.00E-05	1.00E-04	9.00E-05	9.00E-05	9.00E-05	9.00E-05	0.00E+00	0.00E+00	0.00E+00
Offsite Worker Travel	(tons/month)	2.00E-04	2.40E-04	4.30E-04	5.90E-04	7.70E-04	9.00E-04	1.00E-03	1.22E-03	1.38E-03	1.93E-03	1.94E-03	2.35E-03	2.35E-03	1.97E-03	2.06E-03	1.74E-03	1.60E-03	1.48E-03	8.90E-04	4.40E-04	1.80E-04	8.00E-05
Onsite Off-Road Equipment	Rolling 12-month total (tons/year)												0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Onsite Off-Road + Onsite Vehicle	Rolling 12-month total (tons/year)												0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Offsite Haul Truck	Rolling 12-month total (tons/year)												0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Offsite Delivery Truck	Rolling 12-month total (tons/year)												0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Offsite Worker Travel	Rolling 12-month total (tons/year)												0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

Construction of the Proposed SEP Project Site - Monthly and Annual Emission Calculations

Project Month		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
		PM10																					
Onsite Off-Road Equipment	(tons/month)	0.002	0.003	0.003	0.004	0.005	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001
Onsite Vehicle	(tons/month)	1.83E-05	2.45E-05	4.54E-05	2.04E-05	9.70E-05	1.42E-04	2.22E-04	9.89E-05	1.05E-04	1.03E-04	6.63E-05	6.22E-05	3.59E-05	2.76E-05	2.96E-05	2.68E-05	4.17E-05	3.88E-05	3.90E-05	1.62E-05	5.86E-07	2.61E-07
Onsite Off-Road + Onsite Vehicle	(tons/month)	2.43E-03	3.03E-03	2.63E-03	4.36E-03	4.63E-03	4.37E-03	2.80E-03	3.13E-03	2.84E-03	3.25E-03	2.78E-03	3.28E-03	3.34E-03	3.23E-03	2.72E-03	2.39E-03	2.51E-03	1.72E-03	1.36E-03	1.05E-03	9.91E-04	9.80E-04
Offsite Haul Truck	(tons/month)	2.30E-03	2.21E-03	4.77E-03	1.48E-03	8.83E-03	1.27E-02	2.30E-02	7.54E-03	7.22E-03	4.24E-03	1.96E-03	2.04E-03	2.04E-03	1.96E-03	2.12E-03	1.96E-03	3.93E-03	3.61E-03	3.93E-03	1.93E-03	0.00E+00	0.00E+00
Offsite Delivery Truck	(tons/month)	0.00E+00	8.70E-04	9.50E-04	9.10E-04	3.48E-03	5.47E-03	5.47E-03	4.82E-03	5.84E-03	8.40E-03	5.84E-03	5.04E-03	1.61E-03	7.70E-04	8.40E-04	7.70E-04	8.00E-04	8.00E-04	7.70E-04	0.00E+00	0.00E+00	0.00E+00
Offsite Worker Travel	(tons/month)	1.10E-04	1.30E-04	2.30E-04	3.20E-04	4.10E-04	4.80E-04	5.40E-04	6.30E-04	7.10E-04	9.90E-04	1.00E-03	1.21E-03	1.21E-03	1.02E-03	1.06E-03	9.00E-04	8.30E-04	7.60E-04	4.60E-04	2.20E-04	9.00E-05	4.00E-05
Onsite Off-Road Equipment	Rolling 12-month total (tons/year)												0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Onsite Off-Road + Onsite Vehicle	Rolling 12-month total (tons/year)												0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Offsite Haul Truck	Rolling 12-month total (tons/year)												0.08	0.08	0.08	0.08	0.08	0.07	0.06	0.04	0.04	0.03	0.03
Offsite Delivery Truck	Rolling 12-month total (tons/year)												0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02
Offsite Worker Travel	Rolling 12-month total (tons/year)												0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Onsite Fugitive (Off-Road)	(tons/month)	8.53E-03	8.14E-03	8.92E-03	1.14E-02	8.14E-03	8.53E-03	2.84E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Fugitive (Onsite Vehicle)	(tons/month)	1.48E-02	1.70E-02	3.15E-02	4.10E-02	5.69E-02	6.91E-02	8.65E-02	8.47E-02	9.46E-02	1.25E-01	1.23E-01	1.49E-01	1.48E-01	1.24E-01	1.30E-01	1.10E-01	1.04E-01	9.59E-02	5.98E-02	2.97E-02	1.08E-02	4.77E-03
Onsite Off-Road + Onsite Vehicle	(tons/month)	0.02	0.03	0.04	0.05	0.07	0.08	0.09	0.09	0.10	0.13	0.12	0.15	0.15	0.12	0.13	0.11	0.10	0.10	0.06	0.03	0.01	0.00
Offsite Fugitive - Haul Truck	(tons/month)	0.01	0.01	0.01	0.00	0.02	0.03	0.06	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
Offsite Fugitive - Delivery Truck	(tons/month)	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Fugitive - Worker Travel	(tons/month)	0.02	0.02	0.03	0.05	0.06	0.07	0.08	0.10	0.11	0.16	0.16	0.19	0.19	0.16	0.17	0.14	0.13	0.12	0.07	0.04	0.01	0.01
Onsite Fugitive (Off-Road)	Rolling 12-month total (tons/year)												0.06	0.05	0.04	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00
Onsite Fugitive - Off-Road + Onsite Veh	Rolling 12-month total (tons/year)												0.95	1.08	1.18	1.27	1.33	1.37	1.38	1.35	1.30	1.21	1.09
Offsite Fugitive - Haul Truck	Rolling 12-month total (tons/year)												0.22	0.22	0.22	0.22	0.22	0.21	0.18	0.13	0.11	0.09	0.08
Offsite Fugitive - Delivery Truck	Rolling 12-month total (tons/year)												0.15	0.16	0.16	0.16	0.16	0.15	0.14	0.12	0.11	0.09	0.06
Offsite Fugitive - Worker Travel	Rolling 12-month total (tons/year)												1.04	1.21	1.35	1.49	1.58	1.65	1.69	1.68	1.62	1.52	1.38
		PM2.5																					
Onsite Off-Road Equipment	(tons/month)	0.002	0.003	0.003	0.004	0.005	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001
Onsite Vehicle	(tons/month)	1.68E-05	2.25E-05	4.18E-05	1.88E-05	8.93E-05	1.31E-04	2.04E-04	9.09E-05	9.64E-05	9.51E-05	6.11E-05	5.73E-05	3.31E-05	2.54E-05	2.72E-05	2.47E-05	3.83E-05	3.57E-05	3.59E-05	1.49E-05	5.21E-07	2.61E-07
Onsite Off-Road + Onsite Vehicle	(tons/month)	2.43E-03	3.03E-03	2.62E-03	4.36E-03	4.62E-03	4.36E-03	2.78E-03	3.12E-03	2.84E-03	3.25E-03	2.77E-03	3.28E-03	3.33E-03	3.23E-03	2.72E-03	2.38E-03	2.51E-03	1.72E-03	1.36E-03	1.04E-03	9.91E-04	9.80E-04
Offsite Haul Truck	(tons/month)	2.11E-03	2.03E-03	4.39E-03	1.36E-03	8.12E-03	1.17E-02	2.11E-02	6.93E-03	6.64E-03	3.90E-03	1.81E-03	1.88E-03	1.88E-03	1.81E-03	1.95E-03	1.81E-03	3.61E-03	3.32E-03	3.61E-03	1.77E-03	0.00E+00	0.00E+00
Offsite Delivery Truck	(tons/month)	0.00E+00	8.00E-04	8.80E-04	8.40E-04	3.20E-03	5.03E-03	5.03E-03	4.43E-03	5.38E-03	7.73E-03	5.38E-03	4.64E-03	1.48E-03	7.10E-04	7.70E-04	7.10E-04	7.40E-04	7.40E-04	7.10E-04	0.00E+00	0.00E+00	0.00E+00
Offsite Worker Travel	(tons/month)	1.00E-04	1.20E-04	2.10E-04	2.90E-04	3.80E-04	4.40E-04	4.90E-04	5.80E-04	6.50E-04	9.10E-04	9.20E-04	1.12E-03	1.12E-03	9.40E-04	9.80E-04	8.20E-04	7.60E-04	7.00E-04	4.20E-04	2.00E-04	8.00E-05	4.00E-05
Onsite Off-Road Equipment	Rolling 12-month total (tons/year)												0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Onsite Off-Road + Onsite Vehicle	Rolling 12-month total (tons/year)												0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Offsite Haul Truck	Rolling 12-month total (tons/year)												0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.04	0.03	0.03	0.02
Offsite Delivery Truck	Rolling 12-month total (tons/year)												0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.02	0.02
Offsite Worker Travel	Rolling 12-month total (tons/year)												0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Onsite Fugitive (Off-Road)	(tons/month)	9.20E-04	8.80E-04	9.60E-04	1.23E-03	8.80E-04	9.20E-04	3.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Fugitive (Onsite Vehicle)	(tons/month)	1.48E-03	1.77E-03	3.23E-03	4.17E-03	5.99E-03	7.34E-03	9.12E-03	8.90E-03	1.00E-02	1.33E-02	1.29E-02	1.53E-02	1.50E-02	1.25E-02	1.31E-02	1.11E-02	1.05E-02	9.66E-03	6.06E-03	2.97E-03	1.08E-03	4.77E-04
Onsite Off-Road + Onsite Vehicle	(tons/month)	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Offsite Fugitive - Haul Truck	(tons/month)	1.74E-03	1.67E-03	3.60E-03	1.11E-03	6.67E-03	9.61E-03	1.74E-02	6.41E-03	6.14E-03	3.60E-03	1.67E-03	1.74E-03	1.74E-03	1.67E-03	1.80E-03	1.67E-03	3.34E-03	3.07E-03	3.34E-03	1.67E-03	0.00E+00	0.00E+00
Offsite Fugitive - Delivery Truck	(tons/month)	0.00E+00	7.50E-04	8.20E-04	7.80E-04	2.98E-03	4.69E-03	4.69E-03	4.69E-03	5.69E-03	8.18E-03	5.69E-03	4.91E-03	1.56E-03	7.50E-04	8.20E-04	7.50E-04	7.80E-04	7.80E-04	7.50E-04	0.00E+00	0.00E+00	0.00E+00
Offsite Fugitive - Worker Travel	(tons/month)	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	0.00	0.00
Onsite Fugitive (Off-Road)	Rolling 12-month total (tons/year)												0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Fugitive - Off-Road + Onsite Veh	Rolling 12-month total (tons/year)												0.10	0.11	0.12	0.13	0.14	0.14	0.14	0.14	0.13	0.12	0.11
Offsite Fugitive - Haul Truck	Rolling 12-month total (tons/year)												0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.04	0.03	0.03	0.02
Offsite Fugitive - Delivery Truck	Rolling 12-month total (tons/year)												0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.02	0.02
Offsite Fugitive - Worker Travel	Rolling 12-month total (tons/year)												0.28	0.32	0.36	0.40	0.42	0.44	0.45	0.45	0.43	0.41	0.37
		CO2																					
Onsite Off-Road Equipment	(MT/month)	104.27	141.02	112.95	219.05	210.15	212.82	155.16	178.48	161.37	185.58	159.27	189.01	193.35	188.89	159.12	139.94	146.60	97.68	76.72	59.70	57.28	54.87
Onsite Vehicle	(MT/month)	2.87E-01	3.58E-01	6.68E-01	4.73E-01	1.35E+00	1.87E+00	2.77E+00	1.63E+00	1.76E+00	1.94E+00	1.54E+00	1.68E+00	1.41E+00	1.16E+00	1.22E+00	1.05E+00	1.17E+00	1.08E+00	8.34E-01	3.75E-01	7.88E-02	3.47E-02
Onsite Off-Road + Onsite Vehicle	(MT/month)	104.55	141.38	113.62	219.52	211.49	214.69	157.93	180.11	163.14	187.52	160.81	190.69	194.76	190.06	160.34	140.99	147.77	98.77	77.56	60.08	57.36	54.90
Offsite Haul Truck	(MT/month)	24.73	23.78	51.36	16.12	95.12	136.97	247.31	89.72	85.98	50.46	23.36	24.30	24.30	23.36	25.23	23.36	46.73	42.99	46.73	22.96	0.00	0.00
Offsite Delivery Truck	(MT/month)	0.00	7.93	8.69	8.31	31.72	49.85	49.85	49.02	59.42	85.41	59.42	51.25	16.34	7.80	8.54	7.80	8.17	8.17	7.80	0.00	0.00	0.00
Offsite Worker Travel	(MT/month)	14.98	17.60	31.93	43.80	57.21	66.85	74.92	87.44	99.11	138.28	139.36	168.94	168.79	141.57	148.11	124.67	115.11	106.25	63.92	30.61	12.10	5.32
Onsite Off-Road Equipment	Rolling 12-month total (MT/year)												2,029	2,118	2,166	2,212	2,133	2,070	1,954	1,876	1,757	1,653	1,522
Onsite Off-Road + Onsite Vehicle	Rolling 12-month total (MT/year)												2,045	2,136	2,184	2,231	2,153	2,089	1,973	1,893	1,772	1,667	1,534
Offsite Haul Truck	Rolling 12-month total (MT/year)												869	869	868	842	849	801	707	507	440	354	303
Offsite Delivery Truck	Rolling 12-month total (MT/year)												461	477	477	477	476	453	411	369	320	261	175
Offsite Worker Travel	Rolling 12-month total (MT/year)												940	1,094	1,218	1,334	1,415	1,473	1,513	1,502	1,445	1,358	1,225

Construction of the Proposed SEP Project Site - Monthly and Annual Emission Calculations

Project Month		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
													CH4										
Onsite Off-Road Equipment	(MT/month)	0.031	0.042	0.034	0.058	0.056	0.056	0.038	0.046	0.042	0.048	0.041	0.049	0.051	0.047	0.040	0.035	0.036	0.029	0.023	0.018	0.017	0.017
Onsite Vehicle	(tons/month)	6.72E-06	8.00E-06	1.46E-05	1.79E-05	2.70E-05	3.30E-05	4.03E-05	3.72E-05	4.17E-05	5.57E-05	5.42E-05	6.49E-05	6.36E-05	5.33E-05	5.57E-05	4.70E-05	4.43E-05	4.09E-05	2.55E-05	1.17E-05	4.30E-06	1.89E-06
Onsite Off-Road + Onsite Vehicle	(MT/month)	0.03	0.04	0.03	0.06	0.06	0.06	0.04	0.05	0.04	0.05	0.04	0.05	0.05	0.05	0.04	0.03	0.04	0.03	0.02	0.02	0.02	0.02
Offsite Haul Truck	(MT/month)	1.20E-04	1.20E-04	2.60E-04	9.00E-05	4.80E-04	6.90E-04	1.24E-03	4.30E-04	4.10E-04	2.40E-04	1.10E-04	1.20E-04	1.20E-04	1.10E-04	1.20E-04	1.10E-04	2.20E-04	2.00E-04	2.20E-04	1.10E-04	0.00E+00	0.00E+00
Offsite Delivery Truck	(MT/month)	0.00E+00	4.00E-05	4.00E-05	4.00E-05	1.60E-04	2.50E-04	2.50E-04	2.30E-04	2.70E-04	3.90E-04	2.70E-04	2.40E-04	8.00E-05	4.00E-05	4.00E-05	4.00E-05	4.00E-05	4.00E-05	4.00E-05	0.00E+00	0.00E+00	0.00E+00
Offsite Worker Travel	(MT/month)	8.90E-04	1.04E-03	1.89E-03	2.59E-03	3.39E-03	3.96E-03	4.44E-03	4.94E-03	5.60E-03	7.81E-03	7.87E-03	9.54E-03	9.53E-03	8.00E-03	8.36E-03	7.04E-03	6.50E-03	6.00E-03	3.61E-03	1.66E-03	6.60E-04	2.90E-04
Onsite Off-Road Equipment	Rolling 12-month total (MT/year)												0.54	0.56	0.56	0.57	0.55	0.53	0.50	0.48	0.46	0.43	0.40
Onsite Off-Road + Onsite Vehicle	Rolling 12-month total (MT/year)												1	1	1	1	1	1	1	0	0	0	0
Offsite Haul Truck	Rolling 12-month total (MT/year)												4.31E-03	4.31E-03	4.30E-03	4.16E-03	4.18E-03	3.92E-03	3.43E-03	2.41E-03	2.09E-03	1.68E-03	1.44E-03
Offsite Delivery Truck	Rolling 12-month total (MT/year)												2.18E-03	2.26E-03	2.26E-03	2.26E-03	2.26E-03	2.14E-03	1.93E-03	1.72E-03	1.49E-03	1.22E-03	8.30E-04
Offsite Worker Travel	Rolling 12-month total (MT/year)												5.40E-02	6.26E-02	6.96E-02	7.60E-02	8.05E-02	8.36E-02	8.56E-02	8.48E-02	8.15E-02	7.66E-02	6.91E-02
													N2O										
Onsite Off-Road Equipment	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Vehicle	(tons/month)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Onsite Off-Road + Onsite Vehicle	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Haul Truck	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Worker Travel	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road Equipment	Rolling 12-month total (MT/year)												0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	Rolling 12-month total (MT/year)												0	0	0	0	0	0	0	0	0	0	0
Offsite Haul Truck	Rolling 12-month total (MT/year)												0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	Rolling 12-month total (MT/year)												0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Worker Travel	Rolling 12-month total (MT/year)												0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
													CO2e										
Onsite Off-Road Equipment	(MT/month)	105.04	142.07	113.79	220.49	211.54	214.22	156.12	179.62	162.41	186.77	160.29	190.23	194.61	190.06	160.11	140.80	147.51	98.42	77.30	60.15	57.71	55.29
Onsite Vehicle	(tons/month)	2.87E-01	3.58E-01	6.69E-01	4.73E-01	1.35E+00	1.87E+00	2.77E+00	1.63E+00	1.76E+00	1.94E+00	1.54E+00	1.68E+00	1.41E+00	1.16E+00	1.23E+00	1.05E+00	1.17E+00	1.09E+00	8.35E-01	3.76E-01	7.89E-02	3.47E-02
Onsite Off-Road + Onsite Vehicle	(MT/month)	105.33	142.43	114.46	220.97	212.88	216.09	158.89	181.26	164.17	188.72	161.83	191.91	196.03	191.22	161.33	141.86	148.68	99.50	78.13	60.53	57.79	55.33
Offsite Haul Truck	(MT/month)	24.73	23.78	51.37	16.12	95.13	136.99	247.34	89.73	85.99	50.47	23.37	24.30	24.30	23.37	25.24	23.37	46.73	42.99	46.73	22.96	0.00	0.00
Offsite Delivery Truck	(MT/month)	0.00	7.93	8.69	8.31	31.72	49.85	49.85	49.03	59.42	85.42	59.42	51.25	16.34	7.80	8.54	7.80	8.17	8.17	7.80	0.00	0.00	0.00
Offsite Worker Travel	(MT/month)	15.01	17.63	31.98	43.86	57.30	66.95	75.03	87.56	99.25	138.47	139.56	169.18	169.03	141.77	148.32	124.84	115.27	106.40	64.01	30.65	12.12	5.33
Onsite Off-Road Equipment	Rolling 12-month total (MT/year)												2,043	2,132	2,180	2,226	2,147	2,083	1,967	1,888	1,769	1,664	1,532
Onsite Off-Road + Onsite Vehicle	Rolling 12-month total (MT/year)												2,059	2,150	2,198	2,245	2,166	2,102	1,985	1,905	1,784	1,678	1,544
Offsite Haul Truck	Rolling 12-month total (MT/year)												869	869	868	842	850	801	707	507	440	354	303
Offsite Delivery Truck	Rolling 12-month total (MT/year)												461	477	477	477	476	453	411	369	320	261	175
Offsite Worker Travel	Rolling 12-month total (MT/year)												942	1,096	1,220	1,336	1,417	1,475	1,515	1,504	1,447	1,360	1,226

Construction of the Proposed SEP Transmission Line - Monthly and Annual Emission Calculations

Project Month		7	8	9	10	11	12	13
					ROG			
T-Line Site Off-Road Equipment	(tons/month)	0.00E+00	9.53E-03	6.56E-03	4.84E-02	8.89E-02	5.93E-02	8.17E-03
T-Line Site Vehicle	(tons/month)	1.11E-06	1.82E-05	5.58E-05	5.93E-05	5.37E-05	1.35E-05	1.01E-05
T-Line Site Off-Road + T-Line Site Vehicle	(tons/month)	1.11E-06	9.55E-03	6.62E-03	4.85E-02	8.90E-02	5.93E-02	8.18E-03
Offsite Haul Truck	(tons/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	(tons/month)	0.00E+00	0.00E+00	4.11E-03	4.09E-03	3.83E-03	0.00E+00	0.00E+00
Offsite Worker Travel	(tons/month)	1.70E-04	2.80E-03	3.69E-03	4.25E-03	3.69E-03	2.05E-03	1.54E-03
T-Line Site Off-Road Equipment	7-month total (tons/year)							0.22
T-Line Site Off-Road + T-Line Site Vehicle	7-month total (tons/year)							0.22
Offsite Haul Truck	7-month total (tons/year)							0.00
Offsite Delivery Truck	7-month total (tons/year)							0.01
Offsite Worker Travel	7-month total (tons/year)							0.02
					NOx			
T-Line Site Off-Road Equipment	(tons/month)	0.00	0.15	0.11	0.82	1.51	1.01	0.13
T-Line Site Vehicle	(tons/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	(tons/month)	0.00	0.15	0.11	0.82	1.51	1.01	0.13
Offsite Haul Truck	(tons/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	(tons/month)	0.000	0.000	0.072	0.072	0.067	0.000	0.000
Offsite Worker Travel	(tons/month)	0.000	0.008	0.011	0.013	0.011	0.006	0.005
T-Line Site Off-Road Equipment	7-month total (tons/year)							3.73
T-Line Site Off-Road + T-Line Site Vehicle	7-month total (tons/year)							3.74
Offsite Haul Truck	7-month total (tons/year)							0.00
Offsite Delivery Truck	7-month total (tons/year)							0.21
Offsite Worker Travel	7-month total (tons/year)							0.05
					CO			
T-Line Site Off-Road Equipment	(tons/month)	0.000	0.310	0.223	1.609	2.981	1.996	0.266
T-Line Site Vehicle	(tons/month)	0.000	0.000	0.001	0.001	0.001	0.000	0.000
T-Line Site Off-Road + T-Line Site Vehicle	(tons/month)	0.000	0.310	0.224	1.611	2.982	1.997	0.266
Offsite Haul Truck	(tons/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	(tons/month)	0.000	0.000	0.051	0.051	0.048	0.000	0.000
Offsite Worker Travel	(tons/month)	0.004	0.074	0.098	0.113	0.098	0.054	0.041
T-Line Site Off-Road Equipment	7-month total (tons/year)							7.38
T-Line Site Off-Road + T-Line Site Vehicle	7-month total (tons/year)							7.39
Offsite Haul Truck	7-month total (tons/year)							0.00
Offsite Delivery Truck	7-month total (tons/year)							0.15
Offsite Worker Travel	7-month total (tons/year)							0.48

Construction of the Proposed SEP Transmission Line - Monthly and Annual Emission Calculations

Project Month		7	8	9	10	11	12	13
					SO2			
T-Line Site Off-Road Equipment	(tons/month)	0.00E+00	5.80E-04	4.00E-04	2.93E-03	5.42E-03	3.64E-03	5.00E-04
T-Line Site Vehicle	(tons/month)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
T-Line Site Off-Road + T-Line Site Vehicle	(tons/month)	6.51E-08	5.81E-04	4.03E-04	2.93E-03	5.42E-03	3.64E-03	5.01E-04
Offsite Haul Truck	(tons/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	(tons/month)	0.00E+00	0.00E+00	2.50E-04	2.50E-04	2.30E-04	0.00E+00	0.00E+00
Offsite Worker Travel	(tons/month)	1.00E-05	1.50E-04	2.00E-04	2.30E-04	2.00E-04	1.10E-04	8.00E-05
T-Line Site Off-Road Equipment	7-month total (tons/year)							0.01
T-Line Site Off-Road + T-Line Site Vehicle	7-month total (tons/year)							0.01
Offsite Haul Truck	7-month total (tons/year)							0.00
Offsite Delivery Truck	7-month total (tons/year)							0.00
Offsite Worker Travel	7-month total (tons/year)							0.00
					PM10			
T-Line Site Off-Road Equipment	(tons/month)	0.00E+00	9.50E-04	6.50E-04	4.80E-03	8.89E-03	5.97E-03	8.20E-04
T-Line Site Vehicle	(tons/month)	0.00E+00	5.21E-07	1.74E-05	1.75E-05	1.64E-05	3.95E-07	2.63E-07
T-Line Site Off-Road + T-Line Site Vehicle	(tons/month)	0.00E+00	9.51E-04	6.67E-04	4.82E-03	8.91E-03	5.97E-03	8.20E-04
Offsite Haul Truck	(tons/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	(tons/month)	0.00E+00	0.00E+00	2.19E-03	2.18E-03	2.05E-03	0.00E+00	0.00E+00
Offsite Worker Travel	(tons/month)	0.00E+00	8.00E-05	1.00E-04	1.20E-04	1.00E-04	6.00E-05	4.00E-05
T-Line Site Off-Road Equipment	7-month total (tons/year)							0.02
T-Line Site Off-Road + T-Line Site Vehicle	7-month total (tons/year)							0.02
Offsite Haul Truck	7-month total (tons/year)							0.00
Offsite Delivery Truck	7-month total (tons/year)							0.01
Offsite Worker Travel	7-month total (tons/year)							0.00
T-Line Site Fugitive (Off-Road)	(tons/month)	0.00E+00	2.84E-03	0.00E+00	0.00E+00	2.94E-02	3.38E-02	2.84E-03
T-Line Site Fugitive (T-Line Site Vehicle)	(tons/month)	7.95E-05	1.59E-03	3.39E-03	3.70E-03	3.38E-03	1.16E-03	8.75E-04
T-Line Site Off-Road + T-Line Site Vehicle	(tons/month)	7.95E-05	4.43E-03	3.39E-03	3.70E-03	3.28E-02	3.50E-02	3.71E-03
Offsite Fugitive - Haul Truck	(tons/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Fugitive - Delivery Truck	(tons/month)	0.00E+00	0.00E+00	7.44E-03	7.41E-03	6.94E-03	0.00E+00	0.00E+00
Offsite Fugitive - Worker Travel	(tons/month)	6.20E-04	1.24E-02	1.64E-02	1.88E-02	1.64E-02	9.08E-03	6.83E-03
T-Line Site Fugitive (Off-Road)	7-month total (tons/year)							0.07
T-Line Site Fugitive - Off-Road + T-Line Site Veh	7-month total (tons/year)							0.08
Offsite Fugitive - Haul Truck	7-month total (tons/year)							0.00
Offsite Fugitive - Delivery Truck	7-month total (tons/year)							0.02
Offsite Fugitive - Worker Travel	7-month total (tons/year)							0.08

Construction of the Proposed SEP Transmission Line - Monthly and Annual Emission Calculations

Project Month		7	8	9	10	11	12	13
					PM2.5			
T-Line Site Off-Road Equipment	(tons/month)	0.0E+00	9.5E-04	6.5E-04	4.8E-03	8.9E-03	6.0E-03	8.2E-04
T-Line Site Vehicle	(tons/month)	0.0E+00	4.6E-07	1.6E-05	1.6E-05	1.5E-05	3.3E-07	2.6E-07
T-Line Site Off-Road + T-Line Site Vehicle	(tons/month)	0.0E+00	9.5E-04	6.7E-04	4.8E-03	8.9E-03	6.0E-03	8.2E-04
Offsite Haul Truck	(tons/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	(tons/month)	0.0E+00	0.0E+00	2.0E-03	2.0E-03	1.9E-03	0.0E+00	0.0E+00
Offsite Worker Travel	(tons/month)	0.0E+00	7.0E-05	1.0E-04	1.1E-04	1.0E-04	5.0E-05	4.0E-05
T-Line Site Off-Road Equipment	7-month total (tons/year)							0.02
T-Line Site Off-Road + T-Line Site Vehicle	7-month total (tons/year)							0.02
Offsite Haul Truck	7-month total (tons/year)							0.00
Offsite Delivery Truck	7-month total (tons/year)							0.01
Offsite Worker Travel	7-month total (tons/year)							0.00
T-Line Site Fugitive (Off-Road)	(tons/month)	0.0E+00	3.1E-04	0.0E+00	0.0E+00	1.6E-02	1.9E-02	3.1E-04
T-Line Site Fugitive (T-Line Site Vehicle)	(tons/month)	8.0E-06	1.6E-04	3.4E-04	3.7E-04	3.4E-04	1.2E-04	8.7E-05
T-Line Site Off-Road + T-Line Site Vehicle	(tons/month)	8.0E-06	4.7E-04	3.4E-04	3.7E-04	1.6E-02	1.9E-02	4.0E-04
Offsite Fugitive - Haul Truck	(tons/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Fugitive - Delivery Truck	(tons/month)	0.0E+00	0.0E+00	2.1E-03	2.1E-03	2.0E-03	0.0E+00	0.0E+00
Offsite Fugitive - Worker Travel	(tons/month)	0.00	0.00	0.00	0.01	0.00	0.00	0.00
T-Line Site Fugitive (Off-Road)	7-month total (tons/year)							0.04
T-Line Site Fugitive - Off-Road + T-Line Site Veh	7-month total (tons/year)							0.04
Offsite Fugitive - Haul Truck	7-month total (tons/year)							0.00
Offsite Fugitive - Delivery Truck	7-month total (tons/year)							0.01
Offsite Fugitive - Worker Travel	7-month total (tons/year)							0.02
					CO2			
T-Line Site Off-Road Equipment	(MT/month)	0.00	53.89	36.80	271.62	503.11	337.74	46.22
T-Line Site Vehicle	(MT/month)	0.004	0.072	0.267	0.281	0.256	0.053	0.040
T-Line Site Off-Road + T-Line Site Vehicle	(MT/month)	0.00	53.97	37.06	271.90	503.37	337.79	46.26
Offsite Haul Truck	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	(MT/month)	0.00	0.00	22.28	22.21	20.80	0.00	0.00
Offsite Worker Travel	(MT/month)	0.58	11.07	14.59	16.78	14.59	8.10	6.09
T-Line Site Off-Road Equipment	7-month total (tons/year)							1,249.38
T-Line Site Off-Road + T-Line Site Vehicle	7-month total (tons/year)							1,250.35
Offsite Haul Truck	7-month total (tons/year)							0.00
Offsite Delivery Truck	7-month total (tons/year)							65.29
Offsite Worker Travel	7-month total (tons/year)							71.79

Construction of the Proposed SEP Transmission Line - Monthly and Annual Emission Calculations

Project Month		7	8	9	10	11	12	13
					CH4			
T-Line Site Off-Road Equipment	(MT/month)	0.000	0.017	0.011	0.083	0.154	0.104	0.014
T-Line Site Vehicle	(MT/month)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
T-Line Site Off-Road + T-Line Site Vehicle	(MT/month)	0.00	0.02	0.01	0.08	0.15	0.10	0.01
Offsite Haul Truck	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	(MT/month)	0.00E+00	0.00E+00	1.00E-04	1.00E-04	1.00E-04	0.00E+00	0.00E+00
Offsite Worker Travel	(MT/month)	3.00E-05	6.30E-04	8.20E-04	9.50E-04	8.20E-04	4.60E-04	3.40E-04
T-Line Site Off-Road Equipment	7-month total (MT/year)							0.38
T-Line Site Off-Road + T-Line Site Vehicle	7-month total (MT/year)							0.38
Offsite Haul Truck	7-month total (MT/year)							0.00
Offsite Delivery Truck	7-month total (MT/year)							0.00
Offsite Worker Travel	7-month total (MT/year)							0.00
					N2O			
T-Line Site Off-Road Equipment	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Vehicle	(MT/month)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
T-Line Site Off-Road + T-Line Site Vehicle	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Haul Truck	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Worker Travel	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road Equipment	7-month total (MT/year)							0.00
T-Line Site Off-Road + T-Line Site Vehicle	7-month total (MT/year)							0.00
Offsite Haul Truck	7-month total (MT/year)							0.00
Offsite Delivery Truck	7-month total (MT/year)							0.00
Offsite Worker Travel	7-month total (MT/year)							0.00
					CO2e			
T-Line Site Off-Road Equipment	(MT/month)	0.00	54.31	37.08	273.70	506.96	340.33	46.58
T-Line Site Vehicle	(MT/month)	0.004	0.072	0.267	0.281	0.256	0.053	0.040
T-Line Site Off-Road + T-Line Site Vehicle	(MT/month)	0.00	54.38	37.35	273.98	507.22	340.38	46.62
Offsite Haul Truck	(MT/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	(MT/month)	0.00	0.00	22.28	22.21	20.80	0.00	0.00
Offsite Worker Travel	(MT/month)	0.58	11.08	14.61	16.80	14.61	8.11	6.10
T-Line Site Off-Road Equipment	7-month total (MT/year)							1,258.95
T-Line Site Off-Road + T-Line Site Vehicle	7-month total (MT/year)							1,259.93
Offsite Haul Truck	7-month total (MT/year)							0.00
Offsite Delivery Truck	7-month total (MT/year)							65.29
Offsite Worker Travel	7-month total (MT/year)							71.89

Construction of the Proposed SEP Project Site - Summer (Peak) Daily Emissions

Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	ROG (lbs/day)																					
Onsite Off-Road Equipment	1.64	2.32	1.72	3.42	3.45	3.34	2.40	2.79	2.77	2.77	2.73	2.82	3.02	3.03	2.36	2.27	2.27	1.55	1.25	0.90	0.97	0.90
Onsite Vehicle	0.01	0.01	0.01	0.01	0.03	0.04	0.05	0.03	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.01	0.00	0.00
Onsite Off-Road + Onsite Vehicle	1.64	2.33	1.74	3.43	3.48	3.38	2.45	2.82	2.81	2.81	2.77	2.86	3.06	3.06	2.39	2.30	2.30	1.57	1.27	0.90	0.97	0.90
Offsite Haul Truck	0.41	0.42	0.82	0.46	1.67	2.30	4.15	1.40	1.48	0.75	0.40	0.36	0.38	0.38	0.38	0.38	0.73	0.67	0.76	0.33	0.00	0.00
Offsite Delivery Truck	0.00	0.15	0.15	0.15	0.59	0.89	0.89	0.80	1.07	1.33	1.07	0.80	0.27	0.13	0.13	0.13	0.13	0.13	0.13	0.00	0.00	0.00
Offsite Worker Travel	0.45	0.56	0.92	1.32	1.81	2.02	2.26	2.34	2.91	3.54	4.10	4.32	4.51	3.96	3.79	3.49	3.08	2.84	1.79	0.69	0.31	0.13
	NOx (lbs/day)																					
Onsite Off-Road Equipment	26.84	38.23	28.92	58.01	58.86	55.29	39.84	45.72	45.45	45.45	44.44	45.89	49.15	51.80	38.47	37.02	37.02	25.37	20.21	14.43	17.02	14.43
Onsite Vehicle	0.06	0.08	0.14	0.07	0.31	0.43	0.67	0.30	0.36	0.32	0.25	0.21	0.15	0.12	0.12	0.12	0.15	0.14	0.13	0.05	0.01	0.00
Onsite Off-Road + Onsite Vehicle	26.90	38.31	29.05	58.08	59.17	55.72	40.51	46.03	45.81	45.77	44.69	46.10	49.30	51.92	38.58	37.14	37.17	25.51	20.34	14.48	17.03	14.44
Offsite Haul Truck	6.75	6.80	13.41	4.69	27.20	37.38	67.50	21.66	22.83	11.65	6.20	5.61	5.87	5.91	5.83	5.91	11.28	10.38	11.82	4.79	0.00	0.00
Offsite Delivery Truck	0.00	2.58	2.58	2.58	10.31	15.46	15.46	13.48	17.97	22.47	17.97	13.48	4.49	2.25	2.25	2.25	2.25	2.25	2.25	0.00	0.00	0.00
Offsite Worker Travel	1.00	1.23	2.04	2.92	4.00	4.46	5.00	5.45	6.79	8.24	9.55	10.07	10.51	9.24	8.82	8.14	7.17	6.62	4.17	1.71	0.78	0.31
	CO (lbs/day)																					
Onsite Off-Road Equipment	53.09	75.51	55.85	113.27	114.14	108.54	78.11	90.66	90.12	90.12	88.61	91.52	98.11	102.06	76.56	73.65	73.65	50.16	40.73	29.09	33.54	29.09
Onsite Vehicle	0.11	0.14	0.24	0.28	0.50	0.62	0.82	0.61	0.74	0.81	0.85	0.86	0.85	0.74	0.71	0.66	0.62	0.57	0.39	0.16	0.06	0.02
Onsite Off-Road + Onsite Vehicle	53.20	75.65	56.09	113.55	114.64	109.16	78.92	91.27	90.86	90.93	89.47	92.39	98.96	102.80	77.27	74.31	74.27	50.73	41.12	29.25	33.60	29.11
Offsite Haul Truck	4.64	4.68	9.22	5.84	18.70	25.71	46.42	16.10	16.97	8.66	4.61	4.17	4.36	4.39	4.33	4.39	8.39	7.72	8.79	3.87	0.00	0.00
Offsite Delivery Truck	0.00	1.76	1.76	1.76	7.05	10.57	10.57	9.56	12.74	15.93	12.74	9.56	3.19	1.59	1.59	1.59	1.59	1.59	1.59	0.00	0.00	0.00
Offsite Worker Travel	11.68	14.38	23.81	34.14	46.72	52.12	58.41	63.07	78.64	95.40	110.57	116.56	121.75	106.98	102.19	94.20	83.03	76.64	48.30	19.65	8.93	3.57
	SO2 (lbs/day)																					
Onsite Off-Road Equipment	0.10	0.14	0.11	0.22	0.22	0.21	0.16	0.18	0.18	0.18	0.18	0.18	0.19	0.20	0.15	0.15	0.15	0.10	0.08	0.06	0.06	0.05
Onsite Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	0.10	0.14	0.11	0.22	0.22	0.21	0.16	0.18	0.18	0.18	0.18	0.18	0.20	0.20	0.15	0.15	0.15	0.10	0.08	0.06	0.06	0.05
Offsite Haul Truck	2.46E-02	2.47E-02	4.88E-02	1.61E-02	9.90E-02	1.36E-01	2.46E-01	9.05E-02	9.54E-02	4.87E-02	2.59E-02	2.34E-02	2.45E-02	2.47E-02	2.43E-02	2.47E-02	4.71E-02	4.34E-02	4.94E-02	2.25E-02	0.00E+00	0.00E+00
Offsite Delivery Truck	0.00E+00	8.28E-03	8.28E-03	8.28E-03	3.31E-02	4.97E-02	4.97E-02	4.96E-02	6.62E-02	8.27E-02	6.62E-02	4.96E-02	1.65E-02	8.27E-03	8.27E-03	8.27E-03	8.27E-03	8.27E-03	8.27E-03	0.00E+00	0.00E+00	0.00E+00
Offsite Worker Travel	1.96E-02	2.41E-02	3.99E-02	5.72E-02	7.83E-02	8.73E-02	9.79E-02	1.19E-01	1.48E-01	1.80E-01	2.08E-01	2.20E-01	2.29E-01	2.02E-01	1.93E-01	1.78E-01	1.57E-01	1.44E-01	9.10E-02	4.13E-02	1.88E-02	7.52E-03
	PM10 (lbs/day)																					
Onsite Off-Road Equipment	0.22	0.29	0.22	0.39	0.43	0.38	0.23	0.28	0.27	0.27	0.27	0.28	0.30	0.30	0.23	0.22	0.22	0.15	0.13	0.09	0.10	0.09
Onsite Vehicle	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	0.22	0.29	0.23	0.40	0.44	0.40	0.25	0.28	0.28	0.28	0.28	0.29	0.30	0.31	0.24	0.23	0.23	0.16	0.13	0.09	0.10	0.09
Offsite Haul Truck	0.21	0.21	0.41	0.13	0.84	1.16	2.09	0.69	0.72	0.37	0.20	0.18	0.19	0.19	0.18	0.19	0.36	0.33	0.37	0.17	0.00	0.00
Offsite Delivery Truck	0.00E+00	8.28E-02	8.28E-02	8.28E-02	3.31E-01	4.97E-01	4.97E-01	4.38E-01	5.84E-01	7.30E-01	5.84E-01	4.38E-01	1.46E-01	7.30E-02	7.30E-02	7.30E-02	7.30E-02	7.30E-02	7.30E-02	0.00E+00	0.00E+00	0.00E+00
Offsite Worker Travel	9.83E-03	1.21E-02	2.00E-02	2.87E-02	3.93E-02	4.38E-02	4.91E-02	5.71E-02	7.12E-02	8.64E-02	1.00E-01	1.06E-01	1.10E-01	9.69E-02	9.25E-02	8.53E-02	7.52E-02	6.94E-02	4.37E-02	1.93E-02	8.76E-03	3.51E-03
Onsite Fugitive (Off-Road)	0.78	0.78	0.78	1.03	0.78	0.78	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Fugitive (Vehicle)	1.35	1.69	2.81	3.79	5.71	6.67	8.29	8.09	10.01	11.58	12.91	13.33	13.61	11.92	11.40	10.54	9.52	8.78	5.77	2.59	1.08	0.43
Onsite Fugitive - Off-Road + Onsite Veh	2.12	2.46	3.59	4.83	6.48	7.45	8.55	8.09	10.01	11.58	12.91	13.33	13.61	11.92	11.40	10.54	9.52	8.78	5.77	2.59	1.08	0.43
Offsite Fugitive - Haul Truck	0.58	0.58	1.15	0.37	2.33	3.21	5.79	2.14	2.25	1.15	0.61	0.55	0.58	0.58	0.57	0.58	1.11	1.02	1.17	0.53	0.00	0.00
Offsite Fugitive - Delivery Truck	0.00	0.25	0.25	0.25	1.01	1.51	1.51	1.51	2.01	2.52	2.01	1.51	0.50	0.25	0.25	0.25	0.25	0.25	0.25	0.00	0.00	0.00
Offsite Fugitive - Worker Travel	1.49	1.84	3.04	4.37	5.97	6.66	7.47	9.08	11.32	13.73	15.91	16.77	17.52	15.39	14.70	13.56	11.95	11.03	6.95	3.16	1.44	0.57
	PM2.5 (lbs/day)																					
Onsite Off-Road Equipment	0.22	0.29	0.22	0.39	0.43	0.38	0.23	0.28	0.27	0.27	0.27	0.28	0.30	0.30	0.23	0.22	0.22	0.15	0.13	0.09	0.10	0.09
Onsite Vehicle	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	0.22	0.29	0.23	0.40	0.44	0.40	0.25	0.28	0.28	0.28	0.28	0.28	0.30	0.31	0.24	0.23	0.23	0.16	0.13	0.09	0.10	0.09
Offsite Haul Truck	0.19	0.19	0.38	0.12	0.77	1.06	1.92	0.63	0.66	0.34	0.18	0.16	0.17	0.17	0.17	0.17	0.33	0.30	0.34	0.15	0.00	0.00
Offsite Delivery Truck	0.00E+00	7.62E-02	7.62E-02	7.62E-02	3.05E-01	4.57E-01	4.57E-01	4.03E-01	5.37E-01	6.72E-01	5.37E-01	4.03E-01	1.34E-01	6.72E-02	6.72E-02	6.72E-02	6.72E-02	6.72E-02	6.72E-02	0.00E+00	0.00E+00	0.00E+00
Offsite Worker Travel	8.99E-03	1.11E-02	1.83E-02	2.63E-02	3.60E-02	4.01E-02	4.49E-02	5.25E-02	6.55E-02	7.94E-02	9.21E-02	9.71E-02	1.01E-01	8.91E-02	8.51E-02	7.84E-02	6.91E-02	6.38E-02	4.02E-02	1.78E-02	8.10E-03	3.24E-03
Onsite Fugitive (Off-Road)	0.08	0.08	0.08	0.11	0.08	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Fugitive (Vehicle)	0.13	0.17	0.28	0.38	0.57	0.67	0.83	0.81	1.00	1.16	1.29	1.33	1.36	1.19	1.14	1.05	0.95	0.88	0.58	0.26	0.11	0.04
Onsite Fugitive - Off-Road + Onsite Veh	0.22	0.25	0.36	0.49	0.65	0.75	0.86	0.81	1.00	1.16	1.29	1.33	1.36	1.19	1.14	1.05	0.95	0.88	0.58	0.26	0.11	0.04
Offsite Fugitive - Haul Truck	0.16	0.16	0.32	0.10	0.64	0.89	1.60	0.59	0.62	0.32	0.17	0.15	0.16	0.16	0.16	0.16	0.31	0.28	0.32	0.15	0.00	0.00
Offsite Fugitive - Delivery Truck	0.00	0.07	0.07	0.07	0.29	0.43	0.43	0.43	0.58	0.72	0.58	0.43	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.00	0.00	0.00
Offsite Fugitive - Worker Travel	0.40	0.49	0.81	1.16	1.59	1.78	1.99	2.42	3.02	3.66	4.24	4.47	4.67	4.11	3.92	3.62	3.19	2.94	1.85	0.84	0.38	0.15

Construction of the Proposed SEP Project Site - Summer (Peak) Daily Emissions

Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
											CO2 (lbs/day)											
Onsite Off-Road Equipment	10,449	14,805	10,827	21,951	22,062	21,327	15,549	17,885	17,789	17,789	17,556	18,117	19,376	19,831	15,252	14,691	14,691	9,789	8,054	5,723	6,314	5,498
Onsite Vehicle	29.49	38.43	65.51	49.41	144.05	190.34	280.79	167.78	199.17	192.39	177.19	168.55	149.27	128.81	123.91	116.43	122.69	113.63	90.73	37.35	9.31	3.72
Onsite Off-Road + Onsite Vehicle	10,478	14,843	10,892	22,000	22,206	21,517	15,829	18,053	17,988	17,981	17,733	18,285	19,525	19,959	15,376	14,808	14,814	9,903	8,145	5,760	6,323	5,502
Offsite Haul Truck	2,479	2,497	4,925	1,617	9,989	13,731	24,792	8,994	9,481	4,839	2,576	2,330	2,436	2,454	2,419	2,454	4,684	4,309	4,907	2,201	0	0
Offsite Delivery Truck	0	833	833	833	3,332	4,997	4,997	4,915	6,553	8,191	6,553	4,915	1,638	819	819	819	819	819	819	0	0	0
Offsite Worker Travel	1,609	1,980	3,280	4,703	6,436	7,178	8,045	9,388	11,705	14,200	16,458	17,349	18,121	15,923	15,210	14,022	12,358	11,408	7,189	3,143	1,429	571
											CH4 (lbs/day)											
Onsite Off-Road Equipment	3.11	4.42	3.21	5.80	5.84	5.60	3.84	4.60	4.57	4.57	4.51	4.68	5.06	4.89	3.80	3.63	3.63	2.93	2.42	1.73	1.92	1.71
Onsite Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	3.11	4.42	3.22	5.80	5.84	5.61	3.84	4.60	4.58	4.58	4.51	4.68	5.07	4.90	3.81	3.63	3.63	2.94	2.42	1.74	1.92	1.71
Offsite Haul Truck	1.24E-02	1.25E-02	2.46E-02	8.73E-03	4.98E-02	6.85E-02	1.24E-01	4.27E-02	4.50E-02	2.30E-02	1.22E-02	1.11E-02	1.16E-02	1.17E-02	1.15E-02	1.17E-02	2.22E-02	2.05E-02	2.33E-02	1.05E-02	0.00E+00	0.00E+00
Offsite Delivery Truck	0.00E+00	4.11E-03	4.11E-03	4.11E-03	1.65E-02	2.47E-02	2.47E-02	2.26E-02	3.01E-02	3.76E-02	3.01E-02	2.26E-02	7.53E-03	3.76E-03	3.76E-03	3.76E-03	3.76E-03	3.76E-03	3.76E-03	0.00E+00	0.00E+00	0.00E+00
Offsite Worker Travel	0.09	0.11	0.18	0.26	0.36	0.40	0.44	0.49	0.62	0.75	0.87	0.91	0.96	0.84	0.80	0.74	0.65	0.60	0.38	0.16	0.07	0.03
											N2O (lbs/day)											
Onsite Off-Road Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onsite Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite Haul Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite Delivery Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite Worker Travel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
											CO2e (lbs/day)											
Onsite Off-Road Equipment	10,526	14,915	10,907	22,096	22,208	21,467	15,645	18,000	17,903	17,903	17,669	18,234	19,502	19,953	15,347	14,782	14,782	9,862	8,115	5,766	6,362	5,541
Onsite Vehicle	29.50	38.45	65.54	49.46	144.12	190.42	280.89	167.87	199.28	192.53	177.34	168.71	149.43	128.95	124.04	116.55	122.80	113.73	90.80	37.38	9.32	3.73
Onsite Off-Road + Onsite Vehicle	10,556	14,954	10,973	22,145	22,352	21,657	15,925	18,168	18,102	18,095	17,846	18,402	19,652	20,082	15,471	14,898	14,905	9,976	8,206	5,803	6,371	5,545
Offsite Haul Truck	2,479	2,498	4,926	1,617	9,991	13,733	24,795	8,995	9,482	4,840	2,577	2,330	2,436	2,454	2,420	2,454	4,685	4,310	4,908	2,201	0	0
Offsite Delivery Truck	0	833	833	833	3,332	4,998	4,998	4,915	6,553	8,192	6,553	4,915	1,638	819	819	819	819	819	819	0	0	0
Offsite Worker Travel	1,611	1,983	3,284	4,710	6,445	7,188	8,056	9,400	11,720	14,219	16,480	17,372	18,145	15,944	15,230	14,040	12,375	11,423	7,199	3,147	1,431	572

Construction of the Proposed SEP Transmission Line - Summer (Peak) Daily Emissions

Project Month	7	8	9	10	11	12	13
	ROG (lbs/day)						
T-Line Site Off-Road Equipment	0.00	0.87	0.66	4.21	8.89	5.16	0.74
T-Line Site Vehicle	0.00	0.00	0.01	0.01	0.01	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	0.87	0.66	4.22	8.90	5.16	0.74
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00	0.00	0.40	0.35	0.37	0.00	0.00
Offsite Worker Travel	0.02	0.30	0.43	0.43	0.43	0.21	0.16
	NOx (lbs/day)						
T-Line Site Off-Road Equipment	0.00	13.98	11.36	71.09	150.99	87.58	11.98
T-Line Site Vehicle	0.00	0.00	0.06	0.05	0.05	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	13.98	11.42	71.14	151.04	87.58	11.98
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00	0.00	6.74	5.84	6.29	0.00	0.00
Offsite Worker Travel	0.04	0.69	1.00	1.00	1.00	0.48	0.38
	CO (lbs/day)						
T-Line Site Off-Road Equipment	0.00	28.17	22.30	139.95	298.08	173.60	24.14
T-Line Site Vehicle	0.00	0.05	0.11	0.11	0.11	0.04	0.03
T-Line Site Off-Road + T-Line Site Vehicle	0.00	28.22	22.41	140.06	298.19	173.64	24.17
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00	0.00	4.78	4.14	4.46	0.00	0.00
Offsite Worker Travel	0.45	7.98	11.58	11.58	11.58	5.59	4.39
	SO2 (lbs/day)						
T-Line Site Off-Road Equipment	0.00	0.05	0.04	0.25	0.54	0.32	0.05
T-Line Site Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	0.05	0.04	0.25	0.54	0.32	0.05
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00E+00	0.00E+00	2.48E-02	2.15E-02	2.32E-02	0.00E+00	0.00E+00
Offsite Worker Travel	7.50E-04	1.50E-02	2.18E-02	2.18E-02	2.18E-02	1.05E-02	8.27E-03
	PM10 (lbs/day)						
T-Line Site Off-Road Equipment	0.00	0.09	0.07	0.42	0.89	0.52	0.07
T-Line Site Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	0.09	0.07	0.42	0.89	0.52	0.07
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00E+00	0.00E+00	2.19E-01	1.90E-01	2.04E-01	0.00E+00	0.00E+00
Offsite Worker Travel	3.80E-04	7.23E-03	1.05E-02	1.05E-02	1.05E-02	5.06E-03	3.98E-03
T-Line Site Fugitive (Off-Road)	0.00	0.26	0.00	0.00	2.94	2.94	0.26
T-Line Site Fugitive (T-Line Site Vehicle)	0.01	0.14	0.34	0.32	0.34	0.10	0.08
T-Line Site Fugitive - Off-Road + T-Line Site Veh	0.01	0.40	0.34	0.32	3.27	3.04	0.34
Offsite Fugitive - Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Fugitive - Delivery Truck	0.00	0.00	0.75	0.65	0.70	0.00	0.00
Offsite Fugitive - Worker Travel	0.06	1.15	1.67	1.67	1.67	0.80	0.63
	PM2.5 (lbs/day)						
T-Line Site Off-Road Equipment	0.00	0.09	0.07	0.42	0.89	0.52	0.07
T-Line Site Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	0.09	0.07	0.42	0.89	0.52	0.07
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00E+00	0.00E+00	2.02E-01	1.75E-01	1.88E-01	0.00E+00	0.00E+00
Offsite Worker Travel	3.50E-04	6.65E-03	9.64E-03	9.64E-03	9.64E-03	4.65E-03	3.66E-03
T-Line Site Fugitive (Off-Road)	0.00	0.03	0.00	0.00	1.61	1.61	0.03
T-Line Site Fugitive (T-Line Site Vehicle)	0.00	0.01	0.03	0.03	0.03	0.01	0.01
T-Line Site Fugitive - Off-Road + T-Line Site Veh	0.00	0.04	0.03	0.03	1.65	1.62	0.04
Offsite Fugitive - Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Fugitive - Delivery Truck	0.00	0.00	0.22	0.19	0.20	0.00	0.00
Offsite Fugitive - Worker Travel	0.02	0.31	0.44	0.44	0.44	0.21	0.17

Construction of the Proposed SEP Transmission Line - Summer (Peak) Daily Emissions

Project Month	7	8	9	10	11	12	13
	CO2 (lbs/day)						
T-Line Site Off-Road Equipment	0	5,401	4,056	26,035	55,458	32,373	4,632
T-Line Site Vehicle	0.40	7.74	30.19	27.67	28.93	5.48	4.30
T-Line Site Off-Road + T-Line Site Vehicle	0	5,408	4,086	26,063	55,487	32,379	4,636
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0	0	2,457	2,130	2,293	0	0
Offsite Worker Travel	62	1,188	1,723	1,723	1,723	832	654
	CH4 (lbs/day)						
T-Line Site Off-Road Equipment	0.00	1.65	1.24	7.98	16.99	9.92	1.42
T-Line Site Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	1.66	1.24	7.98	16.99	9.92	1.42
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00E+00	0.00E+00	1.13E-02	9.78E-03	1.05E-02	0.00E+00	0.00E+00
Offsite Worker Travel	0.00	0.06	0.09	0.09	0.09	0.04	0.03
	N2O (lbs/day)						
T-Line Site Off-Road Equipment	0		0	0	0	0	0
T-Line Site Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0	0	0	0	0	0	0
Offsite Haul Truck	0		0	0	0	0	0
Offsite Delivery Truck	0		0	0	0	0	0
Offsite Worker Travel	0		0	0	0	0	0
	CO2e (lbs/day)						
T-Line Site Off-Road Equipment	0	5,442	4,087	26,235	55,883	32,621	4,668
T-Line Site Vehicle	0.40	7.75	30.20	27.69	28.95	5.48	4.31
T-Line Site Off-Road + T-Line Site Vehicle	0	5,450	4,118	26,262	55,912	32,627	4,672
Offsite Haul Truck	0	0	0	0	0	0	0
Offsite Delivery Truck	0	0	2,458	2,130	2,294	0	0
Offsite Worker Travel	62	1,190	1,725	1,725	1,725	833	654

Construction of the Proposed SEP Project Site - Winter (Peak) Daily Emissions

Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	ROG (lbs/day)																					
Onsite Off-Road Equipment	1.64	2.32	1.72	3.42	3.45	3.34	2.40	2.79	2.77	2.77	2.73	2.82	3.02	3.03	2.36	2.27	2.27	1.55	1.25	0.90	0.97	0.90
Onsite Vehicle	0.01	0.01	0.01	0.01	0.03	0.04	0.05	0.03	0.04	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.00	0.00
Onsite Off-Road + Onsite Vehicle	1.64	2.33	1.74	3.43	3.48	3.38	2.45	2.82	2.81	2.81	2.76	2.85	3.05	3.05	2.38	2.29	2.29	1.57	1.27	0.90	0.97	0.90
Offsite Haul Truck	0.43	0.44	0.86	0.50	1.75	2.40	4.34	1.46	1.54	0.79	0.42	0.38	0.40	0.40	0.39	0.40	0.76	0.70	0.80	0.35	0.00	0.00
Offsite Delivery Truck	0.00	0.15	0.15	0.15	0.61	0.92	0.92	0.83	1.10	1.38	1.10	0.83	0.28	0.14	0.14	0.14	0.14	0.14	0.14	0.00	0.00	0.00
Offsite Worker Travel	0.38	0.47	0.77	1.11	1.52	1.69	1.90	1.93	2.41	2.92	3.39	3.57	3.73	3.28	3.13	2.89	2.54	2.35	1.48	0.56	0.26	0.10
	NOx (lbs/day)																					
Onsite Off-Road Equipment	26.84	38.23	28.92	58.01	58.86	55.29	39.84	45.72	45.45	45.45	44.44	45.89	49.15	51.80	38.47	37.02	37.02	25.37	20.21	14.43	17.02	14.43
Onsite Vehicle	0.06	0.08	0.14	0.08	0.33	0.46	0.71	0.32	0.38	0.33	0.26	0.22	0.16	0.13	0.13	0.12	0.16	0.15	0.14	0.05	0.01	0.00
Onsite Off-Road + Onsite Vehicle	26.90	38.31	29.06	58.09	59.19	55.75	40.55	46.05	45.83	45.79	44.71	46.11	49.31	51.93	38.59	37.14	37.18	25.51	20.35	14.48	17.03	14.44
Offsite Haul Truck	7.13	7.18	14.16	4.93	28.72	39.48	71.28	22.87	24.11	12.31	6.55	5.93	6.19	6.24	6.15	6.24	11.91	10.96	12.48	5.06	0.00	0.00
Offsite Delivery Truck	0.00	2.74	2.74	2.74	10.94	16.42	16.42	14.31	19.08	23.86	19.08	14.31	4.77	2.39	2.39	2.39	2.39	2.39	2.39	0.00	0.00	0.00
Offsite Worker Travel	1.05	1.29	2.14	3.07	4.20	4.68	5.25	5.70	7.11	8.63	10.00	10.54	11.01	9.67	9.24	8.52	7.51	6.93	4.37	1.79	0.81	0.33
	CO (lbs/day)																					
Onsite Off-Road Equipment	53.09	75.51	55.85	113.27	114.14	108.54	78.11	90.66	90.12	90.12	88.61	91.52	98.11	102.06	76.56	73.65	73.65	50.16	40.73	29.09	33.54	29.09
Onsite Vehicle	0.10	0.13	0.21	0.24	0.45	0.57	0.77	0.53	0.65	0.69	0.70	0.70	0.68	0.59	0.57	0.53	0.50	0.47	0.33	0.13	0.04	0.02
Onsite Off-Road + Onsite Vehicle	53.19	75.64	56.06	113.50	114.59	109.11	78.88	91.20	90.76	90.80	89.32	92.23	98.78	102.65	77.13	74.18	74.16	50.63	41.06	29.22	33.59	29.11
Offsite Haul Truck	5.09	5.13	10.12	6.73	20.52	28.21	50.93	17.80	18.77	9.58	5.10	4.61	4.82	4.86	4.79	4.86	9.27	8.53	9.71	4.29	0.00	0.00
Offsite Delivery Truck	0.00	1.87	1.87	1.87	7.48	11.21	11.21	10.23	13.65	17.06	13.65	10.23	3.41	1.71	1.71	1.71	1.71	1.71	1.71	0.00	0.00	0.00
Offsite Worker Travel	9.09	11.19	18.54	26.58	36.37	40.57	45.46	48.89	60.96	73.96	85.72	90.36	94.38	82.93	79.22	73.03	64.37	59.41	37.44	15.17	6.89	2.76
	SO2 (lbs/day)																					
Onsite Off-Road Equipment	0.10	0.14	0.11	0.22	0.22	0.21	0.16	0.18	0.18	0.18	0.18	0.18	0.19	0.20	0.15	0.15	0.15	0.10	0.08	0.06	0.06	0.05
Onsite Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	0.10	0.14	0.11	0.22	0.22	0.21	0.16	0.18	0.18	0.18	0.18	0.18	0.20	0.20	0.15	0.15	0.15	0.10	0.08	0.06	0.06	0.05
Offsite Haul Truck	0.02	0.02	0.05	0.02	0.10	0.14	0.25	0.09	0.10	0.05	0.03	0.02	0.02	0.02	0.02	0.02	0.05	0.04	0.05	0.02	0.00	0.00
Offsite Delivery Truck	0.00	0.01	0.01	0.01	0.03	0.05	0.05	0.05	0.07	0.08	0.07	0.05	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Offsite Worker Travel	0.02	0.02	0.04	0.05	0.07	0.08	0.09	0.11	0.13	0.16	0.19	0.20	0.21	0.18	0.17	0.16	0.14	0.13	0.08	0.04	0.02	0.01
	PM10 (lbs/day)																					
Onsite Off-Road Equipment	0.22	0.29	0.22	0.39	0.43	0.38	0.23	0.28	0.27	0.27	0.27	0.28	0.30	0.30	0.23	0.22	0.22	0.15	0.13	0.09	0.10	0.09
Onsite Vehicle	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	0.22	0.29	0.23	0.40	0.44	0.40	0.25	0.28	0.28	0.28	0.28	0.29	0.30	0.31	0.24	0.23	0.23	0.16	0.13	0.09	0.10	0.09
Offsite Haul Truck	0.21	0.21	0.41	0.14	0.84	1.16	2.09	0.69	0.72	0.37	0.20	0.18	0.19	0.19	0.18	0.19	0.36	0.33	0.37	0.17	0.00	0.00
Offsite Delivery Truck	0.00	0.08	0.08	0.08	0.33	0.50	0.50	0.44	0.58	0.73	0.58	0.44	0.15	0.07	0.07	0.07	0.07	0.07	0.07	0.00	0.00	0.00
Offsite Worker Travel	0.01	0.01	0.02	0.03	0.04	0.04	0.05	0.06	0.07	0.09	0.10	0.11	0.11	0.10	0.09	0.09	0.08	0.07	0.04	0.02	0.01	0.00
Onsite Fugitive (Off-Road)	0.78	0.78	0.78	1.03	0.78	0.78	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Fugitive (Vehicle)	1.35	1.69	2.81	3.79	5.71	6.67	8.29	8.09	10.01	11.58	12.91	13.33	13.61	11.92	11.40	10.54	9.52	8.78	5.77	2.59	1.08	0.43
Onsite Fugitive - Off-Road + Onsite Veh	2.12	2.46	3.59	4.83	6.48	7.45	8.55	8.09	10.01	11.58	12.91	13.33	13.61	11.92	11.40	10.54	9.52	8.78	5.77	2.59	1.08	0.43
Offsite Fugitive - Haul Truck	0.58	0.58	1.15	0.37	2.33	3.21	5.79	2.14	2.25	1.15	0.61	0.55	0.58	0.58	0.57	0.58	1.11	1.02	1.17	0.53	0.00	0.00
Offsite Fugitive - Delivery Truck	0.00	0.25	0.25	0.25	1.01	1.51	1.51	1.51	2.01	2.52	2.01	1.51	0.50	0.25	0.25	0.25	0.25	0.25	0.25	0.00	0.00	0.00
Offsite Fugitive - Worker Travel	1.49	1.84	3.04	4.37	5.97	6.66	7.47	9.08	11.32	13.73	15.91	16.77	17.52	15.39	14.70	13.56	11.95	11.03	6.95	3.16	1.44	0.57

Construction of the Proposed SEP Project Site - Winter (Peak) Daily Emissions

Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	PM2.5 (lbs/day)																					
Onsite Off-Road Equipment	0.22	0.29	0.22	0.39	0.43	0.38	0.23	0.28	0.27	0.27	0.27	0.28	0.30	0.30	0.23	0.22	0.22	0.15	0.13	0.09	0.10	0.09
Onsite Vehicle	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	0.22	0.29	0.23	0.40	0.44	0.40	0.25	0.28	0.28	0.28	0.28	0.28	0.30	0.31	0.24	0.23	0.23	0.16	0.13	0.09	0.10	0.09
Offsite Haul Truck	0.19	0.19	0.38	0.12	0.77	1.06	1.92	0.63	0.66	0.34	0.18	0.16	0.17	0.17	0.17	0.17	0.33	0.30	0.34	0.15	0.00	0.00
Offsite Delivery Truck	0.00	0.08	0.08	0.08	0.30	0.46	0.46	0.40	0.54	0.67	0.54	0.40	0.13	0.07	0.07	0.07	0.07	0.07	0.07	0.00	0.00	0.00
Offsite Worker Travel	0.01	0.01	0.02	0.03	0.04	0.04	0.04	0.05	0.07	0.08	0.09	0.10	0.10	0.09	0.09	0.08	0.07	0.06	0.04	0.02	0.01	0.00
Onsite Fugitive (Off-Road)	0.08	0.08	0.08	0.11	0.08	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Fugitive (Vehicle)	0.13	0.17	0.28	0.38	0.57	0.67	0.83	0.81	1.00	1.16	1.29	1.33	1.36	1.19	1.14	1.05	0.95	0.88	0.58	0.26	0.11	0.04
Onsite Fugitive - Off-Road + Onsite Veh	0.22	0.25	0.36	0.49	0.65	0.75	0.86	0.81	1.00	1.16	1.29	1.33	1.36	1.19	1.14	1.05	0.95	0.88	0.58	0.26	0.11	0.04
Offsite Fugitive - Haul Truck	0.16	0.16	0.32	0.10	0.64	0.89	1.60	0.59	0.62	0.32	0.17	0.15	0.16	0.16	0.16	0.16	0.31	0.28	0.32	0.15	0.00	0.00
Offsite Fugitive - Delivery Truck	0.00	0.07	0.07	0.07	0.29	0.43	0.43	0.43	0.58	0.72	0.58	0.43	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.00	0.00	0.00
Offsite Fugitive - Worker Travel	0.40	0.49	0.81	1.16	1.59	1.78	1.99	2.42	3.02	3.66	4.24	4.47	4.67	4.11	3.92	3.62	3.19	2.94	1.85	0.84	0.38	0.15
	CO2 (lbs/day)																					
Onsite Off-Road Equipment	10,449	14,805	10,827	21,951	22,062	21,327	15,549	17,885	17,789	17,789	17,556	18,117	19,376	19,831	15,252	14,691	14,691	9,789	8,054	5,723	6,314	5,498
Onsite Vehicle	28.39	37.08	63.27	46.22	139.64	185.40	275.19	161.39	191.21	182.78	166.09	156.87	137.10	118.12	113.69	107.01	114.37	105.95	85.88	35.23	8.35	3.34
Onsite Off-Road + Onsite Vehicle	10477	14842	10,890	21,997	22,201	21,512	15,824	18,047	17,980	17,971	17,722	18,274	19,513	19,949	15,365	14,798	14,805	9,895	8,140	5,758	6,322	5,501
Offsite Haul Truck	2477	2495	4921	1613	9981	13719	24771	8986	9473	4835	2574	2328	2434	2452	2417	2452	4680	4306	4903	2199	0	0
Offsite Delivery Truck	0	832	832	832	3328	4992	4992	4909	6546	8182	6546	4909	1636	818	818	818	818	818	818	0	0	0
Offsite Worker Travel	1,443	1,776	2,942	4,219	5,773	6,439	7,217	8,422	10,501	12,739	14,765	15,564	16,257	14,285	13,646	12,579	11,087	10,234	6,450	2,820	1,282	513
	CH4 (lbs/day)																					
Onsite Off-Road Equipment	3.11	4.42	3.21	5.80	5.84	5.60	3.84	4.60	4.57	4.57	4.51	4.68	5.06	4.89	3.80	3.63	3.63	2.93	2.42	1.73	1.92	1.71
Onsite Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	3.11	4.42	3.22	5.80	5.84	5.61	3.84	4.60	4.58	4.58	4.51	4.68	5.07	4.90	3.81	3.63	3.63	2.94	2.42	1.74	1.92	1.71
Offsite Haul Truck	1.25E-02	1.25E-02	2.47E-02	8.90E-03	5.02E-02	6.90E-02	1.25E-01	4.30E-02	4.54E-02	2.32E-02	1.23E-02	1.12E-02	1.17E-02	1.17E-02	1.16E-02	1.17E-02	2.24E-02	2.06E-02	2.35E-02	1.05E-02	0.00E+00	0.00E+00
Offsite Delivery Truck	0.00E+00	4.14E-03	4.14E-03	4.14E-03	1.66E-02	2.48E-02	2.48E-02	2.27E-02	3.03E-02	3.79E-02	3.03E-02	2.27E-02	7.58E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03	0.00E+00	0.00E+00	0.00E+00
Offsite Worker Travel	0.09	0.11	0.18	0.26	0.36	0.40	0.44	0.49	0.62	0.75	0.87	0.91	0.96	0.84	0.80	0.74	0.65	0.60	0.38	0.16	0.07	0.03
	N2O (lbs/day)																					
Onsite Off-Road Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onsite Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite Haul Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite Delivery Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Offsite Worker Travel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CO2e (lbs/day)																					
Onsite Off-Road Equipment	10,526	14,915	10,907	22,096	22,208	21,467	15,645	18,000	17,903	17,903	17,669	18,234	19,502	19,953	15,347	14,782	14,782	9,862	8,115	5,766	6,362	5,541
Onsite Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Off-Road + Onsite Vehicle	10,526	14,915	10,907	22,096	22,208	21,467	15,645	18,000	17,903	17,903	17,669	18,234	19,502	19,953	15,347	14,782	14,782	9,862	8,115	5,766	6,362	5,541
Offsite Haul Truck	2,477	2,496	4,922	1,613	9,982	13,721	24,774	8,987	9,474	4,835	2,574	2,328	2,434	2,452	2,418	2,452	4,681	4,306	4,904	2,200	0	0
Offsite Delivery Truck	0	832	832	832	3,328	4,992	4,992	4,910	6,546	8,183	6,546	4,910	1,637	818	818	818	818	818	818	0	0	0
Offsite Worker Travel	1,446	1,779	2,947	4,225	5,782	6,449	7,228	8,434	10,516	12,758	14,787	15,587	16,281	14,306	13,666	12,598	11,103	10,249	6,459	2,824	1,284	513

Construction of the Proposed SEP Transmission Line - Winter (Peak) Daily Emissions

Project Month	7	8	9	10	11	12	13
	ROG (lbs/day)						
T-Line Site Off-Road Equipment	0.00	0.87	0.66	4.21	8.89	5.16	0.74
T-Line Site Vehicle	0.00	0.00	0.01	0.01	0.01	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	0.87	0.66	4.22	8.90	5.16	0.74
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00	0.00	0.41	0.36	0.39	0.00	0.00
Offsite Worker Travel	0.01	0.24	0.35	0.35	0.35	0.17	0.13
	NOx (lbs/day)						
T-Line Site Off-Road Equipment	0.00	13.98	11.36	71.09	150.99	87.58	11.98
T-Line Site Vehicle	0.00	0.00	0.06	0.05	0.06	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	13.98	11.42	71.14	151.04	87.58	11.98
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00	0.00	7.16	6.20	6.68	0.00	0.00
Offsite Worker Travel	0.04	0.72	1.05	1.05	1.05	0.51	0.40
	CO (lbs/day)						
T-Line Site Off-Road Equipment	0.00	28.17	22.30	139.95	298.08	173.60	24.14
T-Line Site Vehicle	0.00	0.04	0.10	0.09	0.10	0.03	0.02
T-Line Site Off-Road + T-Line Site Vehicle	0.00	28.21	22.40	140.04	298.17	173.63	24.16
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00	0.00	5.12	4.43	4.78	0.00	0.00
Offsite Worker Travel	0.35	6.19	8.97	8.97	8.97	4.33	3.40
	SO2 (lbs/day)						
T-Line Site Off-Road Equipment	0.00	0.05	0.04	0.25	0.54	0.32	0.05
T-Line Site Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	0.05	0.04	0.25	0.54	0.32	0.05
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00E+00	0.00E+00	2.48E-02	2.15E-02	2.31E-02	0.00E+00	0.00E+00
Offsite Worker Travel	6.70E-04	1.35E-02	1.95E-02	1.95E-02	1.95E-02	9.43E-03	7.41E-03
	PM10 (lbs/day)						
T-Line Site Off-Road Equipment	0.00	0.09	0.07	0.42	0.89	0.52	0.07
T-Line Site Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	0.09	0.07	0.42	0.89	0.52	0.07
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00	0.00	0.22	0.19	0.20	0.00	0.00
Offsite Worker Travel	3.80E-04	7.23E-03	1.05E-02	1.05E-02	1.05E-02	5.06E-03	3.98E-03
T-Line Site Fugitive (Off-Road)	0.00	0.26	0.00	0.00	2.94	2.94	0.26
T-Line Site Fugitive (T-Line Site Vehicle)	0.01	0.14	0.34	0.32	0.34	0.10	0.08
T-Line Site Fugitive - Off-Road + T-Line Site Veh	0.01	0.40	0.34	0.32	3.27	3.04	0.34
Offsite Fugitive - Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Fugitive - Delivery Truck	0.00	0.00	0.75	0.65	0.70	0.00	0.00
Offsite Fugitive - Worker Travel	0.06	1.15	1.67	1.67	1.67	0.80	0.63
	PM2.5 (lbs/day)						
T-Line Site Off-Road Equipment	0.00	0.09	0.07	0.42	0.89	0.52	0.07
T-Line Site Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	0.09	0.07	0.42	0.89	0.52	0.07
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00E+00	0.00E+00	2.02E-01	1.75E-01	1.88E-01	0.00E+00	0.00E+00
Offsite Worker Travel	3.50E-04	6.65E-03	9.64E-03	9.64E-03	9.64E-03	4.65E-03	3.66E-03
T-Line Site Fugitive (Off-Road)	0.00	0.03	0.00	0.00	1.61	1.61	0.03
T-Line Site Fugitive (T-Line Site Vehicle)	0.00	0.01	0.03	0.03	0.03	0.01	0.01
T-Line Site Fugitive - Off-Road + T-Line Site Veh	0.00	0.04	0.03	0.03	1.65	1.62	0.04
Offsite Fugitive - Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Fugitive - Delivery Truck	0.00	0.00	0.22	0.19	0.20	0.00	0.00
Offsite Fugitive - Worker Travel	0.02	0.31	0.44	0.44	0.44	0.21	0.17

Construction of the Proposed SEP Transmission Line - Winter (Peak) Daily Emissions

Project Month	7	8	9	10	11	12	13
	CO2 (lbs/day)						
T-Line Site Off-Road Equipment	0	5,401	4,056	26,035	55,458	32,373	4,632
T-Line Site Vehicle	0.36	6.94	29.00	26.49	27.74	4.91	3.86
T-Line Site Off-Road + T-Line Site Vehicle	0	5408	4085	26,062	55,486	32,378	4,636
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0	0	2455	2127	2291	0	0
Offsite Worker Travel	56	1,066	1,546	1,546	1,546	746	586
	CH4 (lbs/day)						
T-Line Site Off-Road Equipment	0.00	1.65	1.24	7.98	16.99	9.92	1.42
T-Line Site Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0.00	1.66	1.24	7.98	16.99	9.92	1.42
Offsite Haul Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Delivery Truck	0.00E+00	0.00E+00	1.14E-02	9.85E-03	1.06E-02	0.00E+00	0.00E+00
Offsite Worker Travel	0.00	0.06	0.09	0.09	0.09	0.04	0.03
	N2O (lbs/day)						
T-Line Site Off-Road Equipment	0	0	0	0	0	0	0
T-Line Site Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T-Line Site Off-Road + T-Line Site Vehicle	0	0	0	0	0	0	0
Offsite Haul Truck	0	0	0	0	0	0	0
Offsite Delivery Truck	0	0	0	0	0	0	0
Offsite Worker Travel	0	0	0	0	0	0	0
	CO2e (lbs/day)						
T-Line Site Off-Road Equipment	0	5,442	4,087	26,235	55,883	32,621	4,668
T-Line Site Vehicle	0.36	6.95	29.02	26.51	27.76	4.92	3.87
T-Line Site Off-Road + T-Line Site Vehicle	0	5,449	4,116	26,261	55,911	32,626	4,672
Offsite Haul Truck	0	0	0	0	0	0	0
Offsite Delivery Truck	0	0	2,455	2,128	2,291	0	0
Offsite Worker Travel	56	1,068	1,548	1,548	1,548	747	587

Fugitive Dust Calculations

Worker, Delivery (vendor) Trucks and Haul Trucks Onsite Travels

Onsite travel for worker, truck delivery, and haul trucks are assumed to be on graveled surfaces.

- Onsite delivery and haul truck travel distances are estimated from the site security point to the laydown area, 0.46 mile (one-way)
- Onsite work travel distance is estimated from the site security point to the parking area 0.27 mile (one-way)

Total Controlled Fugitive Emissions for Worker, Delivery Trucks and Haul Truck travel for Project Construction

	2016							2017												2018		
	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Number of Workdays	22	21	23	22	21	22	22	22	20	23	20	23	22	21	23	21	22	22	21	23	20	22
Onsite Fugitive PM10 (ton/month)	0.01	0.02	0.03	0.04	0.06	0.07	0.09	0.08	0.09	0.13	0.12	0.15	0.15	0.12	0.13	0.11	0.10	0.10	0.06	0.03	0.01	0.00
Onsite Fugitive PM2.5 (ton/month)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Onsite Fugitive PM10, Rolling 12-month total (tons/year)												0.89	1.03	1.13	1.23	1.30	1.35	1.38	1.35	1.29	1.21	1.09
Onsite Fugitive PM2.5, Rolling 12-month total (tons/year)												0.09	0.11	0.12	0.13	0.13	0.14	0.14	0.14	0.13	0.12	0.11
Onsite Fugitive PM10 (lb/day)	1.35	1.69	2.81	3.79	5.71	6.67	8.29	8.09	10.01	11.58	12.91	13.33	13.61	11.92	11.40	10.54	9.52	8.78	5.77	2.59	1.08	0.43
Onsite Fugitive PM2.5 (lb/day)	0.13	0.17	0.28	0.38	0.57	0.67	0.83	0.81	1.00	1.16	1.29	1.33	1.36	1.19	1.14	1.05	0.95	0.88	0.58	0.26	0.11	0.04

Fugitive Dust Calculations

Vehicle Weights Estimations

Estimated average vehicle weights for

Workers	2.4	ton	(CalEEMod default value; CARB Area Source Manual, 9/97)
Delivery (vendor) trucks	27.5	ton	(Average for loaded and unloaded heavy duty diesel trucks)
Haul trucks	27.5	ton	(Average for loaded and unloaded heavy duty diesel trucks)

Unpaved Road Travel Emissions Factors - Source: AP-42, Section 13.2.2, 11/06.

E = (k)[(s/12)^0.9(W/3)^0.45]*

k = particle size constant =	1.5	for PM10
k = particle size constant =	0.15	for PM2.5
s = silt fraction =	4.3	(AP-42, Table 13.2.2-1, 11/06, plant road)

Emission factors	Workers	Delivery Trucks	Haul Trucks
PM10 (lb/VMT)	0.54	1.61	1.61
PM2.5 (lb/VMT)	0.05	0.16	0.16

Unpaved Road Travel Emissions Control - Source: Control of Open Fugitive Dust Sources, Scraping, and Grading U.S EPA, 9/88

C = 100 - (0.8)(p)(d)(t)/(i)

p = potential average hourly daytime evaporation rate =	0.845	mm/hr	(EPA document, Figure 3-2, summer)
evaporation rate =	0.637	mm/hr	(EPA document, Figure 3-2, annual)
t = time between applications of dust suppressants =	2	hr/application	(estimated)
i = application intensity =	1.4	L/m2	(typical level in EPA document, page 3-23)

d = average hourly daytime traffic rate	Construction	T-Line
Workers Travel (vehicle/hr) =	15.0	2.5
Delivery Trucks (vehicle/hr) =	1.8	1.0
Haul Trucks (vehicle/hr) =	2.5	0.0

Notes

Construction hourly traffic estimated from average daily worker 150 trips/day, daily delivery truck 18 trips/day, haul truck 25 trips/day and 10 hr/day work day, Table 5.12-7

T-Line Construction hourly traffic estimated from average daily worker 50 trips/day, daily delivery truck 20 trips/day, received 6/9/2015

	Construction		T-Line	
Average Control Efficiency (C)	Summer	Annual	Summer	Annual
Worker Travel	85%	89%	98%	98%
Delivery Trucks	98%	99%	99%	99%
Haul Trucks	98%	98%	100%	100%

For conservative estimates, assumed "summer" control efficiency for all construction months

Fugitive Dust Calculations

Fugitive Dust Calculations for Project Site Construction

	2016							2017												2018		
	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Workers Travel																						
Workers Trips (one way trips/day)	52	64	106	152	208	232	260	316	394	478	554	584	610	536	512	472	416	384	242	110	50	20
Workers Onsite VMT (one way)	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Control Efficiency (%)	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Controlled Fugitive Emissions																						
Onsite Fugitive - Worker PM10 (ton/month)	0.01	0.01	0.03	0.04	0.05	0.06	0.06	0.08	0.09	0.12	0.12	0.15	0.15	0.12	0.13	0.11	0.10	0.09	0.06	0.03	0.01	0.00
Onsite Fugitive - Worker PM2.5 (ton/month)	0.001	0.001	0.003	0.004	0.005	0.006	0.006	0.008	0.009	0.012	0.012	0.015	0.015	0.012	0.013	0.011	0.010	0.009	0.006	0.003	0.001	0.000
Onsite Fugitive - Worker PM10 (lb/day)	1.13	1.39	2.30	3.30	4.51	5.03	5.64	6.85	8.55	10.37	12.02	12.67	13.23	11.63	11.10	10.24	9.02	8.33	5.25	2.39	1.08	0.43
Onsite Fugitive - Worker PM2.5 (lb/day)	0.11	0.14	0.23	0.33	0.45	0.50	0.56	0.69	0.85	1.04	1.20	1.27	1.32	1.16	1.11	1.02	0.90	0.83	0.52	0.24	0.11	0.04
Delivery Trucks																						
Monthly Delivery Trucks (one way)	0	125	135	125	500	720	780	720	920	1350	1000	780	260	125	135	125	125	115	125	0	0	0
Delivery Truck Trips Length (miles, one way)	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Control Efficiency (%)	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
Controlled Fugitive Emissions																						
Onsite Fugitive - Delivery Trucks PM10 (ton/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Fugitive - Delivery Trucks PM2.5 (ton/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Fugitive - Delivery Trucks PM10 (lb/day)	0.00	0.08	0.08	0.08	0.32	0.43	0.47	0.43	0.61	0.78	0.66	0.45	0.16	0.08	0.08	0.08	0.08	0.07	0.08	0.00	0.00	0.00
Onsite Fugitive - Delivery Trucks PM2.5 (lb/day)	0.00	0.01	0.01	0.01	0.03	0.04	0.05	0.04	0.06	0.08	0.07	0.05	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Haul Trucks																						
Monthly Hauling Trucks (one way)	260	250	540	500	1000	1440	2600	960	920	540	250	260	260	250	270	250	500	460	500	250	0	0
Haul Trucks Onsite VMT (one way)	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Control Efficiency (%)	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
Controlled Fugitive Emissions																						
Onsite Fugitive - Haul Trucks PM10 (ton/month)	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Fugitive - Haul Trucks PM2.5 (ton/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onsite Fugitive - Haul Trucks PM10 (lb/day)	0.22	0.22	0.43	0.42	0.88	1.21	2.18	0.81	0.85	0.43	0.23	0.21	0.22	0.22	0.22	0.22	0.42	0.39	0.44	0.20	0.00	0.00
Onsite Fugitive - Haul Trucks PM2.5 (lb/day)	0.02	0.02	0.04	0.04	0.09	0.12	0.22	0.08	0.08	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.02	0.00	0.00

Fugitive Dust Calculations

Fugitive Dust Calculations for Transmission Line Construction

	2016							2017												2018		
	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Workers Travel																						
Workers Trips (one way trips/day)							2	40	58	58	58	28	22									
Workers Onsite VMT (mile, one way)							0.27	0.27	0.27	0.27	0.27	0.27	0.27									
Control Efficiency (%)							98%	98%	98%	98%	98%	98%	98%									
Controlled Fugitive Emissions																						
Onsite Fugitive - Worker PM10 (ton/month)							7.95E-05	1.59E-03	2.10E-03	2.41E-03	2.10E-03	1.16E-03	8.75E-04									
Onsite Fugitive - Worker PM2.5 (ton/month)							7.95E-06	1.59E-04	2.10E-04	2.41E-04	2.10E-04	1.16E-04	8.75E-05									
Onsite Fugitive - Worker PM10 (lb/day)							0.01	0.14	0.21	0.21	0.21	0.10	0.08									
Onsite Fugitive - Worker PM2.5 (lb/day)							0.00	0.01	0.02	0.02	0.02	0.01	0.01									
Delivery Trucks																						
Monthly Delivery Trucks (one way trips/month)							0	0	351	349	349	0	0									
Delivery Truck Onsite VMT (mile, one way)							0.46	0.46	0.46	0.46	0.46	0.46	0.46									
Control Efficiency (%)							99%	99%	99%	99%	99%	99%	99%									
Controlled Fugitive Emissions																						
Onsite Fugitive - Delivery Trucks PM10 (ton/month)							0	0	1.30E-03	1.29E-03	1.29E-03	0	0									
Onsite Fugitive - Delivery Trucks PM2.5 (ton/month)							0	0	1.30E-04	1.29E-04	1.29E-04	0	0									
Onsite Fugitive - Delivery Trucks PM10 (lb/day)							0	0	0.13	0.11	0.13	0	0									
Onsite Fugitive - Delivery Trucks PM2.5 (lb/day)							0	0	0.01	0.01	0.01	0	0									

Fugitive Dust Calculations for Soil Movement during Construction

Dust emission from the storage piles result from several distinct source activities, those that are related to moving fill material form SEP for storage includes

1 Loading of fill material onto storage piles (batch or continuous drop operations)
2 Wind erosion of pile surfaces and ground areas around piles.
3 Haul trucks traffic in storage area

Fill Material Storage Operations at SEP

For month 4: 10,000 cubic yards of material will be imported from offsite
For months 5 and 6: 50,000 cubic yards of material will be moved to adjacent property and stored as piles

SUMMARY (TOTAL FUGITIVE DUST EMISSIONS)	2016							2017												2018		
Soil Movement	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Number of Workdays	22	21	23	22	21	22	22	22	20	23	20	23	22	21	23	21	22	22	21	23	20	22
Total Controlled Fugitive Emissions from Loading of the fill material, Wind Erosion of Pile Surface and Haul Truck Travel to the Storage Piles																						
PM10 (ton/month)	0	0	0	7.93E-05	0.05	0.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
PM2.5 (ton/month)	0	0	0	1.20E-05	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10, Rolling 12-month total (tons/year)												0.17	0.18	0.20	0.21	0.22	0.18	0.13	0.13	0.13	0.13	0.13
PM2.5, Rolling 12-month total (tons/year)												0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02
PM10 (lb/day)	0	0	0	0.07	4.65	5.12	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
PM2.5 (lb/day)	0	0	0	0.01	0.51	0.59	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11

Fugitive Dust Calculations for Soil Movement during Construction

1 Loading of fill material onto storage piles/receiving surface Emission Factors - Source: AP-42 Section 13.2.4.3, 11/06

E = k(0.0032)[(U/5)^1.3/(M/2)^1.4] (lb/ton)

k = particle size constant =	0.35	for PM10	
k = particle size constant =	0.053	for PM2.5	
U = mean wind speed (miles/hour)	5.82	(CalEEMod default for MDAQMD, 2.6 m/s)	
M = material moisture content (%)	11	(AP-42 Table 13.2.4-1 for misc. fill material, also CalEEMod default value)	

Emission factors material loading	
PM10 (lb/ton)	1.25E-04
PM2.5 (lb/ton)	1.90E-05

Import fill material	10,000	cubic yards	
Soil movement from SEP	50,000	cubic yards	
Material density	1.26	ton/cubic yards	(CalEEMod default value, Section 4.3 Appendix A)

Emission Controls Source: AP-42 Section 13.2.4.4, 11/06
For the storage operations, emissions controls typically include:
- Use of chemical wetting agents to control storage pile emissions
- Enclosure or covering of inactive piles to reduce wind erosion
- Continuous chemical treating of material loaded onto piles
- Treatment of roadways to reduce emissions from vehicle traffic in the storage pile area

Control efficiency 90% (AP-42 Section 13.2.4.4, 11/06)

1. Import of the fill material (10,000 cu yards) will occur in Month 4
Excess soil (50,000 cu yards) will be moved to the IEP during months 5 and 6

	2016							2017												2018		
	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Number of Workdays	22	21	23	22	21	22	22	22	20	23	20	23	22	21	23	21	22	22	21	23	20	22
Truck Loading																						
Fill material throughput [1], ton	0	0	0	12,642	31,604	31,604	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Control Efficiency (%)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Controlled Fugitive Emissions																						
Truck Loading - PM10 (ton/month)	0	0	0	7.93E-05	1.98E-04	1.98E-04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck Loading - PM2.5 (ton/month)	0	0	0	1.20E-05	3.00E-05	3.00E-05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck Loading - PM10 (lb/day)	0	0	0	0.07	0.19	0.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck Loading - PM2.5 (lb/day)	0	0	0	0.01	0.03	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fugitive Dust Calculations for Soil Movement during Construction

2 Wind erosion of pile surfaces Emission Factors - Source: AP-42, Fourth Edition, Section 8.19, Table 8.19.1-1

Emission factors for storage piles are typically taken from AP-42, Chapter 13.2.4, Aggregate Handling and Storage Piles
Section 8.19 of AP-42 was deleted from the fifth edition of AP-42 and the "updated" AP-42 estimation procedures require a substantial quantity of site-specific information to estimate emissions.
Therefore, some Districts (e.g. BAAQMD, SDAPCD, SMAQMD) have decided to continue using the older AP-42 emission factors for windblown dusts for storage piles in their current permitting policy, guidelines or manual.

Emission factors for wind erosion of storage piles	Inactive	Active	
PM10 (lb/acre-day)	1.70	6.30	Source: AP-42, Fourth Edition, Section 8.19, Table 8.19.1-1
PM10 (lb/sq ft-day)	3.90E-05	1.45E-04	
PM2.5 (lb/sq ft-day)	5.85E-06	2.17E-05	PM2.5 emission factor is based on a PM2.5/PM10 ratio of 0.15 derived from the Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors Finalized 11/1/06 (http://www.epa.gov/ttn/chief/ap42/ch13/bgdocs/b13s02.pdf)

Total volume of the exported material	50,000	cubic yards
Total volume of the exported material	1,350,000	cubic feet (conversion factor, 1 cubic yard = 27 cubic feet)
Assume the storage piles height	15	feet
Estimated pile surface (assumed rectangular piles)	90,000	square feet

Control Efficiency (%): **80%** **(SMAQMD policy manual, updated 5/2012. A maximum abatement efficiency of 80% if watering is used to suppress dust)**

Loading of excess soil to storage piles primarily occurs during months 5 and 6, for conservative estimates, assumed the storage pile remains for the rest of the project period
Therefore, emission factors for active storage piles were used during month 5 and 6, for the rest of the project period, the storage piles will inactive and inactive emission factors were used.
Assumed the watering is used to suppress dust.

	2016							2017												2018		
	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Number of days per month	30	31	31	30	31	30	31	31	28	31	30	31	30	31	31	30	31	30	31	31	28	31
Average monthly storage pile surface (sq ft)	0	0	0	0	22,500	45,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Control Efficiency (%)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Fugitive Emission PM10 (ton/month)	0	0	0	0	0.0101	0.0195	0.0109	0.0109	0.0098	0.0109	0.0105	0.0109	0.0105	0.0109	0.0109	0.0105	0.0109	0.0105	0.0109	0.0109	0.0098	0.0109
Fugitive Emission PM2.5 (ton/month)	0	0	0	0	0.0015	0.0029	0.0016	0.0016	0.0015	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0015	0.0016
Number of work days	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0					0	0
Fugitive Emission PM10 (lb/day)	0	0	0	0	0.65	1.30	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Fugitive Emission PM2.5 (lb/day)	0	0	0	0	0.10	0.20	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11

Fugitive Dust Calculations for Soil Movement during Construction

3 Haul trucks traffic in storage area

Fugitive dust emission associated with haul trucks travel between the SEP project site to the storage piles in the neighboring site will be calculated as follow:

Unpaved Road Travel Emissions Factors - Source: AP-42, Section 13.2.2, 11/06.

E = (k)[(s/12)^0.9(W/3)^0.45]*

k = particle size constant =	1.5	for PM10
k = particle size constant =	0.15	for PM2.5
s = silt fraction =	8.50	(AP-42, Table 13.2.2-1, 11/06, construction sites)

Estimated average vehicle weights for haul trucks

Haul truck	33.35	tons (avg. of loaded and unloaded weights, 980H loader, Caterpillar Performance Handbook, 2006)

Emission factors	Haul Trucks
PM10 (lb/VMT)	3.25
PM2.5 (lb/VMT)	0.33

Unpaved Road Travel Emissions Control - Source: Control of Open Fugitive Dust Sources, Scraping, and Grading U.S EPA, 9/88

C = 100 - (0.8)(p)(d)(t)/(i)

p = potential average hourly daytime

evaporation rate =	0.845	mm/hr (EPA document, Figure 3-2, summer)
evaporation rate =	0.637	mm/hr (EPA document, Figure 3-2, annual)

d = average hourly daytime traffic rate

Haul Truck =	4.8	vehicles/hr (estimated from monthly haul truck trip 1000 trips/month, 22 work days/month and 10 hrs/day)
t = time between watering applications =	2	hr/application (estimated)
i = application intensity =	1.4	L/m2 (typical level in EPA document, page 3-23)

	Summer	Annual
Average Control Efficiency (C)	95.3%	96.4%

Estimated travel distance from SEP to storage piles on unpaved surface

For conservative estimates, assumed all haul truck trips occurs in month 5 are haul trips to the storage piles and same number of haul truck trips occurs in month 6 (i.e. also 1000 trips, one-way); remaining trips in month 6 are assumed to be delivery trucks trips and fugitive dust emissions for these delivery truck trips are accounted for in onsite fugitive dust emission calculations.

For conservative estimates, assumed "summer" control efficiency for all construction months

	2016							2017												2018		
	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Number of Workdays	22	21	23	22	21	22	22	22	20	23	20	23	22	21	23	21	22	22	21	23	20	22
Haul Trucks																						
Monthly Hauling Trucks (one way)	0	0	0	0	1000	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haul Trucks Onsite VMT (one way)	0	0	0	0	0.52	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Control Efficiency (%)	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%	95.3%
Controlled Fugitive Emissions																						
Onsite Fugitive - Haul Trucks PM10 (ton/month)	0	0	0	0	0.04	0.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onsite Fugitive - Haul Trucks PM2.5 (ton/month)	0	0	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onsite Fugitive - Haul Trucks PM10 (lb/day)	0	0	0	0	3.81	3.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onsite Fugitive - Haul Trucks PM2.5 (lb/day)	0	0	0	0	0.38	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fugitive Dust Calculations from Wind Erosion

Total Wind Erosion for Project Site Construction

	2016							2017												2018		
	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Number of days per month	30	31	31	30	31	30	31	31	28	31	30	31	30	31	31	30	31	30	31	31	28	31
Fugitive PM10 (ton/month)	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
Fugitive PM2.5 (ton/month)	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Fugitive PM10, Rolling 12-month total (tons/year)												0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Fugitive PM2.5, Rolling 12-month total (tons/year)												0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Fugitive Emission PM10 (lb/day)	0.83	0.81	0.81	0.83	0.81	0.83	0.81	0.81	0.89	0.81	0.83	0.81	0.83	0.81	0.81	0.83	0.81	0.83	0.81	0.81	0.89	0.81
Fugitive Emission PM2.5 (lb/day)	0.33	0.32	0.32	0.33	0.32	0.33	0.32	0.32	0.36	0.32	0.33	0.32	0.33	0.32	0.32	0.33	0.32	0.33	0.32	0.32	0.36	0.32

Level 2 Emission Factor

0.011	ton/acre-month	[1]
22	lb/acre-month	
5.05E-04	PM10 lb/sq ft-month	
2.02E-04	PM2.5 lb/sq ft-month	

1. Wind erosion of active construction area - Source: "Improvement of Specific Emission Factors (BACM Project No. 1), Final Report", prepared for South Coast AQMD by Midwest Research Institute, March 1996

Fugitive Dust Calculations from Wind Erosion

Wind Erosion Calculation for the Project Site Construction Area

Project Site Construction Area 25 acre

Project Site Construction Duration 22 months

Monthly Disturbed Area 1.14 acre/month

Active project area is averaged over the 22 month period to estimate monthly disturbed area

	2016							2017												2018		
	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Number of days per month	30	31	31	30	31	30	31	31	28	31	30	31	30	31	31	30	31	30	31	31	28	31
Average monthly disturbed area (sq ft)	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500
Fugitive PM10 (ton/month)	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
Fugitive PM2.5 (ton/month)	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Fugitive PM10, Rolling 12-month total (tons/year)												0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Fugitive PM2.5, Rolling 12-month total (tons/year)												0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Fugitive Emission PM10 (lb/day)	0.83	0.81	0.81	0.83	0.81	0.83	0.81	0.81	0.89	0.81	0.83	0.81	0.83	0.81	0.81	0.83	0.81	0.83	0.81	0.81	0.89	0.81
Fugitive Emission PM2.5 (lb/day)	0.33	0.32	0.32	0.33	0.32	0.33	0.32	0.32	0.36	0.32	0.33	0.32	0.33	0.32	0.32	0.33	0.32	0.33	0.32	0.32	0.36	0.32

The Sonoran site includes 76 acres of property. Approximately 25 acres of construction laydown, material storage and parking will be required during the construction phase of the project, Section 5.1.4.4 of Draft AFC

Fugitive Dust Calculations from Wind Erosion

Wind Erosion Calculation for the Transmission Line Construction Area

Project Area

Estimated Disturbed Area for T-Line Construction 331,250 sq ft From T-Line construction data received 6/9/2015

Project Duration 7 months

		2016	2017					
		DEC	JAN	FEB	MAR	APR	MAY	JUN
Project Month		**7**	**8**	**9**	**10**	**11**	**12**	**13**
Number of days per month		31	31	28	31	30	31	30
Average monthly disturbed area (sq ft)		47,321	47,321	47,321	47,321	47,321	47,321	47,321
Fugitive PM10 (ton/month)		0.012	0.012	0.012	0.012	0.012	0.012	0.012
Fugitive PM2.5 (ton/month)		0.005	0.005	0.005	0.005	0.005	0.005	0.005
Fugitive PM10, 7-month total (tons/year)								0.084
Fugitive PM2.5, 7-month total (tons/year)								0.033
Fugitive Emission PM10 (lb/day)		0.77	0.77	0.85	0.77	0.80	0.77	0.80
Fugitive Emission PM2.5 (lb/day)		0.31	0.31	0.34	0.31	0.32	0.31	0.32

Construction of the Proposed SEP - CalEEMod Input Data

Project Name	SEP Construction	
District	MDAQMD	
Wind Speed	2.6	m/s
Precipitation Frequency	30	days/year
Climate Zone	10	
Urbanization Level	Rural	
Expected Operational Year	2019	
Utility Company	Southern California Edison	
CO2 Intensity Factor	630.89	
CH4 Intensity Factor	0.029	
N2O Intensity Factor	0.006	

CalEEMod Phase Name	Phase Type	Start Date	End Date	# day/Week	Number of Days	Month	# of Days, Rolling 12-month
Grading 1	Grading	6/1/2016	6/30/2016	5	22	1	
Grading 2	Grading	7/1/2016	7/31/2016	5	21	2	
Grading 3	Grading	8/1/2016	8/31/2016	5	23	3	
Grading 4	Grading	9/1/2016	9/30/2016	5	22	4	
Grading 5	Grading	10/1/2016	10/31/2016	5	21	5	
Grading 6	Grading	11/1/2016	11/30/2016	5	22	6	
Grading 7	Grading	12/1/2016	12/31/2016	5	22	7	
Grading 8	Grading	1/1/2017	1/31/2017	5	22	8	
Grading 9	Grading	2/1/2017	2/28/2017	5	20	9	
Grading 10	Grading	3/1/2017	3/31/2017	5	23	10	
Grading 11	Grading	4/1/2017	4/30/2017	5	20	11	
Grading 12	Grading	5/1/2017	5/31/2017	5	23	12	261
Grading 13	Grading	6/1/2017	6/30/2017	5	22	13	261
Grading 14	Grading	7/1/2017	7/31/2017	5	21	14	261
Grading 15	Grading	8/1/2017	8/31/2017	5	23	15	261
Grading 16	Grading	9/1/2017	9/30/2017	5	21	16	260
Grading 17	Grading	10/1/2017	10/31/2017	5	22	17	261
Grading 18	Grading	11/1/2017	11/30/2017	5	22	18	261
Grading 19	Grading	12/1/2017	12/31/2017	5	21	19	260
Grading 20	Grading	1/1/2018	1/31/2018	5	23	20	261
Grading 21	Grading	2/1/2018	2/28/2018	5	20	21	261
Grading 22	Grading	3/1/2018	3/31/2018	5	22	21	260

1. 22 months of construction for the Sonoran Energy Project

Construction of the Proposed SEP Project Site - CalEEMod Equipment Schedule Input

						2016							2017												2018		
	Fuel Type	CalEEMod Equip Type	HP	Quantity	Days on Site	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Project Month						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Construction Equipment						Number of Equipment																					
101150 Core Drill, Elect, 11HP, 8" to 18"Dia. Cores	Electric	Bore/Drill Rigs	11	1	21	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102120 Pump, Concr, Trkmtd, 4"Line, 80' Boom	Diesel	Pump	175	2	179	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0
103000 Vibrator, Concr, Gas engine, 8 HP	Gas	Cement and Mortar Mixers	8	4	179	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
200150 Backhoe Diesel Hyd Crawler Mount 1CY	Diesel	Tractors/Loaders/Backhoes	45	1	127	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
200450 Backhoe Loader Wheel Type, 45-60HP,3/4CY	Diesel	Tractors/Loaders/Backhoes	60	1	30	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
201910 Grader,Self-propelled,	Diesel	Graders	145	1	23	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
203050 Roller, Vibratory, smooth drum, Tandem, Gas, 35 hp	Gas	Rollers	35	1	5	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
203200 Roller Pneumatic Tire, Diesel, 80 hp	Diesel	Rollers	80	1	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
203350 Roller, Vibratory, smooth drum, 75 hp	Diesel	Rollers	75	1	31	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
203400 Roller, Vibratory, smooth drum, 125 hp	Diesel	Rollers	125	1	10	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
203550 Scraper, Self-Propelled, 4 X 4 Drive, Dual Engine 21 CY	Diesel	Scrapers	179	1	119	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
204260 Tractor, Crawler, w/Bulldozer, Torqueconvertor, Diesel, 200 HP	Diesel	Crawler Tractors	200	1	122	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
204310 Tractor, Crawler, convertor, Diesel, 300 HP	Diesel	Crawler Tractors	300	1	40	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
204610 Front end Loader, 4-Wheel drive, Articulated frame, 1to 1.25 CY, 70 HP	Diesel	Rubber Tired Loaders	70	1	110	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
204760 Front end Loader, 4-Wheel drive, Articulated frame, 5.25 to 5.75 CY, 270 HP	Diesel	Rubber Tired Loaders	270	1	15	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
205400 Truck, Dump Trailer Only, Rear dump, 20 CY	Diesel	Off-Highway Trucks	365	1	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
205500 Truck, Flatbed, 1 Axle, 3 Ton Rating	Diesel	Off-Highway Trucks	190	1	121	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
205598 Truck, Off Hwy, Rear Dump, 34 ton cap. Note: Prorated from 35 Ton.	Diesel	Off-Highway Trucks	365	1	30	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400300 Air Comprsr, Towed type,	Diesel	Air Compressors	50	1	105	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
402700 Generator, Electric, Diesel Engine, 100KW	Diesel	Generator Sets	134	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
406265 Saw, Concrete, Self- propelled, Gas, 30 HP	Gas	Concrete/Industrial Saws	30	1	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
406800 Trailer, Platform, Flush Deck, 3 Axle, 75 Ton	Diesel	Off-Highway Trucks	175	1	61	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
406900 Water Tank, Engine Driven Disch, 5,000 Gals.cap.	Diesel	Other Construction Equipment	175	1	10	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Axle CT13 Hauling Truck 365HP	Diesel	Off-Highway Trucks	365	3	60	0	0	0	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Med Wheel Loader 962M 250HP	Diesel	Off-Highway Trucks	250	2	60	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
407500 Truck Tractor 6X4 40 Ton Capcty, 380HP	Diesel	Off-Highway Tractors	380	1	7	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
407600 Truck Tractor 6X4 45 Ton Capcty, 450HP	Diesel	Off-Highway Tractors	450	1	71	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
408030 Backhoe Diesel Hyd Crawler Mount 2CY	Diesel	Tractors/Loaders/Backhoes	45	1	17	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
408135 Compactor, Vibrating Plate, Gas, 21" Plate, 5,000 lb Blow	Gas	Plate Compactors	6.5	1	153	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
408462 Tractor, Loader, Wheeled, 4X4, 1.5 - 1.75 CY, 80 HP	Diesel	Rubber Tired Loaders	80	1	21	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
420720 Truck, Pickup, 3/4 Ton, 4 Wheel Drive	Diesel	Off-Highway Trucks	175	1	21	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
504250 Paver, asphalt, wheel or crawler, 130 HP, diesel	Diesel	Pavers	130	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
601200 Crane, Crawler, lattice boom, Cable, 100 TON Cap, 60' Boom	Diesel	Cranes	285	1	31	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
601400 Crane, Crawler, Lattice Boom, 200 Ton	Diesel	Cranes	260	2	323	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0
601500 Crane, Crawler, Lattice Boom, 350 Ton	Diesel	Cranes	450	1	197	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0
602100 Crane, Truckmount, Cable, 8x4, 90 TN Cap, 15' Radius	Diesel	Cranes	476	1	141	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
602500 Crane, Truck Mount, Hyd, 25 Ton Cap.	Diesel	Cranes	286	1	32	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
602800 Crane, Self-Prpld, 4 X 4, w/Telescoping Boom, 5 Ton cap.	Diesel	Cranes	175	1	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
603050 Crane, Self-Prpld, 4 X 4, w/Telescoping Boom, 20 Ton cap.	Diesel	Cranes	175	4	178	0	0	0	0	0	0	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0
603100 Crane, Self-Prpld, 4 X 4, w/Telescoping Boom, 25 Ton cap.	Diesel	Cranes	175	1	114	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
603150 Crane, Self-Prpld, 4 X 4, w/Telescoping Boom, 40 Ton cap.	Diesel	Cranes	250	7	399	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Total						**16**	**21**	**19**	**29**	**31**	**30**	**26**	**28**	**27**	**27**	**25**	**25**	**26**	**26**	**22**	**21**	**21**	**17**	**15**	**11**	**12**	**7**

1. Based on the construction equipment schedule received (SEP_PTA_Data_Needs Rev C), 2/20/2015
CalEEMod default load factors were used for all equipment

Construction of the Proposed SEP Transmission Line - CalEEMod Equipment Schedule Input

Equipment	CalEEMod Equip Type	HP	2016	2017					
			DEC	JAN	FEB	MAR	APR	MAY	JUN
Month			**7**	**8**	**9**	**10**	**11**	**12**	**13**
Construction - Transmission Line									
Pickup Truck, 4 Wheel Drive, 240 HP	Off-Highway Trucks	240		1	2	4	6	4	2
Crane, Hydraulic, Rough Terrain, 35 Ton	Cranes	175			1	1	1		
Forklift, 10 Ton - 120 HP	Forklifts	120			1	1	1		
Forklift, 5 Ton - 94 HP	Forklifts	94			1	1	1		
Truck, Flatbed, 1 Ton - 250 HP	Off-Highway Trucks	250		1	1	1	6	5	
Truck, Flatbed, 2 Ton - 300 HP	Off-Highway Trucks	300				4	7	2	
Truck, Semi, Tractor - 435 HP	Off-Highway Trucks	435		1					
Road Grader - 179 HP	Graders	179		1					1
Fuel truck - 175 HP	Off-Highway Trucks	175		1		1	2	1	
Digger, Transmission Type, Truck Mount - 215 HP	Bore/Drill Rigs	215				2	3	1	
Back Hoe, w/ Bucket - 93 HP	Tractors/Loaders/Backhoes	93				1	2	1	
Bobcat, w/Bucket - 73 HP	Other Material Handling Equipment	73				1	1		
Truck, Concrete, 10 Yd - 175 HP	Off-Highway Trucks	175				3	3		
Truck, Flatbed, w/ Boom, 5 Ton - 300 HP	Off-Highway Trucks	300				1	2	1	
Truck, Dump, 10 Ton - 365 HP	Off-Highway Trucks	365				1	1		
Truck, Mechanics, 2 Ton - 300 HP	Off-Highway Trucks	300				1	2	1	
Truck, Semi, Tractor, w/Boom - 435 HP	Off-Highway Trucks	435				2	2		
Loader, w/Bucket - 148 HP	Tractors/Loaders/Backhoes	148				1	1		
RT Crane, Hydraulic, 20T - 175 HP	Cranes	175				1	1		
Motor, Auxiliary Power - 25 HP	Other Construction Equipment	25				1	2	1	
RT Crane, Hydraulic, 35T - 175 HP	Cranes	175					1	3	
RT Crane, Hydraulic, 150T - 345 HP	Cranes	345					1	2	
Truck, Semi, Tractor - 435 HP	Off-Highway Trucks	435					3	3	1
Truck, Flatbed w/ Bucket, 5 Ton - 300 HP	Off-Highway Trucks	300					1	1	
Tension Machine, Conductor - 135 HP	Other General Industrial Equipment	135					1	1	
Tension Machine, OPGW - 135 HP	Other General Industrial Equipment	135					1	1	
Wire Puller, Single Drum - 310 HP	Other General Industrial Equipment	310					1	1	
Wire Puller, Triple Drum - 310 HP	Other General Industrial Equipment	310					1	1	
Wire Puller, Sockline - 310 HP	Other General Industrial Equipment	310					1	1	
Dozer, Track Type, Sagging (D8 type) - 148 HP	Rubber Tired Dozers	148					1	1	
TOTAL			**0**	**5**	**6**	**28**	**56**	**32**	**4**

1. Based on the equipment schedule for transmission construction, transmission line, received 6/9/2015

CalEEMod default load factors were used for all equipment

Numbers are roundup to the nearest integer for CalEEMod calculation

Construction of the Proposed SEP Project Site - CalEEMod Vehicle Trips Input

	2016							2017												2018			
	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	
Project Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	
Number of workdays	22	21	23	22	21	22	22	22	20	23	20	23	22	21	23	21	22	22	21	23	20	22	
Construction Labor	**Number of Workers**																						
Craft																							**Total**
Worker/Insulator												15	30	40	40	40	40	40	20	15	10		**290**
Boilmakers								20	40	60	80	80	100	80	80	70	65	55	23				**753**
Carpenters	5	10	10	15	20	20	20	15	15	15	15	12											**172**
Cement Finishers							1	2	3	4	4	3	2	1									**20**
Common Laborers	5	5	5	5	5	5	5	5	10	10	10	10	10	10	10	10	8	5	5	5	5	5	**153**
Electricians	5	5	10	10	20	20	30	30	40	40	40	40	40	40	40	30	30	30	20	10	5		**535**
Equipment Operators, Heavy	4	4	6	15	15	10	6	6	5														**71**
Equipment Operators, Light			2	2	1	1	1	1	1	1	1	1											**12**
Equipment Operators, Medium			8	10	10	22	20	20	15	15	8	8	5	5									**146**
Equipment Operators, Oilers		1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1				**24**
Mechanical Equipment																							**0**
Millwrights	2	2	4	4	8	8	10	10	8	8	4	4	1	1									**74**
Plumbers Helper						1																	**1**
Plumbers						1	1																**2**
Painters,																				4	4	4	**12**
Rodmen (Reinforcing)	4	4	4	8	8	10	20	20	10	4	4												**96**
Skilled Trade										1	1												**2**
Structural Steel Workers					10	10	10	20	20	30	40	40	40	15	10	10	5	2					**262**
Structural Steel Welders						1	1	2	3	3	3	2	1										**16**
Steamfitters/Pipefitters									20	40	60	70	70	70	70	70	55	55	50	20			**650**
Truck Drivers, Heavy			1	4	4	4	1	1	1														
Truck Drivers, Light										1													
Number of Craft Labor (Subtotal)	**25**	**31**	**51**	**74**	**102**	**114**	**128**	**154**	**193**	**234**	**272**	**287**	**300**	**263**	**251**	**231**	**204**	**188**	**119**	**54**	**24**	**9**	**3,308**
Supervision	1	1	2	2	2	2	2	4	4	5	5	5	5	5	5	5	4	4	2	1	1	1	**68**
Total Manpower	**26**	**32**	**53**	**76**	**104**	**116**	**130**	**158**	**197**	**239**	**277**	**292**	**305**	**268**	**256**	**236**	**208**	**192**	**121**	**55**	**25**	**10**	**3,376**
Worker Trips (one way trips/day)	**52**	**64**	**106**	**152**	**208**	**232**	**260**	**316**	**394**	**478**	**554**	**584**	**610**	**536**	**512**	**472**	**416**	**384**	**242**	**110**	**50**	**20**	
Worker Trips Length (miles, one way)	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	
Worker Trips, Percent Paved (%)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Construction of the Proposed SEP Project Site - CalEEMod Vehicle Trips Input

	2016							2017												2018			
	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	
Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Number of workdays	22	21	23	22	21	22	22	22	20	23	20	23	22	21	23	21	22	22	21	23	20	22	
Construction Labor	Number of Workers																						
Delivery Trucks																							
Daily Delivery Trucks (one way)	0	5	5	5	20	30	30	30	40	50	40	30	10	5	5	5	5	5	5	0	0	0	
Monthly Delivery Trucks (one way)	0	125	135	125	500	720	780	720	920	1350	1000	780	260	125	135	125	125	115	125	0	0	0	
Delivery Truck Trips Length (miles, one way)	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Delivery Truck Trips, Percent Paved (%)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Heavy Haul Trucks (Total per month)																							
Monthly Hauling Trucks (one way)	260	250	540	500	1000	1440	2600	960	920	540	250	260	260	250	270	250	500	460	500	250	0	0	
Haul Truck Trip Length (miles, one way)	60	60	60	20	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Haul Truck Trips, Percent Paved (%)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

1. Based on the workers, delivery and haul trucks schedules received (SEP_PTA_Data_Needs Rev D), 3/6/2015
   Based on the information provided (email dated 3/16/2015), the maximum daily commute for the workers that are not from Blythe will be 60 miles
   —that is, 65% of workers would commute 60 miles and 35% would commute 7 miles.
2. Delivery and haul truck travel distances are estimated from the Glamis, CA to Blythe, CA via CA-78 (60 miles).

Construction of the Proposed SEP Transmission Line - CalEEMod Vehicle Trips Input

	2016	2017					
	DEC	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**
Project Month	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Construction Management / Inspection	1	2	1	1	1	1	1
Linemen		3	3	3	3	3	
Operators		15	7	7	7	10	10
Apprentice Linemen			9	9	9		
Groundmen			9	9	9		
Electricians							
Skilled trade/other							
Number of Craft Labor (Subtotal)	**1**	**20**	**29**	**29**	**29**	**14**	**11**
Worker Trips (one way trips/day)	**2**	**40**	**58**	**58**	**58**	**28**	**22**
Worker Trips Length (miles, one way)	41	41	41	41	41	41	41
Worker Trips, Percent Paved (%)	100%	100%	100%	100%	100%	100%	100%

Delivery Trucks							
Shipping days per month	26	24	23	27	25	26	26
Monthly Delivery Trucks (One way)			56	54	54		
Monthly Concrete Trucks (One way)			295	295	295		
Monthly Delivery Trucks (One way)	**0**	**0**	**351**	**349**	**349**	**0**	**0**
Daily Delivery Trucks (One way trips/day)	**0**	**0**	**15**	**13**	**14**	**0**	**0**
Delivery Truck Trips Length (miles)	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Delivery Truck Trips, Percent Paved (%)	100%	100%	100%	100%	100%	100%	100%

Worker trips and truck trips length are assumed to be the same as during construction period.
Based on the information provided (email dated 3/16/2015), the maximum daily commute for the workers that are not from Blythe will be 60 miles —that is, 65% of workers would commute 60 miles and 35% would commute 7 miles.
Delivery and haul truck travel distances are estimated from the Glamis, CA to Blythe, CA via CA-78 (60 miles).

Attachment DR17-1

Revised Modeling Results

The revised tables of modeling results reflect the following changes:

- Updated fumigation impacts using AERSCREEN (per DR-6);
- Updated 24-hour $PM_{10}/PM_{2.5}$ emission rate for the gas turbine (per DR-12);
- Updated construction emission rates that eliminate construction of the substation and refined calculation of emissions during the soil movement phase (per DR-15); and
- Worst-case individual yearly modeled impacts for both short-term and annual standards (per DR-17).

Table 3.1-21R1. Maximum Daily and Annual Emissions During Construction

Construction Emissions	NOx	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions, lb/day	325	~~564~~ 617	~~22~~ 23	~~1.3~~ 1.4	~~58~~ 52	~~18~~ 16
MDAQMD CEQA Significance Thresholds, lb/day[a]	137	548	137	137	82	82
Maximum Annual Emissions, tons/yr	16	34	1.3	0.1	~~5~~ 4	1
MDAQMD CEQA Significance Thresholds, tons/yr[a]	25	100	25	25	15	15

Note: Maximum daily and annual emissions encompass contributions from project and linear construction activities. The PM_{10} and $PM_{2.5}$ emissions encompass exhaust and fugitive dust emissions.

[a] Source: "MDAQMD CEQA and Federal Conformity Guidelines," February 2009.

Table 3.1-37R1. Maximum Modeled Impacts During Project Construction

Pollutant	Averaging Period	Maximum Modeled Concentration During SEP Construction ($\mu g/m^3$)	Modeled Concentration, BEP[a] ($\mu g/m^3$)	Combined Concentration, SEP + BEP ($\mu g/m^3$)[b]
NO_2[c]	1-hour[d]	~~130.7~~ 134.9	~~4.8~~ 8.7	~~130.7~~ 134.9
	Annual	~~3.6~~ 3.4	0.1	~~3.6~~ 3.5
SO_2	1-hour[d]	~~1.9~~ 1.6	~~0.8~~ 1.3	~~1.9~~ 1.6
	3-hour	~~1.6~~ 1.3	~~0.7~~ 1.0	~~1.6~~ 1.3
	24-hour	~~0.35~~ 0.29	~~0.25~~ 0.29	~~0.44~~ 0.32
CO	1-hour	~~1,009.2~~ 849.6	~~5.1~~ 8.5	~~1,009.2~~ 849.6
	8-hour	~~504.6~~ 415.0	~~2.1~~ 4.2	~~504.6~~ 415.0
PM_{10}	24-hour	~~17.1~~ 19.3	~~0.8~~ 1.0	~~17.2~~ 19.4
	Annual	~~1.3~~ 1.2	~~0.1~~ 0.2	~~1.4~~ 1.3
$PM_{2.5}$	24-hour ~~(98th percentile)~~	~~2.8~~ 2.7	~~0.8~~ 1.0	2.8
	Annual	~~0.2~~ 0.14	~~0.1~~ 0.2	0.3

Notes:

[a] Modeled concentrations at location of maximum modeled concentration during SEP construction.

[b] Combined concentration does not necessarily equal the sum of the individual concentrations because the individual maxima may occur during different hours at the same receptor.

[c] The maximum 1-hour NO_2 concentration is based on OLM, and the maximum annual NO_2 concentration shows an NO_2 to NOx equilibrium ratio of 0.75.

[d] Only highest first high is shown, for comparison with state standard. Federal standard is based on a 3-hour average, and construction period will last for less than 2 years.

Table 3.1-39R1. Air Quality Modeling Results

Pollutant	Averaging Time	Modeled Maximum Concentrations (µg/m³)		
		Normal Operation AERMOD	Startup/Shutdown AERMOD	Fumigation ~~SCREEN3~~ AERSCREEN
Gas Turbine				
NO_2[g]	1-hour	~~11.55~~ 13.67	~~101.58~~ 115.3	~~3.87~~ 9.3
	98th percentile	6.00	53.7	-
	Annual	~~0.17~~ 0.18	a	c
SO_2	1-hour	2.89	b	~~0.73~~ 1.8
	3-hour	1.49	b	~~0.60~~ 1.6
	24-hour	0.39	b	~~0.25~~ 0.70
	Annual	0.02	b	c
CO	1-hour	9.23	117.9	~~2.36~~ 5.7
	8-hour	7.90	a	~~1.42~~ 4.0
$PM_{2.5}/PM_{10}$	24-hour	~~1.14~~ 1.42	b	~~0.56~~ 1.7
	Annual	~~0.06~~ 0.07	b	c
Auxiliary Boiler				
NO_2	1-hour	~~1.08~~ 1.28	~~8.37~~ 9.32	~~0.88~~ 3.2
	98th percentile	0.99	7.47	–
	Annual	0.05	a	c
SO_2	1-hour	0.23	b	~~0.14~~ 0.52
	3-hour	0.18	b	~~0.12~~ 0.36
	24-hour	0.12	b	~~0.05~~ 0.12
	Annual	0.004	b	c
CO	1-hour	6.21	63.0	~~3.84~~ 13.8
	8-hour	9.18	a	~~2.38~~ 6.1
$PM_{2.5}/PM_{10}$	24-hour	0.54	b	~~0.25~~ 0.60
	Annual	0.04	b	c
Emergency Diesel Fire Pump Engine				
NO_2	1-hour	~~59.3~~ 60.7	d	e
	98th percentile	51.4	d	-
	Annual	0.04	d	c,e
SO_2	1-hour	0.1	d	e
	3-hour	0.02	d	e
	24-hour	0.005	d	e
	Annual	<0.001	d	c,e
CO	1-hour	15.8	d	e
	8-hour	0.5	d	e
$PM_{2.5}/PM_{10}$	24-hour	0.02	d	~~0.3~~ e
	Annual	0.001	d	c

Table 3.1-39R1. Air Quality Modeling Results

Pollutant	Averaging Time	Modeled Maximum Concentrations (µg/m³)		
		Normal Operation AERMOD	Startup/Shutdown AERMOD	Fumigation ~~SCREEN3~~ AERSCREEN
Cooling Tower				
$PM_{2.5}/PM_{10}$	24-hour	4.9	d	e
	Annual	~~0.4~~ 0.5	d	c,e
Combined Impacts, All SEP Equipment				
NO_2[g]	1-hour	~~59.3~~ 60.7	~~101.6~~ 115.3	~~3.9~~ h
	98th percentile	51.4	53.8	–
	Annual	0.2	a	~~c~~ h
SO_2	1-hour	2.9	b	~~0.7~~ h
	3-hour	1.5	b	~~0.6~~ h
	24-hour	0.4	b	~~0.2~~ h
	Annual	0.02	b	~~c~~ h
CO	1-hour	15.8	117.9	~~2.4~~ h
	8-hour	9.2	a	~~1.4~~ h
$PM_{2.5}/PM_{10}$ [f]	24-hour	~~5.3~~ 5.4	b	~~0.6~~ h
	Annual	~~0.5~~ 0.6	b	~~c~~ h

[a] Not applicable, because startup/shutdown emissions are shown in the modeling for this averaging period.

[b] Not applicable, because emissions are not elevated above normal operation levels during startups/shutdowns.

[c] Not applicable, because inversion breakup is a short-term phenomenon and as such is evaluated only for short-term averaging periods.

[d] Not applicable, because engine emissions are the same during gas turbine startups/shutdowns.

[e] Not applicable, because fumigation ~~this type of~~ modeling is not performed by the models for ~~small combustion~~ sources with relatively short stacks.

[f] Encompasses cooling tower.

[g] 1-hour NO_2 modeled using OLM. Annual NO_2 modeled using ARM.

[h] Not applicable, because AERSCREEN is a single-source model.

Table 3.1-40R1. Maximum Modeled Impacts from Construction and the Ambient Air Quality Standards

Pollutant	Averaging Period	Maximum Modeled Concentration[a] (µg/m³)	Background Concentration[b] (µg/m³)	Total Predicted Concentration (µg/m³)	State Standard (µg/m³)	Federal Standard (µg/m³)
NO_2	1-hour[c,d]	~~130.7~~ 134.9	77.1	~~196.2~~ 210.9	339	—
	Annual[c]	~~3.6~~ 3.5	13.2	~~16.8~~ 16.7	57	100
SO_2	1-hour[d]	~~1.9~~ 1.6	22.9	~~24.8~~ 24.5	655	—
	3-hour	~~1.6~~ 1.3	22.6	~~24.2~~ 23.9	—	1,300
	24-hour	~~0.4~~ 0.3	2.6	~~3.0~~ 2.9	105	365
CO	1-hour	~~1,009.2~~ 849.6	4,000	~~5,009.2~~ 4,849.6	23,000	40,000
	8-hour	~~504.6~~ 415.0	1,698	~~2,202.6~~ 2,113.0	10,000	10,000
PM_{10}	24-hour	~~17.2~~ 19.4	127	~~144.2~~ 146.4	50	150
	Annual	~~1.4~~ 1.3	22.1	~~23.5~~ 23.4	20	—
$PM_{2.5}$	24-hour ~~(98th percentile)~~	2.8	13.8	16.6	—	35
	Annual	0.3	6.5	6.8	12	15

[a] Includes BEP. See Table 3.1-37R1.

[b] Background concentrations were the highest concentrations monitored between 2012 and 2014. See Table 3.1-11.

[c] The maximum 1-hour NO_2 concentration is based on OLM, and the maximum annual NO_2 concentration shows an NO_2 to NOx equilibrium ratio of 0.75.

[d] Only highest first high is shown, for comparison with state standard. Federal standard is based on a 3-hour average, and construction period will last for less than 2 years.

Table 3.1-41R1. Operation Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration (µg/m³)[a]	Modeled Impact, BEP (µg/m³)	Background Concentration (µg/m³)[b]	Total Combined Predicted Concentration (µg/m³)	State Standard (µg/m³)	Federal Standard (µg/m³)
NO_2[c]	1-hour	~~101.6~~ 115.3	~~21.4~~ 23.0	77.1	~~167~~ 195.9	339	—
	Federal 1-hour[d]	53.8	~~11.1~~ 11.3	77.1	115	—	188
	annual	0.2	0.2	13.2	14	57	100
SO_2	1-hour	2.9	4.1	22.9	30	655	—
	Federal 1-hour[e]	2.9	4.1	13	20	—	196
	3-hour	1.5	1.9	22.6	26	—	1,300
	24-hour	0.4	0.64	2.6	3.4	105	365
CO	1-hour	117.9	26.7	4,000	4,141	23,000	40,000
	8-hour	9.2	7.2	1,698	1,711	10,000	10,000
PM_{10}	24-hour	~~5.3~~ 5.4	2.8	127	132	50	150
	Annual	~~0.5~~ 0.6	0.4	22.1	23	20	—
$PM_{2.5}$	24-hour[d]	~~5.3~~ 5.4	2.8	13.8	19	—	35
	Annual	~~0.5~~ 0.6	0.4	6.5	7.2	12	15

[a] SEP only.

[b] Background concentrations were the highest concentrations monitored during 2011--2013.

[c] The maximum 1-hour NO_2 concentration is modeled using AERMOD OLM, and the maximum annual NO_2 concentration uses the ambient ratio method (ARM) with the default NO_2 to NOx equilibrium ratio of 0.75.

[d] Total predicted concentrations for the federal 1-hour NO_2 standard and 24-hour $PM_{2.5}$ standard are the respective maximum modeled concentrations combined with the three-year average of 98th percentile background concentrations.

[e] Total predicted concentrations for the federal 1-hour SO_2 standard is the maximum modeled concentrations combined with the 3-year average of 99th percentile background concentrations.

Table 3.1-42R1. Comparison of Maximum Modeled Impacts and PSD Significant Impact Levels, SEP

Pollutant	Averaging Time	Significant Impact Level, µg/m³	Maximum Modeled Concentrations for SEP, µg/m³ [a]	Exceed Significant Impact Level?
NO_2	1-Hour	7.5[b]	~~101.6~~ 115.3[c]	Yes
	Annual	1	0.2	No
SO_2	1-Hour	7.8	2.9	No
	3-Hour	25	2	No
	24-Hour	5	0.4	No
	Annual	1	0.02	No
CO	1-Hour	2000	118	No
	8-Hour	500	9	No
PM_{10}	24-Hour	5	5	No
	Annual	1	~~0.5~~ 0.6	No
$PM_{2.5}$	24-Hour	1.2[d]	~~5.3~~ 5.4	Yes
	Annual	0.3[d]	~~0.50.5~~ 0.6	Yes

[a] Modeled concentrations have been rounded to the same number of significant figures as the SIL.

[b] EPA has not yet defined significance levels (SILs) for one-hour NO_2 and SO_2 impacts. However, EPA has suggested that, until SILs have been promulgated, interim values of 4 ppb (7.5 µg/m³) for NO_2 and 3 ppb (7.8 µg/m³) for SO_2 may be used (USEPA (2010b); USEPA (2010c)). These values will be used in this analysis as interim SILs.

[c] Concentration occurs during gas turbine startup; encompasses operation of the emergency diesel fire pump engine.

[d] While EPA sought and the U.S. Court of Appeals for the District of Columbia Circuit recently granted remand and vacatur of these SILs as they apply for purposes of avoiding a cumulative impacts analysis under federal PSD requirements (40 CFR § 51.166(k)(2) and § 52.21(k)(2)), EPA has retained these SILs for purposes of demonstrating whether a source locating in an attainment/unclassifiable area will be deemed to cause or contribute to a violation in a downwind nonattainment area. See Sierra Club v. EPA, No. 10-1413 (D.C. Cir. 2013), slip op. 9. Accordingly, application of these SILs for purposes of satisfying the District's requirement to ensure that the construction and operation of new or modified sources does not interfere with the attainment and maintenance of ambient air quality standard (MDAQMD Rule 1300) may be appropriate.

Table 3.1-50R1. Maximum Construction Emissions, SEP and BEP II

Emitting Activity	NOx	CO	VOC	PM10/PM2.5
Onsite Construction				
		Maximum Daily Emissions, lb/day		
Onsite Construction: SEP	~~85~~ 59	~~169~~ 115	~~5.1~~ 3.5	~~20.2/4.3~~ 15.6/2.2
Onsite Construction: BEP II[a]	147.2	62	20.5	85.0/23.9[b]
MDAQMD CEQA Significance Thresholds	137	548	137	82/82
		Maximum Annual Emissions, tpy		
Onsite Construction: SEP	~~7.4~~ 6.3	~~14.5~~ 12.5	~~0.4~~	~~2.5/0.5~~ 1.7/0.2
Onsite Construction: BEP II[a]	19.43	8.18	2.7	3.51/1.5[c]
MDAQMD CEQA Significance Thresholds	25	100	25	15/15
All Project Construction, including Linear Features				
		Maximum Daily Emissions, lb/day		
Project Construction: SEP	~~353~~ 325	~~651~~ 619	~~25~~ 23	~~58.0/18.2~~ 51.9/15.7
Project Construction: BEP II[d]	152.8	89.7	22.9	49.2/16.4
MDAQMD CEQA Significance Thresholds	137	548	137	82/82
		Maximum Annual Emissions, tpy		
Project Construction: SEP	~~17~~ 16	~~36~~ 34	~~1.4~~ 1.3	~~5.1/1.3~~ 4.2/1.0
Project Construction: BEP II[d]	20.2	11.8	3.05	2.61/1.35
MDAQMD CEQA Significance Thresholds	25	100	25	15/15

Notes:

[a] BEP II onsite construction emissions from BEP Phase II Amendment, October 2009 (Caithness 2009), Appendix 5.2E, Tables 5.2E-1 and 5.2E-2.

[b] Shown as 47.6/15.8 lb/day in Table 5.2E-5 (Caithness 2009).

[c] Shown as 2.41/1.3 tpy in Table 5.2E-5 (Caithness 2009).

[d] BEP II onsite construction emissions from Table 5.2E-5 (Caithness 2009).

Table 3.1-51R1. Comparison of Estimated GHG Emissions During the Construction Period

	CO_2	CH_4	N_2O	CO_2e
SEP	~~7,139~~ 6,735	~~1.1~~ 1.0	0.0	~~7,166~~ 6,759
BEP II[a]	4,744.8	0.29	0.18	4,806

Note:

[a] CO_2, CH_4 and N_2O emissions for BEP II from October 2009 PTA, CO2e Emissions Estimates table in Appendix 5.2E. CO_2e calculated using current GWPs.

SECTION 3

Biological Resources (23-25)

BACKGROUND: TRANSMISSION LINE

Section 2.1.3.2 of the 2015 Petition to Amend (PTA) the Blythe Energy Project Phase II (Sonoran Energy Project) states: "The new 161-kV Gen-Tie line will go from the high side of the SEP generator step-up unit (GSU) transformer to the existing Buck Boulevard (or Buck) 161-kV substation, on the existing BEP site" (page 2-6). On page 3-83 the petition states that "[t]he interconnection will be built on the previously surveyed SEP site…" However, Figure 2-2b shows a portion of the Gen-Tie north of W. Chanslor Way and extending east parallel to W. Chanslor Way for approximately 900 feet before entering the Buck substation. This portion of the proposed Gen-Tie line will be constructed within a habitat (Sonoran creosote scrub) suitable for biological resources including desert tortoise. The impacts to biological resources from this portion of the Gen-Tie on the north side of W. Chanslor Way were not discussed in the petition and would need to be considered in staff's analysis of the amendment.

DATA REQUESTS

23. Please provide a habitat assessment for sensitive plants and wildlife and plant communities (listing species), along with an environmental impact analysis of the proposed Gen-Tie line.

Response: The new 161-kV generator-tie line alignment runs from the north side of the Sonoran Energy Project (SEP) generator step-up unit (GSU) transformer to the existing Buck Boulevard (or Buck) 161-kV substation, on the existing Blythe Energy Project (BEP) site. Land cover types and vegetation communities within 500 feet for the proposed generator-tie line include barren/disturbed, developed, and Sonoran desert scrub. Figure DR23-1 presents the Land cover types and vegetation communities within 500 feet of the generator-tie line. Barren/disturbed land cover consists of graded/barren substrate, which is adjacent to the southern portion of the proposed alignment. Developed land cover is primarily related to existing industrial land uses. Sonoran desert scrub, which is predominantly vegetated within creosote bush (*Larrea tridentata*) has been previously graded and has started to revegetate. This portion of Sonoran desert scrub is relatively flat and appears to have been in agricultural production at some point as visible from aerial imagery (Google Earth).

The generator-tie line alignment was reviewed for sensitive biological resources including United States Fish and Wildlife Service (USFWS) designated critical habitat (USFWS, 2015a), USFWS National Wetlands Inventory (USFWS, 2015b), special-status plant and wildlife species, and sensitive vegetation communities (California Department of Fish and Wildlife [CDFW], 2003, 2009). Lists of potential special-status species were queried from the California Natural Diversity Database (CNDDB) within 1 mile of the generator-tie line alignment (CDFW, 2015).

No critical habitat intersects the generator-tie line alignment (USFWS, 2015a).

There are no NWI-designated wetlands that intersect the generator-tie line alignment (USFWS, 2015b). PUBHx is a code assigned by the NWI that indicates the ponds are considered a palustrine system (P) with an unconsolidated bottom (UB), a permanently flooded water regime (H) that has been excavated (x) (USFWS, 2015b). This feature is a man-made treatment pond, associated with existing industrial facilities and is not expected to support wildlife species.

An updated California Department of Fish and Wildlife (CDFW) California Natural Diversity Database Search (CNDDB) search within 1 mile of the generator-tie line was conducted (Attachment DR23-1). The following special-status plant and wildlife species where occurrence records were documented within the CNDDB: Harwood's milk-vetch (*Astragalus insularis* var. *harwoodii*; California Native Plant Society [CNPS] Rare Plant Rank 2B.2), bitter hymenoxys (*Hymenoxys odorata*; Rare Plant Rank 2B.1), dwarf

germander (*Teucrium cubense* ssp. *depressum*; Rare Plant Rank 2B.2), and mountain plover (*Charadrius montanus*; CDFW Species of Special Concern [SSC]) (CDFW, 2015).

Special-Status Plant Species

Harwood's milk-vetch

Harwood's milk-vetch is a CNPS 2B.2 species, meaning that it is fairly endangered in California (CNPS, 2015). This species blooms from January through May and occurs throughout the Mojave and Sonoran Deserts covering portions of Imperial, Riverside, and San Diego counties (CNPS, 2015). This species occurs in desert dunes/open sandy flats or stony desert washes primarily in creosote bush scrub (CDFW, 2015). According to CNDDB records (CDFW, 2015), this species was documented southeast of Blythe Airport. Harwood's milk-vetch is also a covered species under the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) (BLM, 2002). However, since the majority of the Sonoran desert scrub habitat along the generator-tie alignment has been previously graded/disturbed, there is limited potential for this species to occur within the project area.

Bitter hymenoxys

Bitter hymenoxys is a CNPS 2B.1 species, which means it is seriously endangered in California (CNPS, 2015). According to CNPS (2015), this species blooms in February through November and occurs in sandy soils in riparian scrub and Sonoran desert scrub. A historic record (1922) for this species was documented near the Colorado River near Blythe (CDFFW, 2015). There are no additional occurrence records for bitter hymenoxys within 500 feet of the generator-tie line alignment. As previously noted, since the majority of the Sonoran desert scrub habitat along the generator-tie alignment has been previously disturbed by grading activities, there is limited potential for this species to occur within the project area.

Dwarf germander

Dwarf germander a CNPS 2B.2 species that blooms in March through November (CNPS, 2015). This species occurs in desert dunes, playa margins, and Sonoran desert scrub (CDFW, 2015). A historic record (1949) for dwarf germander was documented near the Blythe Overflow Flats within the Palo Verde Valley (CDFW, 2015). Since the majority of the Sonoran desert scrub habitat along the generator-tie alignment has been previously disturbed by grading activities, there is limited potential for this species to occur within the project area.

Special-Status Wildlife Species

Desert tortoise

Desert tortoise (*Gopherus agassizii*; Federal Threatened [FT], State Threatened [ST]) inhabit bajadas and steep, rocky slopes within the Sonoran Desert, and are uncommon in valleys; while in the Mojave Desert this species predominantly occupies creosote bush scrub (USFWS, 2010 and references therein). Designated critical habitat for the desert tortoise is located approximately 10 miles southwest of the SEP site (USFWS, 2015a). No occurrence records for this species have been documented within 1 mile of the generator-tie line alignment. In addition, since the majority of the Sonoran desert scrub habitat along the generator-tie alignment has been previously disturbed by grading activities, there is limited potential for this species to occur within the project area.

Mountain plover

Mountain plovers inhabit short grasslands, freshly plowed fields, newly sprouting grain fields, and sod farms (CDFW, 2015). According to CDFW (2015), this species was documented within agricultural fields in Blythe. There is no suitable habitat for this species within the generator-tie line alignment; therefore, this species is not expected.

24. Please provide a map that shows the habitats with acres within 500 feet of either side of the Gen-Tie line.

Response: A map showing land cover types and vegetation communities within 500 feet of the generator-tie line is provided as Figure DR23-1.

25. Please provide permanent and temporary impact acres of the habitats for the Gen-Tie line.

Response: The engineering design for the generator-tie line is still being developed; therefore, exact impact calculations are not available at this time. However, preliminary impacts have been calculated based on a 25-foot buffer on each side of the proposed generator-tie line alignment. The generator-tie line will impact the previously disturbed Sonoran desert scrub habitat with approximately 1.4 acres of temporarily disturbance and less than 1 acre of permanently disturbance. Within developed land cover areas, approximately 1.2 acres will be temporarily disturbed and less than 1 acre will be permanently disturbed. No impacts to barren/disturbed land cover is anticipated.

References:

http://www.calflora.org/

California Department of Fish and Wildlife (CDFW). 2015. California Natural Diversity Database (CNDDB) search within 1 mile of the generator-tie line. October.

California Department of Fish and Wildlife (CDFW). 2009. *List of California Vegetation Alliances.* Biogeographic Data Branch, Vegetation Classification and Mapping Program.

California Department of Fish and Wildlife (CDFW). 2003. *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database (CNDDB).* Wildlife and Habitat Data Analysis Branch, Vegetation Classification and Mapping Program.

California Native Plant Society (CNPS), Rare Plant Program. 2015. Inventory of rare, threatened, and endangered plants of California. Available online at: http://www.rareplants.cnps.org/

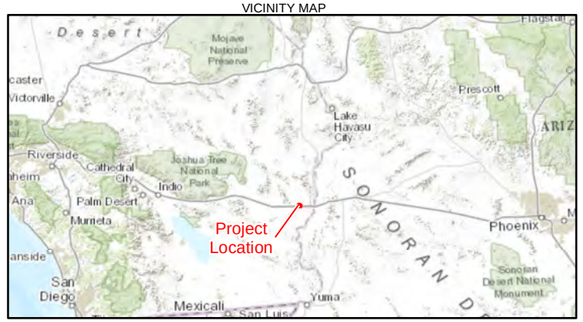
United States Department of the Interior, Bureau of Land Management (BLM). 2002. *Proposed Northern & Eastern Colorado Desert Coordinated Management Plan an amendment to the California Desert Conservation Area Plan 1980 and Sikes Act Plan with the California Department of Fish and Game and the Final Environmental Impact Statement.* July.

United States Fish and Wildlife Service (USFWS). 2010. Mojave Population of the Desert Tortoise (*Gopherus agassizii*) 5-Year Review: Summary and Evaluation. September 30.

United States Fish and Wildlife Service (USFWS). 2015a. Critical Habitat Portal. Available online at: http://ecos.fws.gov/crithab/

United States Fish and Wildlife Service (USFWS). 2015b. National Wetlands Inventory Mapper. Available online at: http://www.fws.gov/wetlands/Data/Mapper.html

VICINITY MAP



LEGEND

- Project Site
- Property Boundary
- Generator Tie-Line
- 500-ft Buffer of Generator Tie-Line

Land Cover Types and Vegetation Communities

- Barren/Disturbed
- Developed
- Sonoran Desert Scrub

0 400 800
Feet

N

FIGURE DR23-1

Generator Tie Line Land Cover Types and Vegetation Communities

Sonoran Energy Project
Riverside County, California

Attachment DR23-1: Land Cover and Vegetation Communities Within 500 Feet of the Generator-Tie Lone

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Imported file selection

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Astragalus insularis var. harwoodii Harwood's milk-vetch	PDFAB0F491	None	None	G5T3	S2	2B.2
Charadrius montanus mountain plover	ABNNB03100	None	None	G3	S2?	SSC
Hymenoxys odorata bitter hymenoxys	PDAST530E0	None	None	G5	S2	2B.1
Teucrium cubense ssp. depressum dwarf germander	PDLAM20032	None	None	G4G5T3T4	S2	2B.2

Record Count: 4

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Imported file selection

Map Index Number:	72304	**EO Index:**	86399
Key Quad:	Blythe (3311455)	**Element Code:**	ABNNB03100
Occurrence Number:	94	**Occurrence Last Updated:**	2012-05-11

Scientific Name: *Charadrius montanus* **Common Name:** mountain plover

Listing Status: **Federal:** None
State: None

CNDDB Element Ranks: **Global:** G3
State: S2?

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
CDFW_SSC-Species of Special Concern
IUCN_NT-Near Threatened
NABCI_RWL-Red Watch List
USFWS_BCC-Birds of Conservation Concern

General Habitat:

SHORT GRASSLANDS, FRESHLY PLOWED FIELDS, NEWLY SPROUTING GRAIN FIELDS, & SOMETIMES SOD FARMS.

Micro Habitat:

SHORT VEGETATION, BARE GROUND & FLAT TOPOGRAPHY. PREFERS GRAZED AREAS & AREAS WITH BURROWING RODENTS.

Last Date Observed:	1981-11-28	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1981-11-28	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

AGRICULTURE FIELDS IN THE VICINITY OF BLYTHE.

Detailed Location:

EXACT LOCATION UNKNOWN. EBIRD POINT COORDINATE CENTERED ON BLYTHE, & LOCATION STATED AS "BLYTHE AND VICINITY." MAPPED TO 5 MILE NON-SPECIFIC POLYGON IN THE VICINITY OF BLYTHE INCORPORATING THE AGRICULTURE LANDS OUTSIDE OF THE CITY CENTER.

Ecological:

MOUNTAIN PLOVERS WERE LIKELY DETECTED ON THE AGRICULTURE LANDS IN THE VICINITY OF BLYTHE. UNKNOWN IF MOUNTAIN PLOVERS REGULARLY USE THIS AREA FOR FORAGING AND OVER WINTERING. FURTHER MONITORING AND RESEARCH NEEDED.

Threats:

General:

100 DETECTED BY K. GARRETT ON 28 NOV 1981.

PLSS:	T06S, R23E, Sec. 32 (S)	**Accuracy:**	5 miles	**Area (acres):**	0
UTM:	Zone-11 N3721564 E722994	**Latitude/Longitude:**	33.61053 / -114.59646	**Elevation (feet):**	270

County Summary:	**Quad Summary:**
Riverside, Arizona State	Blythe (3311455), Ripley (3311456), Blythe NE (3311465), McCoy Wash (3311466)

Sources:

EBI11D0005 EBIRD - RIVERSIDE COUNTY MOUNTAIN PLOVER RECORDS FROM EBIRD: AN ONLINE DATABASE OF BIRD DISTRIBUTION & ABUNDANCE. ITHACA, NEW YORK. AVAILABLE: HTTP://WWW.EBIRD.ORG. (ACCESSED: 2012-01-12) 2011-10-24

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number: 72304
EO Index: 74011
Key Quad: Blythe (3311455)
Element Code: PDAST530E0
Occurrence Number: 3
Occurrence Last Updated: 2008-12-04

Scientific Name: *Hymenoxys odorata*
Common Name: bitter hymenoxys

Listing Status: **Federal:** None
State: None
Rare Plant Rank: 2B.1
Other Lists:

CNDDB Element Ranks: **Global:** G5
State: S2

General Habitat:
RIPARIAN SCRUB, SONORAN DESERT SCRUB.

Micro Habitat:
SANDY SITES. 45-150 M.

Last Date Observed: 1922-04-06
Occurrence Type: Natural/Native occurrence
Last Survey Date: 1922-04-06
Occurrence Rank: Unknown
Owner/Manager: UNKNOWN
Trend: Unknown
Presence: Presumed Extant

Location:
NEAR BLYTHE.

Detailed Location:
EXACT LOCATION UNKNOWN. UNCERTAIN IF COLLECTIONS WERE MADE WITHIN BLYTHE OR AT THE EDGE OF THE COLORADO RIVER NEAR BLYTHE. MOST LIKELY THE JEPSON COLLECTION WAS FROM IMMEDIATELY NEAR THE RIVER. MAPPED AS A LARGE, VAGUE 5 MILE RADIUS CIRCLE.

Ecological:
HABITAT DESCRIBED AS "SANDY SLOPE" "LOW BOTTOM LANDS" AND "OVERFLOW FLATS"

Threats:

General:
ONLY SOURCES OF INFORMATION ARE 3 COLLECTIONS: JEPSON, IN 1912, FROM "FLATS, OVERFLOW, BLYTHE" TAKEN DURING FLOAT TRIP DOWN RIVER; MUNZ, IN 1920 FROM "NEAR BLYTHE" AND JAEGER IN 1922 FROM "BLYTHE, ON LOW BOTTOM LANDS." NEEDS FIELDWORK.

PLSS: T06S, R23E, Sec. 32 (S)
Accuracy: 5 miles
Area (acres): 0
UTM: Zone-11 N3721564 E722994
Latitude/Longitude: 33.61053 / -114.59646
Elevation (feet):

County Summary:
Riverside, Arizona State

Quad Summary:
Blythe (3311455), Ripley (3311456), Blythe NE (3311465), McCoy Wash (3311466)

Sources:

JAE22S0005	JAEGER, E. - JAEGER #884 US #1243351 1922-04-06
JEP12S0009	JEPSON, W. - JEPSON #5260 JEPS #34802 1912-11-01
MUN20S0018	MUNZ, P. & R. HARWOOD - MUNZ #3579 POM #7691 1920-04-02

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number: 60490
Key Quad: Ripley (3311456)
Occurrence Number: 13
EO Index: 60526
Element Code: PDFAB0F491
Occurrence Last Updated: 2013-04-18

Scientific Name: *Astragalus insularis var. harwoodii*
Common Name: Harwood's milk-vetch

Listing Status: **Federal:** None
State: None
Rare Plant Rank: 2B.2
Other Lists: SB_RSABG-Rancho Santa Ana Botanic Garden

CNDDB Element Ranks: **Global:** G5T3
State: S2

General Habitat:
DESERT DUNES, MOJAVEAN DESERT SCRUB.

Micro Habitat:
OPEN SANDY FLATS AND SANDY OR STONY DESERT WASHES; MOSTLY IN CREOSOTE BUSH SCRUB. 0-710 M.

Last Date Observed: 2013-03-17
Last Survey Date: 2013-03-17
Owner/Manager: UNKNOWN
Presence: Presumed Extant
Occurrence Type: Natural/Native occurrence
Occurrence Rank: Poor
Trend: Unknown

Location:
BETWEEN INTERSTATE 10 AND WEST HOBSON WAY NEAR BUCK BOULEVARD, SE OF BLYTHE AIRPORT, WEST OF BLYTHE.

Detailed Location:
MAPPED BY CNDDB AS TWO POLYGONS BASED ON GPS COORDINATES FROM 2004 AND 2012.

Ecological:
SANDY FLATS WITH LARREA TRIDENTATA, AMBROSIA DUMOSA, PLANTAGO, SCHISMUS, AND CRYPTANTHA.

Threats:
TRASH DUMPING NOTED IN 2004.

General:
25 PLANTS OBSERVED IN 2004 IN SE POLYGON. UNKNOWN NUMBER FOUND IN 2013 IN NW POLYGON.

PLSS: T06S, R22E, Sec. 33 (S)
Accuracy: specific area
Area (acres): 2
UTM: Zone-11 N3721041 E714938
Latitude/Longitude: 33.60747 / -114.68336
Elevation (feet): 335

County Summary:
Riverside

Quad Summary:
Ripley (3311456)

Sources:

BEL04F0027	BELASCO, L. - FIELD SURVEY FORM FOR ASTRAGALUS INSULARIS VAR. HARWOODII 2004-04-08
RIN13S0002	RINK, G. - RINK #11855 ASC #103497 2013-03-17

Occurrence Report

California Department of Fish and Wildlife

California Natural Diversity Database

Map Index Number: 72304
EO Index: 73264
Key Quad: Blythe (3311455)
Element Code: PDLAM20032
Occurrence Number: 3
Occurrence Last Updated: 2012-11-14

Scientific Name: *Teucrium cubense ssp. depressum*
Common Name: dwarf germander

Listing Status: **Federal:** None
State: None
Rare Plant Rank: 2B.2
Other Lists:

CNDDB Element Ranks: **Global:** G4G5T3T4
State: S2

General Habitat:
DESERT DUNES, PLAYAS, SONORAN DESERT SCRUB.

Micro Habitat:
DUNES, PLAYA MARGINS AND SCRUB. 45-400M.

Last Date Observed: 1949-04-08
Occurrence Type: Natural/Native occurrence
Last Survey Date: 1949-04-08
Occurrence Rank: Unknown
Owner/Manager: UNKNOWN
Trend: Unknown
Presence: Presumed Extant

Location:
BLYTHE OVERFLOW FLATS, PALO VERDE VALLEY.

Detailed Location:
EXACT LOCATION UNKNOWN. MAPPED BY CNDDB CENTERED ON THE CITY OF BLYTHE, BUT THE LOCATION DESCRIPTIONS ARE SO VAGUE THAT THESE COLLECTIONS COULD HAVE COME FROM ELSEWHERE IN THE PALO VERDE VALLEY. MAPPED AS LARGE 5 MILE RADIUS CIRCLE.

Ecological:

Threats:

General:
SOURCES FOR OCCURRENCE ARE A 1904 SCHELLENGER COLLECTION FROM "PALO VERDE" A 1912 JEPSON COLLECTION FROM "BLYTHE, OVERFLOW FLATS. PALO VERDE VALLEY" AND A 1949 ROOS COLLECTION FROM "EDGE OF IRRIGATED FIELD, PALO VERDE". NEEDS FIELDWORK.

PLSS: T06S, R23E, Sec. 32 (S)
Accuracy: 5 miles
Area (acres): 0
UTM: Zone-11 N3721564 E722994
Latitude/Longitude: 33.61053 / -114.59646
Elevation (feet):

County Summary:
Riverside, Arizona State

Quad Summary:
Blythe (3311455), Ripley (3311456), Blythe NE (3311465), McCoy Wash (3311466)

Sources:

JEP12S0008	JEPSON, W. - JEPSON #5258 JEPS #2892, RSA #279365 1912-XX-XX
ROO49S0068	ROOS, J. - ROOS #4201 RSA #45514 1949-04-08
SCH04S0001	SCHELLENGER, E. - SCHELLENGER #8 UC #66496 1904-11-03

SECTION 4

Hazardous Materials Management (26-29)

BACKGROUND

Section 3.5.1 of the Petition to Amend (PTA) states that the new Sonoran Energy Project (SEP) will have a total of 24,000 gallons of aqueous ammonia. However, Table 3.5.1 lists two aqueous ammonia solutions at 19 and 29 percent by weight. The table does not specify the precise quantities for each percentage of aqueous ammonia and the PTA does not explain why SEP needs both concentrations, or how each will be used. Staff needs more information in order to complete its analysis.

DATA REQUESTS

26. Please clarify that SEP will require both types (19 percent and 29 percent by weight) of aqueous ammonia on site and provide a site map with the location showing each of the aqueous ammonia tank locations.

Response: SEP will use both 19 and 29 percent aqueous ammonia onsite. The 19 percent aqueous ammonia is used to adjust the pH of the boiler feedwater and the 29 percent aqueous ammonia is used to control oxides of nitrogen emissions in the turbines selective catalytic reduction system. Figure DR26-1 presents the locations of the aqueous ammonia use.

27. Please submit a separate line item for each aqueous ammonia by weight on site listing the amount of each in gallons.

Response: Table DR27-1 presents individual rows for the 19 and 29 percent aqueous ammonia.

TABLE DR27-1
Aqueous Ammonia Uses, Quantity, and Storage

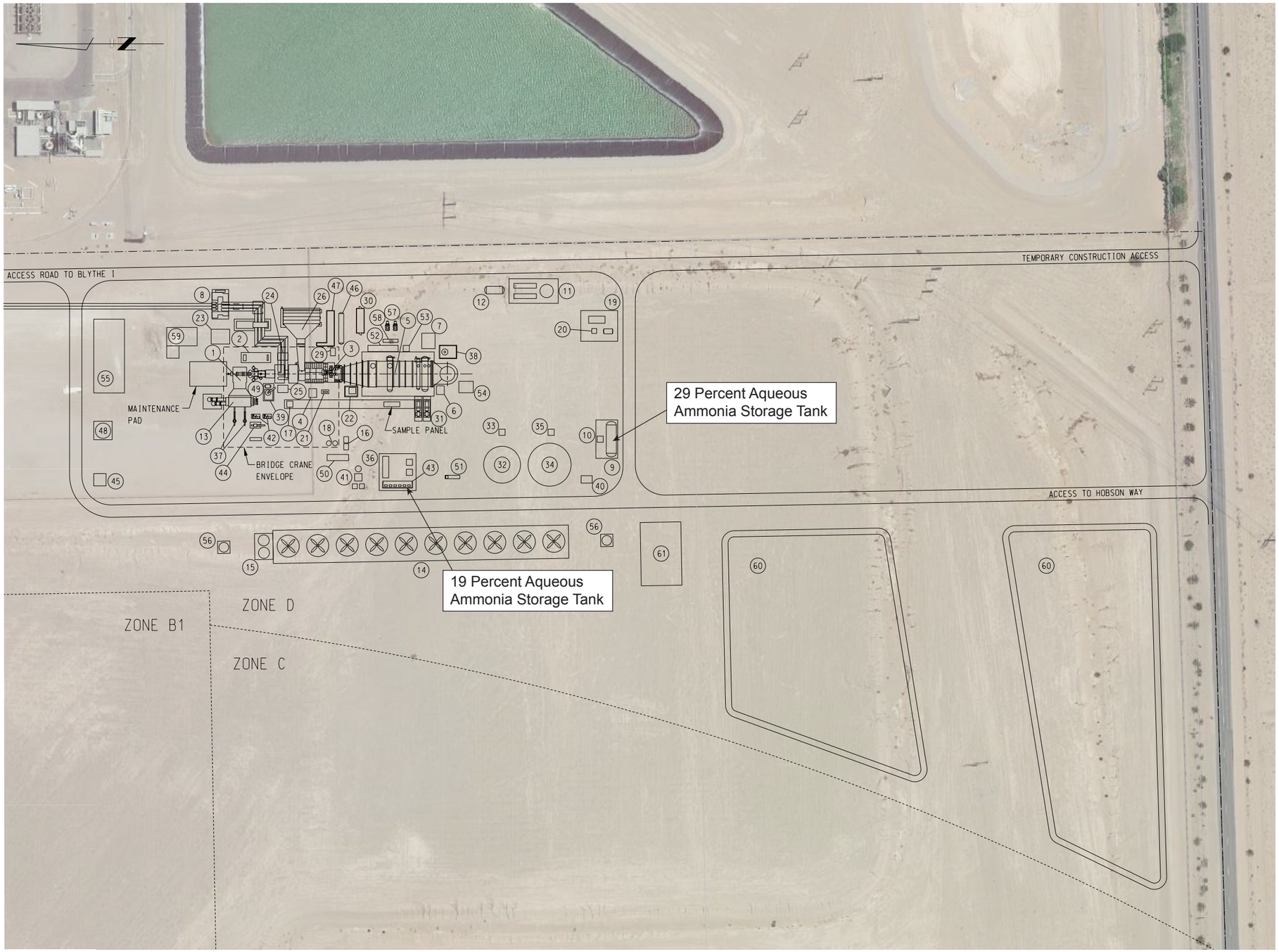
Chemical	Estimated Delivery Schedule	Use	Quantity	Storage Location	State	Type of Storage
Aqueous ammonia - 29%	122 tanker trucks (6,000 gallons per truck)	Control NO_x emissions through SCR	24,000 gallons	Onsite storage tank	Liquid	Continuously onsite
Aqueous ammonia - 19%	1 tote per month	Steam cycle pH control	500 gallons	Water treatment building	Liquid	Continuously onsite

28. Please clarify whether the 19 percent or 29 percent by weight of aqueous ammonia will be used and stored for the selective catalytic reduction (SCR) process. For the aqueous ammonia not used for the SCR process, please provide a detailed written analysis showing how the aqueous ammonia will be used and stored on site.

Response: As noted in the response to Data Request #26, the 19 percent aqueous ammonia will be used as a water treatment chemical to control boiler feed water pH. Adding dilute aqueous ammonia to boiler feed water elevates the pH of the condensate control corrosion in the steam cycle. The pH of the boiler feed water is monitored and the 19 percent aqueous ammonia is added to maintain the proper pH setting.

29. Please provide an updated Offsite Consequence Analysis (OCA) due to the increase in the amount of aqueous ammonia on site. If both concentrations of aqueous ammonia are to be kept on site, please provide a separate OCA for each tank.

Response: Attachment DR29-1 presents an Offsite Consequence Analysis for the use and storage of aqueous ammonia on the SEP site. The results of the OCA indicate that the complete release of the contents of the 24,000-gallon, 29 percent aqueous ammonia storage tank will not result in an offsite ammonia concentration of 75 parts per million. As such, preparing an OCA for the smaller (500-gallons), less concentrated (19 percent) aqueous ammonia storage tank will not provide any additional information on the impacts of aqueous ammonia use at SEP.



LEGEND

1 - STEAM TURBINE
2 - STEAM TURBINE LO MODULE
3 - GAS TURBINE
4 - GAS TURBINE LO MODULE
5 - HEAT RECOVERY STEAM GENERATOR
6 - HRSG LP/ECONOMIZER RECIRC PUMP
7 - HRSG BLOW DOWN SUMP
8 - STEP UP TRANSFORMER
9 - AQUEOUS AMMONIA STORAGE
10 - AQUEOUS AMMONIA FORWARD PUMPS
11 - FUEL GAS CONDITIONING AND PRESSURE REGULATING STATION
12 - FUEL GAS DRAINS TANK
13 - SURFACE CONDENSER
14 - COOLING TOWER
15 - CIRCULATING WATER PUMPS
16 - CLOSED COOLING WATER (CCW) HEAT EXCHANGER
17 - CCW EXPANSION TANK
18 - CCW PUMPS
19 - AUX BOILER
20 - AUX BOILER BLOW DOWN SUMP
21 - WASH WATER SKID
22 - WASH WATER DRAINS TANK
23 - AUX TRANSFORMER
24 - GENERATOR LINE ACCESSORY COMPARTMENT
25 - GENERATOR NEUTRAL ACCESSORY COMPARTMENT
26 - INLET AIR FILTER/EVAPORATIVE COOLER
27 - NOT USED
28 - NOT USED
29 - GE DLN GAS MODULE
30 - PACKAGED ELECTRONIC/ELECTRICAL CONTROL COMPARTMENT
31 - FEEDWATER PUMPS
32 - DEMIN WATER TANK
33 - DEMIN WATER PUMPS
34 - RAW WATER TANK
35 - RAW WATER PUMPS
36 - WATER TREATMENT AREA
37 - CONDENSATE PUMPS
38 - HRSG BLOW DOWN TANK
39 - CONDENSATE DRAINS / FLASH TANK
40 - FIRE PUMP SKID
41 - AIR COMPRESSORS, DRYERS AND RECEIVER
42 - VACUUM PUMPS
43 - CHEM FEED SKIDS
44 - GLAND STEAM CONDENSER
45 - N2 STORAGE
46 - CO2 STORAGE
47 - CT FIRE PROTECTION SKID
48 - HYDROGEN STORAGE
49 - HP, IP, LP BYPASS VALVES
50 - WASTE WATER STORAGE
51 - OIL/WATER SEPARATOR
52 - DUCT BURNER SKID
53 - SCANNER AIR SKID
54 - CEMS
55 - WAREHOUSE
56 - NEW WELL
57 - AMMONIA FLOW CONTROL UNIT
58 - FUEL GAS PERFORMANCE HEATER
59 - PDC/ELECTRICAL ROOM
60 - EVAP POND
61 - BRINE CONCENTRATOR

0 40 80 160 240
1"= 80'

FIGURE DR26-1
General Arrangement with Ammonia Storage Locations
Sonoran Energy Project
Riverside County, California

Source: Power Engineers, Drawing MSK1-1, Rev. D, 12/23/14.

CH2MHILL

Attachment DR29:
SEP Offsite Consequence Analysis for Ammonia

ATTACHMENT DR29-1

SEP Offsite Consequence Analysis for Ammonia

An offsite consequence analysis (OCA) for ammonia was conducted for the proposed Sonoran Energy Project (SEP). SEP is required by both the Clean Air Act and the Mojave Desert Air Quality Management District to install Best Available Control Technology to control emissions of criteria air pollutants from the proposed natural-gas-fired combustion turbine. Oxides of nitrogen (NO_x) emissions from the combustion turbine will be reduced through the use of selective catalytic reduction (SCR). The SCR control system utilizes ammonia as the reduction reagent in the presence of a catalyst. The SEP will use a 29 percent aqueous ammonia solution, stored in an aboveground storage tank located near the power block with a capacity of 24,000 gallons. A second 19 percent aqueous ammonia tank (a 500 gallon tote) is located at the water treatment skid. This ammonia solution is used to control boiler feed water pH. Due to the smaller size storage container, the off-site consequence analysis is focused on the larger, more concentrated SCR aqueous ammonia storage tank.

The storage area for the ammonia storage tank will include a covered secondary containment basin, measuring 62 feet by 35 feet, with depth sufficient to hold the full contents of the tank plus rainwater from a 25-year, 24-hour storm event. The secondary containment area will be partially covered to effectively reduce the exposed surface area of spilled ammonia by 50 percent in the event of a catastrophic tank failure. The ammonia storage tank will be equipped with a pressure relief valve, a vapor equalization system, and a vacuum breaker system. The ammonia storage tank will be maintained at ambient temperature and atmospheric pressure.

Aqueous ammonia will be delivered to the plant by truck transport. The ammonia delivery truck unloading area will include a bermed and sloped pad surface. The bermed truck drainage pad will slope to a collection trough that will drain into the same secondary containment basin used for the ammonia storage tank.

Analysis

An analysis of tank failure and subsequent release of aqueous ammonia from the 24,000-gallon ammonia storage tank was prepared using a numerical dispersion model. The analysis assumed the complete failure of the storage tank, the immediate release of the contents of the tank, and the formation of an evaporating pool of aqueous ammonia within the secondary containment basin. Evaporative emissions of ammonia would be subsequently released into the atmosphere. Meteorological conditions at the time of the release would control the evaporation rate, dispersion, and transport of ammonia released to the atmosphere.

For purposes of this analysis, the following meteorological data were used:

- U.S. Environmental Protection Agency (USEPA) default (worst-case) meteorological data, supplemented by daily temperature data as defined by 19 California Code of Regulations (CCR) 2750.2.

The maximum temperature recorded at the Blythe Airport station, which is near the SEP, in the past three years was 120 degrees Fahrenheit (°F) or 322.04 Kelvin[1]. Maximum temperatures combined with worst-case meteorological conditions result in the highest ammonia concentrations at the farthest distance downwind of the release site.

Table 1 displays the meteorological data values used in the modeling analysis.

[1] http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca0927

TABLE 1
Meteorological Input Parameters

Parameter	Worst-Case Meteorological Data
Wind Speed, meters/second	1.5
Stability Class	F
Relative Humidity, Percent	50
Ambient Temperature, Kelvin (°F)	322.04 (120)
Surface Roughness Length, meters (based on open country land cover)	0.03

The model run was conducted based on an evaporating pool release using the meteorological data presented in Table 1. Modeling was conducted using the SLAB numerical dispersion model. A complete description of the SLAB model is available in *User's Manual for SLAB: An Atmospheric Dispersion Model for Denser-Than-Air Releases, D. E. Ermak, Lawrence Livermore National Laboratory, June 1990*. The SLAB user's manual contains a substance database, which includes chemical-specific data for ammonia. These data were used in the modeling run without exception or modification.

Emissions of aqueous ammonia were calculated pursuant to the guidance given in *RMP Offsite Consequence Analysis Guidance, USEPA, April 1999*, using the emission calculation tool for evaporating solutions provided in the USEPA's Area Locations of Hazardous Atmospheres (ALOHA) model[2].

Release rates for ammonia vapor from an evaporating 29-percent aqueous ammonia solution were calculated assuming mass transfer of ammonia across the liquid surface occurs according to principles of heat transfer by natural convection. The ammonia release rate was calculated using ALOHA, meteorological data displayed in Table 1, the dimensions of the secondary containment basin, and the area of the opening in the containment cover. For the worst-case scenario, it was assumed that a complete failure of the storage tank occurred which resulted in an evaporating pool of aqueous ammonia within the secondary containment basin while the cover was in place.

During the worst-case scenario, an initial ammonia evaporation rate was calculated and assumed to occur for 1 hour after the initial release. For concentrated solutions, the initial evaporation rate is substantially higher than the rate averaged over time periods of a few minutes or more since the concentration of the solution immediately begins to decrease as evaporation begins.

Although the edge of the secondary containment basin is raised above ground level, the release height used in the modeling was set at 0 meters above ground level (AGL) to maintain the conservative nature of the analysis. Downwind concentrations of ammonia were calculated at heights of 1.6 meters AGL and at 0 meters AGL. The California Office of Environmental Health Hazard Assessment has designated 1.6 meters as the breathing zone height for individuals.

An analysis of the ammonia storage tank loading hose failure with a leak below the excess flow valve's activation set-point and the subsequent impacts was considered. This analysis would normally be completed under typical or average meteorological conditions for the area. However, after review of the possible failure modes, it was determined that the impact of this leak would be bracketed by the complete tank failure as a worst-case for the hose failure.

[2] http://www2.epa.gov/cameo/aloha-software.

Toxic Effects of Ammonia

With respect to the assessment of potential impacts associated with an accidental release of ammonia, four offsite "bench mark" exposure levels were evaluated, as follows: (1) the lowest concentration posing a risk of lethality, 2,000 part(s) per million (ppm); (2) the Occupational Safety and Health Administration's (OSHA) Immediately Dangerous to Life and Health (IDLH) level of 300 ppm; (3) the Emergency Response Planning Guideline (ERPG) level of 150 ppm, which is the American Industrial Hygiene Association's (AIHA) updated ERPG-2 for ammonia; and (4) the level considered by the California Energy Commission (CEC) staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm (*Preliminary Staff Assessment-Otay Mesa Generating Project, 99-AFC-5, May 2000)*.

The odor threshold of ammonia is approximately 5 ppm, and minor irritation of the nose and throat will occur at 30 to 50 ppm. Concentrations greater than 140 ppm will cause detectable effects on lung function, even for short-term exposures (0.5 to 2 hours). At higher concentrations of 700 to 1,700 ppm, ammonia gas will cause severe effects; death occurs at concentrations of 2,500 to 7,000 ppm.

The ERPG-2 value is based on a 1-hour exposure or averaging time; therefore, the modeled distance to ERPG-2 concentrations are presented in terms of a 1-hour (or 60-minute) averaging time. The ERPG-2 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.

Modeling Results

Table 2 shows the modeled distance to the four benchmark criteria concentrations: lowest concentration posing a risk of lethality (2,000 ppm), OSHA's IDLH (300 ppm), AIHA's ERPG-2 (150 ppm), and the CEC significance value (75 ppm).

TABLE 2
Distance to USEPA and CEC Toxic Endpoints (Ammonia)

Scenario	Distance in Meters to 2,000 ppm	Distance in Meters to IDLH (300 ppm)	Distance in Meters to AIHA's ERPG-2 (150 ppm)	Distance in Meters to CEC Significance Value (75 ppm)
0 meters AGL	25 feet	25 feet	25 feet	26 feet
1.6 meters AGL	29 feet	30 feet	30 feet	30 feet

Note:

The model input and output files are available upon request.

The closest point on the SEP boundary to the secondary containment basin extends approximately 287 feet to the east. The results of the offsite consequence analysis for the worst-case release scenario of ammonia at the SEP indicate that concentrations exceeding the benchmarks above would not extend beyond the SEP boundary for either the 0- or 1.6-meter AGL scenarios.

Assessment of the Methodology Used

Numerous conservative assumptions were used in the above analysis of the worst-case release scenario. These include the following:

- Worst-case of a constant mass flow, at the highest possible initial evaporation rate for the modeled wind speed and temperature, was used, whereas in reality the evaporation rate would decrease with time as the concentration in the solution decreases.
- Worst-case stability class was used, which almost exclusively occurs during nighttime hours, but the maximum ambient temperature of 120°F was used, which would occur during daylight hours.

- Again, worst-case meteorology corresponds to nighttime hours, whereas the worst-case release of a tank failure would most likely occur during daytime activities at the power plant. At night, activity at a power plant is typically minimal.

Risk Probability

Accidental releases of aqueous ammonia in industrial use situations are rare. Statistics compiled on the normalized accident rates for RMP chemicals for the years 1994-1999 from *Chemical Accident Risks in U.S. Industry-A Preliminary Analysis of Accident Risk Data from U.S. Hazardous Chemical Facilities*, J.C. Belke, September 2000, indicates that ammonia (all forms) averages 0.017 accidental releases per process per year, and 0.018 accidental releases per million pounds stored per year. Data derived from *The Center for Chemical Process Safety, 1989* indicates the accidental release scenarios and probabilities for ammonia in general, as shown in Table 3.

TABLE 3
General Accidental Release Scenarios and Probabilities for Ammonia

Accident Scenario	Failure Probability
Onsite Truck Release	0.0000022
Loading Line Failure	0.005
Storage Tank Failure	0. 000095
Process Line Failure	0.00053
Evaporator Failure	0.00015

Conclusions

Several factors need to be considered when determining the potential risk from the use and storage of hazardous materials. These factors include the probability of equipment failure, population densities near the project site, meteorological conditions, and the process design. Considering the results of the above analysis, and accounting for the probability of a tank failure resulting in the modeled ammonia concentrations at the conditions modeled, the risk posed to the local community from the storage of aqueous ammonia at the SEP is not significant.

The results of the catastrophic scenario analysis indicate that the probability of a complete storage tank failure in combination with the conservatively modeled meteorological conditions would not pose a significant threat since ammonia concentrations above the four “benchmark” thresholds of 2,000, 300, 150, and 75 ppm would not be accessible to the public.

As described above, numerous conservative assumptions have been made at each step in this analysis. The conservative nature of these assumptions has resulted in a significant overestimation of the probability of an ammonia release at the SEP site, and the predicted distances and elevations to toxic endpoints do not pose a threat to the public. Therefore, it is concluded that risk from exposure to aqueous ammonia due to the SEP is less than significant.

Attachment 1
SLAB Model Output

SEP Offsite Consequence Analysis for Ammonia
SLAB Model Output

problem input

idspl	=	1
ncalc	=	1
wms	=	0.017031
cps	=	2170
tbp	=	239.72
cmed0	=	0
dhe	=	1370840
cpsl	=	4294
rhosl	=	682.8
spb	=	2132.52
spc	=	-32.98
ts	=	322.04
qs	=	0.9
as	=	100.8
tsd	=	3600
qtis	=	0
hs	=	0
tav	=	3600
xffm	=	5000
zp(1)	=	0
zp(2)	=	1.6
zp(3)	=	5
zp(4)	=	10
z0	=	0.03
za	=	10
ua	=	1.5
ta	=	322.04
rh	=	50
stab	=	6

release gas properties

molecular	weight	of	source	gas	(kg)	-	wms	=	1.70E-02
vapor	heat	capacity,	const.	p.	(j/kg-k)	-	cps	=	2.17E+03
temperature	of	source	gas	(k)	-	ts	=	3.22E+02	
density	of	source	gas	(kg/m3)	-	rhos	=	6.45E-01	
boiling	point	temperature	-	tbp	=	2.40E+02			
liquid	mass	fraction	-	cmed0=	0.00E+00				
liquid	heat	capacity	(j/kg-k)	-	cpsl	=	4.29E+03		
heat	of	vaporization	(j/kg)	-	dhe	=	1.37E+06		
liquid	source	density	(kg/m3)	-	rhosl=	6.83E+02			
saturation	pressure	constant	-	spa	=	1.03E+01			
saturation	pressure	constant	(k)	-	spb	=	2.13E+03		
saturation	pressure	constant	(k)	-	spc	=	-3.30E+01		

spill characteristics

spill	type	-	idspl=	1					
mass	source	rate	(kg/s)	-	qs	=	9.00E-01		
continuous	source	duration	(s)	-	tsd	=	3.60E+03		
continuous	source	mass	(kg)	-	qtcs	=	3.24E+03		
instantaneous	source	mass	(kg)	-	qtis	=	0.00E+00		
source	area	(m2)	-	as	=	1.01E+02			
vertical	vapor	velocity	(m/s)	-	ws	=	1.39E-02		
source	half	width	(m)	-	bs	=	5.02E+00		
source	height	(m)	-	hs	=	0.00E+00			
horizontal	vapor	velocity	(m/s)	-	us	=	0.00E+00		

field parameters

concentration	averaging	time	(s)	-	tav	=	3.60E+03		
mixing	layer	height	(m)	-	hmx	=	2.60E+02		
maximum	downwind	distrace	(m)	-	xffm	=	5.00E+03		
concentration	measureme	height	(m)	-	zp(1)=	0.00E+00			
-	zp(2)=	1.60E+00							
-	zp(3)=	5.00E+00							
-	zp(4)=	1.00E+01							

SEP Offsite Consequence Analysis for Ammonia

SLAB Model Output

ambient meteorological properties

molecular	weight	of	ambient	air	(kg	-	wmae	=	2.83E-02		
heat	capacity	of	ambient	air	at	const	p.	(j/kg-k)-	cpaa	=	1.04E+03
density	of	ambient	air	(kg/m3)	-	rhoa	=	1.07E+00			
ambient	measureme	height	(m)	-	za	=	1.00E+01				
ambient	atmospheric	pressure	(pa=n/m2=i	-	pa	=	1.01E+05				
ambient	wind	speed	(m/s)	-	ua	=	1.50E+00				
ambient	temperature	(k)	-	ta	=	3.22E+02					
relative	humidity	(percent)	-	rh	=	5.00E+01					
ambient	friction	velocity	(m/s)	-	uastr	=	4.88E-02				
atmospheric	stability	class	value	-	stab	=	6.00E+00				
inverse	monin-obukl	length	(1/m)	-	ala	=	7.02E-02				
surface	roughness	height	(m)	-	z0	=	3.00E-02				

additional parameters

sub-step	multiplier	-	ncalc	=	1				
number	of	calculational	sub-steps	-	nssm	=	3		
acceleration	of	gravity	(m/s2)	-	grav	=	9.81E+00		
gas	constant	(j/mol-	k)	-	rr	=	8.31E+00		
von	karman	constant	-	xk	=	4.10E-01			

1

instantaneous spatially averaged cloud parameters

x	zc	h	bb	b	bbx	bx	cv	rho	t	u	ua
-5.02E+00	0.00E+00	0.00E+00	5.02E+00	4.52E+00	5.02E+00	5.02E+00	0.00E+00	1.07E+00	3.22E+02	0.00E+00	0.00E+00
-4.02E+00	0.00E+00	7.43E-01	5.09E+00	4.53E+00	5.49E+00	5.49E+00	8.00E-02	1.04E+00	3.22E+02	2.31E-01	3.32E-01
-3.01E+00	0.00E+00	4.04E+00	6.14E+00	4.52E+00	5.95E+00	5.95E+00	6.54E-02	1.04E+00	3.22E+02	8.61E-02	7.42E-01
-2.01E+00	0.00E+00	1.06E+00	6.33E+00	4.54E+00	6.42E+00	6.42E+00	4.41E-02	1.05E+00	3.22E+02	7.07E-01	4.03E-01
-1.00E+00	0.00E+00	1.40E+00	6.46E+00	4.59E+00	6.88E+00	6.88E+00	5.11E-02	1.05E+00	3.22E+02	6.04E-01	4.61E-01
-1.79E-07	0.00E+00	1.96E+00	6.66E+00	4.71E+00	7.35E+00	7.35E+00	6.01E-02	1.04E+00	3.22E+02	4.45E-01	5.38E-01
1.00E+00	0.00E+00	4.01E+00	7.15E+00	4.71E+00	7.81E+00	7.81E+00	6.61E-02	1.04E+00	3.22E+02	2.21E-01	7.41E-01
2.01E+00	0.00E+00	2.02E+00	7.36E+00	4.80E+00	8.28E+00	8.28E+00	7.23E-02	1.04E+00	3.22E+02	4.55E-01	5.46E-01
3.01E+00	0.00E+00	1.55E+00	7.54E+00	4.81E+00	8.75E+00	8.75E+00	7.64E-02	1.04E+00	3.22E+02	6.27E-01	4.83E-01
4.02E+00	0.00E+00	2.68E+00	7.82E+00	4.94E+00	9.21E+00	9.21E+00	8.20E-02	1.03E+00	3.22E+02	3.66E-01	6.21E-01
5.02E+00	0.00E+00	1.43E+00	8.06E+00	4.97E+00	9.68E+00	9.68E+00	7.99E-02	1.04E+00	3.22E+02	7.58E-01	4.67E-01
5.12E+00	3.35E-03	1.56E+00	8.11E+00	5.00E+00	9.77E+00	9.77E+00	7.92E-02	1.04E+00	3.22E+02	6.98E-01	4.86E-01
5.24E+00	1.62E-02	1.57E+00	8.12E+00	5.00E+00	9.88E+00	9.88E+00	7.83E-02	1.04E+00	3.22E+02	6.97E-01	4.88E-01
5.39E+00	4.42E-02	1.59E+00	8.13E+00	5.00E+00	1.00E+01	1.00E+01	7.73E-02	1.04E+00	3.22E+02	6.97E-01	4.91E-01
5.57E+00	9.54E-02	1.62E+00	8.13E+00	5.00E+00	1.02E+01	1.02E+01	7.62E-02	1.04E+00	3.22E+02	6.96E-01	4.94E-01
5.78E+00	1.82E-01	1.64E+00	8.14E+00	5.00E+00	1.04E+01	1.04E+01	7.49E-02	1.04E+00	3.22E+02	6.96E-01	4.98E-01
6.03E+00	3.20E-01	1.67E+00	8.16E+00	5.00E+00	1.06E+01	1.06E+01	7.35E-02	1.04E+00	3.22E+02	6.95E-01	5.02E-01
6.34E+00	5.35E-01	1.71E+00	8.17E+00	4.99E+00	1.09E+01	1.09E+01	7.19E-02	1.04E+00	3.22E+02	6.95E-01	5.07E-01
6.71E+00	8.61E-01	1.75E+00	8.19E+00	4.99E+00	1.12E+01	1.12E+01	7.02E-02	1.04E+00	3.22E+02	6.95E-01	5.12E-01
7.15E+00	1.32E+00	1.75E+00	8.18E+00	4.97E+00	1.17E+01	1.17E+01	6.62E-02	1.04E+00	3.22E+02	7.37E-01	5.68E-01
7.68E+00	1.93E+00	1.72E+00	8.15E+00	4.95E+00	1.21E+01	1.21E+01	6.29E-02	1.04E+00	3.22E+02	7.89E-01	6.33E-01
8.32E+00	2.72E+00	1.67E+00	8.13E+00	4.92E+00	1.27E+01	1.27E+01	6.03E-02	1.04E+00	3.22E+02	8.51E-01	7.04E-01
9.09E+00	3.73E+00	1.61E+00	8.11E+00	4.89E+00	1.35E+01	1.35E+01	5.82E-02	1.04E+00	3.22E+02	9.20E-01	7.82E-01
1.00E+01	5.02E+00	1.53E+00	8.10E+00	4.86E+00	1.43E+01	1.43E+01	5.64E-02	1.05E+00	3.22E+02	9.96E-01	8.67E-01
1.11E+01	6.64E+00	1.46E+00	8.10E+00	4.83E+00	1.53E+01	1.53E+01	5.48E-02	1.05E+00	3.22E+02	1.08E+00	9.58E-01
1.25E+01	8.67E+00	1.38E+00	8.10E+00	4.81E+00	1.66E+01	1.66E+01	5.34E-02	1.05E+00	3.22E+02	1.17E+00	1.05E+00
1.41E+01	1.12E+01	1.32E+00	8.12E+00	4.79E+00	1.81E+01	1.81E+01	5.19E-02	1.05E+00	3.22E+02	1.26E+00	1.15E+00
1.60E+01	1.43E+01	1.25E+00	8.15E+00	4.77E+00	1.99E+01	1.99E+01	5.05E-02	1.05E+00	3.22E+02	1.35E+00	1.26E+00
1.83E+01	1.82E+01	1.20E+00	8.20E+00	4.75E+00	2.20E+01	2.20E+01	4.90E-02	1.05E+00	3.22E+02	1.45E+00	1.36E+00
2.11E+01	2.30E+01	1.15E+00	8.26E+00	4.73E+00	2.46E+01	2.46E+01	4.75E-02	1.05E+00	3.22E+02	1.55E+00	1.47E+00
2.45E+01	2.90E+01	1.10E+00	8.35E+00	4.72E+00	2.77E+01	2.77E+01	4.59E-02	1.05E+00	3.22E+02	1.66E+00	1.58E+00
2.85E+01	3.62E+01	1.06E+00	8.46E+00	4.70E+00	3.15E+01	3.15E+01	4.42E-02	1.05E+00	3.22E+02	1.76E+00	1.69E+00
3.33E+01	4.51E+01	1.03E+00	8.60E+00	4.69E+00	3.60E+01	3.60E+01	4.24E-02	1.05E+00	3.22E+02	1.86E+00	1.80E+00
3.92E+01	5.60E+01	1.00E+00	8.77E+00	4.68E+00	4.14E+01	4.14E+01	4.05E-02	1.05E+00	3.22E+02	1.96E+00	1.91E+00
4.62E+01	6.93E+01	9.79E-01	8.99E+00	4.67E+00	4.79E+01	4.79E+01	3.85E-02	1.05E+00	3.22E+02	2.06E+00	2.01E+00
5.46E+01	8.54E+01	9.60E-01	9.26E+00	4.66E+00	5.57E+01	5.57E+01	3.64E-02	1.05E+00	3.22E+02	2.16E+00	2.12E+00
6.47E+01	1.05E+02	9.45E-01	9.58E+00	4.65E+00	6.51E+01	6.51E+01	3.43E-02	1.05E+00	3.22E+02	2.25E+00	2.22E+00
7.69E+01	1.28E+02	9.33E-01	9.98E+00	4.65E+00	7.64E+01	7.64E+01	3.21E-02	1.06E+00	3.22E+02	2.33E+00	2.31E+00
9.15E+01	1.57E+02	9.23E-01	1.05E+01	4.64E+00	8.99E+01	8.99E+01	3.00E-02	1.06E+00	3.22E+02	2.41E+00	2.39E+00
1.09E+02	1.91E+02	9.14E-01	1.10E+01	4.64E+00	1.06E+02	1.06E+02	2.78E-02	1.06E+00	3.22E+02	2.49E+00	2.47E+00
1.30E+02	2.32E+02	9.01E-01	1.17E+01	4.64E+00	1.26E+02	1.26E+02	2.59E-02	1.06E+00	3.22E+02	2.55E+00	2.54E+00
1.56E+02	2.60E+02	8.92E-01	1.26E+01	4.63E+00	1.49E+02	1.49E+02	2.41E-02	1.06E+00	3.22E+02	2.59E+00	2.58E+00
1.86E+02	2.60E+02	8.91E-01	1.36E+01	4.63E+00	1.78E+02	1.78E+02	2.23E-02	1.06E+00	3.22E+02	2.59E+00	2.58E+00
2.23E+02	2.60E+02	8.91E-01	1.48E+01	4.63E+00	2.12E+02	2.12E+02	2.05E-02	1.06E+00	3.22E+02	2.59E+00	2.58E+00
2.67E+02	2.60E+02	8.91E-01	1.62E+01	4.63E+00	2.53E+02	2.53E+02	1.87E-02	1.06E+00	3.22E+02	2.58E+00	2.58E+00
3.20E+02	2.60E+02	8.90E-01	1.80E+01	4.63E+00	3.02E+02	3.02E+02	1.69E-02	1.06E+00	3.22E+02	2.58E+00	2.58E+00
3.84E+02	2.60E+02	8.90E-01	2.00E+01	4.63E+00	3.61E+02	3.61E+02	1.52E-02	1.06E+00	3.22E+02	2.58E+00	2.58E+00
4.61E+02	2.60E+02	8.90E-01	2.24E+01	4.63E+00	4.32E+02	4.32E+02	1.35E-02	1.06E+00	3.22E+02	2.58E+00	2.58E+00
5.53E+02	2.60E+02	8.90E-01	2.53E+01	4.63E+00	5.18E+02	5.18E+02	1.20E-02	1.06E+00	3.22E+02	2.58E+00	2.58E+00
6.64E+02	2.60E+02	8.90E-01	2.87E+01	4.63E+00	6.21E+02	6.21E+02	1.06E-02	1.06E+00	3.22E+02	2.58E+00	2.58E+00
7.97E+02	2.60E+02	8.91E-01	3.27E+01	4.63E+00	7.45E+02	7.44E+02	9.27E-03	1.07E+00	3.22E+02	2.58E+00	2.58E+00
9.57E+02	2.60E+02	8.91E-01	3.75E+01	4.63E+00	8.93E+02	8.93E+02	8.10E-03	1.07E+00	3.22E+02	2.58E+00	2.58E+00
1.15E+03	2.60E+02	8.92E-01	4.30E+01	4.63E+00	1.07E+03	1.07E+03	7.05E-03	1.07E+00	3.22E+02	2.58E+00	2.58E+00
1.38E+03	2.60E+02	8.93E-01	4.95E+01	4.63E+00	1.29E+03	1.29E+03	6.12E-03	1.07E+00	3.22E+02	2.58E+00	2.58E+00
1.66E+03	2.60E+02	8.94E-01	5.71E+01	4.63E+00	1.54E+03	1.54E+03	5.30E-03	1.07E+00	3.22E+02	2.58E+00	2.58E+00
1.99E+03	2.60E+02	8.95E-01	6.59E+01	4.63E+00	1.86E+03	1.86E+03	4.59E-03	1.07E+00	3.22E+02	2.58E+00	2.58E+00
2.40E+03	2.60E+02	8.97E-01	7.60E+01	4.63E+00	2.23E+03	2.23E+03	3.97E-03	1.07E+00	3.22E+02	2.58E+00	2.58E+00
2.88E+03	2.60E+02	8.99E-01	8.77E+01	4.63E+00	2.68E+03	2.68E+03	3.43E-03	1.07E+00	3.22E+02	2.58E+00	2.58E+00
3.46E+03	2.60E+02	9.02E-01	1.01E+02	4.63E+00	3.22E+03	3.22E+03	2.97E-03	1.07E+00	3.22E+02	2.58E+00	2.58E+00
4.16E+03	2.60E+02	9.05E-01	1.16E+02	4.63E+00	3.86E+03	3.86E+03	2.57E-03	1.07E+00	3.22E+02	2.58E+00	2.58E+00
5.00E+03	2.60E+02	9.09E-01	1.34E+02	4.63E+00	4.64E+03	4.64E+03	2.23E-03	1.07E+00	3.22E+02	2.58E+00	2.58E+00

SEP Offsite Consequence Analysis for Ammonia
SLAB Model Output

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x	cm	cmv	cmda	cmw	cmwv	wc	vq	uq	w	v	vx
-5.02E+00	0.00E+00	0.00E+00	9.59E-01	4.14E-02	4.14E-02	0.00E+00	0.00E+00	0.00E+00	9.37E-01	3.06E-02	0.00E+00
-4.02E+00	4.98E-02	4.98E-02	9.11E-01	3.93E-02	3.93E-02	0.00E+00	0.00E+00	0.00E+00	2.08E-02	1.12E-02	8.40E-02
-3.01E+00	4.05E-02	4.05E-02	9.20E-01	3.97E-02	3.97E-02	0.00E+00	0.00E+00	0.00E+00	3.55E-02	6.04E-02	1.65E-01
-2.01E+00	2.70E-02	2.70E-02	9.33E-01	4.03E-02	4.03E-02	0.00E+00	0.00E+00	0.00E+00	8.02E-02	2.80E-02	9.57E-02
-1.00E+00	3.14E-02	3.14E-02	9.28E-01	4.01E-02	4.01E-02	0.00E+00	0.00E+00	0.00E+00	3.78E-02	1.56E-02	1.06E-01
-1.79E-07	3.71E-02	3.71E-02	9.23E-01	3.98E-02	3.98E-02	0.00E+00	0.00E+00	0.00E+00	1.25E-02	1.34E-02	1.22E-01
1.00E+00	4.09E-02	4.09E-02	9.19E-01	3.97E-02	3.97E-02	0.00E+00	0.00E+00	0.00E+00	2.43E-02	4.87E-02	1.64E-01
2.01E+00	4.49E-02	4.49E-02	9.16E-01	3.95E-02	3.95E-02	0.00E+00	0.00E+00	0.00E+00	1.24E-02	1.34E-02	1.23E-01
3.01E+00	4.75E-02	4.75E-02	9.13E-01	3.94E-02	3.94E-02	0.00E+00	0.00E+00	0.00E+00	3.49E-02	1.60E-02	1.11E-01
4.02E+00	5.11E-02	5.11E-02	9.10E-01	3.93E-02	3.93E-02	0.00E+00	0.00E+00	0.00E+00	1.22E-02	2.59E-02	1.39E-01
5.02E+00	4.98E-02	4.98E-02	9.11E-01	3.93E-02	3.93E-02	0.00E+00	0.00E+00	0.00E+00	6.03E-02	2.77E-02	1.07E-01
5.12E+00	4.93E-02	4.93E-02	9.11E-01	3.93E-02	3.93E-02	4.61E-02	0.00E+00	0.00E+00	5.21E-02	2.13E-02	1.11E-01
5.24E+00	4.87E-02	4.87E-02	9.12E-01	3.94E-02	3.94E-02	1.01E-01	0.00E+00	0.00E+00	5.14E-02	2.10E-02	1.12E-01
5.39E+00	4.81E-02	4.81E-02	9.12E-01	3.94E-02	3.94E-02	1.65E-01	0.00E+00	0.00E+00	5.04E-02	2.08E-02	1.15E-01
5.57E+00	4.74E-02	4.74E-02	9.13E-01	3.94E-02	3.94E-02	2.40E-01	0.00E+00	0.00E+00	4.91E-02	2.05E-02	1.19E-01
5.78E+00	4.66E-02	4.66E-02	9.14E-01	3.95E-02	3.95E-02	3.27E-01	0.00E+00	0.00E+00	4.75E-02	2.02E-02	1.25E-01
6.03E+00	4.56E-02	4.56E-02	9.15E-01	3.95E-02	3.95E-02	4.29E-01	0.00E+00	0.00E+00	4.56E-02	1.99E-02	1.34E-01
6.34E+00	4.46E-02	4.46E-02	9.16E-01	3.95E-02	3.95E-02	5.46E-01	0.00E+00	0.00E+00	4.34E-02	1.95E-02	1.46E-01
6.71E+00	4.35E-02	4.35E-02	9.17E-01	3.96E-02	3.96E-02	6.82E-01	0.00E+00	0.00E+00	4.10E-02	1.91E-02	1.62E-01
7.15E+00	4.10E-02	4.10E-02	9.19E-01	3.97E-02	3.97E-02	8.05E-01	0.00E+00	0.00E+00	8.16E-02	1.87E-02	1.86E-01
7.68E+00	3.89E-02	3.89E-02	9.21E-01	3.98E-02	3.98E-02	9.39E-01	0.00E+00	0.00E+00	5.87E-02	1.86E-02	2.11E-01
8.32E+00	3.73E-02	3.73E-02	9.23E-01	3.98E-02	3.98E-02	1.08E+00	0.00E+00	0.00E+00	4.18E-02	1.89E-02	2.35E-01
9.09E+00	3.59E-02	3.59E-02	9.24E-01	3.99E-02	3.99E-02	1.24E+00	0.00E+00	0.00E+00	3.01E-02	1.96E-02	2.57E-01
1.00E+01	3.48E-02	3.48E-02	9.25E-01	3.99E-02	3.99E-02	1.42E+00	0.00E+00	0.00E+00	2.22E-02	2.04E-02	2.76E-01
1.11E+01	3.38E-02	3.38E-02	9.26E-01	4.00E-02	4.00E-02	1.60E+00	0.00E+00	0.00E+00	1.69E-02	2.15E-02	2.92E-01
1.25E+01	3.29E-02	3.29E-02	9.27E-01	4.00E-02	4.00E-02	1.80E+00	0.00E+00	0.00E+00	1.35E-02	2.29E-02	3.05E-01
1.41E+01	3.20E-02	3.20E-02	9.28E-01	4.01E-02	4.01E-02	2.02E+00	0.00E+00	0.00E+00	1.11E-02	2.44E-02	3.14E-01
1.60E+01	3.11E-02	3.11E-02	9.29E-01	4.01E-02	4.01E-02	2.24E+00	0.00E+00	0.00E+00	9.39E-03	2.60E-02	3.21E-01
1.83E+01	3.01E-02	3.01E-02	9.30E-01	4.01E-02	4.01E-02	2.47E+00	0.00E+00	0.00E+00	8.08E-03	2.78E-02	3.24E-01
2.11E+01	2.92E-02	2.92E-02	9.31E-01	4.02E-02	4.02E-02	2.71E+00	0.00E+00	0.00E+00	7.03E-03	2.96E-02	3.25E-01
2.45E+01	2.82E-02	2.82E-02	9.32E-01	4.02E-02	4.02E-02	2.95E+00	0.00E+00	0.00E+00	6.17E-03	3.15E-02	3.22E-01
2.85E+01	2.71E-02	2.71E-02	9.33E-01	4.03E-02	4.03E-02	3.20E+00	0.00E+00	0.00E+00	5.44E-03	3.35E-02	3.17E-01
3.33E+01	2.60E-02	2.60E-02	9.34E-01	4.03E-02	4.03E-02	3.45E+00	0.00E+00	0.00E+00	4.81E-03	3.54E-02	3.08E-01
3.92E+01	2.48E-02	2.48E-02	9.35E-01	4.04E-02	4.04E-02	3.69E+00	0.00E+00	0.00E+00	4.24E-03	3.74E-02	2.95E-01
4.62E+01	2.36E-02	2.36E-02	9.36E-01	4.04E-02	4.04E-02	3.92E+00	0.00E+00	0.00E+00	3.72E-03	3.93E-02	2.79E-01
5.46E+01	2.23E-02	2.23E-02	9.37E-01	4.05E-02	4.05E-02	4.14E+00	0.00E+00	0.00E+00	3.23E-03	4.12E-02	2.57E-01
6.47E+01	2.10E-02	2.10E-02	9.39E-01	4.05E-02	4.05E-02	4.34E+00	0.00E+00	0.00E+00	2.74E-03	4.30E-02	2.31E-01
7.69E+01	1.96E-02	1.96E-02	9.40E-01	4.06E-02	4.06E-02	4.52E+00	0.00E+00	0.00E+00	2.23E-03	4.46E-02	1.98E-01
9.15E+01	1.83E-02	1.83E-02	9.41E-01	4.06E-02	4.06E-02	4.68E+00	0.00E+00	0.00E+00	1.70E-03	4.61E-02	1.59E-01
1.09E+02	1.70E-02	1.70E-02	9.42E-01	4.07E-02	4.07E-02	4.83E+00	0.00E+00	0.00E+00	1.11E-03	4.75E-02	1.13E-01
1.30E+02	1.58E-02	1.58E-02	9.44E-01	4.07E-02	4.07E-02	4.98E+00	0.00E+00	0.00E+00	4.44E-04	4.87E-02	6.62E-02
1.56E+02	1.47E-02	1.47E-02	9.45E-01	4.08E-02	4.08E-02	5.15E+00	0.00E+00	0.00E+00	7.07E-06	4.91E-02	5.26E-02
1.86E+02	1.36E-02	1.36E-02	9.46E-01	4.08E-02	4.08E-02	5.31E+00	0.00E+00	0.00E+00	7.07E-06	4.89E-02	5.26E-02
2.23E+02	1.25E-02	1.25E-02	9.47E-01	4.09E-02	4.09E-02	5.44E+00	0.00E+00	0.00E+00	7.06E-06	4.85E-02	5.26E-02
2.67E+02	1.13E-02	1.13E-02	9.48E-01	4.09E-02	4.09E-02	5.55E+00	0.00E+00	0.00E+00	7.06E-06	4.82E-02	5.26E-02
3.20E+02	1.03E-02	1.03E-02	9.49E-01	4.10E-02	4.10E-02	5.63E+00	0.00E+00	0.00E+00	7.06E-06	4.78E-02	5.26E-02
3.84E+02	9.20E-03	9.20E-03	9.50E-01	4.10E-02	4.10E-02	5.70E+00	0.00E+00	0.00E+00	7.06E-06	4.73E-02	5.26E-02
4.61E+02	8.20E-03	8.20E-03	9.51E-01	4.10E-02	4.10E-02	5.75E+00	0.00E+00	0.00E+00	7.06E-06	4.67E-02	5.26E-02
5.53E+02	7.27E-03	7.27E-03	9.52E-01	4.11E-02	4.11E-02	5.79E+00	0.00E+00	0.00E+00	7.06E-06	4.60E-02	5.26E-02
6.64E+02	6.40E-03	6.40E-03	9.52E-01	4.11E-02	4.11E-02	5.82E+00	0.00E+00	0.00E+00	7.06E-06	4.53E-02	5.26E-02
7.97E+02	5.61E-03	5.61E-03	9.53E-01	4.12E-02	4.12E-02	5.85E+00	0.00E+00	0.00E+00	7.06E-06	4.44E-02	5.26E-02
9.57E+02	4.90E-03	4.90E-03	9.54E-01	4.12E-02	4.12E-02	5.87E+00	0.00E+00	0.00E+00	7.06E-06	4.34E-02	5.26E-02
1.15E+03	4.26E-03	4.26E-03	9.55E-01	4.12E-02	4.12E-02	5.90E+00	0.00E+00	0.00E+00	7.07E-06	4.23E-02	5.26E-02
1.38E+03	3.70E-03	3.70E-03	9.55E-01	4.12E-02	4.12E-02	5.93E+00	0.00E+00	0.00E+00	7.07E-06	4.11E-02	5.26E-02
1.66E+03	3.20E-03	3.20E-03	9.56E-01	4.13E-02	4.13E-02	5.96E+00	0.00E+00	0.00E+00	7.08E-06	3.98E-02	5.26E-02
1.99E+03	2.77E-03	2.77E-03	9.56E-01	4.13E-02	4.13E-02	6.00E+00	0.00E+00	0.00E+00	7.09E-06	3.83E-02	5.26E-02
2.40E+03	2.40E-03	2.40E-03	9.56E-01	4.13E-02	4.13E-02	6.04E+00	0.00E+00	0.00E+00	7.11E-06	3.69E-02	5.26E-02
2.88E+03	2.07E-03	2.07E-03	9.57E-01	4.13E-02	4.13E-02	6.08E+00	0.00E+00	0.00E+00	7.12E-06	3.52E-02	5.26E-02
3.46E+03	1.79E-03	1.79E-03	9.57E-01	4.13E-02	4.13E-02	6.12E+00	0.00E+00	0.00E+00	7.15E-06	3.35E-02	5.26E-02
4.16E+03	1.55E-03	1.55E-03	9.57E-01	4.13E-02	4.13E-02	6.16E+00	0.00E+00	0.00E+00	7.17E-06	3.17E-02	5.26E-02
5.00E+03	1.34E-03	1.34E-03	9.57E-01	4.13E-02	4.13E-02	6.21E+00	0.00E+00	0.00E+00	7.20E-06	2.99E-02	5.26E-02

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SEP Offsite Consequence Analysis for Ammonia
SLAB Model Output

time averaged (tav = 3600 s) volume concentratic concentratic contour parameters

c(x,y,z,t) = cc(x) * (erf(xa)-erf(* (erf(ya)-erf(y * (exp(-za*za)+exp(-zb*zb))

c(x,v,z,t) = concentration (volume fraction) at (x,v,z,t)
x = downwind distance (m)
y = crosswind horizontal distance (m)
z = height (m)
t = time (s)

erf = error functon
xa = (x-xc+bx)/(sr2*betax)
xb = (x-xc-bx)/(sr2*betax)
ya = (y+b)/(sr2*betac)
yb = (y-b)/(sr2*betac)
exp = exponential function
za = (z-zc)/(sr2*sig)
zb = (z+zc)/(sr2*sig)
sr2 = sqrt(2.0)

x	cc(x)	b(x)	betac(x)	zc(x)	sig(x)	t	xc(t)	bx(t)	betax(t)
-5.02E+00	0.00E+00	4.52E+00	1.26E+00	0.00E+00	0.00E+00	7.06E+00	0.00E+00	5.02E+00	4.10E-02
-4.02E+00	1.56E-02	4.53E+00	1.35E+00	0.00E+00	4.29E-01	9.14E+00	5.02E-01	5.49E+00	4.48E-02
-3.01E+00	1.54E-02	4.52E+00	2.40E+00	0.00E+00	2.33E+00	1.12E+01	1.00E+00	5.95E+00	4.86E-02
-2.01E+00	1.06E-02	4.54E+00	2.55E+00	0.00E+00	6.13E-01	1.26E+01	1.51E+00	6.42E+00	5.24E-02
-1.00E+00	1.24E-02	4.59E+00	2.63E+00	0.00E+00	8.10E-01	1.39E+01	2.01E+00	6.88E+00	5.62E-02
-1.79E-07	1.47E-02	4.71E+00	2.74E+00	0.00E+00	1.13E+00	1.61E+01	2.51E+00	7.35E+00	6.00E-02
1.00E+00	1.74E-02	4.71E+00	3.13E+00	0.00E+00	2.32E+00	1.83E+01	3.01E+00	7.81E+00	6.38E-02
2.01E+00	1.92E-02	4.80E+00	3.25E+00	0.00E+00	1.17E+00	2.01E+01	3.51E+00	8.28E+00	6.76E-02
3.01E+00	2.09E-02	4.81E+00	3.39E+00	0.00E+00	8.92E-01	2.20E+01	4.02E+00	8.75E+00	7.14E-02
4.02E+00	2.26E-02	4.94E+00	3.55E+00	0.00E+00	1.55E+00	2.42E+01	4.52E+00	9.21E+00	7.52E-02
5.02E+00	2.26E-02	4.97E+00	3.72E+00	0.00E+00	8.26E-01	2.65E+01	5.02E+00	9.68E+00	7.90E-02
5.12E+00	2.25E-02	5.00E+00	3.74E+00	3.35E-03	8.98E-01	2.68E+01	5.12E+00	9.77E+00	7.98E-02
5.24E+00	2.24E-02	5.00E+00	3.75E+00	1.62E-02	9.00E-01	2.72E+01	5.24E+00	9.88E+00	8.07E-02
5.39E+00	2.26E-02	5.00E+00	3.76E+00	4.42E-02	8.95E-01	2.76E+01	5.39E+00	1.00E+01	8.18E-02
5.57E+00	2.30E-02	5.00E+00	3.77E+00	9.54E-02	8.79E-01	2.81E+01	5.57E+00	1.02E+01	8.32E-02
5.78E+00	2.40E-02	5.00E+00	3.78E+00	1.82E-01	8.44E-01	2.87E+01	5.78E+00	1.04E+01	8.48E-02
6.03E+00	2.59E-02	5.00E+00	3.79E+00	3.20E-01	7.82E-01	2.94E+01	6.03E+00	1.06E+01	8.67E-02
6.34E+00	2.99E-02	4.99E+00	3.80E+00	5.35E-01	6.78E-01	3.03E+01	6.34E+00	1.09E+01	8.90E-02
6.71E+00	3.96E-02	4.99E+00	3.82E+00	8.61E-01	5.13E-01	3.14E+01	6.71E+00	1.12E+01	9.18E-02
7.15E+00	3.81E-02	4.97E+00	3.82E+00	1.32E+00	5.05E-01	3.26E+01	7.15E+00	1.17E+01	9.52E-02
7.68E+00	3.64E-02	4.95E+00	3.83E+00	1.93E+00	4.97E-01	3.40E+01	7.68E+00	1.21E+01	9.92E-02
8.32E+00	3.50E-02	4.92E+00	3.83E+00	2.72E+00	4.83E-01	3.56E+01	8.32E+00	1.27E+01	1.04E-01
9.09E+00	3.40E-02	4.89E+00	3.84E+00	3.73E+00	4.64E-01	3.73E+01	9.09E+00	1.35E+01	1.10E-01
1.00E+01	3.32E-02	4.86E+00	3.86E+00	5.02E+00	4.43E-01	3.92E+01	1.00E+01	1.43E+01	1.17E-01
1.11E+01	3.25E-02	4.83E+00	3.89E+00	6.64E+00	4.21E-01	4.14E+01	1.11E+01	1.53E+01	1.25E-01
1.25E+01	3.19E-02	4.81E+00	3.92E+00	8.67E+00	4.00E-01	4.37E+01	1.25E+01	1.66E+01	1.35E-01
1.41E+01	3.14E-02	4.79E+00	3.97E+00	1.12E+01	3.80E-01	4.64E+01	1.41E+01	1.81E+01	1.48E-01
1.60E+01	3.10E-02	4.77E+00	4.04E+00	1.43E+01	3.62E-01	4.93E+01	1.60E+01	1.99E+01	1.62E-01
1.83E+01	3.06E-02	4.75E+00	4.13E+00	1.82E+01	3.45E-01	5.27E+01	1.83E+01	2.20E+01	1.80E-01
2.11E+01	3.03E-02	4.73E+00	4.24E+00	2.30E+01	3.31E-01	5.64E+01	2.11E+01	2.46E+01	2.01E-01
2.45E+01	3.01E-02	4.72E+00	4.39E+00	2.90E+01	3.18E-01	6.05E+01	2.45E+01	2.77E+01	2.26E-01
2.85E+01	2.99E-02	4.70E+00	4.57E+00	3.62E+01	3.07E-01	6.53E+01	2.85E+01	3.15E+01	2.57E-01
3.33E+01	2.98E-02	4.69E+00	4.81E+00	4.51E+01	2.97E-01	7.06E+01	3.33E+01	3.60E+01	2.94E-01
3.92E+01	2.99E-02	4.68E+00	5.10E+00	5.60E+01	2.89E-01	7.67E+01	3.92E+01	4.14E+01	3.38E-01
4.62E+01	3.01E-02	4.67E+00	5.47E+00	6.93E+01	2.83E-01	8.37E+01	4.62E+01	4.79E+01	3.91E-01
5.46E+01	3.05E-02	4.66E+00	5.94E+00	8.54E+01	2.77E-01	9.17E+01	5.46E+01	5.57E+01	4.55E-01
6.47E+01	3.11E-02	4.65E+00	6.51E+00	1.05E+02	2.73E-01	1.01E+02	6.47E+01	6.51E+01	5.31E-01
7.69E+01	3.19E-02	4.65E+00	7.22E+00	1.29E+02	2.69E-01	1.11E+02	7.69E+01	7.64E+01	6.24E-01
9.15E+01	3.29E-02	4.64E+00	8.10E+00	1.57E+02	2.67E-01	1.24E+02	9.15E+01	8.99E+01	7.34E-01
1.09E+02	3.43E-02	4.64E+00	9.16E+00	1.91E+02	2.64E-01	1.38E+02	1.09E+02	1.06E+02	8.68E-01
1.30E+02	3.60E-02	4.64E+00	1.05E+01	2.32E+02	2.60E-01	1.55E+02	1.30E+02	1.26E+02	1.03E+00
1.56E+02	3.83E-02	4.63E+00	1.20E+01	2.60E+02	2.57E-01	1.75E+02	1.56E+02	1.49E+02	1.22E+00
1.86E+02	4.09E-02	4.63E+00	1.39E+01	2.60E+02	2.57E-01	1.98E+02	1.86E+02	1.78E+02	1.45E+00
2.23E+02	4.35E-02	4.63E+00	1.62E+01	2.60E+02	2.57E-01	2.27E+02	2.23E+02	2.12E+02	1.73E+00
2.67E+02	4.62E-02	4.63E+00	1.90E+01	2.60E+02	2.57E-01	2.61E+02	2.67E+02	2.53E+02	2.06E+00
3.20E+02	4.89E-02	4.63E+00	2.22E+01	2.60E+02	2.57E-01	3.02E+02	3.20E+02	3.02E+02	2.47E+00
3.84E+02	5.15E-02	4.63E+00	2.62E+01	2.60E+02	2.57E-01	3.51E+02	3.84E+02	3.61E+02	2.95E+00
4.61E+02	5.41E-02	4.63E+00	3.08E+01	2.60E+02	2.57E-01	4.11E+02	4.61E+02	4.32E+02	3.53E+00
5.53E+02	5.64E-02	4.63E+00	3.63E+01	2.60E+02	2.57E-01	4.82E+02	5.53E+02	5.18E+02	4.23E+00
6.64E+02	5.87E-02	4.63E+00	4.29E+01	2.60E+02	2.57E-01	5.68E+02	6.64E+02	6.21E+02	5.07E+00
7.97E+02	6.07E-02	4.63E+00	5.06E+01	2.60E+02	2.57E-01	6.71E+02	7.97E+02	7.44E+02	6.08E+00
9.57E+02	6.25E-02	4.63E+00	5.97E+01	2.60E+02	2.57E-01	7.95E+02	9.57E+02	8.93E+02	7.29E+00
1.15E+03	6.41E-02	4.63E+00	7.03E+01	2.60E+02	2.57E-01	9.44E+02	1.15E+03	1.07E+03	8.75E+00
1.38E+03	6.55E-02	4.63E+00	8.28E+01	2.60E+02	2.58E-01	1.12E+03	1.38E+03	1.29E+03	1.05E+01
1.66E+03	6.66E-02	4.63E+00	9.73E+01	2.60E+02	2.58E-01	1.34E+03	1.66E+03	1.54E+03	1.26E+01
1.99E+03	6.76E-02	4.63E+00	1.14E+02	2.60E+02	2.58E-01	1.60E+03	1.99E+03	1.86E+03	1.51E+01
2.40E+03	6.84E-02	4.63E+00	1.33E+02	2.60E+02	2.59E-01	1.91E+03	2.40E+03	2.23E+03	1.82E+01
2.88E+03	6.90E-02	4.63E+00	1.56E+02	2.60E+02	2.60E-01	2.29E+03	2.88E+03	2.68E+03	2.19E+01
3.46E+03	6.95E-02	4.63E+00	1.81E+02	2.60E+02	2.60E-01	2.74E+03	3.46E+03	3.22E+03	2.63E+01
4.16E+03	6.98E-02	4.63E+00	2.10E+02	2.60E+02	2.61E-01	3.28E+03	4.16E+03	3.86E+03	3.16E+01
5.00E+03	6.99E-02	4.63E+00	2.43E+02	2.60E+02	2.62E-01	3.93E+03	5.00E+03	4.64E+03	3.79E+01

SEP Offsite Consequence Analysis for Ammonia
SLAB Model Output

time averaged (tav = 3600 s) volume concentratic concentratic in the z = 0 plane.

downwind distance x (m)	time max conc (s)	of cloud duration (s)	effective half bbc	average width (m)	concentratic v/bbc= 0	(volume v/bbc= 0.5	fraction) v/bbc= 1	at v/bbc= 1.5	(x,y,z) v/bbc= 2	v/bbc= 2.5
-5.02E+00	1.80E+03	3.60E+03	5.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
-4.02E+00	1.80E+03	3.60E+03	5.09E+00	1.24E-01	1.16E-01	4.20E-02	1.30E-03	1.65E-06	0.00E+00	
-3.01E+00	1.80E+03	3.60E+03	6.14E+00	1.15E-01	8.91E-02	3.06E-02	3.11E-03	7.55E-05	3.99E-07	
-2.01E+00	1.80E+03	3.60E+03	6.34E+00	7.85E-02	5.97E-02	2.04E-02	2.19E-03	6.08E-05	3.99E-07	
-1.00E+00	1.80E+03	3.60E+03	6.47E+00	9.12E-02	6.90E-02	2.36E-02	2.58E-03	7.49E-05	5.32E-07	
-1.79E-07	1.80E+03	3.60E+03	6.68E+00	1.07E-01	8.10E-02	2.76E-02	3.06E-03	9.20E-05	6.89E-07	
1.00E+00	1.80E+03	3.60E+03	7.18E+00	1.20E-01	8.81E-02	2.98E-02	3.66E-03	1.41E-04	1.61E-06	
2.01E+00	1.80E+03	3.60E+03	7.40E+00	1.32E-01	9.62E-02	3.25E-02	4.03E-03	1.60E-04	1.91E-06	
3.01E+00	1.80E+03	3.60E+03	7.59E+00	1.40E-01	1.01E-01	3.41E-02	4.34E-03	1.84E-04	2.45E-06	
4.02E+00	1.80E+03	3.60E+03	7.88E+00	1.50E-01	1.08E-01	3.64E-02	4.69E-03	2.04E-04	2.81E-06	
5.02E+00	1.80E+03	3.60E+03	8.13E+00	1.47E-01	1.05E-01	3.53E-02	4.64E-03	2.13E-04	3.22E-06	
5.12E+00	1.80E+03	3.60E+03	8.19E+00	1.46E-01	1.05E-01	3.51E-02	4.61E-03	2.12E-04	3.20E-06	
5.24E+00	1.80E+03	3.60E+03	8.19E+00	1.45E-01	1.04E-01	3.49E-02	4.59E-03	2.12E-04	3.21E-06	
5.39E+00	1.80E+03	3.60E+03	8.20E+00	1.46E-01	1.05E-01	3.51E-02	4.62E-03	2.13E-04	3.25E-06	
5.57E+00	1.80E+03	3.60E+03	8.22E+00	1.48E-01	1.06E-01	3.55E-02	4.68E-03	2.17E-04	3.32E-06	
5.78E+00	1.80E+03	3.60E+03	8.23E+00	1.51E-01	1.08E-01	3.63E-02	4.79E-03	2.22E-04	3.43E-06	
6.03E+00	1.80E+03	3.60E+03	8.25E+00	1.53E-01	1.10E-01	3.68E-02	4.86E-03	2.27E-04	3.52E-06	
6.34E+00	1.80E+03	3.60E+03	8.27E+00	1.41E-01	1.01E-01	3.37E-02	4.46E-03	2.09E-04	3.27E-06	
6.71E+00	1.80E+03	3.60E+03	8.29E+00	6.18E-02	4.43E-02	1.48E-02	1.97E-03	9.26E-05	1.46E-06	
7.15E+00	1.80E+03	3.60E+03	8.28E+00	7.92E-03	5.67E-03	1.90E-03	2.52E-04	1.19E-05	1.91E-07	
7.68E+00	1.80E+03	3.60E+03	8.27E+00	1.24E-04	8.84E-05	2.95E-05	3.94E-06	1.88E-07	3.04E-09	
8.32E+00	1.80E+03	3.60E+03	8.26E+00	2.83E-08	2.02E-08	6.75E-09	9.04E-10	4.35E-11	7.13E-13	
9.09E+00	1.80E+03	3.60E+03	8.26E+00	1.85E-15	1.32E-15	4.41E-16	5.92E-17	2.88E-18	4.79E-20	
1.00E+01	1.80E+03	3.60E+03	8.27E+00	2.52E-29	1.80E-29	6.01E-30	8.10E-31	3.98E-32	6.75E-34	
1.11E+01	1.80E+03	3.60E+03	8.29E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.25E+01	1.80E+03	3.60E+03	8.32E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.41E+01	1.81E+03	3.60E+03	8.38E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.60E+01	1.81E+03	3.60E+03	8.47E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.83E+01	1.81E+03	3.60E+03	8.58E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.11E+01	1.81E+03	3.60E+03	8.74E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.45E+01	1.81E+03	3.60E+03	8.94E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.85E+01	1.81E+03	3.60E+03	9.21E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.33E+01	1.81E+03	3.60E+03	9.56E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.92E+01	1.81E+03	3.60E+03	1.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
4.62E+01	1.82E+03	3.60E+03	1.06E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.46E+01	1.82E+03	3.60E+03	1.13E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
6.47E+01	1.82E+03	3.60E+03	1.22E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.69E+01	1.83E+03	3.60E+03	1.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.15E+01	1.83E+03	3.60E+03	1.48E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.09E+02	1.84E+03	3.60E+03	1.65E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.30E+02	1.85E+03	3.60E+03	1.87E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.56E+02	1.86E+03	3.60E+03	2.14E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.86E+02	1.87E+03	3.60E+03	2.46E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.23E+02	1.88E+03	3.60E+03	2.85E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.67E+02	1.90E+03	3.60E+03	3.32E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.20E+02	1.92E+03	3.60E+03	3.88E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.84E+02	1.94E+03	3.60E+03	4.55E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
4.61E+02	1.97E+03	3.60E+03	5.36E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.53E+02	2.00E+03	3.60E+03	6.31E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
6.64E+02	2.04E+03	3.60E+03	7.44E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.97E+02	2.09E+03	3.60E+03	8.78E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.57E+02	2.14E+03	3.60E+03	1.03E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.15E+03	2.21E+03	3.60E+03	1.22E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.38E+03	2.30E+03	3.60E+03	1.43E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.66E+03	2.40E+03	3.60E+03	1.69E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.99E+03	2.52E+03	3.60E+03	1.98E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.40E+03	2.66E+03	3.60E+03	2.31E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.88E+03	2.84E+03	3.60E+03	2.70E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.46E+03	3.05E+03	3.60E+03	3.14E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
4.16E+03	3.30E+03	3.60E+03	3.64E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.00E+03	3.60E+03	3.60E+03	4.21E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

x	
-5.02	0.00
-4.02	124000.00
-3.01	115000.00
-2.01	78500.00
-1.00	91200.00
0.00	107000.00
1.00	120000.00
2.01	132000.00
3.01	140000.00
4.02	150000.00
5.02	147000.00
5.12	146000.00
5.24	145000.00
5.39	146000.00
5.57	148000.00
5.78	151000.00
6.03	153000.00
6.34	141000.00
6.71	61800.00
7.15	7920.00
7.68	124.00
8.32	0.03
9.09	0.00
10.00	0.00
11.10	0.00
12.50	0.00
14.10	0.00
16.00	0.00
18.30	0.00
21.10	0.00
24.50	0.00
28.50	0.00
33.30	0.00
39.20	0.00
46.20	0.00
54.60	0.00
64.70	0.00
76.90	0.00
91.50	0.00
109.00	0.00
130.00	0.00
156.00	0.00
186.00	0.00
223.00	0.00
267.00	0.00
320.00	0.00
384.00	0.00
461.00	0.00
553.00	0.00
664.00	0.00
797.00	0.00
957.00	0.00
1150.00	0.00
1380.00	0.00
1660.00	0.00
1990.00	0.00
2400.00	0.00
2880.00	0.00
3460.00	0.00
4160.00	0.00
5000.00	0.00

m	b	value	dist
-14709.43	113092.45	2000.00	7.5524628
-193.71	1611.66	75.00	7.93296096

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SEP Offsite Consequence Analysis for Ammonia

SLAB Model Output

time averaged (tav = 3600 s) volume concentratic concentratic in the z = 1.6 plane.

downwind distance x	time max (m)	of conc (s)	cloud duration (s)	effective half bbc	average width (m)	concentratic y/bbc= 0	(volume y/bbc= 0.5	fraction) y/bbc= 1	at y/bbc= 1.5	(x,y,z) y/bbc= 2	y/bbc= 2.5						
-5.02E+00	1.80E+03	3.60E+03	5.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			-5.02	0.00				
-4.02E+00	1.80E+03	3.60E+03	5.09E+00	1.19E-04	1.10E-04	4.01E-05	1.24E-06	1.57E-09	0.00E+00			-4.02	119.00				
-3.01E+00	1.80E+03	3.60E+03	6.14E+00	9.12E-02	7.04E-02	2.42E-02	2.46E-03	5.97E-05	3.15E-07			-3.01	91200.00				
-2.01E+00	1.80E+03	3.60E+03	6.34E+00	2.61E-03	1.99E-03	6.81E-04	7.31E-05	2.03E-06	1.33E-08			-2.01	2610.00				
-1.00E+00	1.80E+03	3.60E+03	6.47E+00	1.30E-02	9.82E-03	3.36E-03	3.67E-04	1.07E-05	7.57E-08			-1.00	13000.00				
-1.79E-07	1.80E+03	3.60E+03	6.68E+00	3.95E-02	2.98E-02	1.02E-02	1.13E-03	3.39E-05	2.54E-07			0.00	39500.00				
1.00E+00	1.80E+03	3.60E+03	7.18E+00	9.47E-02	6.94E-02	2.35E-02	2.88E-03	1.11E-04	1.27E-06			1.00	94700.00				
2.01E+00	1.80E+03	3.60E+03	7.40E+00	5.13E-02	3.75E-02	1.27E-02	1.57E-03	6.25E-05	7.43E-07			2.01	51300.00				
3.01E+00	1.80E+03	3.60E+03	7.59E+00	2.80E-02	2.03E-02	6.83E-03	8.71E-04	3.70E-05	4.91E-07			3.01	28000.00				
4.02E+00	1.80E+03	3.60E+03	7.88E+00	8.79E-02	6.36E-02	2.14E-02	2.75E-03	1.19E-04	1.64E-06			4.02	87900.00				
5.02E+00	1.80E+03	3.60E+03	8.13E+00	2.25E-02	1.61E-02	5.41E-03	7.10E-04	3.26E-05	4.93E-07			5.02	22500.00				
5.12E+00	1.80E+03	3.60E+03	8.19E+00	2.98E-02	2.14E-02	7.16E-03	9.41E-04	4.32E-05	6.55E-07			5.12	29800.00				
5.24E+00	1.80E+03	3.60E+03	8.19E+00	2.99E-02	2.15E-02	7.20E-03	9.46E-04	4.36E-05	6.62E-07			5.24	29900.00				
5.39E+00	1.80E+03	3.60E+03	8.20E+00	2.96E-02	2.13E-02	7.12E-03	9.38E-04	4.33E-05	6.61E-07			5.39	29600.00				
5.57E+00	1.80E+03	3.60E+03	8.22E+00	2.87E-02	2.06E-02	6.90E-03	9.09E-04	4.21E-05	6.45E-07			5.57	28700.00				
5.78E+00	1.80E+03	3.60E+03	8.23E+00	2.72E-02	1.95E-02	6.53E-03	8.61E-04	4.00E-05	6.17E-07			5.78	27200.00				
6.03E+00	1.80E+03	3.60E+03	8.25E+00	2.59E-02	1.86E-02	6.22E-03	8.22E-04	3.83E-05	5.95E-07			6.03	25900.00				
6.34E+00	1.80E+03	3.60E+03	8.27E+00	2.86E-02	2.05E-02	6.87E-03	9.10E-04	4.26E-05	6.66E-07			6.34	28600.00				
6.71E+00	1.80E+03	3.60E+03	8.29E+00	4.48E-02	3.21E-02	1.07E-02	1.43E-03	6.71E-05	1.06E-06			6.71	44800.00				
7.15E+00	1.80E+03	3.60E+03	8.28E+00	1.04E-01	7.47E-02	2.50E-02	3.32E-03	1.57E-04	2.51E-06			7.15	104000.00				
7.68E+00	1.80E+03	3.60E+03	8.27E+00	9.24E-02	6.61E-02	2.21E-02	2.95E-03	1.41E-04	2.27E-06			7.68	92400.00				
8.32E+00	1.80E+03	3.60E+03	8.26E+00	7.48E-03	5.35E-03	1.79E-03	2.39E-04	1.15E-05	1.89E-07			8.32	7480.00	-9710.73	88273.25	2000.00	8.88432436
9.09E+00	1.80E+03	3.60E+03	8.26E+00	2.74E-06	1.95E-06	6.52E-07	8.76E-08	4.26E-09	7.08E-11			9.09	2.74				
1.00E+01	1.80E+03	3.60E+03	8.27E+00	1.16E-14	8.24E-15	2.75E-15	3.71E-16	1.82E-17	3.09E-19			10.00	0.00				
1.11E+01	1.80E+03	3.60E+03	8.29E+00	7.47E-33	5.32E-33	1.77E-33	2.40E-34	1.20E-35	2.07E-37			11.10	0.00				
1.25E+01	1.80E+03	3.60E+03	8.32E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			12.50	0.00				
1.41E+01	1.81E+03	3.60E+03	8.38E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			14.10	0.00				
1.60E+01	1.81E+03	3.60E+03	8.47E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			16.00	0.00				
1.83E+01	1.81E+03	3.60E+03	8.58E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			18.30	0.00				
2.11E+01	1.81E+03	3.60E+03	8.74E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			21.10	0.00				
2.45E+01	1.81E+03	3.60E+03	8.94E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			24.50	0.00				
2.85E+01	1.81E+03	3.60E+03	9.21E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			28.50	0.00				
3.33E+01	1.81E+03	3.60E+03	9.56E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			33.30	0.00				
3.92E+01	1.81E+03	3.60E+03	1.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			39.20	0.00				
4.62E+01	1.82E+03	3.60E+03	1.06E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			46.20	0.00				
5.46E+01	1.82E+03	3.60E+03	1.13E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			54.60	0.00				
6.47E+01	1.82E+03	3.60E+03	1.22E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			64.70	0.00				
7.69E+01	1.83E+03	3.60E+03	1.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			76.90	0.00				
9.15E+01	1.83E+03	3.60E+03	1.48E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			91.50	0.00				
1.09E+02	1.84E+03	3.60E+03	1.65E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			109.00	0.00				
1.30E+02	1.85E+03	3.60E+03	1.87E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			130.00	0.00				
1.56E+02	1.86E+03	3.60E+03	2.14E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			156.00	0.00				
1.86E+02	1.87E+03	3.60E+03	2.46E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			186.00	0.00				
2.23E+02	1.88E+03	3.60E+03	2.85E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			223.00	0.00				
2.67E+02	1.90E+03	3.60E+03	3.32E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			267.00	0.00				
3.20E+02	1.92E+03	3.60E+03	3.88E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			320.00	0.00				
3.84E+02	1.94E+03	3.60E+03	4.55E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			384.00	0.00				
4.61E+02	1.97E+03	3.60E+03	5.36E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			461.00	0.00				
5.53E+02	2.00E+03	3.60E+03	6.31E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			553.00	0.00				
6.64E+02	2.04E+03	3.60E+03	7.44E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			664.00	0.00				
7.97E+02	2.09E+03	3.60E+03	8.78E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			797.00	0.00				
9.57E+02	2.14E+03	3.60E+03	1.03E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			957.00	0.00				
1.15E+03	2.21E+03	3.60E+03	1.22E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1150.00	0.00				
1.38E+03	2.30E+03	3.60E+03	1.43E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1380.00	0.00				
1.66E+03	2.40E+03	3.60E+03	1.69E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1660.00	0.00				
1.99E+03	2.52E+03	3.60E+03	1.98E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1990.00	0.00				
2.40E+03	2.66E+03	3.60E+03	2.31E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			2400.00	0.00				
2.88E+03	2.84E+03	3.60E+03	2.70E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			2880.00	0.00				
3.46E+03	3.05E+03	3.60E+03	3.14E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			3460.00	0.00				
4.16E+03	3.30E+03	3.60E+03	3.64E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			4160.00	0.00				
5.00E+03	3.60E+03	3.60E+03	4.21E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			5000.00	0.00				

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SEP Offsite Consequence Analysis for Ammonia

SLAB Model Output

time averaged (tav = 3600 s) volume concentratic concentratic in the z = 5 plane.

downwind distance x	time max (m)	of conc (s)	cloud duration (s)	effective half bbc	average width (m)	concentratic y/bbc= 0	(volume y/bbc= 0.5	fraction) y/bbc= 1	at y/bbc= 1.5	(x,y,z) y/bbc= 2	y/bbc= 2.5					
-5.02E+00	1.80E+03	3.60E+03	5.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			-5.02	0.00			
-4.02E+00	1.80E+03	3.60E+03	5.09E+00	4.02E-31	3.74E-31	1.36E-31	4.19E-33	5.32E-36	0.00E+00			-4.02	0.00			
-3.01E+00	1.80E+03	3.60E+03	6.14E+00	1.16E-02	8.95E-03	3.08E-03	3.13E-04	7.59E-06	4.01E-08			-3.01	11600.00			
-2.01E+00	1.80E+03	3.60E+03	6.34E+00	2.94E-16	2.23E-16	7.65E-17	8.21E-18	2.28E-19	1.50E-21			-2.01	0.00			
-1.00E+00	1.80E+03	3.60E+03	6.47E+00	4.92E-10	3.72E-10	1.27E-10	1.39E-11	4.04E-13	2.87E-15			-1.00	0.00			
-1.79E-07	1.80E+03	3.60E+03	6.68E+00	6.21E-06	4.68E-06	1.60E-06	1.77E-07	5.32E-09	3.98E-11			0.00	6.21			
1.00E+00	1.80E+03	3.60E+03	7.18E+00	1.17E-02	8.55E-03	2.89E-03	3.55E-04	1.37E-05	1.56E-07			1.00	11700.00			
2.01E+00	1.80E+03	3.60E+03	7.40E+00	1.33E-05	9.69E-06	3.27E-06	4.06E-07	1.61E-08	1.92E-10			2.01	13.30			
3.01E+00	1.80E+03	3.60E+03	7.59E+00	2.14E-08	1.55E-08	5.21E-09	6.64E-10	2.82E-11	3.75E-13			3.01	0.02			
4.02E+00	1.80E+03	3.60E+03	7.88E+00	8.12E-04	5.87E-04	1.97E-04	2.54E-05	1.10E-06	1.52E-08			4.02	812.00			
5.02E+00	1.80E+03	3.60E+03	8.13E+00	1.62E-09	1.16E-09	3.90E-10	5.12E-11	2.35E-12	3.55E-14			5.02	0.00			
5.12E+00	1.80E+03	3.60E+03	8.19E+00	2.68E-08	1.92E-08	6.45E-09	8.47E-10	3.89E-11	5.89E-13			5.12	0.03			
5.24E+00	1.80E+03	3.60E+03	8.19E+00	2.89E-08	2.08E-08	6.96E-09	9.15E-10	4.21E-11	6.40E-13			5.24	0.03			
5.39E+00	1.80E+03	3.60E+03	8.20E+00	2.53E-08	1.82E-08	6.09E-09	8.02E-10	3.70E-11	5.65E-13			5.39	0.03			
5.57E+00	1.80E+03	3.60E+03	8.22E+00	1.65E-08	1.18E-08	3.96E-09	5.21E-10	2.41E-11	3.70E-13			5.57	0.02			
5.78E+00	1.80E+03	3.60E+03	8.23E+00	7.01E-09	5.03E-09	1.69E-09	2.22E-10	1.03E-11	1.59E-13			5.78	0.01			
6.03E+00	1.80E+03	3.60E+03	8.25E+00	1.39E-09	9.97E-10	3.34E-10	4.41E-11	2.06E-12	3.19E-14			6.03	0.00			
6.34E+00	1.80E+03	3.60E+03	8.27E+00	3.65E-11	2.61E-11	8.75E-12	1.16E-12	5.42E-14	8.48E-16			6.34	0.00			
6.71E+00	1.80E+03	3.60E+03	8.29E+00	8.87E-16	6.35E-16	2.13E-16	2.82E-17	1.33E-18	2.09E-20			6.71	0.00			
7.15E+00	1.80E+03	3.60E+03	8.28E+00	3.84E-13	2.75E-13	9.21E-14	1.22E-14	5.80E-16	9.26E-18			7.15	0.00			
7.68E+00	1.80E+03	3.60E+03	8.27E+00	6.24E-10	4.46E-10	1.49E-10	1.99E-11	9.50E-13	1.53E-14			7.68	0.00			
8.32E+00	1.80E+03	3.60E+03	8.26E+00	1.59E-06	1.14E-06	3.80E-07	5.09E-08	2.45E-09	4.02E-11			8.32	1.59			
9.09E+00	1.80E+03	3.60E+03	8.26E+00	2.54E-03	1.82E-03	6.07E-04	8.14E-05	3.96E-06	6.59E-08			9.09	2540.00			
1.00E+01	1.80E+03	3.60E+03	8.27E+00	1.03E-01	7.34E-02	2.45E-02	3.30E-03	1.62E-04	2.75E-06			10.00	103000.00			
1.11E+01	1.80E+03	3.60E+03	8.29E+00	5.12E-05	3.65E-05	1.22E-05	1.65E-06	8.20E-08	1.42E-09			11.10	51.20			
1.25E+01	1.80E+03	3.60E+03	8.32E+00	4.96E-20	3.52E-20	1.17E-20	1.60E-21	8.08E-23	1.44E-24			12.50	0.00			
1.41E+01	1.81E+03	3.60E+03	8.38E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			14.10	0.00			
1.60E+01	1.81E+03	3.60E+03	8.47E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			16.00	0.00			
1.83E+01	1.81E+03	3.60E+03	8.58E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			18.30	0.00			
2.11E+01	1.81E+03	3.60E+03	8.74E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			21.10	0.00			
2.45E+01	1.81E+03	3.60E+03	8.94E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			24.50	0.00			
2.85E+01	1.81E+03	3.60E+03	9.21E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			28.50	0.00			
3.33E+01	1.81E+03	3.60E+03	9.56E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			33.30	0.00	0.00	0.00	2000.00	#DIV/0!
3.92E+01	1.81E+03	3.60E+03	1.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			39.20	0.00	0.00	0.00	75.00	#DIV/0!
4.62E+01	1.82E+03	3.60E+03	1.06E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			46.20	0.00				
5.46E+01	1.82E+03	3.60E+03	1.13E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			54.60	0.00				
6.47E+01	1.82E+03	3.60E+03	1.22E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			64.70	0.00				
7.69E+01	1.83E+03	3.60E+03	1.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			76.90	0.00				
9.15E+01	1.83E+03	3.60E+03	1.48E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			91.50	0.00				
1.09E+02	1.84E+03	3.60E+03	1.65E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			109.00	0.00				
1.30E+02	1.85E+03	3.60E+03	1.87E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			130.00	0.00				
1.56E+02	1.86E+03	3.60E+03	2.14E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			156.00	0.00				
1.86E+02	1.87E+03	3.60E+03	2.46E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			186.00	0.00				
2.23E+02	1.88E+03	3.60E+03	2.85E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			223.00	0.00				
2.67E+02	1.90E+03	3.60E+03	3.32E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			267.00	0.00				
3.20E+02	1.92E+03	3.60E+03	3.88E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			320.00	0.00				
3.84E+02	1.94E+03	3.60E+03	4.55E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			384.00	0.00				
4.61E+02	1.97E+03	3.60E+03	5.36E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			461.00	0.00				
5.53E+02	2.00E+03	3.60E+03	6.31E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			553.00	0.00				
6.64E+02	2.04E+03	3.60E+03	7.44E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			664.00	0.00				
7.97E+02	2.09E+03	3.60E+03	8.78E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			797.00	0.00				
9.57E+02	2.14E+03	3.60E+03	1.03E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			957.00	0.00				
1.15E+03	2.21E+03	3.60E+03	1.22E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1150.00	0.00				
1.38E+03	2.30E+03	3.60E+03	1.43E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1380.00	0.00				
1.66E+03	2.40E+03	3.60E+03	1.69E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1660.00	0.00				
1.99E+03	2.52E+03	3.60E+03	1.98E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1990.00	0.00				
2.40E+03	2.66E+03	3.60E+03	2.31E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			2400.00	0.00				
2.88E+03	2.84E+03	3.60E+03	2.70E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			2880.00	0.00				
3.46E+03	3.05E+03	3.60E+03	3.14E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			3460.00	0.00				
4.16E+03	3.30E+03	3.60E+03	3.64E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			4160.00	0.00				
5.00E+03	3.60E+03	3.60E+03	4.21E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			5000.00	0.00				

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SEP Offsite Consequence Analysis for Ammonia

SLAB Model Output

time averaged (tav = 3600 s) volume concentratic concentratic in the z = 10 plane.

downwind distance x	time max (m)	of conc (s)	cloud duration (s)	effective half bbc	average width (m)	concentratic y/bbc= 0	(volume y/bbc= 0.5	fraction) y/bbc= 1	at y/bbc= 1.5	(x,y,z) y/bbc= 2	y/bbc= 2.5					
-5.02E+00	1.80E+03	3.60E+03	5.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			-5.02	0.00			
-4.02E+00	1.80E+03	3.60E+03	5.09E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			-4.02	0.00			
-3.01E+00	1.80E+03	3.60E+03	6.14E+00	1.18E-05	9.08E-06	3.12E-06	3.17E-07	7.69E-09	4.07E-11			-3.01	11.80			
-2.01E+00	1.80E+03	3.60E+03	6.34E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			-2.01	0.00			
-1.00E+00	1.80E+03	3.60E+03	6.47E+00	7.73E-35	5.85E-35	2.00E-35	2.19E-36	6.35E-38	4.51E-40			-1.00	0.00			
-1.79E-07	1.80E+03	3.60E+03	6.68E+00	1.20E-18	9.03E-19	3.08E-19	3.42E-20	1.03E-21	7.69E-24			0.00	0.00			
1.00E+00	1.80E+03	3.60E+03	7.18E+00	1.07E-05	7.83E-06	2.64E-06	3.25E-07	1.26E-08	1.43E-10			1.00	10.70			
2.01E+00	1.80E+03	3.60E+03	7.40E+00	1.35E-17	9.89E-18	3.34E-18	4.14E-19	1.65E-20	1.96E-22			2.01	0.00			
3.01E+00	1.80E+03	3.60E+03	7.59E+00	7.64E-29	5.54E-29	1.86E-29	2.37E-30	1.01E-31	1.34E-33			3.01	0.00			
4.02E+00	1.80E+03	3.60E+03	7.88E+00	1.29E-10	9.30E-11	3.13E-11	4.02E-12	1.75E-13	2.41E-15			4.02	0.00			
5.02E+00	1.80E+03	3.60E+03	8.13E+00	2.18E-33	1.57E-33	5.26E-34	6.91E-35	3.17E-36	4.79E-38			5.02	0.00			
5.12E+00	1.80E+03	3.60E+03	8.19E+00	1.67E-28	1.20E-28	4.01E-29	5.27E-30	2.42E-31	3.67E-33			5.12	0.00			
5.24E+00	1.80E+03	3.60E+03	8.19E+00	2.28E-28	1.64E-28	5.49E-29	7.21E-30	3.32E-31	5.05E-33			5.24	0.00			
5.39E+00	1.80E+03	3.60E+03	8.20E+00	1.32E-28	9.51E-29	3.18E-29	4.19E-30	1.93E-31	2.95E-33			5.39	0.00			
5.57E+00	1.80E+03	3.60E+03	8.22E+00	2.06E-29	1.48E-29	4.96E-30	6.54E-31	3.03E-32	4.64E-34			5.57	0.00			
5.78E+00	1.80E+03	3.60E+03	8.23E+00	3.26E-31	2.34E-31	7.84E-32	1.03E-32	4.81E-34	7.41E-36			5.78	0.00			
6.03E+00	1.80E+03	3.60E+03	8.25E+00	4.29E-35	3.08E-35	1.03E-35	1.36E-36	6.34E-38	9.85E-40			6.03	0.00			
6.34E+00	1.80E+03	3.60E+03	8.27E+00	4.48E-44	3.22E-44	1.12E-44	1.40E-45	0.00E+00	0.00E+00			6.34	0.00			
6.71E+00	1.80E+03	3.60E+03	8.29E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			6.71	0.00			
7.15E+00	1.80E+03	3.60E+03	8.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			7.15	0.00			
7.68E+00	1.80E+03	3.60E+03	8.27E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			7.68	0.00			
8.32E+00	1.80E+03	3.60E+03	8.26E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			8.32	0.00			
9.09E+00	1.80E+03	3.60E+03	8.26E+00	2.40E-41	1.72E-41	5.73E-42	7.69E-43	3.78E-44	0.00E+00			9.09	0.00			
1.00E+01	1.80E+03	3.60E+03	8.27E+00	3.15E-29	2.24E-29	7.49E-30	1.01E-30	4.96E-32	8.42E-34			10.00	0.00			
1.11E+01	1.80E+03	3.60E+03	8.29E+00	1.37E-15	9.75E-16	3.25E-16	4.40E-17	2.19E-18	3.80E-20			11.10	0.00			
1.25E+01	1.80E+03	3.60E+03	8.32E+00	3.73E-04	2.65E-04	8.83E-05	1.20E-05	6.08E-07	1.08E-08			12.50	373.00			
1.41E+01	1.81E+03	3.60E+03	8.38E+00	6.48E-04	4.60E-04	1.53E-04	2.10E-05	1.08E-06	1.97E-08			14.10	648.00			
1.60E+01	1.81E+03	3.60E+03	8.47E+00	4.45E-33	3.15E-33	1.05E-33	1.45E-34	7.59E-36	1.44E-37			16.00	0.00			
1.83E+01	1.81E+03	3.60E+03	8.58E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			18.30	0.00			
2.11E+01	1.81E+03	3.60E+03	8.74E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			21.10	0.00			
2.45E+01	1.81E+03	3.60E+03	8.94E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			24.50	0.00			
2.85E+01	1.81E+03	3.60E+03	9.21E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			28.50	0.00			
3.33E+01	1.81E+03	3.60E+03	9.56E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			33.30	0.00			
3.92E+01	1.81E+03	3.60E+03	1.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			39.20	0.00			
4.62E+01	1.82E+03	3.60E+03	1.06E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			46.20	0.00			
5.46E+01	1.82E+03	3.60E+03	1.13E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			54.60	0.00			
6.47E+01	1.82E+03	3.60E+03	1.22E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			64.70	0.00			
7.69E+01	1.83E+03	3.60E+03	1.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			76.90	0.00	0.00	0.00	2000.00	#DIV/0!
9.15E+01	1.83E+03	3.60E+03	1.48E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			91.50	0.00	0.00	0.00	75.00	#DIV/0!
1.09E+02	1.84E+03	3.60E+03	1.65E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			109.00	0.00				
1.30E+02	1.85E+03	3.60E+03	1.87E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			130.00	0.00				
1.56E+02	1.86E+03	3.60E+03	2.14E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			156.00	0.00				
1.86E+02	1.87E+03	3.60E+03	2.46E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			186.00	0.00				
2.23E+02	1.88E+03	3.60E+03	2.85E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			223.00	0.00				
2.67E+02	1.90E+03	3.60E+03	3.32E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			267.00	0.00				
3.20E+02	1.92E+03	3.60E+03	3.88E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			320.00	0.00				
3.84E+02	1.94E+03	3.60E+03	4.55E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			384.00	0.00				
4.61E+02	1.97E+03	3.60E+03	5.36E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			461.00	0.00				
5.53E+02	2.00E+03	3.60E+03	6.31E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			553.00	0.00				
6.64E+02	2.04E+03	3.60E+03	7.44E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			664.00	0.00				
7.97E+02	2.09E+03	3.60E+03	8.78E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			797.00	0.00				
9.57E+02	2.14E+03	3.60E+03	1.03E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			957.00	0.00				
1.15E+03	2.21E+03	3.60E+03	1.22E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1150.00	0.00				
1.38E+03	2.30E+03	3.60E+03	1.43E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1380.00	0.00				
1.66E+03	2.40E+03	3.60E+03	1.69E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1660.00	0.00				
1.99E+03	2.52E+03	3.60E+03	1.98E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1990.00	0.00				
2.40E+03	2.66E+03	3.60E+03	2.31E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			2400.00	0.00				
2.88E+03	2.84E+03	3.60E+03	2.70E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			2880.00	0.00				
3.46E+03	3.05E+03	3.60E+03	3.14E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			3460.00	0.00				
4.16E+03	3.30E+03	3.60E+03	3.64E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			4160.00	0.00				
5.00E+03	3.60E+03	3.60E+03	4.21E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			5000.00	0.00				

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SEP Offsite Consequence Analysis for Ammonia

SLAB Model Output

time averaged (tav = 3600 s) volume concentratic maximum concentratic (volume fraction) along centerline.

downwind distance x	maximum height (m)	time concentration z	of max (m)	cloud conc c(x,0,z)	duration (s)	(s)
-5.02E+00	0.00E+00	0.00E+00	1.80E+03	3.60E+03		
-4.02E+00	0.00E+00	1.24E-01	1.80E+03	3.60E+03		
-3.01E+00	0.00E+00	1.15E-01	1.80E+03	3.60E+03		
-2.01E+00	0.00E+00	7.85E-02	1.80E+03	3.60E+03		
-1.00E+00	0.00E+00	9.12E-02	1.80E+03	3.60E+03		
-1.79E-07	0.00E+00	1.07E-01	1.80E+03	3.60E+03		
1.00E+00	0.00E+00	1.20E-01	1.80E+03	3.60E+03		
2.01E+00	0.00E+00	1.32E-01	1.80E+03	3.60E+03		
3.01E+00	0.00E+00	1.40E-01	1.80E+03	3.60E+03		
4.02E+00	0.00E+00	1.50E-01	1.80E+03	3.60E+03		
5.02E+00	0.00E+00	1.47E-01	1.80E+03	3.60E+03		
5.12E+00	0.00E+00	1.46E-01	1.80E+03	3.60E+03		
5.24E+00	0.00E+00	1.45E-01	1.80E+03	3.60E+03		
5.39E+00	0.00E+00	1.46E-01	1.80E+03	3.60E+03		
5.57E+00	0.00E+00	1.48E-01	1.80E+03	3.60E+03		
5.78E+00	0.00E+00	1.51E-01	1.80E+03	3.60E+03		
6.03E+00	0.00E+00	1.53E-01	1.80E+03	3.60E+03		
6.34E+00	0.00E+00	1.41E-01	1.80E+03	3.60E+03		
6.71E+00	8.55E-01	1.27E-01	1.80E+03	3.60E+03		
7.15E+00	1.32E+00	1.21E-01	1.80E+03	3.60E+03		
7.68E+00	1.93E+00	1.15E-01	1.80E+03	3.60E+03		
8.32E+00	2.72E+00	1.10E-01	1.80E+03	3.60E+03		
9.09E+00	3.73E+00	1.06E-01	1.80E+03	3.60E+03		
1.00E+01	5.02E+00	1.03E-01	1.80E+03	3.60E+03		
1.11E+01	6.64E+00	9.99E-02	1.80E+03	3.60E+03		
1.25E+01	8.67E+00	9.69E-02	1.80E+03	3.60E+03		
1.41E+01	1.12E+01	9.40E-02	1.81E+03	3.60E+03		
1.60E+01	1.43E+01	9.09E-02	1.81E+03	3.60E+03		
1.83E+01	1.82E+01	8.77E-02	1.81E+03	3.60E+03		
2.11E+01	2.30E+01	8.43E-02	1.81E+03	3.60E+03		
2.45E+01	2.90E+01	8.05E-02	1.81E+03	3.60E+03		
2.85E+01	3.62E+01	7.64E-02	1.81E+03	3.60E+03		
3.33E+01	4.51E+01	7.20E-02	1.81E+03	3.60E+03		
3.92E+01	5.60E+01	6.72E-02	1.81E+03	3.60E+03		
4.62E+01	6.93E+01	6.21E-02	1.82E+03	3.60E+03		
5.46E+01	8.54E+01	5.68E-02	1.82E+03	3.60E+03		
6.47E+01	1.05E+02	5.12E-02	1.82E+03	3.60E+03		
7.69E+01	1.28E+02	4.58E-02	1.83E+03	3.60E+03		
9.15E+01	1.57E+02	4.04E-02	1.83E+03	3.60E+03		
1.09E+02	1.91E+02	3.55E-02	1.84E+03	3.60E+03		
1.30E+02	2.32E+02	3.10E-02	1.85E+03	3.60E+03		
1.56E+02	2.60E+02	2.71E-02	1.86E+03	3.60E+03		
1.86E+02	2.60E+02	2.35E-02	1.87E+03	3.60E+03		
2.23E+02	2.60E+02	2.03E-02	1.88E+03	3.60E+03		
2.67E+02	2.60E+02	1.75E-02	1.90E+03	3.60E+03		
3.20E+02	2.60E+02	1.49E-02	1.92E+03	3.60E+03		
3.84E+02	2.60E+02	1.27E-02	1.94E+03	3.60E+03		
4.61E+02	2.60E+02	1.08E-02	1.97E+03	3.60E+03		
5.53E+02	2.60E+02	9.19E-03	2.00E+03	3.60E+03		
6.64E+02	2.60E+02	7.79E-03	2.04E+03	3.60E+03		
7.97E+02	2.60E+02	6.61E-03	2.09E+03	3.60E+03		
9.57E+02	2.60E+02	5.60E-03	2.14E+03	3.60E+03		
1.15E+03	2.60E+02	4.75E-03	2.21E+03	3.60E+03		
1.38E+03	2.60E+02	4.03E-03	2.30E+03	3.60E+03		
1.66E+03	2.60E+02	3.43E-03	2.40E+03	3.60E+03		
1.99E+03	2.60E+02	2.92E-03	2.52E+03	3.60E+03		
2.40E+03	2.60E+02	2.49E-03	2.66E+03	3.60E+03		
2.88E+03	2.60E+02	2.13E-03	2.84E+03	3.60E+03		
3.46E+03	2.60E+02	1.83E-03	3.05E+03	3.60E+03		
4.16E+03	2.60E+02	1.57E-03	3.30E+03	3.60E+03		
5.00E+03	2.60E+02	1.34E-03	3.60E+03	3.60E+03		

3.46E+03	2.60E+02	1.83E-03	3.05E+03	3.60E+03
4.16E+03	2.60E+02	1.57E-03	3.30E+03	3.60E+03
5.00E+03	2.60E+02	1.34E-03	3.60E+03	3.60E+03

Attachment 2
ALOHA Model Output

```
SITE DATA:
  Location: BLYTHE, CALIFORNIA
  Building Air Exchanges Per Hour: 0.58 (unsheltered single storied)
  Time: July 1, 2015  1200 hours PDT (user specified)

CHEMICAL DATA:
  Chemical Name: AQUEOUS AMMONIA
  Solution Strength: 29% (by weight)
  Ambient Boiling Point: 81.5° F
  Partial Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%
  Hazardous Component: AMMONIA           Molecular Weight: 17.03 g/mol
  AEGL-1 (60 min): 30 ppm   AEGL-2 (60 min): 160 ppm   AEGL-3 (60 min): 1100 ppm
  IDLH: 300 ppm      LEL: 150000 ppm     UEL: 280000 ppm

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 1.5 meters/second from W at 10 meters
  Ground Roughness: 3.0 centimeters      Cloud Cover: 5 tenths
  Air Temperature: 120° F
  Stability Class: F (user override)
  No Inversion Height                    Relative Humidity: 50%

SOURCE STRENGTH:
  Evaporating Puddle (Note: chemical is flammable)
  Puddle Area: 1085 square feet          Puddle Volume: 24000 gallons
  Ground Type: Concrete                  Ground Temperature: 120° F
  Initial Puddle Temperature: 81.5° F
  Release Duration: ALOHA limited the duration to 1 hour
  Max Average Sustained Release Rate: 119 pounds/min
     (averaged over a minute or more)
  Total Amount Hazardous Component Released: 3,822 pounds
```

SECTION 5

Land Use (30)

BACKGROUND: AIRPORT LAND USE COMPATIBILITY ZONE MAP FOR LICENSED PROJECT

Page 3-95 of the Petition to Amend (PTA) for the Sonoran Energy Project (SEP) states: "The licensed project site includes land located in Airport Compatibility Zones B1 (Inner Approach/Departure Zone), C (Extended Approach/Departure Zone), and D (Primary Traffic Patterns and Runway Buffer Area) of the Riverside County Airport Land Use Compatibility Plan (ALUCP). The previously licensed project was located in Zones C and D. As part of this project modification, and as Figures 3.6-2A and 3.6-2B clearly show, all SEP structures and facilities will occupy the eastern portion of the site, and fall within Compatibility Zones C and D, with the vast majority of project components situated within Zone D."

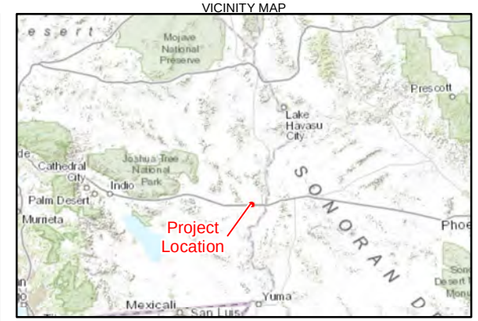
Figures 3.6-2A and 3.6-2B of the PTA show the relationship between the SEP's structures and the ALUCP Compatibility Zones. However, to compare the licensed project and the SEP, staff would like to see a figure similar to 3.6-2B for the licensed project, which would show the licensed project's structures overlaid on the ALUCP Compatibility Zones. The Energy Commission's Cartography Unit could not create this figure due to lack of data, and staff could not find the relevant information in past filings and analyses for the licensed project.

DATA REQUESTS

30. Please provide a figure for the licensed project (the Blythe II amendment filed in October 2009) similar to Figure 3.6-2B in the PTA, showing the licensed project's structures, including the transmission structures, overlaid on the ALUCP Compatibility Zones.

Response: Figure DR30-1 presents an overlay of the Blythe II project (from the October 2009 PTA) and the Airport Land Use Compatibility Zones. Figure DR30-1 includes all project features presented on 2009 Blythe II PTA Figure 1-1.

VICINITY MAP



LEGEND

Property Boundary

Airport Compatibility Zones

Zone B1

Zone C

Zone D

Image Source: NAIP 2012

N

0 400 800

Feet

FIGURE DR30-1

Blythe II GA and the Airport Land Use Compatibility Zones

Sonoran Energy Project
Riverside County, California

X:\SEP\MAPFILES\SEP_AIRPORT_20151029.MXD MD013761 10/30/2015 12:21:14 AM

SECTION 6

Socioeconomics (31-33)

BACKGROUND: PROJECT CONSTRUCTION

Section 2.3.5 on page 2-9 of the Petition to Amend (PTA) notes that construction of the Sonoran Energy Project (SEP) would take 26 months, including four months for commissioning.

However, Table 2-6 presents the construction schedule with workforce by month. The table shows months 1 through 22 with workers in the various trades followed by a 6-month period (months 23 to 28) where no workers are shown; month 29 shows 220 transmission line workers. Staff interprets the information in the table as construction occurring from months 1 through 22 with commissioning occurring during months 23 through 28, and month 29 having 220 transmission workers for a total construction and commissioning period of 29 months.

Staff has proposed the following request to clarify information in Section 2.3.5 on page 2-9 and information in Table 2-6.

DATA REQUEST

31. Please verify the estimated construction duration and workforce needs by month.

Response: Data presented in four columns starting with the Month 29 column for transmission line construction row should be shifted to the right by one row. A revised Table 2-6R presents the corrected version of this table. The editorial change does not alter any analysis presented in the SEP PTA.

BACKGROUND: CALIFORNIA EDUCATION CODE, SECTION 17620 AND CALIFORNIA GOVERNMENT CODE, SECTIONS 65995-65997

California Education Code, Section 17620 authorizes the governing board of any school district to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities. Fees are calculated based on the square foot area of chargeable covered and enclosed space. Fees are imposed for industrial construction and construction is defined in Government Code Section 65995(d) as new construction and reconstruction of existing building for industrial, residential, or commercial.

As stated in Section 2.1.2 on page 2-1, administration and maintenance buildings are to be constructed. These buildings would be assessed school impact fees.

Based on the definition of construction in Government Code Section 65995 (d) and the proposed project as described in the PTA, staff requests the following:

DATA REQUEST

32. Please identify the buildings, including the amount of covered and enclosed square footage SEP proposes to construct.

Response: Table DR32-1 presents the dimensions and square footage for each building and covered/enclosed structure proposed for SEP. The structures presented in Table DR32-1 represent all covered and enclosed structures proposed and most are covered/enclosed to protect equipment from the elements. Most of these structures will likely not be inhabited other than periodic maintenance inspections for a short duration during each work shift. The one exception is the warehouse, which could be occupied for a few hours per day.

TABLE DR32-1
SEP Building/Structure Dimensions and Square Footage

Structure	Length (Feet)	Width (Feet)	Square Footage
Warehouse	120	50	6000
Package Electronic/Electrical Control Compartment	40	13	520
Water Treatment/Chemical Feed Area	60	60	3600
Continuous Emissions Monitoring System Shelter	23.5	18.5	434.75
Power Distribution Center	49.5	30	1485

BACKGROUND: ESTIMATED FISCAL RESOURCES

Section 3.9 on page 3-132 of the PTA presents total construction cost estimates (including wages), the value of local product purchases, and estimated tax revenue from the sale of local products during construction.

Staff has the following question about the estimated fiscal resources for project construction.

DATA REQUEST

33. Please identify the dollar year used in the fiscal resource estimates described above and presented in the PTA.

Response: The fiscal resources estimates presented in the Petition to Amend are based on 2015.

Table 2-6R. Projected Construction Craft Personnel Power by Month

Craft	2016							2017												2018										Man Months	Days/ Mo.	Man Days	Hours
	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT				
Construction	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29				
Worker/Insulator												15	30	40	40	40	40	40	20	15	10									290	23	6,670	66,700
Boilmakers								20	40	60	80	80	100	80	80	70	65	55	23											753	23	17,319	173,190
Carpenters	5	10	10	15	20	20	20	15	15	15	15	12																		172	23	3,956	39,560
Cement Finishers							1	2	3	4	4	3	2	1																20	23	460	4,600
Common Laborers	5	5	5	5	5	5	5	5	10	10	10	10	10	10	10	10	8	5	5	5	5	5								153	23	3,519	35,190
Electricians	5	5	10	10	20	20	30	30	40	40	40	40	40	40	40	30	30	30	20	10	5									535	23	12,305	123,050
Equipment Operators, Heavy	4	4	6	15	15	10	6	6	5																					71	23	1,633	16,330
Equipment Operators, Light			2	2	1	1	1	1	1	1	1	1																		12	23	276	2,760
Equipment Operators, Medium			8	10	10	22	20	20	15	15	8	8	5	5																146	23	3,358	33,580
Equipment Operators, Oilers		1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1											24	23	552	5,520
Mechanical Equipment																														0	23	0	0
Millwrights	2	2	4	4	8	8	10	10	8	8	4	4	1	1																74	23	1,702	17,020
Plumbers Helper						1																								1	23	23	230
Plumbers						1	1																							2	23	46	460
Painters,																				4	4	4								12	23	276	2,760
Rodmen (Reinforcing)	4	4	4	8	8	10	20	20	10	4	4																			96	23	2,208	22,080
Skilled Trade										1	1																			2	23	46	460
Structural Steel Workers					10	10	10	20	20	30	40	40	40	15	10	10	5	2												262	23	6,026	60,260
Structural Steel Welders						1	1	2	3	3	3	2	1																	16	23	368	3,680
Steamfitters/Pipe fitters									20	40	60	70	70	70	70	70	55	55	50	20										650	23	14,950	149,500
Truck Drivers, Heavy			1	4	4	4	1	1	1																					16	23	368	3,680
Truck Drivers, Light										1																				1	23	23	230
Transmission Line	0	0	0	0	0	0	1	28	46	50	48	33	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	220	23	5060	50600
Total Craft	25	31	51	74	102	114	129	182	239	284	320	320	314	263	251	231	204	188	119	54	24	9	0	0	0	0	0	0		3528	23	81,144	811,440
Total Supervision	**1**	**1**	**2**	**2**	**2**	**2**	**2**	**4**	**4**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**4**	**4**	**2**	**1**	**1**	**1**								68	23	1,564	15,640

SECTION 7

Soil and Water Resources (34-45)

BACKGROUND

A groundwater basin budget was prepared for the Blythe Mesa Solar Project, which was licensed by BLM in 2015. The budget (include as Table 1 below) shows that the Palo Verde Mesa, not including water use at the Sonoran (or Blythe 2) project, is currently over-allocated by 2,111 acre-feet per year (AFY). Sonoran's proposed use would result in an over allocation of 4,911 AFY. There are also many other projects proposed or already in operation on the Palo Verde Mesa that could impact the budget in the future. A map of the potential projects is included below (BLM Figure 4.1-1 Cumulative Projects.

SOIL & WATER TABLE 1
Water Budget for the Palo Verde Mesa Groundwater Basin

Budget Components	Palo Verde Mesa Groundwater Basin
Recharge from runoff infiltration (1%)	242 ac-ft/yr
Underflow from Chuckwalla Valley Groundwater Basin	400 ac-ft/yr
Underflow from McCoy Wash	175 ac-ft/yr
Irrigation Return Flow (1.8% of 3,911 ac-ft [2010])	72 ac-ft/yr
Total Inflow	***889 ac-ft/yr***
Groundwater Extraction (wells)	0 ac-ft/yr
Blythe Energy	3,000 ac-ft/yr
Total Outflow	***3,000 ac-ft/yr***
Budget Balance (Inflow-Outflow)	***-2,111ac-ft/yr***

Source: BLM, 2015

DATA REQUESTS

34. Please provide expected water use rate and source for the proposed AltaGas, LLC Irish Energy Project.

Response: The Irish Energy Project is currently in development and Project Owner does not have information about expected water use rate and source for the Irish Energy Project. If and when the Irish Energy Project applicant files an Application for Certification with the California Energy Commission, it will consider the SEP water use (as well as other cumulative projects) in the cumulative impact assessment. It would be speculative to provide such information at this time. (*See* Pub. Resources Code, § 21082.2, CEQA Guidelines, § 15145 (CEQA does not require speculation).)

BACKGROUND

The Sonoran project is required to provide an offset for all site water uses and include the details of how the project's water use would be replaced in the Water Conservation Offset Program (WCOP). Staff's preliminary conclusions regarding the availability of offsets for the proposed project water use in the Colorado River basin is that they are limited and will be difficult to identify.

The Commission Decision states, "The BEP II WCOP will target 786 acres to be acquired and confirmed prior to commercial operation and selected from eligible acreage in the Palo Verde Valley or Mesa. The final submitted WCOP provides for an average consumptive water use rate of 4.2 acre-feet per acre." The Petition to Amend (PTA) states the other options such as canal lining are being considered by the petitioner. Staff is concerned that the canal lining would not meet the terms of the previously agreed upon terms of the WCOP, as lining canals in the region are unlikely to provide a meaningful offset of

actual use. Most canal seepage in the area is returned to the Palo Verde Valley groundwater basin and then the Colorado River.

DATA REQUEST

35. Please provide staff with details about the offset options being considered. Details should include how the proposed water offsets replace water that would otherwise be consumed or lost to evaporation or evapotranspiration from the basin(s).

Response: At this time, the Project Owner is in preliminary discussions with Palo Verde Irrigation District (PVID) about alternative options available to incorporate into the water conservation offset program. The existing license requires a program to offset the planned water use of 2,800 acre-feet per year (afy), including requirements to account for actual water conserved. Although fallowing is referenced in the license condition, all types of water conservation should be considered as long as the offset requirements are met. Based on recent discussions with PVID, fallowing is not likely a valid option given the extent of the existing fallowing program that PVID is implementing together with the Metropolitan Water District of Southern California. Although fallowing has not been eliminated as an appropriate offset mechanism, efforts are now focused on evaluating a canal lining program that would meet the offset requirements, including demonstrating the actual water conserved. Additional details will become available as the program framework is developed, but some rough cost information is presented in Data Response 44 below.

As discussed in the Project Owner's *Objections to Certain Data Responses Contained in CEC Staff's Data Requests Set One (#1-58)*, canal lining represents a reduction in the quantity of water diverted at the Colorado River. Reductions in diversion rates result in more water in-stream, and an increase in the Colorado River water level. Accordingly, canal lining enhances local water resources and supplies – surface water and groundwater.

BACKGROUND

Section 3.16.4.2 of the PTA discusses alternative water supply, but it relies solely on the 2005 Commission Decision. Staff believes the use of recycled water as a supply should be revisited through new analysis. Although use of recycled water could indirectly impact flows to the Colorado River, the loss in flow should be balanced with the potential degradation of water quality that often occurs with discharge of higher salinity wastewater. Staff also understands that the project owners of the adjacent Blythe Solar Power Project have been approached by the City of Blythe to discuss their possible use of recycled water for project operation. Based on this information it appears there may be some recycled water available for use in the basin.

DATA REQUESTS

36. Please provide updated information about the feasibility and availability of recycled water from the City of Blythe Wastewater Treatment Plant, including planned and under construction infrastructure additions.

Response: The potential for recycled water to be used for Sonoran Energy Project cooling depends on the availability of recycled water in the project area and the feasibility of delivering recycled water to the project site. In terms of availability, there are no wastewater treatment plants in the project area that produce recycled water. The City of Blythe operates the only publicly owned treatment works in the project area – the City of Blythe Wastewater Treatment Plant (WWTP). The WWTP provides a secondary level of wastewater treatment, and the treated effluent is discharged to percolation ponds downstream of the City's potable water aquifer (City of Blythe, 2011). The treated wastewater does not meet Title 22 standards, and no wastewater is recycled within the City's service boundaries. Therefore, recycled water is not available.

The WWTP treated an average of 1.2 million gallons per day in 2010, or 1,344 acre-feet per year. Even with assumed growth in the system, there would not be sufficient inflow to produce enough secondary treated wastewater to meet Sonoran Energy Project demands. In addition, delivery of any treated wastewater from the WWTP to the Sonoran Energy Project site would require a pipeline of at least 6.5 miles in length. The lack of sufficient capacity, coupled with the costs associated with treatment upgrades and a 6.5-mile pipeline indicate that a recycled water supply is not feasible.

37. Please compare the water treatment costs of wet cooling versus dry cooling.

Response: The use of recycled water would require additional tertiary treatment and disinfection to be included in the SEP design. These additional water treatment systems include chlorination/oxidation, clarification, clear well, clarified water forwarding pumping, and multi-media/greensand filtration. Estimated additional water treatment cost to allow the use of recycled water are estimated at approximately $2 million.

Costs for wet cooling water treatment are expected to be driven by energy consumption. The recycled water wet cooling water treatment process is expected to use 600 kW to operate the system. Assuming 7000 operating hours per year, this results in 4.2 million kW-hours of energy consumption annual at a cost of $336,000, assuming $0.08/kW-hour. Dry cooling costs are expected to be approximately 10 percent of the wet cooling treatment costs or $33,600.

38. Please compare the wastewater treatment and disposal stream resulting from wet cooling versus dry cooling. Please include volumes discharged and any other resulting waste streams.

Response: Recycled/secondary treated water is not available from the City of Blythe. As such, a comparison of the wastewater treatment streams for a wet cooled and dry cooled project is not possible. A qualitative comparison of the wastewater volumes using the proposed groundwater source shows that a wet cooled project would generate over 23.1 million gallons (70.9 acre-feet) per year of wastewater (SEP PTA Table 2-3) and that dry cooling would require about 90 percent less water and generate 90 percent less wastewater than a wet cooled project.

BACKGROUND

Investigations conducted during the licensing of the Blythe I project indicated the chloride concentrations were about 200 mg/L and have increased to 280 mg/L. A change of this magnitude in this time period is significant in water quality terms and may suggest current groundwater use in the area is degrading water quality. Additionally, CEQA requires a more recent evaluation of the proposed groundwater resource. The groundwater quality data relied upon for the 2005 Decision will need to be updated. It is also important for the owner to evaluate current water levels at the proposed site to establish a baseline.

DATA REQUESTS

39. Please provide a recent evaluation of the groundwater water quality available at the site.

Response: Recent groundwater quality information is available from the adjacent Blythe Energy Project (BEP) 1 site – see semi-annual and annual monitoring reports filed with the California Regional Water Quality Control Board, Lahontan Region (RWQCB). The most recent report is the Second Semi-Annual and Annual 2014 Monitoring Report, dated January 23, 2015 (AMEC Foster Wheeler, 2015). Table DR39-1 below summarizes water quality information from groundwater samples collected November 26, 2014.

TABLE DR39-1
Water Quality Data

Analyte	Monitoring Well 1	Monitoring Well 2	Monitoring Well 3	Monitoring Well 4
Chloride (mg/L)	240	150	110	270
Sulfate (mg/L)	340	360	290	270
Selenium (mg/L)	Not Detected	Not Detected	Not Detected	Not Detected
Total Dissolved Solids (mg/L)	1,200	1,100	1,000	1,000
Specific Conductance (umhos/cm)	1,800	1,600	1,500	1,700

Source: AMEC Foster Wheeler, 2015

40. Please provide a recent evaluation of depth to water at the site.

Response: Recent groundwater depth information is available from the adjacent Blythe Energy Project (BEP) 1 site – see semi-annual and annual monitoring reports filed with the California Regional Water Quality Control Board, Lahontan Region (RWQCB). The most recent report is the Second Semi-Annual and Annual 2014 Monitoring Report, dated January 23, 2015 (AMEC Foster Wheeler, 2015). Table DR40-1 below summarizes water depth information from groundwater samples collected November 26, 2014.

TABLE DR40-1
Water Level Data

Parameters	Monitoring Well 1	Monitoring Well 2	Monitoring Well 3	Monitoring Well 4
Static Water Level (feet below measuring point)	87.15	87.85	87.9	92.4
Potentiometric Surface (feet above mean sea level)	250.12	249.92	250.32	250.10

Source: AMEC Foster Wheeler, 2015

41. Please provide water level data from wells in the site vicinity that show water level trends over the last five years.

Response: Recent groundwater depth information is available from the adjacent Blythe Energy Project (BEP) 1 site – see semi-annual and annual monitoring reports filed with the California Regional Water Quality Control Board, Lahontan Region (RWQCB). Water level data from the last five years are presented in Figures DR41-1 and DR41-2 below (Amec Foster Wheeler, 2015; Amec, 2014; Amec, 2013; Amec, 2012; Amec, 2011). Figure DR41-1 shows water level depth below the ground surface, and Figure DR41-2 shows the potentiometric surface in feet above mean sea level.

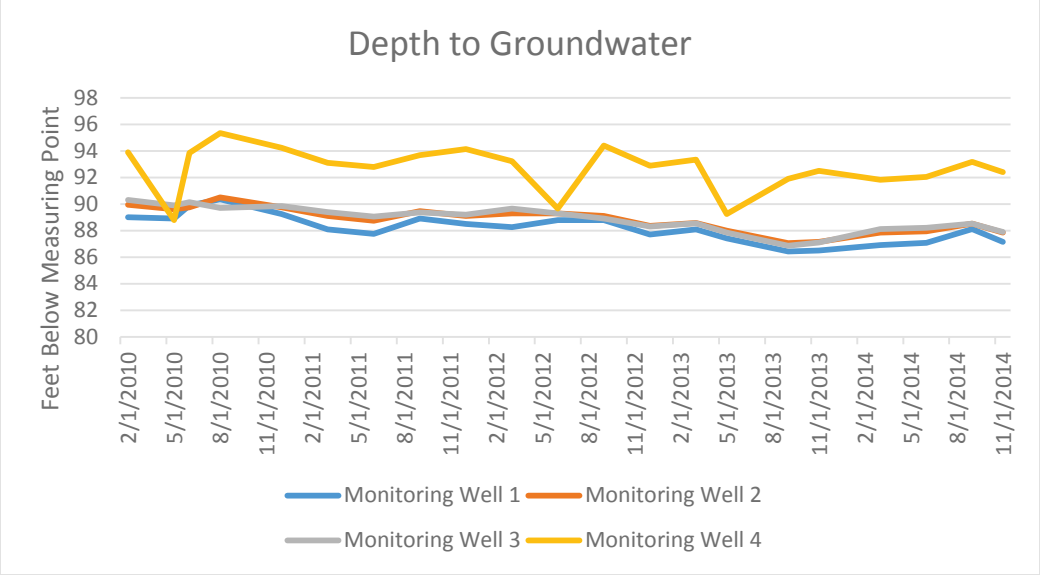


Figure DR41-1. Depth to Groundwater

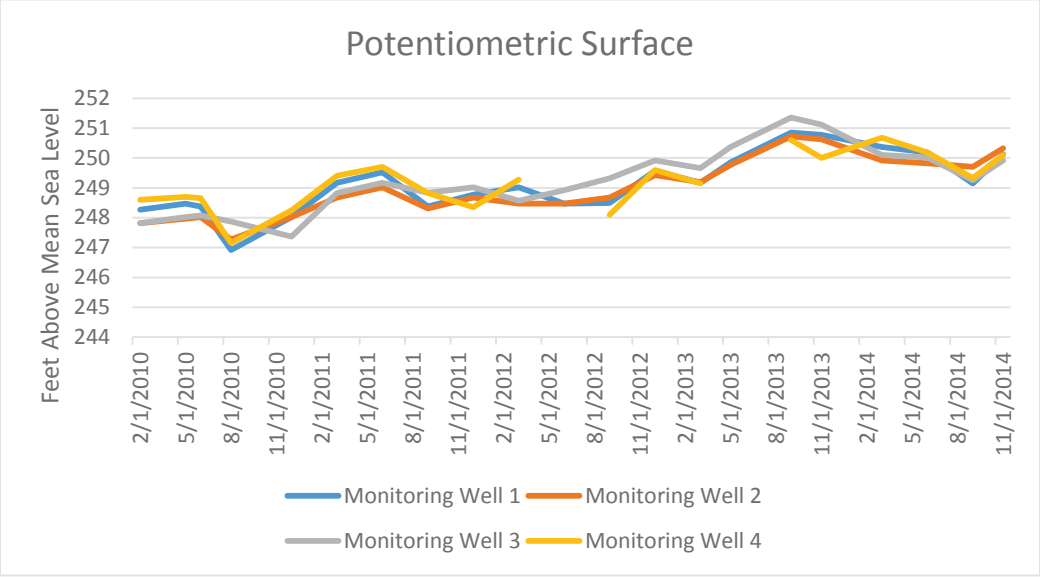


Figure DR41-2. Potentiometric Surface

BACKGROUND

Section 3.16.4.1 of the PTA discusses how the 2005 Commission Decision concluded that dry cooling was infeasible because it would not meet the project objectives. Staff believes that the conditions in Blythe and California have changed substantially since 2005. Water sources in the State are inherently connected and extremely valuable; if reasonably available technology can drastically reduce the consumption of water by the Sonoran project, it should be evaluated for implementation. The issue of whether or not dry cooling meets the plant's objectives should be revisited and given thorough consideration in the context of the current setting. There are more projects now (compared to 2005), in similar climates, that are utilizing air cooled technology. For example, Exelon Generation has started constructing two 1,000 megawatt combined cycle plants using the 7HA turbine and air-cooled condensers for the steam cycle at Wolf Hollow and Colorado Bend plant sites in Texas. The Sonoran project is proposing to use the same 7HA turbine, but with wet cooling for the steam cycle. The financing and construction of the Exelon projects is a signal that dry-cooling in a similar climate is

technologically and economically feasible, especially considering the high cost of water (and mitigation for its use) in California.

Though the PTA includes the design cases used to evaluate operating profiles, staff is unclear which cases (or combination of cases) were used to evaluate the cost differences between a wet-cooled and a dry cooled plant. The PTA states, "The use of dry cooling for the SEP will result in approximately a 7-percent reduction in electrical output during hot weather conditions, when electrical power is most in demand, with approximately twice the cost over the use of a wet cooling tower." Staff needs to review the design cases used to calculate the 7-percent difference. Staff is also interested in understanding the details of the cooling tower costs.

DATA REQUESTS

42. Please provide the design cases that were used to project the Sonoran plant's efficiency. Please include daily temperature and relative humidity conditions as well as expected operating schedules.

Response: The design cases used to determine the SEP's efficiency are presented below.

Case 1 – 30 degrees Fahrenheit (°F) and 60 percent relative humidity

Case 2 – 72 °F and 60 percent relative humidity

Case 3 – 95 °F and 25 percent relative humidity

Case 4 – 109 °F and 15 percent relative humidity

Case 3 – 122 °F and 15 percent relative humidity

The design cases assumed the following conditions.

- It is assumed the plant is operating at 100% load during all cases evaluated
- During ACC operation minimum allowable back pressure is maintained at 79˚F. When ambient temperature is below 79 ˚F ACC fans will begin to turn off.
- During Cooling Tower operation all fans are kept on to minimize backpressure until freezing becomes a concern. When ambient temperature is below 40 ˚F Cooling Tower fans will begin to turn off.
- Air cooled heat exchanger (Fin Fan Cooler) fan load will drop linearly with air temperature.
- Circulating water pumps, closed cooling pumps and zero liquid discharge system will run at a constant load.

43. Please provide details about the construction and operating cost of the proposed wet cooling tower. Please also explain the differences in cost associated with the construction and operation of a dry-cooling tower.

Response: Table DR43-1 presents a capital cost estimate for the wet cooling tower and ACC. Table DR43-2 presents an estimate of the parasitic electrical load for the wet cooling tower and ACC.

TABLE DR43-1
Capital Cost Estimate for a Wet Cooling Tower and ACC

Equipment	Estimated ACC Cost	Estimated Wet Cooling Tower Cost
Air Cooled Condenser		
ACC (36 x 200 HP Fans)	$24,500,000	
Fin Fan Cooler (28, 30 kW Fans)	$2,750,000	

TABLE DR43-1
Capital Cost Estimate for a Wet Cooling Tower and ACC

Equipment	Estimated ACC Cost	Estimated Wet Cooling Tower Cost
Wet Cooling Tower		
Cooling Tower (8 x 250 HP Fans)		$6,000,000
Surface Condenser		$2,500,000
Circ Water Piping and Valves		$1,800,000
Circ Water Pumps		$400,000
CCW Heat Exchanger		$500,000
Brine Concentrator System		$1,500,000
Total Costs	$27,250,000	$12,700,000

TABLE DR43-2
Summary of Parasitic Electrical Load Requirements for a Wet Cooling Tower and ACC

Ambient Conditions	ACC			Wet Cooling Tower		
	Back Pressure Losses	ACC Fan Power	Fin Fan Cooler	Cooling Water Pumps	Cooling Tower Fans	Brine Concentrator
	kW	kW	kW	kW	kW	kW
30 °F, 60% RH	10,711	2,146	233	2,494	1,053	502
72 °F, 60% RH	4,022	5,151	560	2,494	2,105	502
95 °F, 25% RH	11,755	5,652	739	2,494	2,105	502
109 °F, 15% RH	22,099	5,652	848	2,494	2,105	502
122 °F, 15% RH	34,399	5,652	949	2,494	2,105	502

BACKGROUND

The PTA does not provide adequate information about the associated water costs, which are needed to evaluate the how the project's objectives would be met. Staff believes the PTA has not addressed all of the cost differences between the proposed project and a dry cooled one. The cost of mitigation of 2,800 AFY is expected to be very high and the opportunities for real water saving could be limited. Staff obtained draft terms of a fallowing agreement between landowners in Blythe and Metropolitan Water District (MWD), from 2004. The agreement provided landowner with an average of $3,250 per acre of fallowed land that could only be exercised in 10 of the 35-year contract. An additional payment of $604 would be paid to the land owners during fallowing years. The Blythe II project was expected to get credit for 4.2 AFY/acre fallowed. Assuming an annual consumption of 2,800 AFY, would require the fallowing of 667 acres. If the project followed similar terms to that of MWD and required land owners to fallow only one-third of the time, the Sonoran project would need rights to fallowing on 2,000 acres. The cost of 2,000 acres (in 2004) would have been $6,500,000 in 2004. The additional cost of $604 per acre per year fallowed would be an additional $402,868 per year for 667 acres. Over the 30-year project life this cost would be $12,086,040.

The total expected cost of mitigation (in 2004) would have been $18,586,040. Staff would expect this cost to be significantly higher today due to a decrease in local farmland supply and increase in demand for fallowable land.

DATA REQUESTS

44. Please provide a comparison of the cost to mitigate the water use by the proposed project (2,800 AFY) and the cost to mitigate a dry-cooled project (~280 AFY).

Response: Table DR44-1 presents the estimate SEP water offset costs for wet and dry-cooled configurations. Costs were estimated both for purchasing actively irrigated land and fallowing it, using the Palo Verde Irrigation District/Metropolitan Water District (PVID/MWD) Forbearance and Fallowing Program, and for lining irrigation canals.

This cost estimate uses the most currently available 5.04 acre-feet per acre water use estimate found in the 2013 PVID/MWD Forbearance and Fallowing Program Fallowed Land Verification Report and the 2014 annual lease payment of $752/acre for 30 years. The PVID/MWD program referenced by staff in the data request background is essentially a demand-based fallowing program driven in large part by drought-dependent urban water demands. SEP will have a generally constant water demand, and therefore a fallowing program would be based on fallowing for all year types. The per acre cost of $15,000/acre to purchase and fallow irrigated farm land was generated from web-based real estate searches and assumes this land is fallowed for the life of the SEP. The canal lining cost estimate is based on reported costs for lining 36.5 miles of the Coachella Canal at a cost of $124 million at an annual water conservation of 30,850 AFY.

Table DR44-1
SEP Estimated Water Offset Costs

	Wet Cooled	Dry Cooled
Annual SEP Water Use (AFY)	2800	280
Acre-Feet/Acre[1]	5.04	5.04
Acres required for SEP Water Use	555.1	55.5
Cost to purchase acres and fallow[2]	$8,326,939	$832,694
Cost to fallow using the MWD/PVID Program[3]	$14,327,887	$1,432,789
Estimated Canal Lining[4]	$11,254,457	$1,125,446

1. 2013 PVID/MWD Forbearance and Fallowing Program Fallowed Land Verification Report http://www.usbr.gov/lc/region/g4000/4200Rpts/DecreeRpt/2013/17%202013%20MWD-PVID%20Fallowed%20Land%20Verification%20Report%202014-05-12.pdf
2. Assumed actively farmed acres available at a cost of $15,000/acre.
3. Initial per acre cost of $3250 for 555.1 acres and 2014 annual payment of $752/acre for 555.13 acres for 30 years.
4. Based on Coachella Canal Lining Project Costs of $124 million, 36.5 miles, and 30,850 AFY water saved.

45. Please provide a comparison of the water pumping and treatment costs for the proposed project (2,800 AFY) and a dry-cooled alternative (~280 AFY).

Response: Water pumping costs are expected to require 53.38 kW to pump 1804 gallons per minute of water. Assuming SEP operates 7000 hours per year, the annual water pumping electrical demand is 373,660 kW-hours. Assuming electrical generation costs of $0.08/kW-hour, the annual costs for water pumping 2,800 acre-feet per year (AFY) is $29,893. Assuming a dry cooled design would use approximately 10 percent of the 2,800 AFY (or 280 AFY), the cost would be $2,989.

Costs for wet cooling water treatment are expected to be driven by energy consumption. The wet cooling water treatment process is expected to use 500 kW to operate the system. Assuming

7000 operating hours per year, this results in 3.5 million kW-hours of energy consumption annual at a cost of $280,000, assuming $0.08/kW-hour. The dry cooling water treatment costs are expected to be 10 percent of the wet costs or $28,000.

REFERENCES

Amec Foster Wheeler Environment and Infrastructure, Inc. 2015. Second Semi-Annual and Annual 2014 Monitoring Report – Blythe Energy Project. January 23, 2015.

Amec. 2014. Second Semi-Annual and Annual 2013 Monitoring Report – Blythe Energy Project. January 24, 2014.

Amec. 2013. Second Semi-Annual and Annual 2012 Monitoring Report – Blythe Energy Project. January 25, 2013.

Amec. 2012. Second Semi-Annual and Annual 2011 Monitoring Report – Blythe Energy Project. January 25, 2012.

Amec. 2011. Second Semi-Annual and Annual 2010 Monitoring Report – Blythe Energy Project. January 31, 2011.

BLM, 2015. Blythe Mesa Solar Project Final Environmental Impact Report/Environmental Assessment, Volume IV: Technical Appendices. March, 2015.

City of Blythe. 2011. City of Blythe 2010 Urban Water Management Plan. Prepared by Dynamic Consulting Engineers, Inc. March 2011.

SECTION 8

Transmission System Engineering (46-56)

BACKGROUND

Staff needs to determine the transmission system impacts of the project and to identify the interconnection facilities, including downstream facilities, needed to support the reliable interconnection of the proposed Sonoran Energy Project (SEP) in the Western Area Power Administration (Western) System. The proposed interconnection facilities must comply with the utility (Western) rules for new interconnection, California Public Utilities Commission (CPUC) General Order (GO) 95 and the CPUC GO 128. The interconnection must also comply with the Western Reliability and Planning Criteria, North American Electric Reliability Corporation (NERC) Reliability Standards, Western Electricity Coordinating Council (WECC) Regional System Performance Criteria, and the California Independent System Operator (California ISO) Planning Standards for impacts in the California ISO system. In addition, the California Environmental Quality Act (CEQA) requires the identification and description of the "Direct and indirect significant effects of the project on the environment." For the compliance with planning and reliability standards and the identification of indirect or downstream transmission impacts, staff relies on the System Impact Study (SIS) and Facilities Study (FS) as well as review of these studies by the agencies responsible for insuring the interconnecting transmission grid meets reliability standards, in this case, the Western, the Metropolitan Water District (MWD), and Southern California Edison (SCE) for the system impacts in their respective systems. The studies analyze the effect of the proposed project on the ability of the transmission network to meet reliability standards. When the studies determine that the project will cause the transmission system to violate reliability requirements, the potential mitigation or upgrades required to bring the system into compliance are identified. The mitigation measures often include modification and construction of downstream transmission facilities. The CEQA requires environmental analysis of any downstream facilities for potential indirect impacts of the proposed project.

The description of the SEP switchyard and interconnection facilities between the generators and Western's Blythe 161 kV substation including major equipment and their ratings in the August, 2015 Petition to Amend are incomplete (Section 2, Page 2-1, Pages 2-6 to 2-7, Figures 2a & 2-2b, and Figures 2-5 & 2-6).

DATA REQUESTS

46. Please provide a complete and labeled electrical one-line diagram of the proposed SEP switchyard showing the two generators with their respective nominal ratings, and all equipment for each generator's interconnection with the switchyard. The diagram should include:

    a. Any 12.5/13.8 kV switch gear and the circuit breakers on the low side;

    b. The generator step-up transformers;

    c. Any bus duct connectors or cables from the 12.5 kV/13.8 kV switchgear to new generators and to low side of the step-up transformer;

    d. The short overhead lines or conductors on the 161 kV side with their configuration between the generator step-up transformers high side and the switchyard 161 kV bus; and

    e. The buses, breakers, disconnect switches in the 161 kV switchyard with their configuration including transmission outlets and their respective ratings.

Response: See the attached electrical one-line diagram, Figure DR46-1 (Drawing E1-01 Rev. B) for the SEP. Figure DR46-1 shows 12.5/13.0 kilovolt (kV) switch gear and circuit breakers, bus duct connectors/cables from the switchgear to the new generator and the generator step-up transformer

(GSU). Note that due to the proposed SEP design, the General Electric Frame HA.02 combustion turbine incorporates a single shaft configuration with a single 23.5 KV generator for both the combustion turbine and steam turbine.

47. Please provide a legible physical layout drawing of the SEP switchyard showing all major equipment and transmission line outlet(s) with proper labelling.

Response: Figure DR47-1 presents the physical layout of the SEP switchyard showing all major equipment. Please note that the major equipment is labeled, which corresponds to equipment shown on the Figure DR46-1 one- line drawing.

48. Please provide pre and post-project electrical one-line diagrams of Western's Blythe 161 kV substation for interconnection of the proposed 161 kV Gen-Tie line from the SEP switchyard. The diagrams should show all the breakers, buses, disconnect switches with their configuration and their respective ratings.

Response: The requested information will be included in the Final Western Facilities Study requested in Data Request 54. Please note that the proposed SEP will be connected to the Western Buck Boulevard Substation and the Buck Boulevard Substation is connected to the Western Blythe Substation via an existing 161 KV transmission line. Figure DR48-1 presents a schematic of the existing Buck Boulevard substation one line with an interconnection for SEP.

49. Please provide physical layout drawings (plan view) for the pre and post-project Western 161kV Blythe substation.

Response: The requested information will be included in the Final Western Facilities Study requested in Data Request 54, which is expected for release in January 2016.

50. Please provide a physical layout drawing showing distinctly the route and width of the right-of-way (ROW) of the proposed 1,132-ft 161 kV line between the SEP switchyard and Western Blythe 161 kV substation. Also mention if the ROW will be through private or public property. Describe how the route was selected and discuss any alternate routes considered.

Response: The SEP will interconnect to the Buck Boulevard substation and the interconnection route extends north from the GSU, exiting the SEP site at the northern boundary (see PTA Figure 2-2b). The gen-tie line crosses the unpaved road (adjacent to the northern SEP boundary) and enters private property (owned by the corporate parent of the Project Owner). The line then turns east to the western corner of the Buck Boulevard substation, then turns south to the substation. The right-of-way is expected to be approximately 150 feet (75 feet from the gen-tie centerline) in width and will traverse public (the adjacent public road) and private (property owned by the corporate parent of the Project Owner and Western Area Power Administration) lands.

51. Please provide a list of any new or updated federal, state, regional or local laws, ordinances, regulations and standards applicable for transmission and describe their purpose during planning, construction and operation of the proposed SEP project.

Response: There are no new or updated federal, state, regional or local laws, ordinances, regulations and standards applicable for transmission for the proposed planning, construction and operation of the proposed SEP.

BACKGROUND

The Western System Impact Study (SIS) Report of April 29, 2015 is preliminary and incomplete. The SIS shows potential violations on neighboring systems including Voltage issue on the Metropolitan Water District (MWD) system and a thermal overload on SCE's Julian Hinds to Mirage 230 kV line. These potential impacts on neighboring systems require consultations with MWD and SCE and could result in the need for further studies.

The project owner has not decided on whether they will interconnect with Western as a Network Resource (Capacity) or as an Energy Resource. The project impacts and mitigation would be different depending on whether or not they interconnect as a capacity or energy only resource.

DATA REQUESTS

52. Please provide written comments from SCE and MWD discussing potential impacts and any required mitigation on their systems for the SEP interconnection.

Response: The Project Owner is in direct communications with the SCE transmission planning and contracts group to initiate an Affected System Study. SCE has reviewed the Western SIS for the 2014-G35 (SEP) project interconnection to Blythe Substation and has requested to be engaged in conducting the appropriate SIS for SCE transmission infrastructure. As SCE provides operations and maintenance service for the MWD portion of the transmission lines supporting MWD pump load out of the Julian Hinds and Eagle Mountain substations, it is proposed that SCE will include and address impacts to MWD facilities.

53. If SCE or MWD requires further study of the potential impacts on their systems, please submit their study reports.

Response: See the response to Data Request # 52.

54. Please submit the final Western SIS Report and the Facility Study Report.

Response: The Western Area Power Administration is completing a Facilities Study, which is expected to be released in January 2016. Project Owner will provide a copy of the completed Facilities Study upon receipt.

55. Where the Western SIS Report, Facilities Study Report comments/ studies from SCE or MWD identify mitigation options for transmission system impacts, please describe the selected mitigation.

Response: Mitigation requirements are not yet determined. The mitigation has yet to be fully determined as the SCE Affected System Study has not yet been conducted. Control of overloads may include series reactive devices to control flow, possible new or modified remedial action schemes (RAS) may be applied, and possible re-conductoring efforts (Julian Hinds-Mirage).

BACKGROUND

CEQA requires environmental analysis of any downstream facilities required to mitigate transmission system reliability impacts of the SEP.

DATA REQUEST

56. If it is determined that mitigation measures could have significant environmental impacts, please provide an analysis of environmental impacts for installing any downstream facilities required for transmission impacts and necessary mitigation measures. Staff can provide a template for the analysis.

Response: See the response to Data Request #55.

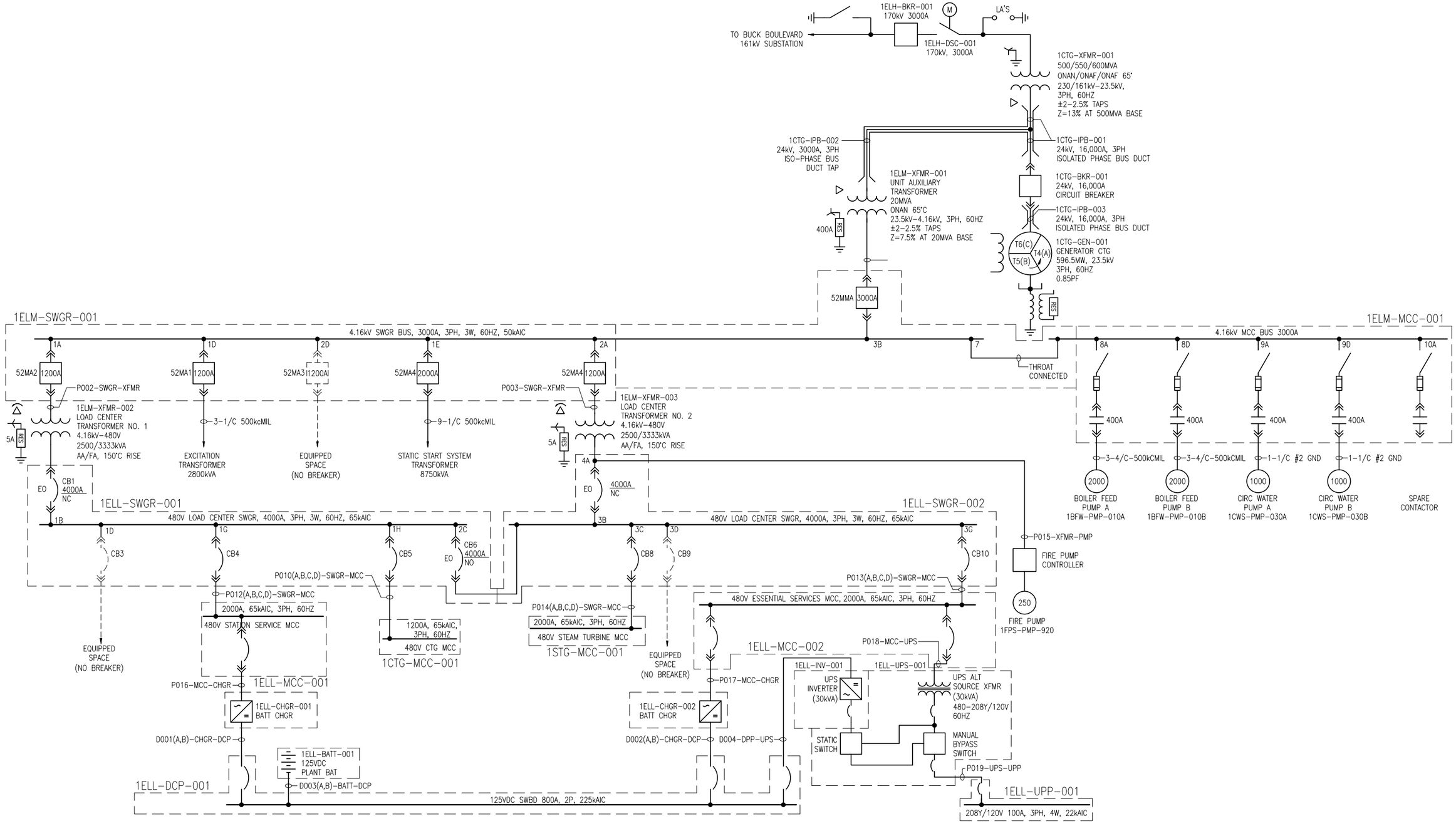
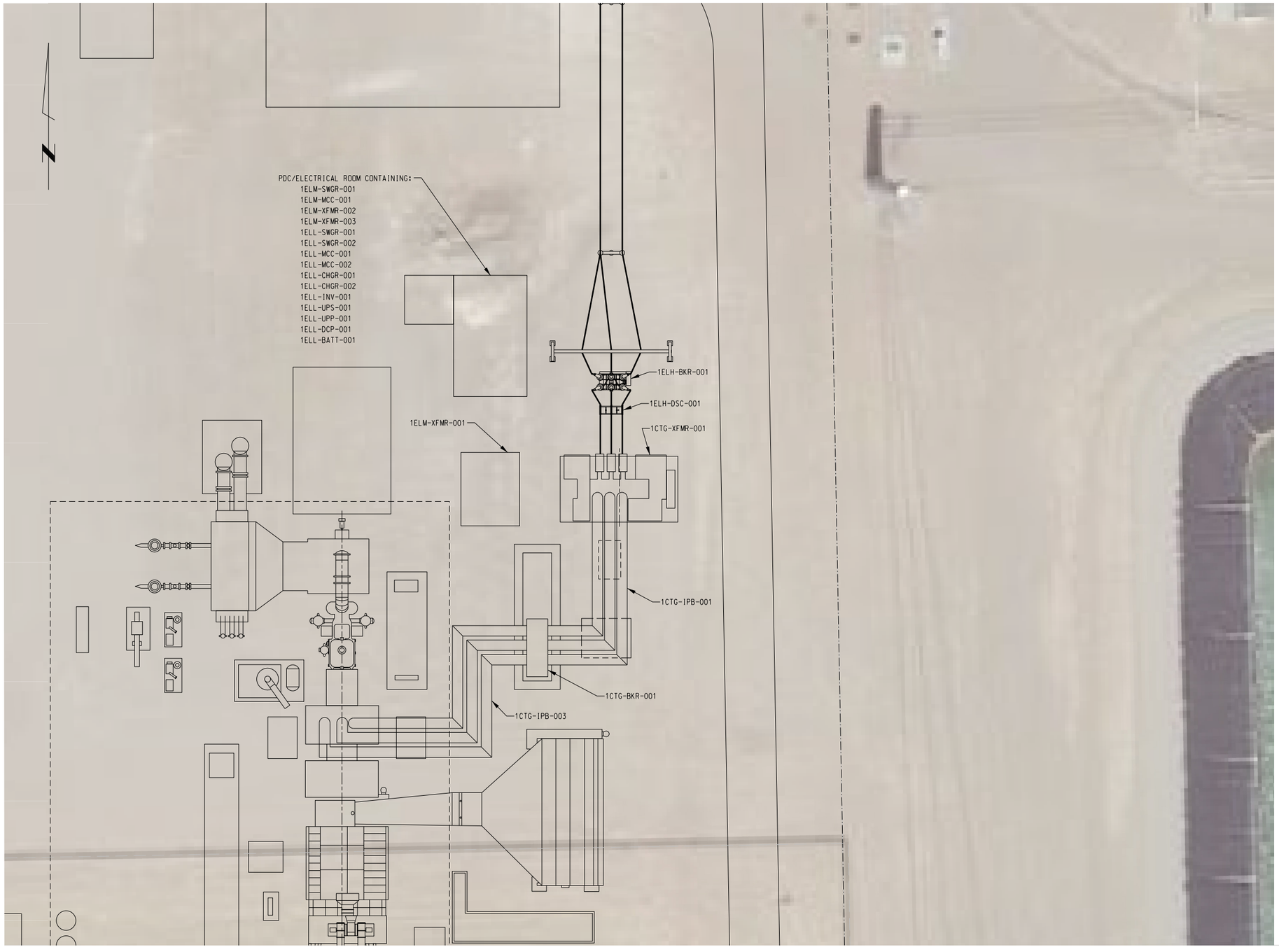


FIGURE DR46-1
One-Line Drawing
Sonoran Energy Project
Riverside County, California

Source: Power Engineers, Drawing E1-01, Rev. B, 11/06/15.

CH2MHILL



NOTES

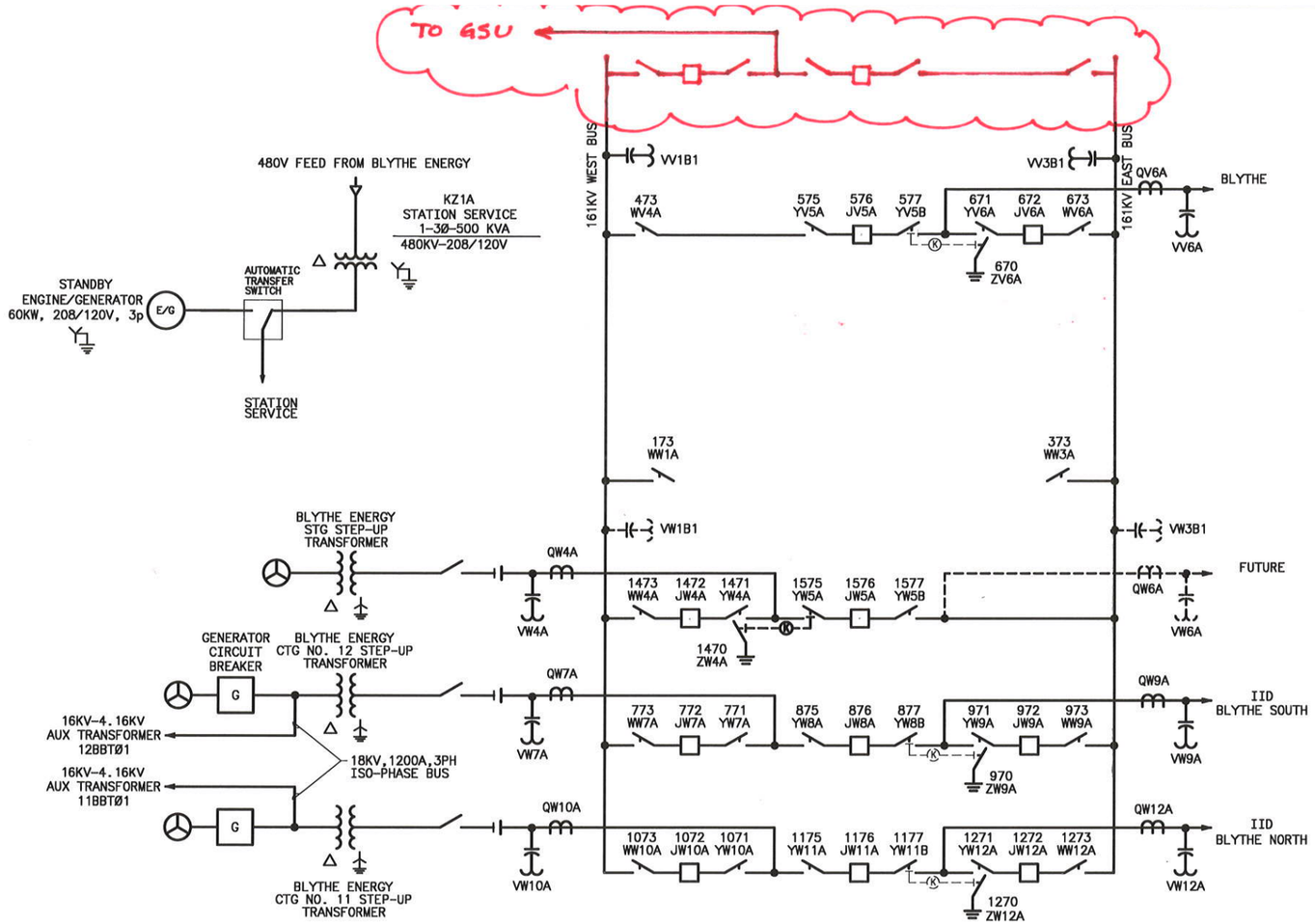
1. TAG NUMBERS SHOWN CORRESPOND TO THE ELECTRICAL MAIN ONE LINE DIAGRAM E1-01.

0 10 20 40 60

1"= 20'

FIGURE DR47-1
Gen Tie Route
Sonoran Energy Project
Riverside County, California

Source: Power Engineers, Drawing Sub1-1, Rev. A, 11/06/15.



TRANSFORMERS			
DESIGNATION	KV	MAX MVA	SPEC OR STAGE NO.
KZ1A	480V	300	STAGE 01

DISCONNECTING SWITCHES			
DESIGNATION	KV	CONT AMP	SPEC OR STAGE NO.
WV4A, 6A	230	2000	STAGE 01
WW1A,3A,4A	230	2000	STAGE 01
WW7A,9A,10A,12A	230	2000	STAGE 01
YV5A,YV5B,YV6A-ZV6A	230	2000	STAGE 01
YW5A,5B,7A,8A,8B	230	2000	STAGE 01
YW4A-ZW4A,YW12A-ZW12A	230	2000	STAGE 01
YW10A,11A,11B	230	2000	STAGE 01
YW9A-ZW9A	230	2000	STAGE 01

POWER CIRCUIT BREAKERS					
DESIGNATION	KV	CONT AMP	SHORT CKT KA	TIME CYCLE	SPEC OR STAGE NO.
JV5A,6A	230	2000	40	3	STAGE 01
JW4A,5A	230	2000	40	3	STAGE 01
JW7A,8A,9A	230	2000	40	3	STAGE 01
JW10A,11A,12A	230	2000	40	3	STAGE 01

COUPLING CAPACITOR VOLTAGE TRANSFORMERS			
DESIGNATION	KV	RATIO	SPEC OR STAGE NO.
VV6A	161\230	1200/2000:1	STAGE 01
VV1B1,3B1	161\230	1200/2000:1	STAGE 01
VW4A,7A,9A	161\230	1200/2000:1	STAGE 01
VW10A,12A	161\230	1200/2000:1	STAGE 01

CURRENT TRANSFORMERS			
DESIGNATION	KV	RATIO	SPEC OR STAGE NO.
QV6A	230	1000/2000:5	STAGE 01
QW4A,QW7A,QW10A	230	400/800:5	STAGE 01
QW9A,QW12A	230	600/1200:5	STAGE 01

Source: US Department of Energy, Western Area Power Administration, Drawing BKB-0001, Rev. E, 5/29/02.

FIGURE DR48-1 (1 of 2)
Buck Blvd. One-Line Drawing
Sonoran Energy Project
Riverside County, California

CH2MHILL

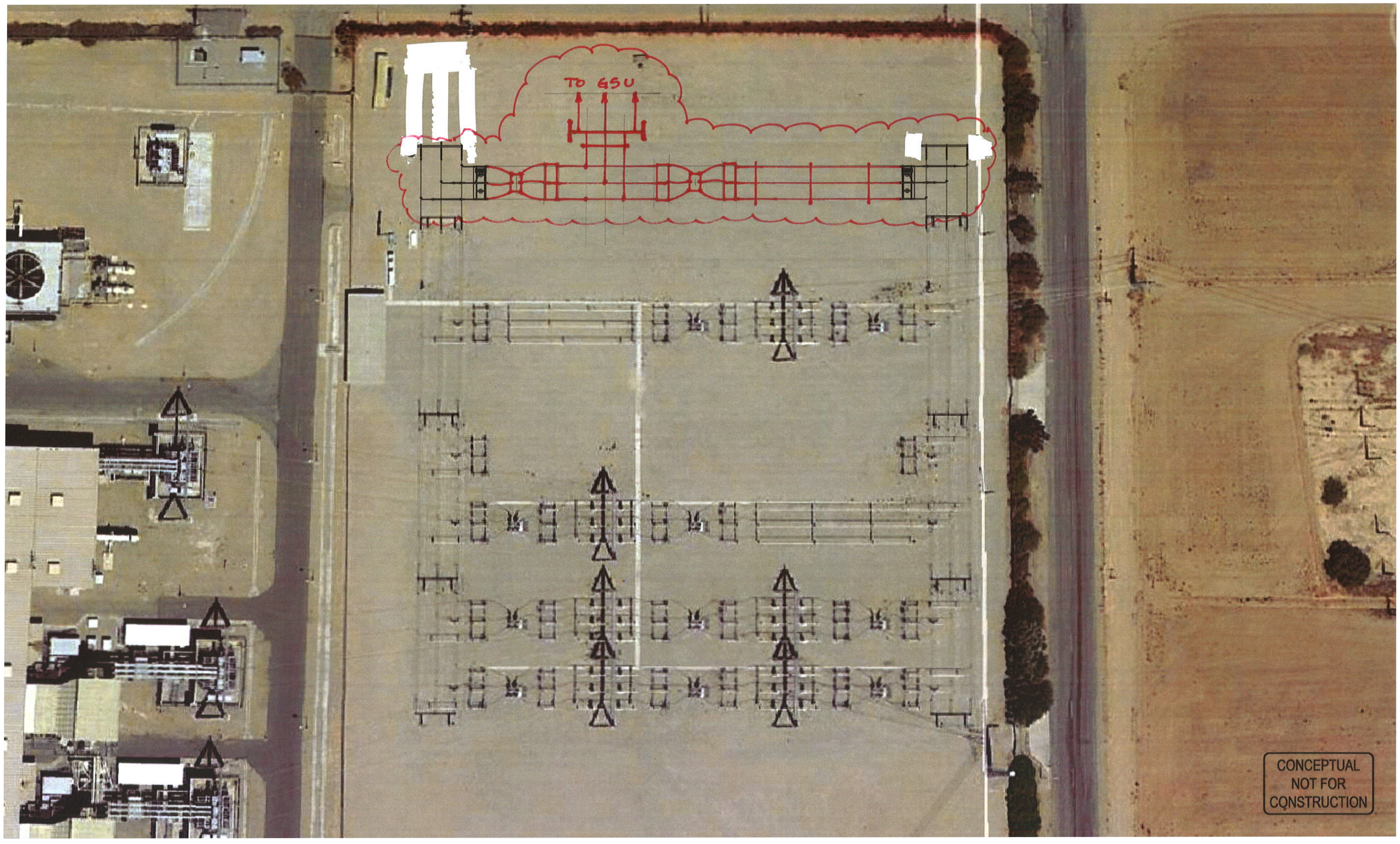


FIGURE DR48-1 (2 of 2)
Buck Blvd. One-Line Drawing
Sonoran Energy Project
Riverside County, California

Source: Power Engineers, Drawing E1-1, Rev. 0, 2/17/15.

SECTION 9

Visual Resources (57-58)

BACKGROUND

Section 3.12 – Visual Resources of the Petition to Amend (PTA) indicates the heights of the proposed HRSG stack and HRSG (140 feet tall and 120 feet tall, respectively) and the height of the two licensed HRSGs (93 feet). The petition states, "The cooling tower will remain approximately the same size as analyzed for BEP II. While the Sonoran Energy Project contains some features taller than those approved for the original Blythe Energy Project Phase II, such features will appear within an objectively smaller development area within the 76-acre site" (p. 3-142). However, the PTA does not include complete dimensions (height, width/diameter, length) of the proposed major structural features, nor does it provide, for comparison purposes, dimensions of the licensed features that would be increased or decreased in size under this PTA.

The elevation drawings (Figures 2-3a, 2-3b) submitted in the PTA indicate the heights of some of the proposed structures and buildings, but a complete set of dimensions are not provided, nor are the features labeled.

DATA REQUESTS

57. Please prepare and submit a figure indicating the dimensions (height, width or diameter, and length) of the proposed major structures and buildings that are equal to or greater than 40 feet tall.

Response: Table DR57-1 presents the dimensions for major SEP structures. Figure DR57-1 present the major structures and building equal to or greater than 40 feet tall.

TABLE DR57-1
Sonoran Energy Project Building Dimensions

Structure	Length feet	Width feet	Height feet
Brine Concentrator	103.4	66.8	10.0
Cooling Tower	480.5	54.2	28.1
Ammonia Tank	46.7	16.4	15.0
Raw Water Tank	35.0	(diameter)	20.0
Demin Water Tank	30.0	(diameter)	20.0
Air Intake Filter - Tier 1	64.3	25.2	30.0
Air Intake Filter - Tier 2	64.3	25.2	**47.0**
PDC/Electrical	60.5	40.4	12.0
Warehouse	121.1	50.4	20.0
Gas Turbine/HRSG - Tier 1	113.5	39.1	32.0
Gas Turbine/HRSG - Tier 2	103.4	42.9	**100.0**
HRSG Exhaust Stack (diameter)	--	22	**140.0**
Auxiliary Boiler	23.0	10.2	13.0
Auxiliary Boiler Exhaust Stack (diameter)	--	2.92	50
Fire Pump Engine Enclosure	20.2	12.0	10.0

58. For comparative purposes, please also include the major structure and building dimensions of the two previously licensed projects (2005 and 2012).

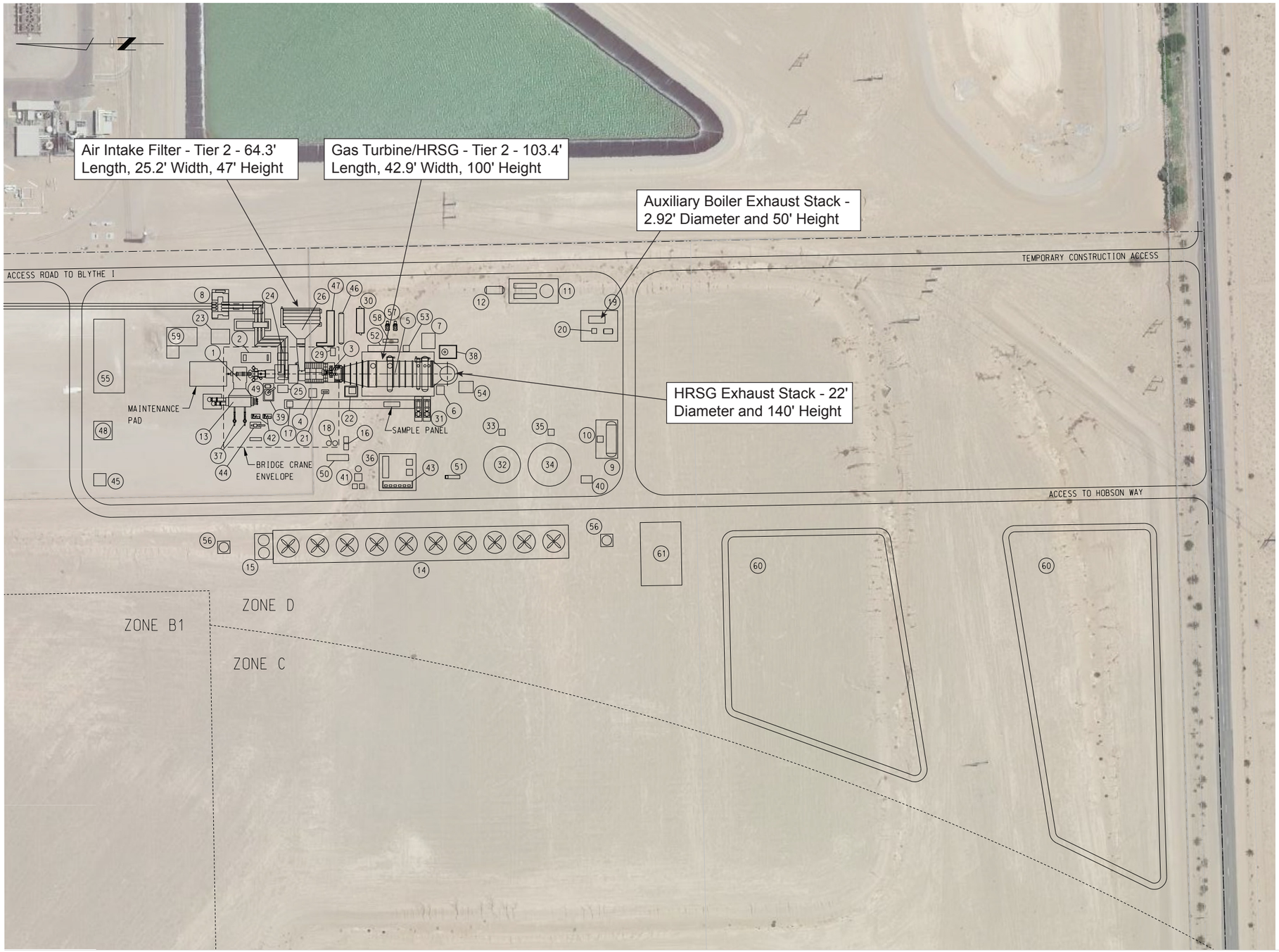
Response: A review of the BEPII 2005 and 2012 licensing documentation to identify structure heights was conducted. Elevation drawings and structure heights were available for the licensed issued in 2005, and structure heights are presented in Table DR58-1. The general arrangement is not of sufficient scale to allow for length and width measurements to be produced. A review of the 2009 BEPII PTA, data responses, Staff Assessment or Commission Decision did not identify any elevation drawings or structure height data. To provide an estimate of structure heights for the 2012 BEPII license, a review of projects with similar generating equipment was undertaken and the San Gabriel Generating Station (07-AFC-02) project proposed the same combustion turbines as were proposed for the BEPII's 2009 PTA. A review of the San Gabriel Generating Station project's AFC visual resource section[2] identified height information which is presented in Table DR58-1.

TABLE DR58-1
BEPII Structure Heights

Project Component	BEPII - 2005[a] Height (feet)	San Gabriel Generating Station Height (feet)
Generation Building	60	80
Exhaust Stack	130	150.5
Heat Recovery Steam Generator	93	100
Cooling Tower	40	--
Raw Water Supply Tank	40	--
Demineralized Water Storage Tank	43	35
Brine Concentrator	90	--
Transmission Lines (double circuit)	145	120.5

[a] BEPII Final Staff Assessment, April 2005, page 4.5-10 and Figures Project Description 4 and 5.

[2] http://www.energy.ca.gov/sitingcases/sangabriel/documents/applicant/afc-cd/AFC_Volume-1/7.11%20Visual%20Resources.pdf



LEGEND

1 - STEAM TURBINE
2 - STEAM TURBINE LO MODULE
3 - GAS TURBINE
4 - GAS TURBINE LO MODULE
5 - HEAT RECOVERY STEAM GENERATOR
6 - HRSG LP/ECONOMIZER RECIRC PUMP
7 - HRSG BLOW DOWN SUMP
8 - STEP UP TRANSFORMER
9 - AQUEOUS AMMONIA STORAGE
10 - AQUEOUS AMMONIA FORWARD PUMPS
11 - FUEL GAS CONDITIONING AND PRESSURE REGULATING STATION
12 - FUEL GAS DRAINS TANK
13 - SURFACE CONDENSER
14 - COOLING TOWER
15 - CIRCULATING WATER PUMPS
16 - CLOSED COOLING WATER (CCW) HEAT EXCHANGER
17 - CCW EXPANSION TANK
18 - CCW PUMPS
19 - AUX BOILER
20 - AUX BOILER BLOW DOWN SUMP
21 - WASH WATER SKID
22 - WASH WATER DRAINS TANK
23 - AUX TRANSFORMER
24 - GENERATOR LINE ACCESSORY COMPARTMENT
25 - GENERATOR NEUTRAL ACCESSORY COMPARTMENT
26 - INLET AIR FILTER/EVAPORATIVE COOLER
27 - NOT USED
28 - NOT USED
29 - GE DLN GAS MODULE
30 - PACKAGED ELECTRONIC/ELECTRICAL CONTROL COMPARTMENT
31 - FEEDWATER PUMPS
32 - DEMIN WATER TANK
33 - DEMIN WATER PUMPS
34 - RAW WATER TANK
35 - RAW WATER PUMPS
36 - WATER TREATMENT AREA
37 - CONDENSATE PUMPS
38 - HRSG BLOW DOWN TANK
39 - CONDENSATE DRAINS / FLASH TANK
40 - FIRE PUMP SKID
41 - AIR COMPRESSORS, DRYERS AND RECEIVER
42 - VACUUM PUMPS
43 - CHEM FEED SKIDS
44 - GLAND STEAM CONDENSER
45 - N2 STORAGE
46 - CO2 STORAGE
47 - CT FIRE PROTECTION SKID
48 - HYDROGEN STORAGE
49 - HP, IP, LP BYPASS VALVES
50 - WASTE WATER STORAGE
51 - OIL/WATER SEPARATOR
52 - DUCT BURNER SKID
53 - SCANNER AIR SKID
54 - CEMS
55 - WAREHOUSE
56 - NEW WELL
57 - AMMONIA FLOW CONTROL UNIT
58 - FUEL GAS PERFORMANCE HEATER
59 - PDC/ELECTRICAL ROOM
60 - EVAP POND
61 - BRINE CONCENTRATOR

0 40 80 160 240
1"= 80'

FIGURE DR57-1
Site Plan with Dimensions for Structures Equal to or Greater than 40 Feet
Sonoran Energy Project
Riverside County, California

Source: Power Engineers, Drawing MSK1-1, Rev. D, 12/23/14.