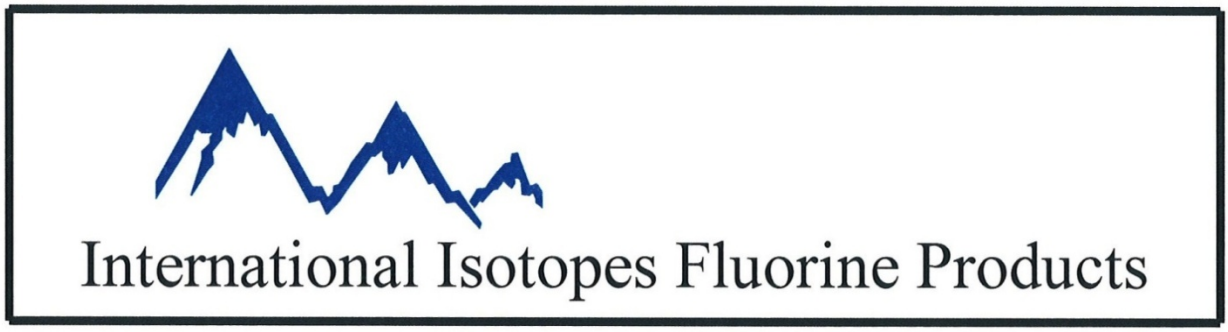

International Isotopes Fluorine Products, Inc.
(IIFP)

A Wholly Owned Subsidiary of
International Isotopes, Inc. (INIS)

Fluorine Extraction Process & Depleted Uranium De-conversion Plant (FEP/DUP)

Official Responses to Talking Points Regarding the Environmental Report

May 24, 2011

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1	8a	Were the equipment quantities assumed in the draft response used to calculate the monthly horsepower-hours listed in Tables RAI 8-a-1 and RAI 8-a-13 of the final response? If not, please provide the correct quantity for each type of construction equipment / vehicle listed.	1
2	8a	Please provide the monthly hours of operation for each type of construction equipment/vehicle listed in Tables RAI 8-a-1 and RAI 8-a-13.	3
3A	8a	Does this timeframe include pre-construction?	4
3B	8a	Please clarify the timing of this 12-month period within the overall 18 to 24 month Phase 1 construction timeframe. Also, please provide assumptions for Phase I construction emissions that would occur outside the 12-month period described in Tables RAI 8-a-1 and RAI 8-a-2 (e.g., emissions would decrease after the 12 months provided because…).	4
4	8a	Was the NONROAD model used to develop emission factors for the construction equipment or were emission factors from AP-42 used?	5
5	8b,c	Will be gas pumping station also be removed?	12
6	9a	Please provide a complete list of the assumptions used to calculate the Boiler emissions provided in Table 4-15 of the final response to RAI 9a. This list should include fuel heating value (Btu/scf), boiler heat rate (MMBtu/hr), annual runtime (hr/year), and whether the boiler is assumed to operate at full capacity. If the boiler is assumed to operate at less than full capacity please describe how that affects the heat rate. If the use of control devices is assumed, please describe how the controlled emissions were calculated and include assumptions regarding the control devices (e.g., pollutant controlled, device type, control efficiency)	13
7	9a	Please explain why the Phase 2 boiler emissions are three times greater than the Phase 1 boiler emissions and a complete list of the assumptions used to calculate the annual boiler emissions provided in Tables 4-18 and 4-25 of the ER. This list should include fuel heating value (Btu/scf), boiler heat rate (MMBtu/hr), annual runtime (hr/year), and whether the boiler is assumed to operate at full capacity. If the boiler is assumed to operate at less than full capacity please describe how that affects the heat rate. If the use of control devices is assumed, please describe how the controlled emissions were calculated and include assumptions regarding the control devices (e.g., pollutant controlled, device type, control efficiency).	16
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Response to Talking Points Regarding the Environmental Report

1. ***RAI 8 – (Air Emissions during Construction / Estimated Emission Off Road Equipment) Provide additional information regarding air emissions during construction of the IIFP facility.***

   a. *Provide the site-specific assumptions that went into the estimates of the air emissions resulting from operation of off-road construction equipment in Table 4-11 of the ER (IIFP, 2009a). Include vehicle types and assumptions regarding quantity totals that make up the thirteen support vehicles and the thirteen construction vehicles.*

Discussion:
The draft response to request for additional information (RAI) 8a identified the assumed quantity for each type of construction equipment/vehicle listed in Tables RAI 8-a-1 and RAI 8-a-13. The final response to RAI 8a omitted this information.

Clarification:
Were the equipment quantities assumed in the draft response used to calculate the monthly horsepower-hours listed in Tables RAI 8-a-1 and RAI 8-a-13 of the final response? If not, please provide the correct quantity for each type of construction equipment / vehicle listed.

Goal:
Equipment quantities are needed to verify the applicant's assumptions and to more accurately estimate potential emissions.

RESPONSE:
The final response to RAI 8a also identified thirteen construction vehicles and twelve support vehicles for Phase 1 construction. However, four welders have been added to that listing making 29 construction/support vehicles. The final response to RAI 8a also identified 14 pieces of equipment for Phase 2 construction.

Fifteen pieces of equipment are needed during pre-construction. The makeup and quantities of that equipment are shown in Table D-2 "Pre-construction Equipment Quantities by Month" in the attached Appendix D" "Non-Radiological Emissions and Impacts for Phase 1 and Phase 2 Construction Activities." The makeup and quantities of the construction/support vehicles used in Phase 1 construction during the first 12 months of construction are shown in Table D-3. It is anticipated that the greatest air emissions would be generated during the first few months of the first year when the large pieces of earthmoving equipment would be used. For Phase 2 construction, the makeup and quantities of equipment anticipated to be involved in construction activities during the 12 months of construction are shown in Table D-4.

(Note: Tables designated as "D-" in this Talking Points response will be located in new Appendix D of the ER).

The Environmental Report will be revised to reflect the construction equipment for pre-construction and the additional construction equipment for Phase 1 construction.

Environmental Report Impact: The Environmental Report will be revised to reflect the construction equipment for pre-construction and the additional construction equipment for Phase 1 construction. See the Environmental Report Impact for item #4

Environmental Report Impact: It is now envisioned that pre-construction can start the first quarter of 2012 and the NRC license will be granted late in the second quarter of 2012. Phase 1 construction would be initiated soon after the license is received. The schedule submitted in the final RAI response will be amended as below and will replace Table 1-2 of the Environmental Report, Revision A:

ER Table 1- 2 Project Major Milestones

Milestones	Projected Date
Submit Licensing Application to NRC for Phase 1 Facility	End of 2009 (Complete)
Environmental Report to NRC for Phases 1 and 2	End of 2009 (Complete)
Start Engineering for Phase 1	Mid 2011
Start Pre-construction	~~3rd~~-1st Quarter ~~2011~~2012
Obtain NRC License for Phase 1	~~4th~~-2nd Quarter ~~2011~~2012
Initiate Phase 1 Facility Construction	End of 2nd Quarter 2012
Complete Construction of Phase 1 Facility	2nd Quarter 2013
Startup Phase 1 Facility	3rd Quarter 2013
Submit Phase 2 amended License Application	2nd Quarter 2013
Complete Phase 2 Engineering and Initiate Phase 2 Facility Construction	2nd Quarter 2015
Complete Construction of Phase 2 Facility	2nd Quarter 2016
Startup Phase 2 Facility	2nd Quarter 2016

Environmental Report Impact: The Environmental Report Revision A, Section 4.6, will also be revised to include the pre-construction equipment and the addition equipment for Phase 1 construction. See the 4th paragraph of Section 4.6.1.1 shown in the Environmental Report Impact for item #4.

2. RAI 8a - (Same as above)

Discussion:
We are unable to verify the horsepower-hours (hp-hrs) per month provided in Tables RAI 8-a-1 and RAI 8-a-13 of the final RAI response. The revised Environmental Report (ER) indicates that emission rates were estimated for a 10-hour workday assuming peak construction activity levels were maintained throughout the year. This equates to 208 hours per month. However, the values in Tables RAI 8-a-1 and RAI 8-a-13 are less than the values that would be calculated using 208 hours per month.

Clarification:
Please provide the monthly hours of operation for each type of construction equipment/vehicle listed in Tables RAI 8-a-1 and RAI 8-a-13.

Goal:
The monthly hours of operation for construction equipment are needed to verify the applicant's assumptions and to more accurately estimate potential emissions.

RESPONSE:
The maximum number of monthly hours of operation for any equipment item in Phase 1 was estimated at 160 hours. Table D-5 shows the hours of operation for each equipment item used to provide emission data for Tables RAI 8-a-1 through RAI 8-a-12 for Pre-construction and Phase 1 construction. Table D-7 provides the Pre-construction/Phase 1 equipment estimated horsepower-hours per month. Pre-construction includes months 01 through 03, while Phase 1 construction includes months 04 through 15. Additionally, the maximum number of monthly hours of operation for any equipment item for Phase 2 was estimated at 160 hours. Table D-6 show the hours of operation for each equipment item used to provide emission data for Tables RAI 8-a-13 through RAI 8-a-22 for Phase 2 construction. Table D-8 provides the Phase 2 equipment estimated horsepower-hours per month.

Environmental Report Impact: A draft of Chapter 4 of the Environmental Report, Revision B was submitted to the NRC with the transmittal of the ER RAIs. Table 4-13 of the draft Environmental Report, Revision B, will be updated to add an assumption that the maximum hour of operation for each piece of equipment is 160 hours/month as below, see Table 4-13 in the Environmental Report Impact for item #4

Environmental Report Impact: Assumption item (1) will be added to Table 4-23 (also Table D-53) of the draft Chapter 4 of the Environmental Report for the maximum hours of operation of each unit of equipment as shown in Environmental Report Impact for item #4 (Section 4.6.3.1).

3. RAI 8a - (Same as above)

A. Discussion:

The revised ER Section 4.6 states that construction in Phase 1 will last approximately 18 to 24 months.

Clarification:

Does this timeframe include preconstruction?

RESPONSE:

This timeframe includes pre-construction. In these responses to Talking Points, Months 01 through 03 are for Pre-construction and months 04 through 15 are for Phase 1 construction. See Tables D-13 through D-15 for pre-construction emissions data and Tables D-16 through D-27 for Phase 1 construction emissions data. Additional months may be necessary for Phase 1 construction, but these months are not included in these responses since the calculation of peak annual emissions will occur during the initial months when large earthmoving equipment is used. Tables D-28 through D-39 provide the emissions data for Phase 2 construction.

Environmental Report Impact: None.

B. Discussion:

Tables RAI 8-a-1 and RAI 8-a-2 of the final RAI responses cover a 12-month period during Phase 1 construction. The timing of this 12-month period within the overall 18 to 24 month Phase 1 construction timeframe is unclear.

Clarification:

Please clarify the timing of this 12-month period within the overall 18 to 24 month Phase 1 construction timeframe. Also, please provide assumptions for Phase I construction emissions that would occur outside the 12-month period described in Tables RAI 8-a-1 and RAI 8-a-2 (e.g., emissions would decrease after the 12 months provided because…).

Goal:

Assumptions and calculations are needed to verify the applicant's assumptions and to more accurately estimate potential emissions.

RESPONSE:

The first 12 months of construction was assumed to the worst-case scenario (maximum annual emissions and impacts) since the large earthmoving equipment would be used during the initial months. Using the first 12 months (months 1 through 3 for pre-construction and months 4 through 15 of Phase 1) would result in the peak annual emission and impacts of the various criteria pollutants. Table D-40 presents the pollutant and CO_2 emissions for pre-construction and Phase 1 construction. See Table D-41 for emissions data for pre-construction, Phase 1 construction, and worst-case construction year.

Environmental Report Impact: None.

4. RAI 8a - (Same as above)

Discussion:
We are unable to verify the emission factors provided in Table RAI 8-a-2 of the final RAI response. The revised ER Chapter 4, states that emission factors from FERC Docket PF06-13-000 and EPA-420-R-10-018 were used to estimate emissions of criteria pollutants and non-methane hydrocarbons from construction support vehicles and equipment. And AP-42 emission factors for diesel-powered construction equipment were used to estimate the total suspended particulates for these vehicles. But Table RAI 8-a-2 of the final RAI response indicates that the values listed are AP-42 non-road emission factors for diesel-fired equipment with transient adjustment and deterioration factors applied. AP-42 emission factors for non-road sources are from work performed in the 1970s and EPA stopped using those emission factors in 1991. EPA currently recommends using their NONROAD model to estimate emissions from construction equipment and other non-road sources. EPA-420-R-10-018 (ER reference EPA 2010) is a technical report that describes and documents the development of exhaust emission factors used for compression ignition (CI) engines in the EPA's NONROAD2008a emission inventory model.

Clarification:
Was the NONROAD model used to develop emission factors for the construction equipment or were emission factors from AP-42 used?

If the NONROAD model was used, please provide the copies of the model runs, including input assumptions and output tables.

If AP-42 or another document was used, please provide a copy of the reference document(s) and justification for its use. (AP-42 Volume II, which contains the emission factors for nonroad mobile sources is no longer available on the EPA website.) Also, please provide the original (unadjusted) emission factors, the transient adjustment factors, the deterioration factors, and the equations used to adjust the emission factors.

Goal:
It is not clear what assumptions, calculations, or sources were used for the emission factors. The model runs, assumptions, and output tables are to more accurately estimate potential emissions.

RESPONSE:
As described in the User Manual, the EPA NONROAD model was specifically developed to assist states and local regulatory agencies across the U.S.A. in the creation of accurate emissions inventories to demonstrate compliance with the *Clean Air Act*. As such, the NONROAD computer model may apply some assumptions that are not necessarily representative of the IIFP project. Therefore, to achieve the most accurate results, construction emissions were instead calculated based on the data and analytic methods published in [1] EPA-420-P-04-009, "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression Ignition" (EPA 2004b) and [2] "EPA-420-P-04-005, Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" (EPA 2004c). These documents are readily available for public download in PDF format at the websites listed below:

[1] http://www.epa.gov/oms/models/nonrdmdl/nonrdmdl2004/420p04009.pdf

[2] http://www.epa.gov/oms/models/nonrdmdl/nonrdmdl2004/420p04005.pdf

To develop the Phase 1 construction emissions calculations, a list of anticipated construction equipment (and rated horsepower) was developed. An EPA Standard Classification Code was then identified for each equipment item, and an appropriate load factor was selected from EPA-420-P-04-005. A data table was then prepared to identify the estimated hours of operation for each equipment item, by month, for the initial twelve months of construction. The monthly horsepower-hours for each equipment item were then calculated as a product of the maximum equipment horsepower, load factor, and estimated hours of operation.

Equipment-specific pollutant emission rates (in units of grams per horsepower-hour), and the Brake Specific Fuel Consumption (BSFC), were then determined based on the analytic methods described in EPA-420-P-04-009 (Tier 1 was assumed for all construction equipment). In general, the EPA-420-P-04-009 methods (1) postulate a zero-hour steady state emission factor (EFss) for construction equipment and (2) present equations to adjust each EFss based on a Transient Adjustment Factor (TAF) and a Deterioration Factor (DF). Monthly pollutant emissions for each equipment item were then calculated as a product of the monthly horsepower-hours and the equipment-specific pollutant emission rates (Note: The list of anticipated construction equipment includes light, medium, and delivery trucks. Although these types of vehicles are frequently used at construction sites, these vehicles are not considered "off-road" and therefore do not have an off-road standard classification code. For simplicity, the horsepower and load factor of a backhoe, standard classification code 2270002066, was conservatively assumed for these vehicles). See Table D-9 for the EFss for the construction equipment (Pre-construction, Phase 1 and Phase 2 construction). The TAFs are shown in Table D-10. Table D-11 presents the BSFCs for all the construction equipment and the Spm rates for all equipment types. D-12 (RAI Table 8-a-2) presents the equipment specific emission rates. For each month of the year, the quantity and average monthly hours of operation for each equipment item was estimated. Based on the equipment horsepower, load factor, equipment quantities, hours of operation, and pollutant emission factors, the total monthly emissions for each pollutant and each equipment item are calculated by Equation 01.

Tailpipe Emissions, g = (Emissions Factor, g/hp-hr) × (horsepower, hp) × (load factor) × (equipment quantity, each) × (hours operated, hrs) [EQN_01]

Annual construction emissions were then determined as a sum of the monthly emissions for each construction interval of interest. (See Tables D-13 through D-27 for 3 months of pre-construction and 12 months of Phase 1 construction.) Phase 2 construction emissions were developed in a comparable manner, see Tables D-28 through D-39. A list of planned construction equipment is provided in the tables, along with the applied values for Load Factor, EFss, TAF, DF, and BSFC.

D-7 provides the Pre-construction/Phase 1 equipment estimated horsepower-hours by month. Table RAI 8-a-3, “Summarize Tailpipe Emissions,” was a compilation of Table D-13 through Table D-24. Table RAI 8-a-3 (also Table D-40) has been modified to denote the Months 01 through 03 as Pre-construction and Months 04 through 15 as Phase 1 construction.
Tables D-25 through D-27 have been added to include the last 3 months of the year required to determine peak annual emissions. Table D-40 (RAI 8-a-3) has also been modified to include CO_2 emissions. Table D-41 has been added to provide the pollutant and CO_2 emissions for pre-construction, Phase 1 construction, and the worst-case construction year. Table D-43 (RAI 8-a-4) has been modified to show the average emission rates for the worst-case year (3 months Pre-construction plus 9 months of Phase 1). Table D-45 (also Table RAI 8-a-5) was added to present the fugitive dust emissions for the fifteen months of pre-construction/Phase 1 construction. Table D-47 (also Table RAI 8-a-6) presents the fugitive dust emission rates for pre-construction/Phase 1 construction. Table D-49 (also Table RAI 8-a-7) is used to calculate the fugitive HAP emissions

for pre-construction/Phase 1 construction. Table D-51 (RAI 8-a-9) was modified to present the criteria pollutant, VOC, and HAP emissions for pre-construction/Phase 1 construction. Table D-69 (RAI 8-a-11) was modified to present the maximum impacts, the property boundary impacts, and the one-mile impacts from the pre-construction/Phase 1 construction. Table D-71 (RAI 8-a-12) was also modified to compare the pre-construction/Phase 1 emissions with the NAAQS Standards.

Table D-8 provides the Phase 2 equipment estimated horsepower-hours by month. Table RAI 8-a-14, "Pollutant and CO_2 Tailpipe Emissions for Phase 2 Construction," is a compilation of Table D-28 through Table D-39. Table D-42 (RAI 8-a-14) was modified to add CO_2 emissions. Table D-44 (RAI 8-a-15) shows the Phase 2 tailpipe emission rates. Table D-46 (also Table RAI 8-a-16) presents the fugitive dust emissions for the twelve months of Phase 2 construction. Table D-48 presents the fugitive dust emission rates for Phase 2 construction. Table D-50 (also Table RAI 8-a-18) is used to calculate the fugitive HAP emissions for Phase 2 construction. Table D-52 (also RAI 8-a-19) presents the criteria pollutant, VOC, and HAP emissions for Phase 2 construction. Table D-70 (RAI 8-a-21) presents the maximum impacts, the property boundary impacts, and the one-mile impacts from Phase 2 construction. Table D-72 (RAI 8-a-22) compares the Phase 2 emission results with the NAAQS Standards.

Environmental Report Impact: The draft Chapter 4, Revision B, of the Environmental Report Section 4.6.1.1, the 4th and sequence paragraphs, will be changed to incorporate the above clarification.

4.6.1.1 Air Quality Impacts from Pre-construction/Phase 1 Construction

An estimate of the air emissions ~~resulting from~~attributable to operation of the off-road construction equipment at the IIFP facility site was made using the site-specific assumptions. The estimated air emissions for the off-road construction equipment used at the IIFP facility site are presented in Table 4-13.

Emission rates from vehicle exhaust and fugitive dust, as listed in Table 4-13, "~~NAAQS~~ Criteria Pollutant, VOC, and HAP Emission Rates during Pre-construction/Phase 1 Construction," were estimated for a 10-hour workday ~~assuming peak construction activity levels were maintained throughout the year~~based on assumed equipment activity levels for each month. Fugitive dust will originate predominantly from vehicle traffic on unpaved surfaces, earth moving, excavating and bulldozing, and to a lesser extent from wind erosion. It was assumed that the total disturbed area of the site was 16.2 ha (40 ac) and that Pre-construction would span for 3 months, followed by 12 additional months of Phase 1 construction. Phase 2 construction is assumed to span for one year. ~~the construction in Phase 1 will last approximately 18 to 24 months and Phase 2 construction will last approximately one year.~~ Some of the equipment will be utilized the entire time, some will be sequential, and others may be only intermittent.

Of the combustion sources, vehicle exhaust will be the dominant source. Fugitive volatile emissions will also occur because diesel vehicles will be refueled on site. Estimated vehicles that will ~~be operating~~operate on the site during construction consist of two types: support vehicles and construction equipment. ~~The support vehicles included 12 miscellaneous diesel vehicles and equipment. Emission factors from the Federal Energy Regulatory Commission (FERC) Docket PF06-13-000 (FERC, 2006) and from EPA-420-R-10-018 (EPA, 2010) for highway mobile sources were used to estimate emissions of criteria pollutants and non-methane hydrocarbons for these vehicles.~~ To achieve the most accurate results, construction emissions attributable to diesel

Table 4- 13 Criteria Pollutant, VOC, and HAP Emissions during Pre-construction/Phase 1 Construction

Combustion Product	Pre-construction Month 01 through Month 03	Phase 1 Month 04 through Month 12	Worse Case Construction Year Month 01 through Month 12	Fugitive	Annual
	Emissions, lb				
NO_2	7,513	27,408	28,504	0	28,504
CO	2,499	7,985	8,779	0	8,779
CO_2	694,466	2,615,039	2,693,024	0	2,693,024
PM_{10}	389	1,593	1,626	25,920	27,546
$PM_{2.5}$	374	1,551	1,569	12,960	14,529
VOC	413	1,760	1,770	21.8	1,792
SO_2	213	796	822	0	822
Combustion HAPs	275	1,034	1,065	0	1,065
Diesel Burned	217,701	819,761	844,208	0	844,208

NO_2 – Nitrogen Dioxide, CO – Carbon Monoxide; CO_2 – Carbon Dioxide; VOC – Volatile Organic Compound, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns, HAP – Hazardous Air Pollutants
Assumptions:

1. Annual construction activities are performed 50 hours per week for 50 weeks. Maximum hours of operation of any piece of equipment ~~is~~are 160 hours/month.
2. Peak site preparation activities persist for 4 months in the first year.
3. Post site-preparation activities persist for ~~7.5 months in the first year.~~next 11 months
4. Fugitive dust emissions are calculated separately for peak site preparation and post site-preparation.
5. Fugitive TSP generation is 1.2 ton/acre/month for peak site preparation.
6. Fugitive TSP generation is 0.3 ton/acre/month ~~for the 3.25 months~~ after site preparation is completed.
7. Fugitive PM_{10} emissions are 15 percent of TSP.
8. Fugitive $PM_{2.5}$ emissions are 7.5 percent of TS~~.~~P
9. The site is 40 acres.
10. Sixty percent of the 40 acre site is disturbed at any given time.
11. The disturbed area at any time has the same aspect ratio as the IIFP site (aspect ratio = 1.3).
12. Sixty percent of construction equipment is operational at any given time.
13. Application of water on unpaved surfaces reduces fugitive dust by 50 percent.
14. All construction equipment is fueled with diesel.
15. Construction equipment ~~emission factors based on EPA AP-42~~load factors are based on EPA-420-P-04-005.
16. Construction equipment emission factors and deterioration factors are based on EPA420-P-04-009,
17. Regional impacts determined via SCREEN3 based on application of frequency-weighted site-specific meteorology.

fuel combustion were calculated based on the data and analytic methods published in [1] EPA-420-P-04-009, "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression Ignition" (EPA, 2004b) and [2] "EPA-420-P-04-005, Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" (EPA, 2004c).

Fifteen pieces of equipment are needed for the pre-construction of the IIFP Facility. For Phase 1 construction, ~~Thirteen~~29 pieces of miscellaneous construction equipment were used to estimate the emissions. For Phase 2 construction, 14 pieces of equipment were used to estimate emissions. ~~Emission factors provided in AP-42, the U.S. Environmental Protection Agency's Compilation of Air Pollutant Emission Factors (EPA, 2009a) for diesel-powered construction equipment were used to estimate the total suspended particulates for these vehicles~~. ~~Pre-construction activities will~~

~~reduce the work density and lower the concentration of air emissions at any given time. The gross amount of emissions will be unaffected.~~

Diesel fuel will be stored on site during construction and will be hand pumped into construction vehicles and other plant vehicles involved in construction. The fuel tanks will be stored on a containment-type pad, and trucks will be driven onto the containment-type pad to start the dispensing process. The pad will be sloped and curbed. The above ground fuel storage and dispensing apparatus is self-contained and includes a support frame on which a fuel storage tank is mounted and surrounded by a fuel containment vessel.

Air quality impacts from site preparation for the IIFP Facility were evaluated using emission factors and air dispersion modeling. Emission rates of Clean Air Act Criteria Pollutants and non-methane hydrocarbons (a precursor of ozone, a Criteria Pollutant) are estimated for exhaust emissions from construction vehicles and for fugitive dust using emission factor's provided in AP-42, the U.S. Environmental Protection Agency's Compilation of Air Pollutant Emission Factors (EPA, 2009a).

Fugitive HAP emissions are generated by evaporative losses from diesel storage tanks and diesel fuel transfer operations. The total annual HAP fugitive emissions are calculated as a product of the diesel consumption factors from AP-42 (EPA, 2009a), and an HAP fugitive emission rate of 0.000028 lb fugitive HAPs per lb diesel (SBAP, 2010). Annual pollutant emission totals (tailpipe emissions + fugitive dust emissions + fugitive HAP emissions) are summed. Annual pollutant emission totals form the basis for calculation of the average emission rate for input to SCREEN3. Similarly, monthly maximum criteria pollutant emissions are summed, and the maximum sum is selected to calculate time-averaged area emission rates for input to SCREEN3. The SCREEN3 computer program is applied to estimate maximum regional criteria pollutant concentrations attributable to area source construction emissions (i.e., air quality impacts). Air quality impacts are not evaluated for HAPs or VOCs because there are no regulatory metrics for comparison (HAP and VOC emissions are regulated by source controls and permit requirements). SCREEN3 calculates the one-hour average concentration for a range of downwind distances. Key inputs include the pollutant emission rate (g/s/m3), release height (m), receptor height (m), stability class, and wind speed (m/s). All construction emissions are conservatively assumed to originate at ground level.

Emissions were estimated ~~in ISCST3~~ as a uniform area source with emissions occurring 10 hours per day, 5 days per week, and 50 weeks per year. The maximum predicted air concentrations during /pre-construction/Phase 1 construction at the site fence boundary for the various averaging periods predicted using five years (1987 to 1991) of hourly meteorological data from the Midland-Odessa, Texas, National Weather Service (NWS) station are presented in Table 4-14~~2~~. These concentrations are compared to the appropriate National Ambient Air Quality Standard (NAAQS).

The results of air modeling show that annual average and short-term ambient air concentrations from fugitive dust and on-site motor vehicle emissions produced by construction activities for the IIFP Facility will be orders of magnitude below the level of the applicable ambient air quality standards. Peak year VOC and HAP emissions attributable to construction are ~~1.8~~ 0.9 tons and ~~1.0~~ 0.5 ton, respectively. These emissions are negligible compared to annual VOC and HAP emissions in Lea County. These incremental air quality impacts from the air emissions from preparation of the IIFP facility site and construction of the facility will not measurably change the existing ambient air quality in the vicinity of the IIFP Facility; therefore, the air quality impacts

Table 4- 14 Predicted Property-Boundary Air Concentrations from Pre-construction/Phase 1 Construction and Applicable National Ambient Air Quality Standards

Pollutant	Average	NAAQS µ/m^3	Maximum Impact µg/m^3	Property Boundary µg/m^3	One Mile Impact µg/m^3
CO	1-hr	10,000	5.652	1.416	0.832
CO	8-hr	40,000	3.956	0.991	0.582
NO_2	1-hr	188	18.449	4.623	2.715
NO_2	Annual	100	0.280	0.070	0.041
$PM_{2.5}$	24-hr	35	2.032	0.509	0.299
$PM_{2.5}$	Annual	15	0.143	0.036	0.021
PM_{10}	24-hr	150	3.898	0.977	0.574
SO_2	1-hr	200	0.538	0.135	0.079
SO_2	3-hr	1300	0.484	0.121	0.071
SO_2	24-hr	365	0.090	0.022	0.013
SO_2	Annual	80	0.008	0.002	0.001

CO – Carbon Monoxide; NO_2 – Nitrogen Dioxide, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns.

Assumptions:

1. Pollutant impacts are determined based on the peak emissions generated by site preparation.
2. The peak one-hour concentrations are as determined by SCREEN3.
3. To determine the peak 3-hour concentration, the peak one-hour concentration is scaled by 0.9 based on EPA guidance on EPA guidance.
4. To determine the peak 8-hour concentration, the peak one-hour concentration is scaled by 0.7 based on EPA guidance.
5. To determine the peak 24-hour concentration, the peak one-hour concentration is scaled by 0.4 based on EPA guidance and by 10/24 to account for limited work day.
6. To determine the peak annual concentration, the peak one-hour concentration is scaled by 0.07 based on EPA guidance, by 10/24 to account for limited work day, then adjusted to account for 4 months of peak emissions (site preparation), 7.5 months of reduced emissions (post site preparation), and two weeks of zero emissions.
7. Scale Factors to estimate impact concentrations other than one hour based on Average 1-hr as 1.00, 3-hr as 0.9, 8-hr as 0.7, 24-hr as 0.4, and annual as 0.08.
8. Based on Average 1-hr as 1.00, 3-hr as 0.9, 8-hr as 0.7, 24-hr as 0.4, and annual as 0.08.

resulting from the preconstruction and general construction stages of the IIFP Facility are anticipated to be SMALL.

Pollutant emissions and diesel fuel consumption attributable to construction activities were estimated based on the anticipated types and sizes of construction equipment, monthly hours of operation, EPA AP-42 emission factors, and fugitive dust emission rates of 1.2 and 0.3 tons of total suspended particulate per acre of construction area per month for initial site preparation and post-site preparation activities, respectively. Annual totals for Pre-construction/Phase 1 include combustion of 778,000 pounds(109,848 gallons) of diesel fuel which would generate VOC and HAP emissions of ~~1,606~~1,770 pounds and ~~981~~ 1,065 pounds, respectively. VOC fugitive losses attributable to diesel fuel storage and transfer operations are estimated at 22 pounds, for an annual VOC emission total of ~~1,628~~1,792 pounds. The annual VOC/HAP emissions for Lea County NM are on the order of 5.4 million pounds. VOC/HAP emissions attributable to IIFP Phase 1 construction activities represent a very small fraction of the present regional emissions. Therefore, the air quality impacts attributable to construction activities and operation of an on-site diesel fuel station would be SMALL.

Environmental Report Impact: Table 4-23 will be modified to add CO_2 and diesel fuel burned as follows:

Table 4-23 ~~NAAQS~~ Criteria Pollutant, VOC, and HAP Annual Air Emissions during Phase 2 Construction

Pollutant	Tailpipe (lb)	Fugitive (lb)	Annual (lb)
NO_2	7,497	0	7,497
CO	2,115	0	2,115
CO_2	725,722	0	725,722
PM_{10}	439	324	763
$PM_{2.5}$	425	162	587
VOC	477	6.4	484
SO_2	221	0	221
HAPs	285	6	291
Diesel Burned	227,499	0	227,499

NO_2 – Nitrogen Dioxide, CO – Carbon Monoxide; CO_2 – Carbon Dioxide; VOC – Volatile Organic ~~Chemicals~~Compound, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns, HAP – Hazardous Air Pollutant~~s~~

Assumptions:

1. Annual construction activities are performed 50 hours per week for 50 weeks. Maximum hours of operation of any piece of equipment are 160 hours/month.
2. Fugitive TSP generation is 0.3 ton/acre/month for all Phase 2 construction activities
3. S~~s~~ize of the construction site - ~~40~~ 1 acre
4. Sixty percent of the 1 acre site is disturbed at any given time~~fraction of the site with active construction at any given time - 0.6~~
5. Effective area of the construction site - ~~24~~ 0.6 acre
6. Effective construction area dimensions - ~~274~~ 49.3 m x ~~354~~49.3 m
7. F~~f~~raction of TSP that is PM_{10} - 0.15 ton PM10/ton TSP
8. F~~f~~raction of TSP that is $PM_{2.5}$ - 0.075 ton PM10/ton TSP
9. Application of water on unpaved surfaces reduces fugitive dust by 50 percent.
10. All construction equipment is fueled with diesel.
11. Construction equipment load factors are based on EPA-420-P-04-005.
12. Construction equipment emission factors and deterioration factors are based on EPA420-P-04-009.
13. Regional impacts determined via SCREEN3 based on application of frequency-weighted site-specific meteorology.~~TSP suppression due to application of water on unpaved surfaces - 50 %~~

5. ***RAI 8 – (Air Emissions during Construction / On-site Fueling)***
Provide additional information regarding air emissions during construction of the IIFP facility.
b. Describe how the on-site fueling of gasoline and diesel vehicles will take place.
c. Provide air impact analysis for the fuel storage and dispensing activities.

Discussion:
In the revised ER, all gas powered vehicles and construction equipment have been removed.

Clarification:
Is this correct? Will the gas pumping station also be removed?

Goal:
Needed to properly estimate emissions.

RESPONSE:
Diesel fuel will be pumped from an onsite diesel fuel pumping station. All gasoline powered vehicles will be fueled off site. See response from RAI 8 b below:

The 6th paragraph of Section 4.6.1, "Air Quality Impacts from Construction," has been revised to address on-site fueling of diesel vehicles. See the following section below as it appears in the rewrite to Chapter 4:

Diesel fuel will be stored on site during construction and will be hand pumped into construction vehicles and other plant vehicles involved in construction. Gasoline-powered vehicles (small trucks) will be fueled offsite. The fuel tanks will be stored on a containment-type pad, and trucks will be driven onto the containment-type pad to start the dispensing process. The pad will be sloped and curbed. The above ground fuel storage and dispensing apparatus is self-contained and includes a support frame on which a fuel storage tank is mounted and surrounded by a fuel containment vessel.

Environmental Report Impact: None.

6. ***RAI 9 – (Air Emissions during Operations / Gas-Fired Boilers)***
Provide additional information regarding air emissions during the operation of the IIFP facility.
a. Describe representative capacity (make and models if available) of the gas-fired boilers to be used at the facility and the source of the data used to estimate the boiler emissions.

Discussion:
The emission estimate for each pollutant listed in Table 4-15 of the March 31, 2011 (final) response to RAI 9a is less than the corresponding estimate provided in Table RAI 9-a of the February 16, 2011 (draft) response to RAI 9a. While we were able to reproduce the estimates provided in Table RAI 9-a of the draft response to RAI 9a, we could not reproduce the revised estimates in the final response. No reason was provided to explain the changes to the emission estimates in the final response.

With the exception of NO2, the same emission factors were used in both the draft response and the final response. (The emission factor for NO2 was changed from 1E-4 to 1E-5 in the final response, which appears to be an error.) Both the draft response and the final response indicate that one boiler would operate for 8,760 hr/yr and that emissions are uncontrolled. However, the emission estimates in the final response for PM, CO, and NO2 (if an emission factor of 1E-4 is used for NO2) are about 20% of the corresponding estimated emissions in the draft response; and the emission estimate for SOx is about 25% estimated SOx emissions in the draft response. The draft response provided assumptions for fuel heating value (Btu/scf), boiler heat rate (MMBtu/hr) which are needed to determine the hourly fuel consumption rate (scf/hr). The final response did not include this information.

Clarification:
Please provide a complete list of the assumptions used to calculate the Boiler emissions provided in Table 4-15 of the final response to RAI 9a. This list should include fuel heating value (Btu/scf), boiler heat rate (MMBtu/hr), annual runtime (hr/year), and whether the boiler is assumed to operate at full capacity. If the boiler is assumed to operate at less than full capacity please describe how that affects the heat rate. If the use of control devices is assumed, please describe how the controlled emissions were calculated and include assumptions regarding the control devices (e.g., pollutant controlled, device type, control efficiency)

Goal:
The assumptions and calculations will provide data to more accurately estimate potential emissions.

RESPONSE:

There was a typographical error in the NO_2 emissions rate from the boilers.

Further assumptions to calculate the boiler emissions for Table 4-15 are as follows:

- Fuel heating value – 1,000 BTU/scf natural gas,
- Boiler heat rate – 11.8 MM BTU/hr (Lower firing rates will only slightly change emissions.),
- Annual runtime – 3,000 lb/hr for Phase 1 operations, 10,000 lb/hr for Phase 2 operations. Operating time is 85% of the 8760 hours in the year for Phase 1 and for Phase 2 plant operations.
- Operations boiler efficiency is 85% at full capacity (10,000 lb/hr) and expected to be 1-2 % lower when the boiler is run at 3,000 lb/hr in the Phase 1 facility operation.

The CO and NO_2 emissions rates (8.4E-5 lb CO / ft^3 NG and 1.0E-4 lb CO / lb NG) are based on EPA AP-42, Table 1.4-1, for Uncontrolled Small NG Boilers

Particulate emissions from NG combustion are all assumed to be $PM_{2.5}$, therefore, the PM_{10} and $PM_{2.5}$ emission rates (7.6E-06 lb PM / ft^3 NG) are identical, and are based on EPA AP-42, Table 1.4-2, for Total PM. No PM emission controls are assumed.

The SO_2 emission rate (6E-07 lb SO_2 / ft^3 NG) is based on EPA AP-42, Table 1.4-2. No SO_2 emission controls are assumed.

Environmental Report Impact: Table 4-15 and Table 4-25 of the Environmental Report, Revision B, will be revised as follows:

Table 4- 15 Applicable ~~NAAQS~~ Air Emissions during Phase 1 Operation of On-Site Boilers (Natural Gas)

Pollutant	Emission Factor (lb/ft^3)	Emissions (lb/year)	Emissions (ton/year)	Unit Emissions (g/s)
Carbon Monoxide (CO)	0.000084	2,065	1.03	0.0297
Carbon Dioxide (CO_2)	0.1200000	2,949,667	1,475	
Nitrogen Dioxide (NO_{2x})	0.000010	2,460	~~0.~~1.2	0.~~0~~035
Particulate Matter Less Than 2.5 Microns ($PM_{2.5}$)	0.000008	187	0.09	0.0027
Particulate Matter Less Than 10 Microns (PM_{10})	0.000008	187	0.09	0.0027
Sulfur Oxides (SO_x)	0.000001	15	0.01	0.0002
Volatile Organic ~~Carbon~~ Compound (VOC)	0.0000055	135	0.07	

~~.~~

a. Source AP 42 Table 1.4-1 and Table 1.4-2 Emission Factors For Criteria Pollutants and Greenhouse Gases From Natural Gas Combustion

b. Assumptions: Emission Factors from EPA –AP- 42, 1.4 natural gas emissions-uncontrolled. One Boiler -10,000lb/hr @ 85% efficiency.

c. Fuel heating value – 1,000 BTU/scf natural gas,

d. Boiler heat rate – 11.8 MM BTU/hr,

e. Annual runtime – 3,000 lb/hr for Phase 1 operations for 85% runtime of the 8760 hours in the year.

Table 4- 25 ~~Maximum NAAQS~~Applicable Air Emissions for Phase 2 Operation of On-Site Boilers (Natural Gas)

Pollutant	Emission Factor (lb/ft^3)	Annual Emissions (lb/yr)	Annual Emissions (ton/yr)	Unit Emissions (g/s)
Carbon Monoxide (CO)	0.000084	8,683	4.34	0.1250
Carbon Dioxide (CO_2)	0.1200000	12,404,160	6,202	
Nitrogen Dioxide (NO_2)	0.000010	1,034	0.52	0.0149
Particulate Matter Less Than 2.5 Microns ($PM_{2.5}$)	0.000008	786	0.39	0.0113
Particulate Matter Less Than 10 Microns (PM_{10})	0.000008	786	0.39	0.0113
Sulfur Oxides (SO_x)	0.000001	62	0.03	0.0009
Volatile Organic Compound	0.0000055	569	0.28	

(VOC)				

Assumptions:

1. Source AP 42 Table 1.4-1 and Table 1.4-2 Emission Factors For Criteria Pollutants and Greenhouse Gases From Natural Gas Combustion
2. Assumptions: Emission Factors from EPA –AP- 42, 1.4 natural gas emissions-uncontrolled. One Boiler -10,000lb/hr @ 85% efficiency.
3. Fuel heating value – 1,000 BTU/scf natural gas,
4. Boiler heat rate – 11.8 MM BTU/hr,
5. Annual runtime –10,000 lb/hr for Phase 2 operations for 85% of the 8760 hours in the year.

7. RAI 9a - (Same as above)

Discussion:
The annual boiler emissions for Phase 2 are approximately three times greater than the boiler emissions for Phase 1 (Tables 4-25 and 4-18 in the ER, respectively). The assumptions for both Phase 1 and Phase 2 indicate that one boiler with a steam generation rate of 10,000 lb/hr would operate for 8,760 hr/yr and that emissions are uncontrolled.

Clarification:
Please explain why the Phase 2 boiler emissions are three times greater than the Phase 1 boiler emissions and a complete list of the assumptions used to calculate the annual boiler emissions provided in Tables 4-18 and 4-25 of the ER. This list should include fuel heating value (Btu/scf), boiler heat rate (MMBtu/hr), annual runtime (hr/year), and whether the boiler is assumed to operate at full capacity. If the boiler is assumed to operate at less than full capacity please describe how that affects the heat rate. If the use of control devices is assumed, please describe how the controlled emissions were calculated and include assumptions regarding the control devices (e.g., pollutant controlled, device type, control efficiency).

Goal:
Assumptions and calculations are needed to properly assess emissions presented by the applicant.

RESPONSE:
The steam requirements for Phase 2 are not known with certainty, but the addition of two more autoclaves and a distillation (steam heated) are estimated to add 7,000 lbs. per hour. For conservatism, the maximum capacity of the boiler was assumed to be the Phase 2 requirements. The boiler natural gas (NG) consumption rate for Phase 2 is assumed to be 11,800 standard cubic feet per hour. Also, see footnotes to Tables 4-15 and 4-25 shown above in response to Talking Point #6.

Environmental Report Impact: None.

8. ***RAI 9 a – - (Same as above)***

Discussion:
Emission estimates for CO_2 and VOCs were omitted from Table 4-15 of the final response to RAI 9a. No reason was provided for omitting this information and we are unable to calculate this number.

Clarification:
Please provide the omitted emission estimates and include a complete list of the assumptions used to calculate those emissions.

Goal:
Assumptions and calculations are needed to properly assess emissions presented by the applicant.

RESPONSE: The values for CO_2 and VOCs have been calculated and will be included in Table 4-15 of the Environmental Report, Revision B.

Environmental Report Impact: Table 4-15 of the Environmental Report, Revision B will be revised as in Item 6 above.

9. ***RAI 2 – (Phase 1 and Phase 2 Activities & Impacts Separately)***
Revised section 4.1.3.2 indicates no rad waste during either construction phase. Table 3-59 (167 of 189) lists rad waste generated during both phases. Need to ensure that responses are consistent.

Discussion:
Response to RAIs (Table 3-59) shows several types of low-level radioactive waste (LLW) being generated during construction; however, we do not see a reason why construction would generate LLW, and the applicant stated in earlier discussion with NRC that no LLW would be generated during construction.

Clarification:
Please clarify the use of the term LLW as applied to construction.

Goal:
Need accurate information about waste types to assess impacts.

RESPONSE:
It is unclear which section indicates no rad waste generated during both construction phases (section 4.1.3.2 nonexistent). During Phase 1 construction, equipment will be shipped from the Sequoyah conversion facility below external contamination free release limits. For conservatism, LLW was included as potential waste during Phase 1 construction. Section 4.13.2 was revised in the Rev B draft provided to the NRC with the RAI submittal which reads as follows:

4.13.2 Site Preparation and Construction of the IIPF Facility

Construction of the IIFP Facility will generate solid waste materials that will need to be collected and transported off-site for recycling or disposal. It is expected that predominately refuse and construction debris typical of industrial construction projects will be generated during the construction stage.

4.13.2.1 Phase 1 Construction

It is anticipated that less than 3,629 kg (8,000 lb) of radioactive wastes will be generated annually during the pre-construction and Phase 1 construction stages. For the construction period for Phase 1, less than 7,258 kg (16,000 lb) of radioactive wastes will be generated. From Table 3-59, less than 817 kg (1,800 lb) of RCRA waste will be generated during the Phase 1 construction period and approximately 499 kg (1,100 lb) of other solid wastes will be generated. See Table 3-59, "Estimated Annual Quantities of Waste Generated at the IIFP Facility." The types of waste anticipated to be generated will include paper, plastic, cardboard, packaging materials, wood scraps, metal building material scraps, roofing and insulation material scraps, masonry and ceramic materials, and empty paint and coatings containers. Small quantities of organic solvent-based residuals remaining from application of specialty paints, architectural coatings, sealants, and adhesives, as well as wastes from certain other materials that possibly could be used for construction, may be required to be managed as hazardous waste. The specific compositions and quantities for these construction waste types will depend on the final facility design.

The general design/build contractor selected for the IIFP Facility project will have responsibility for the day-to-day supervision of on-site waste collection and storage and for arranging for removal of these wastes from the IIFP facility site. Good work practices for facility site waste management will be used to collect and sort the wastes for recycling or disposal (e.g., using

designated roll-off containers and collection areas for different types of wastes). Hazardous waste generated throughout the construction phase will be temporarily stored on-site and then shipped to an off-site facility appropriate for handling the waste composition, in accordance with established recycling and hazardous waste management programs. Therefore, the waste management impacts attributable to pre-construction and Phase 1 construction of the IIFP Facility will be SMALL.

4.13.2.2 Phase 2 Construction

It is also anticipated that less than 3,629 kg (8,000 lb) of radioactive wastes, 835 kg (1840 lb) of RCRA wastes, and 590 kg (1,300 lb) of other solid wastes will be generated during the construction of the add-on buildings for Phase 2. Phase 2 construction necessitates connections to existing Phase 1 Facilities and installation of additional autoclaves. It is also anticipated that annual quantities of radioactive wastes generated during the construction of the add-on buildings for Phase 2 is similar to the rate of generation during Phase 1 construction [less than 3,629 kg (8,000 lb) annually]. It is anticipated that the construction cycle for Phase 2 is about one half that of pre-construction and Phase 1 construction. Thus, it is also anticipated that the waste management impacts from Phase 2 construction will be SMALL.

Environmental Report Impact: None.

APPENDIX D: NON-RADIOLOGICAL EMISSIONS AND IMPACTS FOR PHASE 1 AND PHASE 2 CONSTRUCTION ACTIVITIES

The International Isotopes Fluorine Products (IIFP) project seeks to construct and operate a facility that will (1) convert depleted uranium hexafluoride (DUF_6) to uranium oxide and (2) produce marketable fluorine chemicals. IIFP must obtain a license from the Nuclear Regulatory Commission (NRC) prior to the start of construction. The license application to the NRC includes an Environmental Report (ER). This calculation is prepared in support of the ER as part of the license application to the NRC.

The IIFP Project will be implemented in two separate phases. Phase 1 will include initial site preparation activities, road and infrastructure construction, construction of support facilities, and construction of several process buildings. Phase 2, which will include the construction of additional process buildings, and will be performed after Phase 1 is completed and has already begun operations. Initial site preparation activities may be performed prior to the start of Phase 1 construction. These initial site preparation activities are designated as "Pre-construction" activities.

1. Purpose

The purpose of this report is to quantify the non-radiological emissions attributable to IIFP construction activities and to evaluate the impacts for comparison with regulatory standards.

2. Pollutants Generated By Construction

Site preparation and construction activities would generate criteria pollutants, hazardous air pollutants (HAPs), and volatile organic compounds (VOCs). The criteria pollutants are carbon monoxide (CO), nitrogen dioxide (NO_2), lead (Pb), ozone (O3), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and sulfur dioxide (SO_2) (40 CFR 40). HAPs are compounds that are believed to cause serious adverse health effects or adverse environmental effects. There are 188 pollutants designated as HAPs by the EPA. HAPs are generated by industrial processes and fossil fuel combustion. VOCs are organic compounds of carbon that participate in atmospheric photochemical reactions (carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate are excluded). VOCs are primarily generated by solvents, industrial processes, and fossil fuel combustion.

3. Regulations

The Environmental Protection Agency has established National Ambient Air Quality Standard (NAAQS) for criteria pollutants. The NAAQS do not limit release quantities, but instead establish maximum allowable pollutant concentrations in the ambient air. Ambient air pollutant concentrations are generally measured in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Relevant NAAQS are illustrated below in Table 4-1 (40 CFR 50). The NAAQS for lead and ozone are omitted because these pollutants will not be generated by site preparation or construction activities.

HAPs are regulated by the EPA under 40 CFR 61, *National Emission Standards for Hazardous Air Pollutants*. Unlike the criteria pollutants, there are no ambient air concentration limits for HAPs. Instead, HAPs are regulated through source controls. VOC emission levels are regulated by air permit programs.

4. Emission Sources

Pollutants attributable to construction would include (1) tailpipe emissions (also known as combustion emissions) from operation of diesel-fired equipment (2) fugitive dust emissions ($PM_{2.5}$ and PM_{10}) from unpaved surfaces generated by wind erosion, soil or powder transfers, and the travel of heavy

Table D- 1 Relevant NAAQS Criteria Pollutants

(Originally RAI Attachment Table 4-1)

Criteria Pollutant	Average	Maximum Concentration ($\mu g/m^3$)	Conditions
CO	1-hr	10,000	Not to be exceeded more than once per year
	8-hr	40,000	Not to be exceeded more than once per year
NO_2	1-hr	188	NA
	Annual	100	Annual arithmetic average.
$PM_{2.5}$	24-hr	35	To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 $\mu g/m^3$ (effective December 17, 2006).
	Annual	15	To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 $\mu g/m^3$
PM_{10}	24-hr	150	Not to be exceeded more than once per year on average over 3 years
SO_2	1-hr	200	NA
	3-hr	1,300	Not to be exceeded more than once per year
	24-hr	365	Not to be exceeded more than once per year
	Annual	80	To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.075 ppm

Source: 40 CFR 50

construction equipment and (3) fugitive HAP emissions due to evaporative losses from diesel fuel tanks and diesel fuel transfers. Separate calculations are applied to estimate these emissions.

5. Construction Area

Unlike an emissions stack, which is considered a point emission source, construction emissions will originate as an area source. The dimensions of the 40 acre site are roughly 358 meters by 457 meters. Area emissions for Phase 1 construction activities are based on 60 percent of the 40 acre area. Area emissions for Phase 2 are based on 60 percent of a 1 acre area.

6. Construction Equipment

6.1 Equipment Quantities By Month

Fifteen pieces of equipment are needed during pre-construction. The makeup and quantities of that equipment are shown in Table D-2 Thirteen construction vehicles and twelve support vehicles were identified for Phase 1 construction. However, four welders have been added to that listing making 29 construction/support vehicles. The makeup and quantities of the construction/support vehicles used in Phase 1 construction during the first 12 months of construction are shown in Table D-3. It is anticipated that the greatest air emissions would be generated during the first few months of the first year when the large pieces of earthmoving equipment would be used. Fourteen pieces of equipment have been estimated for Phase 2

Table D- 2 Pre-construction Equipment Quantities by Month

Equipment	Max hp/unit	Load Factor	Number of Units of Equipment per Month of Construction		
			01	02	03
Tractor/backhoe	150	0.21	2	2	2
Grader	400	0.59	1	1	1
Excavator	500	0.59	1	1	1
Dump Trucks	300	0.21	2	2	2
Dozer	400	0.59	1	1	1
Air Compressor	325	0.43	1	1	1
Fuel Truck	250	0.59	1	1	1
Water Truck	250	0.59	1	1	1
Forklifts	200	0.59	1	1	1
Flatbed, 2 ton	200	0.59	1	1	1
Welders	50	0.21	1	1	1
Small Trucks *	150	0.21	2	2	2

* Light, medium, and delivery trucks

Table D- 3 Phase 1 Equipment Quantities by Month

Equipment	Max hp/unit	Load Factor	Number of Units of Equipment per Month of Construction											
			04	05	06	7	8	9	10	11	12	13	14	15
Tractor/backhoe	150	0.21	2	1	1	1	1	1	1	1	1	1	1	1
Grader	400	0.59	1	0	0	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	1	0	0	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	2	2	2	1	1	1	1	1	1	1	1	1
Dozer	400	0.59	1	0	0	0	0	1	1	0	0	0	0	0
Air Compressor	325	0.43	1	2	2	2	2	2	2	2	2	2	2	2
Concrete Pumps	125	0.43	0	1	1	1	1	1	1	1	1	1	1	1
Crane	175	0.43	0	1	1	1	1	1	1	1	1	1	1	1
Fuel Truck	250	0.59	1	1	1	1	1	1	1	1	1	1	1	1
Water Truck	250	0.59	1	1	1	1	1	1	1	1	1	1	1	1
Forklifts	200	0.59	1	2	2	2	2	2	2	2	2	2	2	2
Flatbed, 2 ton	200	0.59	1	1	1	2	2	2	2	2	2	2	2	2
Generators	33	0.43	0	1	1	2	2	2	2	2	2	2	2	2
Welders	50	0.21	1	2	2	5	5	5	5	3	3	3	3	3
Small Trucks *	150	0.21	2	5	5	5	5	5	5	5	5	3	3	3

* Light, medium, and delivery trucks

construction. For Phase 2 construction, the makeup and quantities of equipment anticipated to be involved in construction activities during the 12 months of construction are shown in Table D-4.

Table D- 4 Phase 2 Equipment Quantities by Month

Equipment	Max hp/unit	Load Factor	Number of Units of Equipment per Month of Construction											
			01	02	03	04	05	06	07	08	09	10	11	12
Tractor/backhoe	150	0.21	1	1	1	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	1	1	1	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	0	1	1	1	1	1	1	1	1	1	1	1
Concrete Pumps	125	0.43	0	1	1	1	1	1	1	1	0	0	0	0
Crane	175	0.43	0	1	1	1	1	1	1	1	0	0	0	0
Fuel Truck	250	0.59	1	1	1	1	1	1	1	1	1	1	1	1
Water Truck	250	0.59	1	1	1	1	1	1	1	1	1	1	1	1
Forklifts	200	0.59	1	1	1	1	1	1	1	1	1	1	1	1
Flatbed, 2 ton	200	0.59	1	1	1	1	1	1	1	1	1	1	1	1
Generators	33	0.43	1	1	1	1	1	1	1	1	1	1	1	1
Welders	50	0.21	0	0	1	1	1	2	2	2	2	2	2	2
Small Trucks *	150	0.21	2	2	2	2	2	2	2	2	2	2	2	2

* Light, medium, and delivery trucks

6.2 Estimated Hours Equipment Operated by Month

The maximum number of monthly hours of operation for any equipment item in Phase 1 was estimated at 160 hours. Table D-5 shows the hours of operation for each equipment item used to provide emission data for Tables RAI 8-a-1 through RAI 8-a-12 for Pre-construction and Phase 1 construction. Additionally, the maximum number of monthly hours of operation for any equipment item for Phase 2 was estimated at 160 hours. Table D-6 show the hours of operation for each equipment item used to provide emission data for Tables RAI 8-a-13 through RAI 8-a-22 for Phase 2 construction.

Table D- 5 Pre-construction/Phase 1 Equipment Estimated Hours Operated by Month

Equipment	Hp	Load Factor	Month (hrs/unit of equipment)														
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Tractor/backhoe	150	0.21	160	160	160	160	80	80	80	80	80	80	80	80	80	80	80
Grader	400	0.59	160	160	160	160	0	0	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	160	160	160	160	0	0	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	160	160	160	160	160	160	100	100	100	100	100	100	100	100	100
Dozer	400	0.59	160	160	160	160	0	0	0	0	160	160	0	0	0	0	0
Air Compressor	325	0.43	80	80	80	80	160	160	160	160	160	160	160	160	160	160	160
Concrete Pumps	125	0.43	0	0	0	0	160	160	160	160	160	160	160	160	80	80	80
Crane	175	0.43	0	0	0	0	160	160	160	160	160	160	160	160	160	160	160
Fuel Truck	250	0.59	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Water Truck	250	0.59	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Forklifts	200	0.59	50	50	50	50	160	160	160	160	160	160	160	160	160	160	160
Flatbed, 2 ton	200	0.59	80	80	80	80	80	80	160	160	160	160	160	160	160	160	160
Generators	33	0.43	0	0	0	0	80	80	160	160	160	160	160	160	160	160	160
Welders	50	0.21	30	30	30	30	60	60	160	160	160	160	160	160	160	160	160
Small Trucks *	150	0.21	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50

***** Light, medium, and delivery trucks

Table D- 6 Phase 2 Equipment Estimated Hours Operated by Month

Equipment	Hp	Load Factor	Month (hrs/unit of equipment)											
			01	02	03	04	05	06	07	08	09	10	11	12
Tractor/backhoe	150	0.21	50	50	50	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	50	50	50	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	0	100	100	100	100	100	100	100	100	100	100	100
Concrete Pumps	125	0.43	0	100	100	100	50	50	50	50	0	0	0	0
Crane	175	0.43	0	100	100	100	50	50	50	50	0	0	0	0
Fuel Truck	250	0.59	20	20	20	20	20	20	20	20	20	20	20	20
Water Truck	250	0.59	20	20	20	20	20	20	20	20	20	20	20	20
Forklifts	200	0.59	80	100	100	100	100	100	100	100	50	50	50	50
Flatbed, 2 ton	200	0.59	80	100	100	100	100	100	100	100	50	50	50	50
Generators	33	0.43	0	160	160	160	160	160	160	160	160	160	160	160
Welders	50	0.21	0	100	100	100	100	100	100	100	100	100	100	100
Small Trucks *	150	0.21	50	50	50	50	50	50	50	50	50	50	50	50

* Light, medium, and delivery trucks

6.3 Equipment Estimated Horsepower-Hours by Month

Table D-7 provides the Pre-construction/Phase 1 equipment estimated horsepower-hours per month. Pre-construction includes months 01 through 03, while Phase 1 construction includes months 04 through 15. Table D-8 provides the Phase 2 equipment estimated horsepower-hours per month.

Table D- 7 Pre-construction/Phase 1 Equipment Estimated Horsepower-Hours by Month

(Also RAI 8-a-1 modified)

Equipment	Hp	Load Factor	Pre-construction Month (hp-hrs/item)			Phase 1 Month (horsepower-hrs/item)											
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Tractor/backhoe	150	0.21	10,080	10,080	10,080	10,080	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520
Grader	400	0.59	37,760	37,760	37,760	37,760	0	0	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	47,200	47,200	47,200	47,200	0	0	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	20,160	20,160	20,160	20,160	20,160	20,160	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300
Dozer	400	0.59	37,760	37,760	37,760	37,760	0	0	0	0	37760	37760	0	0	0	0	0
Air Compressor	325	0.43	11,180	11,180	11,180	11,180	44,720	44,720	44,720	44,720	44,720	44,720	44,720	44,720	44,720	44,720	44,720
Concrete Pumps	125	0.43	0	0	0	0	8,600	8,600	8,600	8,600	8,600	8,600	8,600	8,600	4,300	4,300	4,300
Crane	175	0.43	0	0	0	0	12,040	12,040	12,040	12,040	12,040	12,040	12,040	12,040	12,040	12,040	12,040
Fuel Truck	250	0.59	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375
Water Truck	250	0.59	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375	7,375
Forklifts	200	0.59	5,900	5,900	5,900	5,900	37,760	37,760	37,760	37,760	37,760	37,760	37,760	37,760	37,760	37,760	37,760
Flatbed, 2 ton	200	0.59	9,440	9,440	9,440	9,440	9,440	9,440	37,760	37,760	37,760	37,760	37,760	37,760	37,760	37,760	37,760
Generators	33	0.43	0	0	0	0	1,135	1,135	4,541	4,541	4,541	4,541	4,541	4,541	4,541	4,541	4,541
Welders	50	0.21	315	315	315	315	1,260	1,260	8,400	8,400	8,400	8,400	5,040	5,040	5,040	5,040	5,040
Small Trucks *	150	0.21	3,150	3,150	3,150	3,150	7,875	7,875	7,875	7,875	7,875	7,875	7,875	7,875	4,725	4,725	4,725

* Light, medium, and delivery trucks

Table D- 8 Phase 2 Equipment Estimated Horsepower-Hours by Month

(Also 8-a-13 modified)

Equipment	Hp	Load Factor	Month (horsepower-hrs/item)											
			01	02	03	04	05	06	07	08	09	10	11	12
Tractor/backhoe	150	0.21	1,575	1,575	1,575	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	3,150	3,150	3,150	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	0	13,975	13,975	13,975	13,975	13,975	13,975	13,975	13,975	13,975	13,975	13,975
Concrete Pumps	125	0.43	0	5375	5,375	5,375	2,68	2,688	2,688	2,688	0	0	0	0
Crane	175	0.43	0	7,525	7,525	7,525	3,763	3,763	3,763	3,763	0	0	0	0
Fuel Truck	250	0.59	2,950	2,950	2,950	2,950	2,950	2,950	2,950	2,950	2,950	2,950	2,950	2,950
Water Truck	250	0.59	2,950	2,950	2,950	2,950	2,950	2,950	2,950	2,950	2,950	2,950	2,950	2,950
Forklifts	200	0.59	9,440	11,800	11,800	11,800	11,800	11,800	11,800	11,800	5,900	5,900	5,900	5,900
Flatbed, 2 ton	200	0.59	9,440	11,800	11,800	11,800	11,800	11,800	11,800	11,800	5,900	5,900	5,900	5,900
Generators	33	0.43	0	2,270	2,270	2,270	2,270	2,270	2,270	2,270	2,270	2,270	2,270	2,270
Welders	50	0.21	0	0	1,050	1,050	1,050	2,100	2,100	2,100	2,100	2,100	2,100	2,100
Small Trucks *	150	0.21	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150

* Light, medium, and delivery trucks

7. Tailpipe Emissions

EPA Report NR-009d (EPA, 2010) describes pollutant emission factors for calculation of emissions attributable to operation of non-road compression engine equipment (i.e., diesel-fired construction equipment). Emission factors (grams of pollutant per horsepower-hour) are primarily a function equipment horsepower, load factor, and age. Report NR-009d also identifies equipment fuel consumption factors in units of "grams of fuel burned per horsepower-hour." Small equipment tends to have larger emission factors than large equipment (EPA, 2010).

To develop the Phase 1 construction emissions calculations, a list of anticipated construction equipment (and rated horsepower) was developed. An EPA Standard Classification Code was then identified for each equipment item, and an appropriate load factor was selected from EPA-420-P-04-005 (EPA 2004c).

As described in the User Manual, the EPA NONROAD model was specifically developed to assist states and local regulatory agencies across the U.S.A. in the creation of accurate emissions inventories to demonstrate compliance with the *Clean Air Act*. As such, the NONROAD computer model may apply some assumptions that are not necessarily representative of the IIFP project. Therefore, to achieve the most accurate results, construction emissions were instead calculated based on the data and analytic methods published in [1] EPA-420-P-04-009, “Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression Ignition” (EPA 2004b) and [2] “EPA-420-P-04-005, Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling” (EPA 2004c). These documents are readily available for public download in PDF format at the websites listed below:

[1] http://www.epa.gov/oms/models/nonrdmdl/nonrdmdl2004/420p04009.pdf

[2] http://www.epa.gov/oms/models/nonrdmdl/nonrdmdl2004/420p04005.pdf

To calculate the peak annual tailpipe emissions for construction, a list of site preparation and construction equipment was identified. See Table D-2 for the Pre-construction equipment quantities by month. The Phase 1 equipment quantities by month are presented in Table D-3. For the Phase 2 equipment quantities by month, see Table D-4. The estimated hours of operation for the Pre-construction and Phase 1 construction are shown in Table D-5. Table D-6 provide the estimated hours of operation for the Phase 2 equipment. See Table D-7 and D-8 for the estimated horsepower- hours by month for Pre-construction/Phase 1 construction and Phase 2 construction, respectively.

Equipment-specific pollutant emission (Spm) rates (in units of grams per horsepower-hour), and the Brake Specific Fuel Consumption (BSFC), were then determined based on the analytic methods described in EPA-420-P-04-009 (Tier 1 was assumed for all construction equipment). In general, the EPA-420-P-04-009 methods (1) postulate a zero-hour steady state emission factor (EFss) for construction equipment and (2) present equations to adjust each EFss based on a Transient Adjustment Factor (TAF) and a Deterioration Factor (DF). See Table D-9 for the EFss for the construction equipment (Pre-construction, Phase 1 and Phase 2 construction). The TAFs are shown in Table D-10. Table D-11 present the BSFCs for all the construction equipment. Table D-12 shows the Spm rates for all equipment types. For each month of the year, the quantity and average monthly hours of operation for each equipment item was estimated. Based on the equipment horsepower, load factor, equipment quantities, hours of operation, and pollutant emission factors, the total monthly emissions for each pollutant and each equipment item are calculated by Equation 01.

Tailpipe Emissions, g = (Emissions Factor, g/hp-hr) × (horsepower, hp) × (load factor) × (equipment quantity, each) × (hours operated, hrs) [EQN_01]

Table D- 9 Zero-Hour Steady State Emission Factors (EFss) For Construction Equipment

Equipment	EPA Source Classification Category	Max Hp	Load Factor	EFss NO_2 g/hp-hr	EFss CO g/hp-hr	EFss PM g/hp-hr	EFss VOC g/hp-hr
Tractor/backhoe	2270002066	150	0.21	5.65	0.87	0.28	0.34
Grader	2270002048	400	0.59	6.02	1.31	0.2	0.2
Excavator	2267002036	500	0.59	6.02	1.31	0.2	0.2
Dump Trucks	2270002051	300	0.21	5.58	0.75	0.25	0.31
Dozer	2270002048	400	0.59	6.02	1.31	0.2	0.2
Air Compressor	2270006015	325	0.43	5.65	0.87	0.28	0.34
Concrete Pumps	2270002042	125	0.43	5.6	2.37	0.47	0.52
Crane	2270002045	175	0.43	5.58	0.75	0.25	0.31
Fuel Truck	2270002051	250	0.59	5.58	0.75	0.25	0.31
Water Truck	2270002051	250	0.59	5.58	0.75	0.25	0.31
Forklifts	2270003020	200	0.59	5.58	0.75	0.25	0.31
Flatbed, 2 ton	2270002051	200	0.59	5.58	0.75	0.25	0.31
Generators	2270006005	33	0.43	4.44	2.16	0.27	0.44
Welders	2285002015	50	0.21	4.73	1.53	0.34	0.28
Small Trucks *	2270002066	150	0.21	5.65	0.87	0.28	0.34

* Light, medium, and delivery trucks

Table D- 10 Construction Transient Adjustment Factors (TAF) and a Deterioration Factors (DF)

Equipment	TAF NO_2	TAF CO	TAF PM	TAF VOC	DF, NO_2, A=0.024	DF, CO, A=0.101	DF, PM, A=0.473	DF, VOC, A=0.036
Tractor/ backhoe	0.95	2.57	1.97	2.29	1.012	1.051	1.237	1.018
Grader	0.95	1.53	1.23	1.05	1.012	1.051	1.237	1.018
Excavator	0.95	1.53	1.23	1.05	1.012	1.051	1.237	1.018
Dump Trucks	1.1	2.57	1.97	2.29	1.012	1.051	1.237	1.018
Dozer	0.95	1.53	1.23	1.05	1.012	1.051	1.237	1.018
Air Compressor	1.0	1.0	1.0	1.0	1.012	1.051	1.237	1.018
Concrete Pumps	0.95	2.57	1.97	2.29	1.012	1.051	1.237	1.018
Crane	1.0	1.0	1.0	1.0	1.012	1.051	1.237	1.018
Fuel Truck	1.1	2.57	1.97	2.29	1.012	1.051	1.237	1.018
Water Truck	1.1	2.57	1.97	2.29	1.012	1.051	1.237	1.018
Forklifts	0.95	1.53	1.23	1.05	1.012	1.051	1.237	1.018
Flatbed, 2 ton	1.1	2.57	1.97	2.29	1.012	1.051	1.237	1.018
Generators	1.0	1.0	1.0	1.0	1.012	1.051	1.237	1.018
Welders	1.1	2.57	1.97	2.29	1.012	1.051	1.237	1.018
Small Trucks *	0.95	2.57	1.97	2.29	1.012	1.051	1.237	1.018

* Light, medium, and delivery trucks

Table D- 11 Brake Specific Fuel Consumption (BSFC) and Equipment-Specific Pollutant Adjustment Rates For Construction Equipment

Equipment	BSFC lb/hp-hr	Spmadj g/hp-hr	VOCadj g/hp-hr
Tractor/backhoe	0.367	0.073	0.789
Grader	0.367	0.073	0.216
Excavator	0.367	0.073	0.216
Dump Trucks	0.367	0.073	0.719
Dozer	0.367	0.073	0.216
Air Compressor	0.367	0.073	0.344
Concrete Pumps	0.367	0.073	1.215
Crane	0.367	0.073	0.314
Fuel Truck	0.367	0.073	0.719
Water Truck	0.367	0.073	0.719
Forklifts	0.367	0.073	0.33
Flatbed, 2 ton	0.367	0.073	0.719
Generators	0.408	0.082	0.446
Welders	0.408	0.082	0.65
Small Trucks *	0.367	0.073	0.789

* Light, medium, and delivery trucks

Table D- 12 Equipment-Specific Diesel Combustion Rate and Pollutant Emission Rates
(also Table RAI-a-2)

Equipment	lb/hp-hr							
	NO_2	CO	PM_{10}	$PM_{2.5}$	VOC	SO_2	HAPs	Diesel Burn
Tractor/ backhoe	0.012	0.005	0.001	0.001	0.002	0.000	0.000	0.367
Grader	0.013	0.005	0.001	0.000	0.000	0.000	0.000	0.367
Excavator	0.013	0.005	0.001	0.000	0.000	0.000	0.000	0.367
Dump Trucks	0.014	0.004	0.001	0.001	0.002	0.000	0.000	0.367
Dozer	0.013	0.005	0.001	0.000	0.000	0.000	0.000	0.367
Air Compressor	0.013	0.003	0.000	0.000	0.000	0.000	0.000	0.367
Concrete Pumps	0.012	0.014	0.002	0.002	0.003	0.000	0.000	0.367
Crane	0.013	0.002	0.001	0.001	0.001	0.000	0.000	0.367
Fuel Truck	0.012	0.003	0.001	0.001	0.001	0.000	0.000	0.367
Water Truck	0.012	0.003	0.001	0.001	0.001	0.000	0.000	0.367
Forklifts	0.012	0.003	0.001	0.001	0.001	0.000	0.000	0.367
Flatbed, 2 ton	0.012	0.003	0.001	0.001	0.001	0.000	0.000	0.367
Generators	0.011	0.003	0.001	0.001	0.001	0.000	0.000	0.408
Welders	0.011	0.009	0.002	0.002	0.001	0.000	0.000	0.408
Small Trucks *	0.012	0.003	0.001	0.001	0.001	0.000	0.000	0.367

* Light, medium, and delivery trucks

7.1 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-hours and Emission Factors by Month

Pre-construction and Phase 1 construction were estimated to last approximately 18 to 24 months. To determine the worst-case construction year, months 01 through 03 of this schedule are for Pre-construction, and months 04 through 15 are for Phase 1 construction. The first twelve months of this construction period was assumed to the worst-case scenario (maximum annual emissions and impacts) since large earthmoving equipment would be used during the initial months. Additional months may be necessary for Phase 1 construction, but these months are not included in these responses since the calculation of peak annual emissions will occur during the initial months when large earthmoving equipment is used.

Annual construction emissions were then determined as a sum of the monthly emissions for each construction interval of interest. Phase 2 construction emissions were developed in a comparable manner. A list of planned construction equipment is provided in the tables, along with the applied values for Load Factor, EFss, TAF, DF, and BSFC**.**

7.1.1 Pre-construction

Tables D-13 through D-15 show the months 01 thorough 03 for pre-construction emission data.

Table D- 13 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-hours and Emission Factors for Month 01

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	120	51	11,801	13	13	17	3	5	3,699
Grader	2270002048	400	0.59	482	175	44,207	19	19	18	14	17	13,858
Excavator	2267002036	500	0.59	602	218	55,258	24	23	23	17	22	17,322
Dump Trucks	2270002051	300	0.21	275	90	23,602	24	23	32	7	9	7,399
Dozer	2270002048	400	0.59	482	175	44,207	19	19	18	14	17	13,858
Air Compressor	2270006015	325	0.43	150	34	13,089	4	4	5	4	5	4,103
Concrete Pumps	2270002042	125	0.43	0	0	0	0	0	0	0	0	0
Crane	2270002045	175	0.43	0	0	0	0	0	0	0	0	0
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	70	16	6,907	4	4	4	2	3	2,165
Flatbed, 2 ton	2270002051	200	0.59	111	25	11,052	6	6	7	3	4	3,464
Generators	2270006005	33	0.43	0	0	0	0	0	0	0	0	0
Welders	2285002015	50	0.21	3	3	410	0	0	0	0	0	129
Small Trucks *	2270002066	150	0.21	37	8	3,688	2	2	2	1	1	1,156
TOTALS:				2,504	833	231,489	128	124	138	71	92	72,567

* Light, medium, and delivery trucks

Table D- 14 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-hours and Emission Factors for Month 02

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	120	51	11,801	13	13	17	3	5	3,699
Grader	2270002048	400	0.59	482	175	44,207	19	19	18	14	17	13,858
Excavator	2267002036	500	0.59	602	218	55,258	24	23	23	17	22	17,322
Dump Trucks	2270002051	300	0.21	275	90	23,602	24	23	32	7	9	7,399
Dozer	2270002048	400	0.59	482	175	44,207	19	19	18	14	17	13,858
Air Compressor	2270006015	325	0.43	150	34	13,089	4	4	5	4	5	4,103
Concrete Pumps	2270002042	125	0.43	0	0	0	0	0	0	0	0	0
Crane	2270002045	175	0.43	0	0	0	0	0	0	0	0	0
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	70	16	6,907	4	4	4	2	3	2,165
Flatbed, 2 ton	2270002051	200	0.59	111	25	11,052	6	6	7	3	4	3,464
Generators	2270006005	33	0.43	0	0	0	0	0	0	0	0	0
Welders	2285002015	50	0.21	3	3	410	0	0	0	0	0	129
Small Trucks *	2270002066	150	0.21	37	8	3,688	2	2	2	1	1	1,156
TOTALS:				2,504	833	231,489	128	124	138	71	92	72,567

* Light, medium, and delivery trucks

Table D- 15 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-hours and Emission Factors for Month 03

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	120	51	11,801	13	13	17	3	5	3,699
Grader	2270002048	400	0.59	482	175	44,207	19	19	18	14	17	13,858
Excavator	2267002036	500	0.59	602	218	55,258	24	23	23	17	22	17,322
Dump Trucks	2270002051	300	0.21	275	90	23,602	24	23	32	7	9	7,399
Dozer	2270002048	400	0.59	482	175	44,207	19	19	18	14	17	13,858
Air Compressor	2270006015	325	0.43	150	34	13,089	4	4	5	4	5	4,103
Concrete Pumps	2270002042	125	0.43	0	0	0	0	0	0	0	0	0
Crane	2270002045	175	0.43	0	0	0	0	0	0	0	0	0
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	70	16	6,907	4	4	4	2	3	2,165
Flatbed, 2 ton	2270002051	200	0.59	111	25	11,052	6	6	7	3	4	3,464
Generators	2270006005	33	0.43	0	0	0	0	0	0	0	0	0
Welders	2285002015	50	0.21	3	3	410	0	0	0	0	0	129
Small Trucks *	2270002066	150	0.21	37	8	3,688	2	2	2	1	1	1,156
TOTALS:				2,504	833	231,489	128	124	138	71	92	72,567

* Light, medium, and delivery trucks

7.1.2 Phase 1

The first twelve months of 18 to 24 month construction period was assumed to the worst-case scenario (maximum annual emissions and impacts) since large earthmoving equipment would be used during the initial months. To determine the worst-case construction year, months 01 through 03 of this schedule are for Pre-construction, and months 04 through 15 are for Phase 1 construction. Additional months may be necessary for Phase 1 construction, but these months are not included in these responses since the calculation of peak annual emissions will occur during the initial months when large earthmoving equipment is used. See Tables D-16 through D-27 for Months 04 through 15 for Phase 1 construction emission data.

Table D- 16 Phase 1 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-hours and Emission Factors for Month 04

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	120	51	11,801	13	13	17	3	5	3,699
Grader	2270002048	400	0.59	482	175	44,207	19	19	18	14	17	13,858
Excavator	2267002036	500	0.59	602	218	55,258	24	23	23	17	22	17,322
Dump Trucks	2270002051	300	0.21	275	90	23,602	24	23	32	7	9	7,399
Dozer	2270002048	400	0.59	482	175	44,207	19	19	18	14	17	13,858
Air Compressor	2270006015	325	0.43	150	34	13,089	4	4	5	4	5	4,103
Concrete Pumps	2270002042	125	0.43	0	0	0	0	0	0	0	0	0
Crane	2270002045	175	0.43	0	0	0	0	0	0	0	0	0
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	70	16	6,907	4	4	4	2	3	2,165
Flatbed, 2 ton	2270002051	200	0.59	111	25	11,052	6	6	7	3	4	3,464
Generators	2270006005	33	0.43	0	0	0	0	0	0	0	0	0
Welders	2285002015	50	0.21	3	3	410	0	0	0	0	0	129
Small Trucks *	2270002066	150	0.21	37	8	3,688	2	2	2	1	1	1,156
TOTALS:				2,504	833	231,489	128	124	138	71	92	72,567

* Light, medium, and delivery trucks

Table D- 17 Phase 1 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-hours and Emission Factors for Month 05

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	30	13	2,950	3	3	4	1	1	925
Grader	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	2267002036	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	2270002051	300	0.21	275	90	23,602	24	23	32	7	9	7,399
Dozer	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	2270006015	325	0.43	601	135	52,355	17	17	20	16	21	16,412
Concrete Pumps	2270002042	125	0.43	102	121	10,068	20	20	23	3	4	3,156
Crane	2270002045	175	0.43	151	21	14,096	6	6	8	4	6	4,419
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Flatbed, 2 ton	2270002051	200	0.59	111	25	11,052	6	6	7	3	4	3,464
Generators	2270006005	33	0.43	12	4	1,477	1	1	1	0	1	463
Welders	2285002015	50	0.21	14	11	1,640	2	2	2	0	1	514
Small Trucks *	2270002066	150	0.21	93	21	9,219	5	5	6	3	4	2,890
TOTALS:				2,006	579	187,935	122	118	141	57	74	58,914

* Light, medium, and delivery trucks

Table D- 18 Phase 1 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-hours and Emission Factors for Month 06

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	30	13	2,950	3	3	4	1	1	925
Grader	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	2267002036	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	2270002051	300	0.21	275	90	23,602	24	23	32	7	9	7,399
Dozer	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	2270006015	325	0.43	601	135	52,355	17	17	20	16	21	16,412
Concrete Pumps	2270002042	125	0.43	102	121	10,068	20	20	23	3	4	3,156
Crane	2270002045	175	0.43	151	21	14,096	6	6	8	4	6	4,419
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Flatbed, 2 ton	2270002051	200	0.59	111	25	11,052	6	6	7	3	4	3,464
Generators	2270006005	33	0.43	12	4	1,477	1	1	1	0	1	463
Welders	2285002015	50	0.21	14	11	1,640	2	2	2	0	1	514
Small Trucks *	2270002066	150	0.21	93	21	9,219	5	5	6	3	4	2,890
TOTALS:				2,006	579	187,935	122	118	141	57	74	58,914

* Light, medium, and delivery trucks

Table D- 19 Phase 1 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-hours and Emission Factors for Month 07

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	30	13	2,950	3	3	4	1	1	925
Grader	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	2267002036	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	2270002051	300	0.21	86	28	7,376	8	7	10	2	3	2,312
Dozer	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	2270006015	325	0.43	601	135	52,355	17	17	20	16	21	16,412
Concrete Pumps	2270002042	125	0.43	102	121	10,068	20	20	23	3	4	3,156
Crane	2270002045	175	0.43	151	21	14,096	6	6	8	4	6	4,419
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Flatbed, 2 ton	2270002051	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Generators	2270006005	33	0.43	47	16	5,910	3	3	3	2	2	1,853
Welders	2285002015	50	0.21	92	73	10,933	13	13	11	3	4	3,427
Small Trucks *	2270002066	150	0.21	93	21	9,219	5	5	6	3	4	2,890
TOTALS:				2,264	666	218,589	138	134	152	66	86	68,523

* Light, medium, and delivery trucks

Table D- 20 Phase 1 Pollutant and CO_2Tailpipe Emissions as a Product of Horsepower-hours and Emission Factors for Month 08

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	30	13	2,950	3	3	4	1	1	925
Grader	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	2267002036	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	2270002051	300	0.21	86	28	7,376	8	7	10	2	3	2,312
Dozer	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	2270006015	325	0.43	601	135	52,355	17	17	20	16	21	16,412
Concrete Pumps	2270002042	125	0.43	102	121	10,068	20	20	23	3	4	3,156
Crane	2270002045	175	0.43	151	21	14,096	6	6	8	4	6	4,419
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Flatbed, 2 ton	2270002051	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Generators	2270006005	33	0.43	47	16	5,910	3	3	3	2	2	1,853
Welders	2285002015	50	0.21	92	73	10,933	13	13	11	3	4	3,427
Small Trucks *	2270002066	150	0.21	93	21	9,219	5	5	6	3	4	2,890
TOTALS:				2,264	666	218,589	138	134	152	66	86	68,523

* Light, medium, and delivery trucks

Table D- 21 Phase 1 Pollutant and CO_2Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 09

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	30	13	2,950	3	3	4	1	1	925
Grader	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	2267002036	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	2270002051	300	0.21	86	28	7,376	8	7	10	2	3	2,312
Dozer	2270002048	400	0.59	482	175	44,207	19	19	18	14	17	13,858
Air Compressor	2270006015	325	0.43	601	135	52,355	17	17	20	16	21	16,412
Concrete Pumps	2270002042	125	0.43	102	121	10,068	20	20	23	3	4	3,156
Crane	2270002045	175	0.43	151	21	14,096	6	6	8	4	6	4,419
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Flatbed, 2 ton	2270002051	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Generators	2270006005	33	0.43	47	16	5,910	3	3	3	2	2	1,853
Welders	2285002015	50	0.21	92	73	10.933	13	13	11	3	4	3,427
Small Trucks *	2270002066	150	0.21	93	21	9,219	5	5	6	3	4	2,890
TOTALS:				2,746	841	262,796	158	153	170	80	103	82,381

* Light, medium, and delivery trucks

Table D- 22 Phase 1 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 10

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	30	13	2,950	3	3	4	1	1	925
Grader	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	2267002036	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	2270002051	300	0.21	86	28	7,376	8	7	10	2	3	2,312
Dozer	2270002048	400	0.59	482	175	44,207	19	19	18	14	17	13,858
Air Compressor	2270006015	325	0.43	601	135	52,355	17	17	20	16	21	16,412
Concrete Pumps	2270002042	125	0.43	102	121	10,068	20	20	23	3	4	3,156
Crane	2270002045	175	0.43	151	21	14,096	6	6	8	4	6	4,419
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Flatbed, 2 ton	2270002051	200	0.59	445	100	44,207	26	25	28	13	18	1,858
Generators	2270006005	33	0.43	47	16	5,910	3	3	3	2	2	1,853
Welders	2285002015	50	0.21	92	73	10,933	13	13	11	3	4	3,427
Small Trucks *	2270002066	150	0.21	93	21	9,219	5	5	6	3	4	2,890
TOTALS:				2,746	841	262,796	158	153	170	80	103	82,381

* Light, medium, and delivery trucks

Table D- 23 Phase 1 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 11

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	30	13	2,950	3	3	4	1	1	925
Grader	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	2267002036	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	2270002051	300	0.21	86	28	7,376	8	7	10	2	3	2,312
Dozer	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	2270006015	325	0.43	601	135	52,355	17	17	20	16	21	16,412
Concrete Pumps	2270002042	125	0.43	102	121	10,068	20	20	23	3	4	3,156
Crane	2270002045	175	0.43	151	21	14,096	6	6	8	4	6	4,419
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Flatbed, 2 ton	2270002051	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Generators	2270006005	33	0.43	47	16	5,910	3	3	3	2	2	1,853
Welders	2285002015	50	0.21	55	44	6,560	8	8	7	2	2	2,056
Small Trucks *	2270002066	150	0.21	93	21	9,219	5	5	6	3	4	2,890
TOTALS:				2,227	637	214,216	133	129	147	65	84	67,152

* Light, medium, and delivery trucks

Table D- 24 Phase 1 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 12

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	30	13	2,950	3	3	4	1	1	925
Grader	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	2267002036	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	2270002051	300	0.21	86	28	7,376	8	7	10	2	3	2,312
Dozer	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	2270006015	325	0.43	601	135	52,355	17	17	20	16	21	16,412
Concrete Pumps	2270002042	125	0.43	102	121	10,068	20	20	23	3	4	3,156
Crane	2270002045	175	0.43	151	21	14,096	6	6	8	4	6	4,419
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Flatbed, 2 ton	2270002051	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Generators	2270006005	33	0.43	47	16	5,910	3	3	3	2	2	1,853
Welders	2285002015	50	0.21	55	44	6,560	8	8	7	2	2	2,056
Small Trucks *	2270002066	150	0.21	93	21	9,219	5	5	6	3	4	2,890
TOTALS:				2,227	637	214,216	133	129	147	65	84	67,152

* Light, medium, and delivery trucks

Table D- 25 Phase 1 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 13

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	30	13	2,950	3	3	4	1	1	925
Grader	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	2267002036	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	2270002051	300	0.21	86	28	7,376	8	7	10	2	3	2,312
Dozer	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	2270006015	325	0.43	601	135	52,355	17	17	20	16	21	16,412
Concrete Pumps	2270002042	125	0.43	51	60	5,034	10	10	11	2	2	1,578
Crane	2270002045	175	0.43	151	21	14,096	6	6	8	4	6	4,419
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Flatbed, 2 ton	2270002051	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Generators	2270006005	33	0.43	47	16	5,910	3	3	3	2	2	1,853
Welders	2285002015	50	0.21	55	44	6,560	8	8	7	2	2	2,056
Small Trucks *	2270002066	150	0.21	56	12	5,532	3	3	3	2	2	1,734
TOTALS:				2,139	568	205,494	121	117	133	63	81	64,418

* Light, medium, and delivery trucks

Table D- 26 Phase 1 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 14

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	30	13	2,950	3	3	4	1	1	925
Grader	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	2267002036	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	2270002051	300	0.21	86	28	7,376	8	7	10	2	3	2,312
Dozer	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	2270006015	325	0.43	601	135	52,355	17	17	20	16	21	16,412
Concrete Pumps	2270002042	125	0.43	51	60	5,034	10	10	11	2	2	1,578
Crane	2270002045	175	0.43	151	21	14,096	6	6	8	4	6	4,419
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Flatbed, 2 ton	2270002051	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Generators	2270006005	33	0.43	47	16	5,910	3	3	3	2	2	1,853
Welders	2285002015	50	0.21	55	44	6,560	8	8	7	2	2	2,056
Small Trucks *	2270002066	150	0.21	56	12	5,532	3	3	3	2	2	1,734
TOTALS:				2,139	568	205,494	121	117	133	63	81	64,418

* Light, medium, and delivery trucks

Table D- 27 Phase 1 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 15

Equipment	EPA Source Classification Category	Hp	Load Factor	Emissions								Diesel Burned
				NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
				lb								
Tractor/backhoe	2270002066	150	0.21	30	13	2,950	3	3	4	1	1	925
Grader	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	2267002036	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	2270002051	300	0.21	86	28	7,376	8	7	10	2	3	2,312
Dozer	2270002048	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	2270006015	325	0.43	601	135	52,355	17	17	20	16	21	16,412
Concrete Pumps	2270002042	125	0.43	51	60	5,034	10	10	11	2	2	1,578
Crane	2270002045	175	0.43	151	21	14,096	6	6	8	4	6	4,419
Fuel Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Water Truck	2270002051	250	0.59	87	19	8,634	5	5	5	3	3	2,707
Forklifts	2270003020	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Flatbed, 2 ton	2270002051	200	0.59	445	100	44,207	26	25	28	13	18	13,858
Generators	2270006005	33	0.43	47	16	5,910	3	3	3	2	2	1,853
Welders	2285002015	50	0.21	55	44	6,560	8	8	7	2	2	2,056
Small Trucks *	2270002066	150	0.21	56	12	5,532	3	3	3	2	2	1,734
TOTALS:				2,139	568	205,494	121	117	133	63	81	64,418

* Light, medium, and delivery trucks

7.1.3 Phase 2

For Phase 2 construction, see Tables D-28 through D- 39 which provide emission data for months 1 through 12 of the construction year.

Table D- 28 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 01

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	19	8	1,844	2	2	3	1	1	578
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	43	14	3,688	4	4	5	1	1	1,156
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	0	0	0	0	0	0	0	0	0
Concrete Pumps	125	0.43	0	0	0	0	0	0	0	0	0
Crane	175	0.43	0	0	0	0	0	0	0	0	0
Fuel Truck	250	0.59	35	8	3,454	2	2	2	1	1	1,083
Water Truck	250	0.59	35	8	3,454	2	2	2	1	1	1,083
Forklifts	200	0.59	111	25	11,052	6	6	7	3	4	3,464
Flatbed, 2 ton	200	0.59	111	25	11,052	6	6	7	3	4	3,464
Generators	33	0.43	0	0	0	0	0	0	0	0	0
Welders	50	0.21	0	0	0	0	0	0	0	0	0
Small Trucks *	150	0.21	37	8	3,688	2	2	2	1	1	1,156
Totals			391	96	38,230	25	24	28	12	15	11,984

* Light, medium, and delivery trucks

Table D- 29 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 02

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	19	8	1,840	2	2	3	1	1	578
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	43	14	3,690	4	4	5	1	1	1,160
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	188	42	16,400	5	5	6	5	6	5,130
Concrete Pumps	125	0.43	64	75	6,290	13	12	14	2	2	1,970
Crane	175	0.43	94	13	8,810	4	4	5	3	4	2,760
Fuel Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Water Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Forklifts	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Flatbed, 2 ton	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Generators	33	0.43	24	8	2,950	2	2	1	1	1	926
Welders	50	0.21	0	0	0	0	0	0	0	0	0
Small Trucks *	150	0.21	37	8	3,690	2	2	2	1	1	1,160
Totals			816	247	78,174	52	50	59	24	31	24,506

* Light, medium, and delivery trucks

Table D- 30 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 03

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	19	8	1,840	2	2	3	1	1	578
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	43	14	3,690	4	4	5	1	1	1,160
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	188	42	16,400	5	5	6	5	6	5,130
Concrete Pumps	125	0.43	64	75	6,290	13	12	14	2	2	1,970
Crane	175	0.43	94	13	8,810	4	4	5	3	4	2,760
Fuel Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Water Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Forklifts	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Flatbed, 2 ton	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Generators	33	0.43	24	8	2,950	2	2	1	1	1	926
Welders	50	0.21	12	9	1,370	2	2	1	0	0	428
Small Trucks *	150	0.21	37	8	3,690	2	2	2	1	1	1,160
Totals			827	256	79,541	54	52	60	24	31	24,934

* Light, medium, and delivery trucks

Table D- 31 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 04

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	188	42	16,400	5	5	6	5	6	5,130
Concrete Pumps	125	0.43	64	75	6,290	13	12	14	2	2	1,970
Crane	175	0.43	94	13	8,810	4	4	5	3	4	2,760
Fuel Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Water Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Forklifts	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Flatbed, 2 ton	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Generators	33	0.43	24	8	2,950	2	2	1	1	1	926
Welders	50	0.21	12	9	1,370	2	2	1	0	0	428
Small Trucks *	150	0.21	37	8	3,690	2	2	2	1	1	1,160
Totals			765	234	74,009	48	46	52	23	29	23,200

* Light, medium, and delivery trucks

Table D- 32 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 05

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	188	42	16,400	5	5	6	5	6	5,130
Concrete Pumps	125	0.43	32	38	3,150	6	6	7	1	1	986
Crane	175	0.43	47	7	4,400	2	2	3	1	2	1,380
Fuel Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Water Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Forklifts	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Flatbed, 2 ton	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Generators	33	0.43	24	8	2,950	2	2	1	1	1	926
Welders	50	0.21	12	9	1,370	2	2	1	0	0	428
Small Trucks *	150	0.21	37	8	3,690	2	2	2	1	1	1,160
Totals			686	190	66,458	39	38	43	20	26	20,833

* Light, medium, and delivery trucks

Table D- 33 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 06

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	188	42	16,400	5	5	6	5	6	5,130
Concrete Pumps	125	0.43	32	38	3,150	6	6	7	1	1	986
Crane	175	0.43	47	7	4,400	2	2	3	1	2	1,380
Fuel Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Water Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Forklifts	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Flatbed, 2 ton	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Generators	33	0.43	24	8	2,950	2	2	1	1	1	926
Welders	50	0.21	23	18	2,730	3	3	3	1	1	857
Small Trucks *	150	0.21	37	8	3,690	2	2	2	1	1	1,160
Totals			698	199	67,825	41	40	44	21	27	21,262

* Light, medium, and delivery trucks

Table D- 34 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 07

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	188	42	16,400	5	5	6	5	6	5,130
Concrete Pumps	125	0.43	32	38	3,150	6	6	7	1	1	986
Crane	175	0.43	47	7	4,400	2	2	3	1	2	1,380
Fuel Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Water Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Forklifts	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Flatbed, 2 ton	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Generators	33	0.43	24	8	2,950	2	2	1	1	1	926
Welders	50	0.21	23	18	2,730	3	3	3	1	1	857
Small Trucks *	150	0.21	37	8	3,690	2	2	2	1	1	1,160
Totals			698	199	67,825	41	40	44	21	27	21,262

* Light, medium, and delivery trucks

Table D- 35 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 08

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	188	42	16,400	5	5	6	5	6	5,130
Concrete Pumps	125	0.43	32	38	3,150	6	6	7	1	1	986
Crane	175	0.43	47	7	4,400	2	2	3	1	2	1,380
Fuel Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Water Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Forklifts	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Flatbed, 2 ton	200	0.59	139	31	13,800	8	8	9	4	6	4,330
Generators	33	0.43	24	8	2,950	2	2	1	1	1	926
Welders	50	0.21	23	18	2,730	3	3	3	1	1	857
Small Trucks *	150	0.21	37	8	3,690	2	2	2	1	1	1,160
Totals			698	199	67,825	41	40	44	21	27	21,262

* Light, medium, and delivery trucks

Table D- 36 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 09

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	188	42	16,400	5	5	6	5	6	5,130
Concrete Pumps	125	0.43	0	0	0	0	0	0	0	0	0
Crane	175	0.43	0	0	0	0	0	0	0	0	0
Fuel Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Water Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Forklifts	200	0.59	70	16	6,910	4	4	4	2	3	2,170
Flatbed, 2 ton	200	0.59	70	16	6,910	4	4	4	2	3	2,170
Generators	33	0.43	24	8	2,950	2	2	1	1	1	926
Welders	50	0.21	23	18	2,730	3	3	3	1	1	857
Small Trucks *	150	0.21	37	8	3,690	2	2	2	1	1	1,160
Totals			480	124	46,459	25	24	26	14	18	14,564

* Light, medium, and delivery trucks

Table D- 37 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 10

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	188	42	16,400	5	5	6	5	6	5,130
Concrete Pumps	125	0.43	0	0	0	0	0	0	0	0	0
Crane	175	0.43	0	0	0	0	0	0	0	0	0
Fuel Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Water Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Forklifts	200	0.59	70	16	6,910	4	4	4	2	3	2,170
Flatbed, 2 ton	200	0.59	70	16	6,910	4	4	4	2	3	2,170
Generators	33	0.43	24	8	2,950	2	2	1	1	1	926
Welders	50	0.21	23	18	2,730	3	3	3	1	1	857
Small Trucks *	150	0.21	37	8	3,690	2	2	2	1	1	1,160
Totals			480	124	46,459	25	24	26	14	18	14,564

* Light, medium, and delivery trucks

Table D- 38 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 11

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	188	42	16,400	5	5	6	5	6	5,130
Concrete Pumps	125	0.43	0	0	0	0	0	0	0	0	0
Crane	175	0.43	0	0	0	0	0	0	0	0	0
Fuel Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Water Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Forklifts	200	0.59	70	16	6,910	4	4	4	2	3	2,170
Flatbed, 2 ton	200	0.59	70	16	6,910	4	4	4	2	3	2,170
Generators	33	0.43	24	8	2,950	2	2	1	1	1	926
Welders	50	0.21	23	18	2,730	3	3	3	1	1	857
Small Trucks *	150	0.21	37	8	3,690	2	2	2	1	1	1,160
Totals			480	124	46,459	25	24	26	14	18	14,564

* Light, medium, and delivery trucks

Table D- 39 Phase 2 Pollutant and CO_2 Tailpipe Emissions as a Product of Horsepower-Hours and Emission Factors for Month 12

Equipment	Hp	Load Factor	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
			lb								
Tractor/backhoe	150	0.21	0	0	0	0	0	0	0	0	0
Grader	400	0.59	0	0	0	0	0	0	0	0	0
Excavator	500	0.59	0	0	0	0	0	0	0	0	0
Dump Trucks	300	0.21	0	0	0	0	0	0	0	0	0
Dozer	400	0.59	0	0	0	0	0	0	0	0	0
Air Compressor	325	0.43	188	42	16,400	5	5	6	5	6	5,130
Concrete Pumps	125	0.43	0	0	0	0	0	0	0	0	0
Crane	175	0.43	0	0	0	0	0	0	0	0	0
Fuel Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Water Truck	250	0.59	35	8	3,450	2	2	2	1	1	1,080
Forklifts	200	0.59	70	16	6,910	4	4	4	2	3	2,170
Flatbed, 2 ton	200	0.59	70	16	6,910	4	4	4	2	3	2,170
Generators	33	0.43	24	8	2,950	2	2	1	1	1	926
Welders	50	0.21	23	18	2,730	3	3	3	1	1	857
Small Trucks *	150	0.21	37	8	3,690	2	2	2	1	1	1,160
Totals			480	124	46,459	25	24	26	14	18	14,564

* Light, medium, and delivery trucks

7.2 Summary of Emissions

D-7 provides the Pre-construction/Phase 1 equipment estimated horsepower-hours by month. Table D-40 (also Table RAI 8-a-3, "Summarize Tailpipe Emissions") was a compilation of Table D-13 through Table D-24. Table D-40 (RAI 8-a-3) has been modified to denote the Months 01 through 03 as Pre-construction and Months 04 through 15 as Phase 1 construction. Tables D-25 through D-27 have been added to include the last 3 months of the year required to determine peak annual emissions.

Table D-8 provides the Phase 2 equipment estimated horsepower-hours by month. Table RAI 8-a-14, "Pollutant and CO_2 Tailpipe Emissions for Phase 2 Construction," is a compilation of Table D-28 through Table D-39. Table D-42 (RAI 8-a-14) was modified to add CO_2 emissions.

The first 12 months of Phase 1 construction was assumed to the worse-case scenario (maximum annual emissions and impacts) since the large earthmoving equipment would be used during the initial months. Using the first 12 months would result in the peak annual emission and impacts of the various criteria pollutants. Table D-40 summarizes the emissions for each month for the first 15 months and has been modified to include CO_2 emissions. The pollutant and CO_2 tailpipe emissions for Pre-construction, Phase 1 construction, and the worst-case construction year have been summed in Table D-41 to provide the worst case scenario for a 12-month period. Table D-42 shows the annual emissions data for Phase 2 construction (no worst case needed as in pre-construction/Phase 1 construction).

Table D- 40 Pollutant and CO_2 Tailpipe Emissions for Pre-construction and Phase 1 Construction by Month

(Originally Table RAI 8-a-3 which has been modified)

Month	Construction Phase	Tailpipe Emissions (lb)								Diesel Burned (lb)
		NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	
MONTH 01	Pre-construction	2,504	833	231,489	128	124	138	71	92	72,567
MONTH 02	Pre-construction	2,504	833	231,489	128	124	138	71	92	72,567
MONTH 03	Pre-construction	2,504	833	231,489	128	124	138	71	92	72,567
MONTH 04	Phase 1	2,504	833	231,489	128	124	138	71	92	72,567
MONTH 05	Phase 1	2,006	579	187,935	122	118	141	57	74	58,914
MONTH 06	Phase 1	2,006	579	187,935	122	118	141	57	74	58,914
MONTH 07	Phase 1	2,264	666	218,589	138	134	152	66	86	68,523
MONTH 08	Phase 1	2,264	666	218,589	138	134	152	66	86	68,523
MONTH 09	Phase 1	2,746	841	262,796	158	153	170	80	103	82,381
MONTH 10	Phase 1	2,746	841	262,796	158	153	170	80	103	82,381
MONTH 11	Phase 1	2,227	637	214,216	133	129	147	65	84	67,152
MONTH 12	Phase 1	2,227	637	214,216	133	129	147	65	84	67,152
MONTH 13	Phase 1	2,139	568	205,494	121	117	133	63	81	64,418
MONTH 14	Phase 1	2,139	568	205,494	121	117	133	63	81	64,418
MONTH 15	Phase 1	2,139	568	205,494	121	117	133	63	81	64,418

NO_2 – Nitrogen Dioxide, CO – Carbon Monoxide; CO_2 – Carbon Dioxide; VOC – Volatile Organic Compound, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns, HAP – Hazardous Air Pollutant

Table D- 41 Pollutant and CO_2 Tailpipe Emissions for Pre-construction, Phase 1 Construction, and Worse Case Construction Year

Combustion Product	Pre-construction Month 01 through Month 03	Worse Case Construction Year Month 01 through Month 12	Phase 1 Month 04 through Month 12
	lb		
NO_2	7,513	28,504	27,408
CO	2,499	8,779	7,985
CO_2	694,466	2,693,024	2,615,039
PM_{10}	383	1,613	1,593
$PM_{2.5}$	371	1,563	1,543
VOC	413	1,770	1,756
SO_2	213	822	796
Combustion HAPs	275	1,062	1,030
Diesel Burned	217,701	844,208	819,761

Table D- 42 Pollutant and CO_2 Tailpipe Emissions for Phase 2 Construction

(Originally Table RAI 8-a-14 which has been modified)

Month	NO_2	CO	CO_2	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs	Diesel Burned
	lb								
MONTH 01	391	96	38,230	25	24	28	11.7	15.1	11,984
MONTH 02	816	247	78,174	52	50	59	23.9	30.9	24,506
MONTH 03	827	256	79,541	54	52	60	24.2	31.3	24,934
MONTH 04	765	234	74,009	48	46	52	22.5	29.2	23,200
MONTH 05	686	190	66,458	39	38	43	20.2	26.2	20,833
MONTH 06	698	199	67,825	41	40	44	20.6	26.6	21,262
MONTH 07	698	199	67,825	41	40	44	20.6	26.6	21,262
MONTH 08	698	199	67,825	41	40	44	20.6	26.6	21,262
MONTH 09	480	124	46,459	25	24	26	14.1	18.1	14,564
MONTH 10	480	124	46,459	25	24	26	14.1	18.1	14,564
MONTH 11	480	124	46,459	25	24	26	14.1	18.1	14,564
MONTH 12	480	124	46,459	25	24	26	14.1	18.1	14,564
Annual Total Emissions :	7,497	2,115	725,722	439	425	477	221	285	227,499
Maximum Monthly Emissions :	827	256	79,541	54	52	60	24	31	24,934

NO_2 – Nitrogen Dioxide, CO – Carbon Monoxide; CO_2 – Carbon Dioxide; VOC – Volatile Organic Compound, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than +2.5 microns, HAP – Hazardous Air Pollutant

7.3 Emission Rates

Table D-43 (RAI 8-a-4) has been modified to show the average tailpipe area emission rates for the worst-case year (3 months Pre-construction plus 9 months of Phase 1). Phase 2 construction average tailpipe emission rates are shown in Table D-44.

Table D- 43 Average Tailpipe Area Emission Rates for the Worst Case Year (Pre-construction Plus 9 Months of Phase 1)

(Originally Table RAI-8-a-4 which has been modified)

Average Rate	NO_2	CO	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs
	$g/s/m^2$						
1-hr	2.23E-05	6.83E-06	1.28E-06	1.24E-06	1.38E-06	6.49E-07	8.39E-07
3-hr	2.23E-05	6.83E-06	1.28E-06	1.24E-06	1.38E-06	6.49E-07	8.39E-07
8-hr	2.23E-05	6.83E-06	1.28E-06	1.24E-06	1.38E-06	6.49E-07	8.39E-07
24-hr	9.29E-06	2.85E-06	5.34E-07	5.17E-07	5.74E-07	2.71E-07	3.50E-07
8,760-hour	4.23E-06	1.30E-06	2.39E-07	2.32E-07	2.62E-07	1.22E-07	1.58E-07

Table D- 44 Average Tailpipe Emission Rates for Phase 2 Construction

(Originally RAI 8-a-15 which has been modified)

Average Area Emission Rate	NO_2	CO	PM_{10}	$PM_{2.5}$	VOC	SO_2	Combustion HAPs
	$g/s/m^2$						
1-hr	2.68E-04	8.30E-05	1.74E-05	1.68E-05	1.95E-05	7.85E-06	1.02E-05
3-hr	2.68E-04	8.30E-05	1.74E-05	1.68E-05	1.95E-05	7.85E-06	1.02E-05
8-hr	2.68E-04	8.30E-05	1.74E-05	1.68E-05	1.95E-05	7.85E-06	1.02E-05
24-hr	1.12E-04	3.46E-05	7.24E-06	7.00E-06	8.12E-06	3.27E-06	4.23E-06
8760-hour	4.44E-05	1.25E-05	2.60E-06	2.52E-06	2.82E-06	1.31E-06	1.69E-06

NO_2 – Nitrogen Dioxide, CO – Carbon Monoxide; VOC – Volatile Organic Compound, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns, HAP – Hazardous Air Pollutant

8. Fugitive Dust Emissions

Fugitive dust is solid particulate matter emitted from any source other than a stack or chimney. Fugitive dust particulates occur over a wide range of particulate sizes. The term total suspended particulate (TSP) describes the entire range of fugitive particulate emissions (all particle sizes). For initial site preparation activities, EPA AP-42, Section 13.2.3.3, cites a TSP emission factor of 1.2 tons/acre/month (EPA 1995). After site preparation activities have been completed, it is assumed that fugitive TSP emissions would drop to 0.3 tons/acre/month. On average, PM_{10} and $PM_{2.5}$ represent 15 percent and 7.5 percent of TSP fugitive dust emissions (MRI 2006). For the purpose of evaluation, fugitive dust emissions are assumed to occur over 60 percent of the total construction site at any given time.

Table D-45 (RAI 8-a-5) has been modified to add the 3 additional months of fugitive dusts to the 12 months in the RAI response. Table D-46 (RAI 8-a-16) was added to present the fugitive dust emissions for the twelve months of Phase 2 construction.

8.1 Calculations of Fugitive Dust Emissions

Table D- 45 Fugitive Dust Emissions by Month for Pre-construction and Phase 1 Construction

(Originally Table RAI 8-a-5 which has been modified)

Month	TSP (ton/acre)	Hours	TSP (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)
Month 01	1.2	208	14.4	2.16	1.08
Month 02	1.2	208	14.4	2.16	1.08
Month 03	1.2	208	14.4	2.16	1.08
Month 04	1.2	208	14.4	2.16	1.08
Month 05	0.3	208	3.6	0.54	0.27
Month 06	0.3	208	3.6	0.54	0.27
Month 07	0.3	208	3.6	0.54	0.27
Month 08	0.3	208	3.6	0.54	0.27
Month 09	0.3	208	3.6	0.54	0.27
Month 10	0.3	208	3.6	0.54	0.27
Month 11	0.3	208	3.6	0.54	0.27
Month 12	0.3	208	3.6	0.54	0.27
Month 13	0.3	208	3.6	0.54	0.27
Month 14	0.3	208	3.6	0.54	0.27
Month 15	0.3	208	3.6	0.54	0.27

PM_{10} Maximum Monthly Total (ton):	2.16	PM_{10} Annual Total (ton):	12.96
$PM_{2.5}$ Maximum Monthly Total (ton):	1.08	$PM_{2.5}$ Annual Total (ton):	6.48
PM_{10} Annual Total (lb):	25,920	$PM_{2.5}$ Annual Total (lb):	12960
PM_{10} Maximum Monthly Total (g):	1.96E+06	PM_{10} Annual Total (g):	1.18E+07
$PM_{2.5}$ Maximum Monthly Total (g):	9.80E+05 $PM_{2.5}$	Annual Total (g):	5.88E+06
Maximum Hours per month (hrs):	208		

Assumptions

1. size of the construction site - 40 acre
2. fraction of the site with active construction at any given time - 0.6
3. effective area of the construction site - 24 acre
4. construction dimension - 274 m x 354 m
5. fraction of TSP that is PM_{10} - 0.15 ton PM10/ton TSP
6. fraction of TSP that is $PM_{2.5}$ - 0.075 ton PM10/ton TSP
7. Application of water on unpaved surfaces reduces fugitive dust by 50 percent.

Table D- 46 Fugitive Dust Emissions by Month for Phase 2 Construction

(also RAI 8-a-16 which has been modified)

Month	TSP (ton/acre)	Hours	TSP (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)
Month 01	0.3	208	0.09	0.0135	0.00675
Month 02	0.3	208	0.09	0.0135	0.00675
Month 03	0.3	208	0.09	0.0135	0.00675
Month 04	0.3	208	0.09	0.0135	0.00675
Month 05	0.3	208	0.09	0.0135	0.00675
Month 06	0.3	208	0.09	0.0135	0.00675
Month 07	0.3	208	0.09	0.0135	0.00675
Month 08	0.3	208	0.09	0.0135	0.00675
Month 09	0.3	208	0.09	0.0135	0.00675
Month 10	0.3	208	0.09	0.0135	0.00675
Month 11	0.3	208	0.09	0.0135	0.00675
Month 12	0.3	208	0.09	0.0135	0.00675

PM_{10} Maximum Monthly Total (ton):	0.0135	PM_{10} Annual Total (ton):	0.162
$PM_{2.5}$ Maximum Monthly Total (ton):	0.00675	$PM_{2.5}$ Annual Total (ton):	0.081
PM_{10} Annual Total (lb):	324	$PM_{2.5}$ Annual Total (lb):	162
PM_{10} Maximum Monthly Total (g):	1.22E+04	PM_{10} Annual Total (g):	1.47E+05
$PM_{2.5}$ Maximum Monthly Total (g):	6.12E+03	$PM_{2.5}$ Annual Total (g):	7.35E+04
Maximum Hours per month (hrs):	208		

Assumptions

1. Size of the construction site - 1 acre
2. Fraction of the site with active construction at any given time - 0.6
3. Active area of the construction site - 0.6 acre
4. Active construction dimension – 49.3 m x 49.3 m
5. Fraction of TSP that is PM10 - 0.15 ton PM10/ton TSP
6. Fraction of TSP that is PM2.5 - 0.075 ton PM10/ton TSP
7. Application of water on unpaved surfaces reduces fugitive dust by 50 percent.

8.2 Fugitive Dust Emission Rates

Fugitive dust emissions rates for pre-construction and Phase 1 construction are presented by month in Table D-47 (Table RAI 8-a-6 which has been modified). Table D-48 (RAI 8-a-17 unchanged but is included to provide continuity of the calculations) shows the fugitive dust emission rates for Phase 2 construction.

Table D- 47 Average Fugitive Dust Area Emission Rates (PM_{10} and $PM_{2.5}$) for Phase 1 Construction

(Also Table RAI 8-a-6)

Time Rate	Area Emission Rate ($g/s/m^2$)	
	PM_{10}	$PM_{2.5}$
1-hr	2.70E-05	1.35E-05
3-hr	2.70E-05	1.35E-05
8-hr	2.70E-05	1.35E-05
24-hr	1.12E-05	5.62E-06
8,760-hour	3.84E-06	1.92E-06

Values from Table D-45

PM_{10} Maximum Monthly Total (ton):	2.16	PM_{10} Annual Total (ton):	12.96
$PM_{2.5}$ Maximum Monthly Total (ton):	1.08	$PM_{2.5}$ Annual Total (ton):	6.48
PM_{10} Annual Total (lb):	25,920	$PM_{2.5}$ Annual Total (lb):	12960
PM_{10} Maximum Monthly Total (g):	1.96E+06	PM_{10} Annual Total (g):	1.18E+07
$PM_{2.5}$ Maximum Monthly Total (g):	9.80E+05	$PM_{2.5}$ Annual Total (g):	5.88E+06
Maximum Hours per month (hrs):	208		

Table D- 48 Average Fugitive Dust Area Emission Rates (PM_{10} and $PM_{2.5}$) for Phase 2 Construction

(Also Table 8-a-17 which has been modifed)

Time Rate	Area Emission Rate ($g/s/m^2$)	
	PM_{10}	$PM_{2.5}$
1-hr	6.73E-06	3.36E-06
3-hr	6.73E-06	3.36E-06
8-hr	6.73E-06	3.36E-06
24-hr	2.80E-06	1.40E-06
8,760-hour	1.92E-06	9.59E-07

Values from Table D-46

PM_{10} Maximum Monthly Total (ton):	0.0135	PM_{10} Annual Total (ton):	0.162
$PM_{2.5}$ Maximum Monthly Total (ton):	0.00675	$PM_{2.5}$ Annual Total (ton):	0.081
PM_{10} Annual Total (lb):	324	$PM_{2.5}$ Annual Total (lb):	162
PM_{10} Maximum Monthly Total (g):	1.22E+04	PM_{10} Annual Total (g):	1.47E+05
$PM_{2.5}$ Maximum Monthly Total (g):	6.12E+03	$PM_{2.5}$ Annual Total (g):	7.35E+04
Maximum Hours per month (hrs):	208		

9.0 Fugitive HAP Emissions

Fugitive HAP emissions are generated by evaporative losses from diesel storage tanks and diesel fuel transfer operations. The total annual HAP fugitive emissions are calculated as a product of the diesel consumption factors from AP-42, and an HAP fugitive emission rate of 0.000028 lb fugitive HAPs per lb diesel (SBAP 2010). Table D-49 (also Table RAI 8-a-7 modified) shows the HAP fugitive emissions for Pre-construction, Phase 1, and worst-case construction year; and Table D-50 (also Table RAI 8-a-18) provides the HAP fugitive emissions for Phase 2 construction.

Table D- 49 Calculate Fugitive HAP emissions Pre-Construction and Phase 1 Construction

(Also Table RAI 8-a-7)

778336 lb diesel burned - mass of diesel fuel consumed by construction equipment over the entire year
0.000028 lb HAP / lb Diesel emission factor for a diesel service station
Total HAP over one year = 22 lb

Assumptions

1. Assumed equipment types are listed in D-2 and D-3.
2. Construction equipment is operated 10 hours per day, 5 days per week, 50 weeks per year.
3. All construction equipment is fueled with diesel.
4. On average, construction equipment consumes diesel fuel at a rate of 0.054 gal/hp-hr (ATTRA, 2007).
5. Annual storage tank evaporation losses are five percent of tank capacity (ATTRA, 2007).
6. The temporary onsite fuel storage tank is equipped with enhanced vapor recovery equipment to minimize fugitive VOC emissions.

Table D- 50 Calculate Fugitive HAP emissions Phase 2 Construction

(Also RAI 8-a-18)

227499 lb diesel burned - mass of diesel fuel consumed by construction equipment over the entire year.
0.000028 lb HAP / lb Diesel emission factor for a diesel service station.
Total HAP over one year = 6 lb.

Assumptions

1. Assumed equipment types are listed in Table D-4.
2. Construction equipment is operated 10 hours per day, 5 days per week, 50 weeks per year.
3. All construction equipment is fueled with diesel.
4. On average, construction equipment consumes diesel fuel at a rate of 0.054 gal/hp-hr (ATTRA, 2007).
5. Annual storage tank evaporation losses are five percent of tank capacity (ATTRA, 2007).
6. The temporary onsite fuel storage tank is equipped with enhanced vapor recovery equipment to minimize fugitive VOC emissions.

10.0 Combined Emissions

Annual pollutant emission totals (tailpipe emissions + fugitive dust emissions + fugitive HAP emissions) are summed and reported in the Environmental Report. Table D-51 (Also Table RAI 9-a-9 which was modified) presents the combined emissions for Pre-construction, Phase 1 construction, and the worst-case construction year. Table D-52 (also Table RAI8-a-19) summarizes the combined emissions for Phase 2 construction. Annual pollutant emission totals form the basis for calculation of the average emission rate for input to SCREEN3. Similarly, monthly maximum criteria pollutant emissions are summed, and the maximum sum is selected to calculate time-averaged area emission rates for input to SCREEN3 (this is described further in Section 12).

Table D- 51 Criteria Pollutant, VOC, and HAP Annual Pollutant Emissions for Pre-construction, Phase 1 Construction, And Worse Case Construction Year

(Also ER Table 4-13/RAI 8-a-9 which has been modified)

Combustion Product	Pre-construction Month 01 through Month 03	Phase 1 Month 04 through Month 12	Worse Case Construction Year Month 01 through Month 12	Fugitive	Annual
	lb				
NO_2	7,513	27,408	28,504	0	28,504
CO	2,499	7,985	8,779	0	8,779
CO_2	694,466	2,615,039	2,693,024	0	2,693,024
PM_{10}	389	1,593	1,626	25,920	27,546
$PM_{2.5}$	374	1,551	1,569	12,960	14,529
VOC	413	1,760	1,770	21.8	1,792
SO_2	213	796	822	0	822
Combustion HAPs	275	1,034	1,065	0	1,065
Diesel Burned	217,701	819,761	844,208	0	844,208

NO_2 – Nitrogen Dioxide, CO – Carbon Monoxide; VOC – Volatile Organic Compound, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns, HAP – Hazardous Air Pollutant

Assumptions:

1. Annual construction activities are performed 50 hours per week for 50 weeks. Maximum hours of operation of any piece of equipment are 160 hours/month.
2. Peak site preparation activities persist for 4 months in the first year.
3. Post site-preparation activities persist for next 11 months
4. Fugitive dust emissions are calculated separately for peak site preparation and post site-preparation.
5. Fugitive TSP generation is 1.2 ton/acre/month for peak site preparation.
6. Fugitive TSP generation is 0.3 ton/acre/month after site preparation is completed.
7. Fugitive PM_{10} emissions are 15 percent of TSP.
8. Fugitive $PM_{2.5}$ emissions are 7.5 percent of TSP
9. The site is 40 acres.
10. Sixty percent of the 40 acre site is disturbed at any given time.
11. The disturbed area at any time has the same aspect ratio as the IIFP site (aspect ratio = 1.3).
12. Sixty percent of construction equipment is operational at any given time.
13. Application of water on unpaved surfaces reduces fugitive dust by 50 percent.
14. All construction equipment is fueled with diesel.
15. Construction equipment load factors are based on EPA-420-P-04-005.
16. Construction equipment emission factors and deterioration factors are based on EPA420-P-04-009,
17. Regional impacts determined via SCREEN3 based on application of frequency-weighted site-specific meteorology.

Table D- 52 Criteria Pollutant, VOC, and HAP Annual Pollutant Emissions for Phase 2 Construction

(Also ER Table 4- 23/ RAI 8-a-19 which has been modified)

Pollutant	Tailpipe (lb)	Fugitive (lb)	Annual (lb)
NO_2	7,497	0	7,497
CO	2,115	0	2,115
CO_2	725,722	0	725,722
PM_{10}	439	324	763
$PM_{2.5}$	425	162	587
VOC	477	6.4	484
SO_2	221	0	221
HAPs	285	6	291
Diesel Burned	227,499	0	227,499

NO_2 – Nitrogen Dioxide, CO – Carbon Monoxide VOC – Volatile Organic Compound, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns, HAP – Hazardous Air Pollutant

Assumptions:

1. Annual construction activities are performed 50 hours per week for 50 weeks. Maximum hours of operation of any piece of equipment are 160 hours/month.
2. Fugitive TSP generation is 0.3 ton/acre/month for all Phase 2 construction activities
3. Size of the construction site - 1 acre
4. Sixty percent of the 1 acre site is disturbed at any given time
5. effective area of the construction site - 0.6 acre
6. effective construction area dimensions - 49.3 m x 49.3 m
7. fraction of TSP that is PM_{10} - 0.15 ton PM10/ton TSP
8. fraction of TSP that is $PM_{2.5}$ - 0.075 ton PM10/ton TSP
9. Application of water on unpaved surfaces reduces fugitive dust by 50 percent.
10. All construction equipment is fueled with diesel.
11. Construction equipment load factors are based on EPA-420-P-04-005.
12. Construction equipment emission factors and deterioration factors are based on EPA420-P-04-009.
13. Regional impacts determined via SCREEN3 based on application of frequency-weighted site-specific meteorology.

11.0 Site-Specific Meteorology

Representative regional meteorological data was applied to determine regional air-quality impacts attributable to IIFP construction activities. The data, provided by the State of New Mexico, includes 9408 hourly records that indicate the atmospheric stability and the direction and speed of the wind. Because construction activities would occur only in daylight hours, hourly records that occur at night (before sunrise or after sunset) were ignored. The stability class / wind speed combinations illustrated in Table 11-1 represent more than 97 percent of all day time records for the southeastern New Mexico region.

Table D- 53 Regional Daytime Atmospheric Conditions and Occurrence Frequency

(Also RAI Attachment Table 11-1)

Stability Class and Wind Speed	Daytime Occurrence Frequency
D02	2.95%
D03	9.00%
D04	9.50%
D05	12.15%
D06	11.78%
D07	7.25%
D08	4.06%
D09	2.37%
D10	1.24%
D11	0.62%
E01	0.45%
E02	2.63%
E03	5.86%
E04	13.11%
E05	7.04%
F01	1.95%
F02	4.73%
F03	1.28%

Source: NMED 1998

12.0 SCREEN3

The SCREEN3 computer program is applied to estimate maximum regional criteria pollutant concentrations attributable to area source construction emissions (i.e., air quality impacts). Air quality impacts are not evaluated for HAPs or VOCs because there are no regulatory metrics for comparison (HAP and VOC emissions are regulated by source controls and permit requirements). SCREEN3 calculates the one-hour average concentration for a range of downwind distances. Key inputs include the pollutant emission rate ($g/s/m^3$), release height (m), receptor height (m), stability class, and wind speed (m/s). All construction emissions are conservatively assumed to originate at ground level.

12.1 Pre-Construction/Phase 1

Table D- 54 Results from SCREEN3 Output Files, 1 g/s Release Rate for Pre-construction and Phase 1 Construction

Stability	4	4	4	4	4	4	4	4	4
Wind	2	3	4	5	6	7	8	9	10
Emission	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Distance	**CP1_D02**	**CP1_D03**	**CP1_D04**	**CP1_D05**	**CP1_D06**	**CP1_D07**	**CP1_D08**	**CP1_D09**	**CP1_D10**
	µg/m^3								
10	1.77E+07	1.18E+07	8.85E+06	7.08E+06	5.90E+06	5.06E+06	4.43E+06	3.93E+06	3.54E+06
20	1.81E+07	1.21E+07	9.05E+06	7.24E+06	6.03E+06	5.17E+06	4.52E+06	4.02E+06	3.62E+06
30	1.85E+07	1.23E+07	9.23E+06	7.38E+06	6.15E+06	5.28E+06	4.62E+06	4.10E+06	3.69E+06
40	1.88E+07	1.26E+07	9.41E+06	7.53E+06	6.27E+06	5.38E+06	4.71E+06	4.18E+06	3.76E+06
50	1.92E+07	1.28E+07	9.58E+06	7.67E+06	6.39E+06	5.48E+06	4.79E+06	4.26E+06	3.83E+06
60	1.95E+07	1.30E+07	9.75E+06	7.80E+06	6.50E+06	5.57E+06	4.88E+06	4.33E+06	3.90E+06
70	1.98E+07	1.32E+07	9.91E+06	7.93E+06	6.61E+06	5.66E+06	4.96E+06	4.41E+06	3.97E+06
80	2.01E+07	1.34E+07	1.01E+07	8.06E+06	6.71E+06	5.75E+06	5.04E+06	4.48E+06	4.03E+06
90	2.05E+07	1.36E+07	1.02E+07	8.18E+06	6.82E+06	5.84E+06	5.11E+06	4.54E+06	4.09E+06
100	2.12E+07	1.41E+07	1.06E+07	8.47E+06	7.05E+06	6.05E+06	5.29E+06	4.70E+06	4.23E+06
200	2.43E+07	1.62E+07	1.21E+07	9.71E+06	8.09E+06	6.94E+06	6.07E+06	5.39E+06	4.85E+06
300	1.67E+07	1.11E+07	8.35E+06	6.68E+06	5.57E+06	4.77E+06	4.17E+06	3.71E+06	3.34E+06
400	1.16E+07	7.71E+06	5.78E+06	4.62E+06	3.85E+06	3.30E+06	2.89E+06	2.57E+06	2.31E+06
500	9.03E+06	6.02E+06	4.51E+06	3.61E+06	3.01E+06	2.58E+06	2.26E+06	2.01E+06	1.81E+06
600	7.45E+06	4.97E+06	3.73E+06	2.98E+06	2.48E+06	2.13E+06	1.86E+06	1.66E+06	1.49E+06
700	6.34E+06	4.22E+06	3.17E+06	2.53E+06	2.11E+06	1.81E+06	1.58E+06	1.41E+06	1.27E+06
800	5.50E+06	3.67E+06	2.75E+06	2.20E+06	1.83E+06	1.57E+06	1.37E+06	1.22E+06	1.10E+06
900	4.85E+06	3.23E+06	2.42E+06	1.94E+06	1.62E+06	1.38E+06	1.21E+06	1.08E+06	9.69E+05
1000	4.33E+06	2.89E+06	2.17E+06	1.73E+06	1.44E+06	1.24E+06	1.08E+06	9.63E+05	8.67E+05
1200	3.59E+06	2.40E+06	1.80E+06	1.44E+06	1.20E+06	1.03E+06	8.98E+05	7.98E+05	7.19E+05
1400	3.06E+06	2.04E+06	1.53E+06	1.22E+06	1.02E+06	8.75E+05	7.65E+05	6.80E+05	6.12E+05
1600	2.64E+06	1.76E+06	1.32E+06	1.06E+06	8.80E+05	7.55E+05	6.60E+05	5.87E+05	5.28E+05
1800	2.30E+06	1.53E+06	1.15E+06	9.20E+05	7.67E+05	6.57E+05	5.75E+05	5.11E+05	4.60E+05
2000	2.02E+06	1.35E+06	1.01E+06	8.08E+05	6.73E+05	5.77E+05	5.05E+05	4.49E+05	4.04E+05

Table D-54 Results from SCREEN3 Output Files, 1 g/s Release Rate for Pre-construction and Phase 1 Construction (Continued)

Stability	4	5	5	5	5	5	6	6	6
Wind	11	1	2	3	4	5	1	2	3
Emission	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Distance	**CO_D11**	**CO_E01**	**CP1_E02**	**CP1_E03**	**CP1_E04**	**CP1_E05**	**CP1_F01**	**CP1_F02**	**CP1_F03**
	µg/m^3								
10	3.22E+06	4.30E+07	2.15E+07	1.43E+07	1.08E+07	8.60E+06	4.96E+07	2.48E+07	1.65E+07
20	3.29E+06	4.39E+07	2.19E+07	1.46E+07	1.10E+07	8.78E+06	5.12E+07	2.56E+07	1.71E+07
30	3.36E+06	4.37E+07	2.19E+07	1.46E+07	1.09E+07	8.75E+06	5.27E+07	2.63E+07	1.76E+07
40	3.42E+06	4.47E+07	2.24E+07	1.49E+07	1.12E+07	8.95E+06	5.41E+07	2.71E+07	1.80E+07
50	3.48E+06	4.57E+07	2.29E+07	1.52E+07	1.14E+07	9.14E+06	5.55E+07	2.78E+07	1.85E+07
60	3.55E+06	4.66E+07	2.33E+07	1.56E+07	1.17E+07	9.33E+06	5.74E+07	2.87E+07	1.91E+07
70	3.60E+06	4.75E+07	2.38E+07	1.59E+07	1.19E+07	9.51E+06	5.88E+07	2.94E+07	1.96E+07
80	3.66E+06	4.84E+07	2.42E+07	1.61E+07	1.21E+07	9.69E+06	6.02E+07	3.01E+07	2.01E+07
90	3.72E+06	4.93E+07	2.46E+07	1.64E+07	1.23E+07	9.86E+06	6.15E+07	3.08E+07	2.05E+07
100	3.85E+06	5.01E+07	2.51E+07	1.67E+07	1.25E+07	1.00E+07	6.28E+07	3.14E+07	2.09E+07
200	4.41E+06	5.90E+07	2.95E+07	1.97E+07	1.47E+07	1.18E+07	7.43E+07	3.72E+07	2.48E+07
300	3.04E+06	4.57E+07	2.28E+07	1.52E+07	1.14E+07	9.14E+06	6.76E+07	3.38E+07	2.25E+07
400	2.10E+06	3.30E+07	1.65E+07	1.10E+07	8.25E+06	6.60E+06	5.09E+07	2.54E+07	1.70E+07
500	1.64E+06	2.64E+07	1.32E+07	8.82E+06	6.61E+06	5.29E+06	4.13E+07	2.06E+07	1.38E+07
600	1.36E+06	2.23E+07	1.11E+07	7.43E+06	5.57E+06	4.46E+06	3.50E+07	1.75E+07	1.17E+07
700	1.15E+06	1.93E+07	9.65E+06	6.43E+06	4.82E+06	3.86E+06	3.06E+07	1.53E+07	1.02E+07
800	1.00E+06	1.70E+07	8.51E+06	5.67E+06	4.25E+06	3.40E+06	2.73E+07	1.36E+07	9.09E+06
900	8.81E+05	1.52E+07	7.61E+06	5.08E+06	3.81E+06	3.05E+06	2.47E+07	1.24E+07	8.25E+06
1000	7.88E+05	1.38E+07	6.90E+06	4.60E+06	3.45E+06	2.76E+06	2.28E+07	1.14E+07	7.58E+06
1200	6.53E+05	1.17E+07	5.86E+06	3.90E+06	2.93E+06	2.34E+06	1.97E+07	9.84E+06	6.56E+06
1400	5.57E+05	1.02E+07	5.10E+06	3.40E+06	2.55E+06	2.04E+06	1.74E+07	8.70E+06	5.80E+06
1600	4.80E+05	8.98E+06	4.49E+06	2.99E+06	2.25E+06	1.80E+06	1.56E+07	7.80E+06	5.20E+06
1800	4.18E+05	7.99E+06	3.99E+06	2.66E+06	2.00E+06	1.60E+06	1.41E+07	7.06E+06	4.71E+06
2000	3.67E+05	7.16E+06	3.58E+06	2.39E+06	1.79E+06	1.43E+06	1.29E+07	6.45E+06	4.30E+06

Table D- 55 Frequency Adjusted Results Based on 1 g/s/m^2 for Pre-construction and Phase 1 Construction

Distance	D02	D03	D04	D05	D06	D07	D08	D09	D10
	µg/m^3								
10	5.22E+05	1.06E+06	8.40E+05	8.60E+05	6.95E+05	3.67E+05	1.80E+05	9.34E+04	4.39E+04
20	5.34E+05	1.09E+06	8.59E+05	8.79E+05	7.11E+05	3.75E+05	1.84E+05	9.54E+04	4.49E+04
30	5.45E+05	1.11E+06	8.76E+05	8.97E+05	7.25E+05	3.82E+05	1.88E+05	9.74E+04	4.58E+04
40	5.55E+05	1.13E+06	8.93E+05	9.14E+05	7.39E+05	3.90E+05	1.91E+05	9.93E+04	4.67E+04
50	5.65E+05	1.15E+06	9.10E+05	9.31E+05	7.53E+05	3.97E+05	1.95E+05	1.01E+05	4.75E+04
60	5.75E+05	1.17E+06	9.26E+05	9.47E+05	7.66E+05	4.04E+05	1.98E+05	1.03E+05	4.84E+04
70	5.85E+05	1.19E+06	9.41E+05	9.63E+05	7.79E+05	4.11E+05	2.01E+05	1.05E+05	4.92E+04
80	5.94E+05	1.21E+06	9.56E+05	9.79E+05	7.91E+05	4.17E+05	2.05E+05	1.06E+05	5.00E+04
90	6.04E+05	1.23E+06	9.70E+05	9.94E+05	8.03E+05	4.24E+05	2.08E+05	1.08E+05	5.07E+04
100	6.24E+05	1.27E+06	1.00E+06	1.03E+06	8.31E+05	4.38E+05	2.15E+05	1.12E+05	5.25E+04
200	7.16E+05	1.46E+06	1.15E+06	1.18E+06	9.53E+05	5.03E+05	2.47E+05	1.28E+05	6.02E+04
300	4.93E+05	1.00E+06	7.93E+05	8.11E+05	6.56E+05	3.46E+05	1.70E+05	8.81E+04	4.14E+04
400	3.41E+05	6.94E+05	5.49E+05	5.62E+05	4.54E+05	2.39E+05	1.17E+05	6.10E+04	2.87E+04
500	2.66E+05	5.42E+05	4.29E+05	4.39E+05	3.55E+05	1.87E+05	9.17E+04	4.76E+04	2.24E+04
600	2.20E+05	4.47E+05	3.54E+05	3.62E+05	2.93E+05	1.54E+05	7.57E+04	3.93E+04	1.85E+04
700	1.87E+05	3.80E+05	3.01E+05	3.08E+05	2.49E+05	1.31E+05	6.44E+04	3.34E+04	1.57E+04
800	1.62E+05	3.30E+05	2.61E+05	2.67E+05	2.16E+05	1.14E+05	5.58E+04	2.90E+04	1.36E+04
900	1.43E+05	2.91E+05	2.30E+05	2.35E+05	1.90E+05	1.00E+05	4.92E+04	2.56E+04	1.20E+04
1000	1.28E+05	2.60E+05	2.06E+05	2.11E+05	1.70E+05	8.98E+04	4.40E+04	2.29E+04	1.07E+04
1200	1.06E+05	2.16E+05	1.71E+05	1.75E+05	1.41E+05	7.44E+04	3.65E+04	1.90E+04	8.91E+03
1400	9.03E+04	1.84E+05	1.45E+05	1.49E+05	1.20E+05	6.34E+04	3.11E+04	1.61E+04	7.59E+03
1600	7.79E+04	1.59E+05	1.25E+05	1.28E+05	1.04E+05	5.47E+04	2.68E+04	1.39E+04	6.55E+03
1800	6.79E+04	1.38E+05	1.09E+05	1.12E+05	9.03E+04	4.76E+04	2.34E+04	1.21E+04	5.70E+03
2000	5.96E+04	1.21E+05	9.59E+04	9.81E+04	7.93E+04	4.18E+04	2.05E+04	1.07E+04	5.01E+03

Table D-55 Frequency Adjusted Results Based on 1 g/s/m^2 for Pre-construction and Phase 1 Construction (Continued)

Distance	D11	E01	E02	E03	E04	E05	F01	F02	F03	Wt Avg
	µg/m^3									
10	2.00E+04	1.93E+05	5.66E+05	8.40E+05	1.41E+06	6.05E+05	9.65E+05	1.17E+06	2.12E+05	5.92E+05
20	2.04E+04	1.97E+05	5.77E+05	8.57E+05	1.44E+06	6.17E+05	9.96E+05	1.21E+06	2.19E+05	6.05E+05
30	2.08E+04	1.96E+05	5.75E+05	8.54E+05	1.43E+06	6.16E+05	1.02E+06	1.24E+06	2.25E+05	6.14E+05
40	2.12E+04	2.01E+05	5.88E+05	8.74E+05	1.47E+06	6.30E+05	1.05E+06	1.28E+06	2.31E+05	6.28E+05
50	2.16E+04	2.05E+05	6.01E+05	8.92E+05	1.50E+06	6.43E+05	1.08E+06	1.31E+06	2.38E+05	6.41E+05
60	2.20E+04	2.09E+05	6.13E+05	9.11E+05	1.53E+06	6.56E+05	1.12E+06	1.36E+06	2.45E+05	6.55E+05
70	2.24E+04	2.14E+05	6.25E+05	9.29E+05	1.56E+06	6.69E+05	1.14E+06	1.39E+06	2.51E+05	6.68E+05
80	2.27E+04	2.17E+05	6.37E+05	9.46E+05	1.59E+06	6.81E+05	1.17E+06	1.42E+06	2.57E+05	6.81E+05
90	2.31E+04	2.21E+05	6.48E+05	9.63E+05	1.62E+06	6.93E+05	1.20E+06	1.45E+06	2.63E+05	6.92E+05
100	2.39E+04	2.25E+05	6.59E+05	9.79E+05	1.64E+06	7.05E+05	1.22E+06	1.48E+06	2.69E+05	7.10E+05
200	2.74E+04	2.65E+05	7.75E+05	1.15E+06	1.93E+06	8.30E+05	1.45E+06	1.76E+06	3.18E+05	8.28E+05
300	1.88E+04	2.05E+05	6.01E+05	8.92E+05	1.50E+06	6.43E+05	1.32E+06	1.60E+06	2.89E+05	6.37E+05
400	1.30E+04	1.48E+05	4.34E+05	6.45E+05	1.08E+06	4.64E+05	9.90E+05	1.20E+06	2.17E+05	4.58E+05
500	1.02E+04	1.19E+05	3.48E+05	5.17E+05	8.67E+05	3.72E+05	8.03E+05	9.75E+05	1.76E+05	3.65E+05
600	8.40E+03	1.00E+05	2.93E+05	4.35E+05	7.30E+05	3.14E+05	6.81E+05	8.27E+05	1.50E+05	3.06E+05
700	7.14E+03	8.66E+04	2.54E+05	3.77E+05	6.32E+05	2.71E+05	5.95E+05	7.22E+05	1.31E+05	2.64E+05
800	6.20E+03	7.64E+04	2.24E+05	3.32E+05	5.58E+05	2.39E+05	5.31E+05	6.44E+05	1.17E+05	2.32E+05
900	5.46E+03	6.84E+04	2.00E+05	2.97E+05	4.99E+05	2.14E+05	4.81E+05	5.85E+05	1.06E+05	2.07E+05
1000	4.89E+03	6.20E+04	1.82E+05	2.70E+05	4.53E+05	1.94E+05	4.43E+05	5.37E+05	9.73E+04	1.88E+05
1200	4.05E+03	5.26E+04	1.54E+05	2.29E+05	3.84E+05	1.65E+05	3.83E+05	4.65E+05	8.42E+04	1.59E+05
1400	3.45E+03	4.58E+04	1.34E+05	1.99E+05	3.34E+05	1.43E+05	3.39E+05	4.11E+05	7.44E+04	1.38E+05
1600	2.98E+03	4.03E+04	1.18E+05	1.75E+05	2.94E+05	1.26E+05	3.04E+05	3.69E+05	6.67E+04	1.22E+05
1800	2.59E+03	3.59E+04	1.05E+05	1.56E+05	2.62E+05	1.12E+05	2.75E+05	3.34E+05	6.04E+04	1.08E+05
2000	2.28E+03	3.22E+04	9.42E+04	1.40E+05	2.35E+05	1.01E+05	2.51E+05	3.05E+05	5.52E+04	9.71E+04
Max Wt Avg =	8.28E+05									

Table D- 56 One Hour Pollutant Concentrations Based On One Hour Average Emissions Rates for Pre-construction and Phase 1 Construction

$g/s/m^2$ ==>	6.83E-06	2.23E-05	1.47E-05	2.83E-05	6.49E-07
Distance	**CO**	**NO_2**	**$PM_{2.5}$**	**PM_{10}**	**SO_2**
	$\mu g/m^3$				
10	4.04E+00	1.32E+01	8.72E+00	1.67E+01	3.84E-01
20	4.13E+00	1.35E+01	8.92E+00	1.71E+01	3.93E-01
30	4.19E+00	1.37E+01	9.05E+00	1.74E+01	3.99E-01
40	4.29E+00	1.40E+01	9.25E+00	1.77E+01	4.08E-01
50	4.38E+00	1.43E+01	9.45E+00	1.81E+01	4.16E-01
60	4.48E+00	1.46E+01	9.66E+00	1.85E+01	4.26E-01
70	4.56E+00	1.49E+01	9.84E+00	1.89E+01	4.34E-01
80	4.65E+00	1.52E+01	1.00E+01	1.92E+01	4.42E-01
90	4.73E+00	1.54E+01	1.02E+01	1.96E+01	4.50E-01
100	4.85E+00	1.58E+01	1.05E+01	2.01E+01	4.61E-01
200	5.65E+00	1.84E+01	1.22E+01	2.34E+01	5.38E-01
300	4.35E+00	1.42E+01	9.38E+00	1.80E+01	4.13E-01
400	3.13E+00	1.02E+01	6.74E+00	1.29E+01	2.97E-01
500	2.49E+00	8.13E+00	5.37E+00	1.03E+01	2.37E-01
600	2.09E+00	6.81E+00	4.50E+00	8.64E+00	1.98E-01
700	1.80E+00	5.88E+00	3.88E+00	7.45E+00	1.71E-01
800	1.58E+00	5.17E+00	3.42E+00	6.56E+00	1.51E-01
900	1.42E+00	4.62E+00	3.06E+00	5.86E+00	1.35E-01
1000	1.28E+00	4.19E+00	2.77E+00	5.31E+00	1.22E-01
1200	1.09E+00	3.55E+00	2.35E+00	4.50E+00	1.03E-01
1400	9.45E-01	3.08E+00	2.04E+00	3.91E+00	8.99E-02
1600	8.32E-01	2.71E+00	1.79E+00	3.44E+00	7.91E-02
1800	7.39E-01	2.41E+00	1.59E+00	3.06E+00	7.03E-02
2000	6.63E-01	2.16E+00	1.43E+00	2.74E+00	6.30E-02
Maximum:	5.65E+00	1.84E+01	1.22E+01	2.34E+01	5.38E-01
Property Boundary:	1.42E+00	4.62E+00	3.06E+00	5.86E+00	1.35E-01
One Mile:	8.32E-01	2.71E+00	1.79E+00	3.44E+00	7.91E-02

Table D- 57 One Hour Pollutant Concentrations Based On Three Hour Average Emissions Rates for Pre-construction and Phase 1 Construction

$g/s/m^2$ ==>	6.83E-06	2.23E-05	1.47E-05	2.83E-05	6.49E-07
Distance	**CO**	**NO_2**	**$PM_{2.5}$**	**PM_{10}**	**SO_2**
	$\mu g/m^3$				
10	4.04E+00	1.32E+01	8.72E+00	1.67E+01	3.84E-01
20	4.13E+00	1.35E+01	8.92E+00	1.71E+01	3.93E-01
30	4.19E+00	1.37E+01	9.05E+00	1.74E+01	3.99E-01
40	4.29E+00	1.40E+01	9.25E+00	1.77E+01	4.08E-01
50	4.38E+00	1.43E+01	9.45E+00	1.81E+01	4.16E-01
60	4.48E+00	1.46E+01	9.66E+00	1.85E+01	4.26E-01
70	4.56E+00	1.49E+01	9.84E+00	1.89E+01	4.34E-01
80	4.65E+00	1.52E+01	1.00E+01	1.92E+01	4.42E-01
90	4.73E+00	1.54E+01	1.02E+01	1.96E+01	4.50E-01
100	4.85E+00	1.58E+01	1.05E+01	2.01E+01	4.61E-01
200	5.65E+00	1.84E+01	1.22E+01	2.34E+01	5.38E-01
300	4.35E+00	1.42E+01	9.38E+00	1.80E+01	4.13E-01
400	3.13E+00	1.02E+01	6.74E+00	1.29E+01	2.97E-01
500	2.49E+00	8.13E+00	5.37E+00	1.03E+01	2.37E-01
600	2.09E+00	6.81E+00	4.50E+00	8.64E+00	1.98E-01
700	1.80E+00	5.88E+00	3.88E+00	7.45E+00	1.71E-01
800	1.58E+00	5.17E+00	3.42E+00	6.56E+00	1.51E-01
900	1.42E+00	4.62E+00	3.06E+00	5.86E+00	1.35E-01
1000	1.28E+00	4.19E+00	2.77E+00	5.31E+00	1.22E-01
1200	1.09E+00	3.55E+00	2.35E+00	4.50E+00	1.03E-01
1400	9.45E-01	3.08E+00	2.04E+00	3.91E+00	8.99E-02
1600	8.32E-01	2.71E+00	1.79E+00	3.44E+00	7.91E-02
1800	7.39E-01	2.41E+00	1.59E+00	3.06E+00	7.03E-02
2000	6.63E-01	2.16E+00	1.43E+00	2.74E+00	6.30E-02
Maximum:	5.65E+00	1.84E+01	1.22E+01	2.34E+01	5.38E-01
Property Boundary:	1.42E+00	4.62E+00	3.06E+00	5.86E+00	1.35E-01
One Mile:	8.32E-01	2.71E+00	1.79E+00	3.44E+00	7.91E-02

Table D- 58 One Hour Pollutant Concentrations Based On Eight Hour Average Emissions Rates for Pre-construction and Phase 1 Construction

$g/s/m^2$ ==>	6.83E-06	2.23E-05	1.47E-05	2.83E-05	6.49E-07
Distance	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	$\mu g/m^3$				
10	4.04E+00	1.32E+01	8.72E+00	1.67E+01	3.84E-01
20	4.13E+00	1.35E+01	8.92E+00	1.71E+01	3.93E-01
30	4.19E+00	1.37E+01	9.05E+00	1.74E+01	3.99E-01
40	4.29E+00	1.40E+01	9.25E+00	1.77E+01	4.08E-01
50	4.38E+00	1.43E+01	9.45E+00	1.81E+01	4.16E-01
60	4.48E+00	1.46E+01	9.66E+00	1.85E+01	4.26E-01
70	4.56E+00	1.49E+01	9.84E+00	1.89E+01	4.34E-01
80	4.65E+00	1.52E+01	1.00E+01	1.92E+01	4.42E-01
90	4.73E+00	1.54E+01	1.02E+01	1.96E+01	4.50E-01
100	4.85E+00	1.58E+01	1.05E+01	2.01E+01	4.61E-01
200	5.65E+00	1.84E+01	1.22E+01	2.34E+01	5.38E-01
300	4.35E+00	1.42E+01	9.38E+00	1.80E+01	4.13E-01
400	3.13E+00	1.02E+01	6.74E+00	1.29E+01	2.97E-01
500	2.49E+00	8.13E+00	5.37E+00	1.03E+01	2.37E-01
600	2.09E+00	6.81E+00	4.50E+00	8.64E+00	1.98E-01
700	1.80E+00	5.88E+00	3.88E+00	7.45E+00	1.71E-01
800	1.58E+00	5.17E+00	3.42E+00	6.56E+00	1.51E-01
900	1.42E+00	4.62E+00	3.06E+00	5.86E+00	1.35E-01
1000	1.28E+00	4.19E+00	2.77E+00	5.31E+00	1.22E-01
1200	1.09E+00	3.55E+00	2.35E+00	4.50E+00	1.03E-01
1400	9.45E-01	3.08E+00	2.04E+00	3.91E+00	8.99E-02
1600	8.32E-01	2.71E+00	1.79E+00	3.44E+00	7.91E-02
1800	7.39E-01	2.41E+00	1.59E+00	3.06E+00	7.03E-02
2000	6.63E-01	2.16E+00	1.43E+00	2.74E+00	6.30E-02
Maximum:	5.65E+00	1.84E+01	1.22E+01	2.34E+01	5.38E-01
Property Boundary:	1.42E+00	4.62E+00	3.06E+00	5.86E+00	1.35E-01
One Mile:	8.32E-01	2.71E+00	1.79E+00	3.44E+00	7.91E-02

Table D- 59 One Hour Pollutant Concentrations Based On Twenty-Four Hour Average Emissions Rates for Pre-construction and Phase 1 Construction

$g/s/m^2$ ==>	6.83E-06	2.23E-05	1.47E-05	2.83E-05	6.49E-07
Distance	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	$\mu g/m^3$				
10	1.68E+00	5.50E+00	3.63E+00	6.97E+00	1.60E-01
20	1.72E+00	5.62E+00	3.72E+00	7.13E+00	1.64E-01
30	1.75E+00	5.70E+00	3.77E+00	7.23E+00	1.66E-01
40	1.79E+00	5.83E+00	3.85E+00	7.39E+00	1.70E-01
50	1.82E+00	5.96E+00	3.94E+00	7.55E+00	1.74E-01
60	1.86E+00	6.09E+00	4.02E+00	7.72E+00	1.77E-01
70	1.90E+00	6.21E+00	4.10E+00	7.87E+00	1.81E-01
80	1.94E+00	6.32E+00	4.18E+00	8.01E+00	1.84E-01
90	1.97E+00	6.43E+00	4.25E+00	8.15E+00	1.87E-01
100	2.02E+00	6.60E+00	4.36E+00	8.36E+00	1.92E-01
200	2.35E+00	7.69E+00	5.08E+00	9.75E+00	2.24E-01
300	1.81E+00	5.91E+00	3.91E+00	7.50E+00	1.72E-01
400	1.30E+00	4.25E+00	2.81E+00	5.39E+00	1.24E-01
500	1.04E+00	3.39E+00	2.24E+00	4.29E+00	9.87E-02
600	8.70E-01	2.84E+00	1.88E+00	3.60E+00	8.27E-02
700	7.50E-01	2.45E+00	1.62E+00	3.10E+00	7.13E-02
800	6.60E-01	2.15E+00	1.42E+00	2.73E+00	6.28E-02
900	5.90E-01	1.93E+00	1.27E+00	2.44E+00	5.61E-02
1000	5.35E-01	1.75E+00	1.15E+00	2.21E+00	5.09E-02
1200	4.53E-01	1.48E+00	9.78E-01	1.88E+00	4.31E-02
1400	3.94E-01	1.29E+00	8.49E-01	1.63E+00	3.74E-02
1600	3.47E-01	1.13E+00	7.48E-01	1.43E+00	3.30E-02
1800	3.08E-01	1.01E+00	6.64E-01	1.27E+00	2.93E-02
2000	2.76E-01	9.02E-01	5.96E-01	1.14E+00	2.63E-02
Maximum:	2.35E+00	7.69E+00	5.08E+00	9.75E+00	2.24E-01
Property Boundary:	5.90E-01	1.93E+00	1.27E+00	2.44E+00	5.61E-02
One Mile:	3.47E-01	1.13E+00	7.48E-01	1.43E+00	3.30E-02

Table D- 60 One Hour Pollutant Concentrations Based On Annual Average Emissions Rates for Pre-construction and Phase 1 Construction

$g/s/m^2$ ==>	6.83E-06	2.23E-05	1.47E-05	2.83E-05	6.49E-07
Distance	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	$\mu g/m^3$				
10	7.70E-01	2.50E+00	1.27E+00	2.42E+00	7.21E-02
20	7.88E-01	2.56E+00	1.30E+00	2.47E+00	7.38E-02
30	8.00E-01	2.60E+00	1.32E+00	2.51E+00	7.48E-02
40	8.17E-01	2.65E+00	1.35E+00	2.56E+00	7.65E-02
50	8.35E-01	2.71E+00	1.38E+00	2.62E+00	7.81E-02
60	8.53E-01	2.77E+00	1.41E+00	2.68E+00	7.99E-02
70	8.70E-01	2.82E+00	1.44E+00	2.73E+00	8.14E-02
80	8.86E-01	2.88E+00	1.47E+00	2.78E+00	8.29E-02
90	9.01E-01	2.93E+00	1.49E+00	2.83E+00	8.44E-02
100	9.25E-01	3.00E+00	1.53E+00	2.90E+00	8.66E-02
200	1.08E+00	3.50E+00	1.78E+00	3.38E+00	1.01E-01
300	8.29E-01	2.69E+00	1.37E+00	2.60E+00	7.76E-02
400	5.96E-01	1.93E+00	9.86E-01	1.87E+00	5.58E-02
500	4.75E-01	1.54E+00	7.85E-01	1.49E+00	4.44E-02
600	3.98E-01	1.29E+00	6.58E-01	1.25E+00	3.72E-02
700	3.43E-01	1.11E+00	5.68E-01	1.08E+00	3.21E-02
800	3.02E-01	9.80E-01	5.00E-01	9.47E-01	2.83E-02
900	2.70E-01	8.77E-01	4.47E-01	8.47E-01	2.53E-02
1000	2.45E-01	7.95E-01	4.05E-01	7.68E-01	2.29E-02
1200	2.07E-01	6.73E-01	3.43E-01	6.50E-01	1.94E-02
1400	1.80E-01	5.85E-01	2.98E-01	5.65E-01	1.69E-02
1600	1.59E-01	5.15E-01	2.62E-01	4.97E-01	1.48E-02
1800	1.41E-01	4.57E-01	2.33E-01	4.42E-01	1.32E-02
2000	1.26E-01	4.10E-01	2.09E-01	3.96E-01	1.18E-02
Maximum:	1.08E+00	3.50E+00	1.78E+00	3.38E+00	1.01E-01
Property Boundary:	2.70E-01	8.77E-01	4.47E-01	8.47E-01	2.53E-02
One Mile:	1.59E-01	5.15E-01	2.62E-01	4.97E-01	1.48E-02

12.2 Phase 2

Table D- 61 Results From SCREEN3 Output Files, 1 g/s Release Rate for Phase 2 Construction

Stability	4	4	4	4	4	4	4	4	4
Wind	2	3	4	5	6	7	8	9	10
Emission	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Distance	**CP2_D02**	**CP2_D03**	**CP2_D04**	**CP2_D05**	**CP2_D06**	**CP2_D07**	**CP2_D08**	**CP2_D09**	**CP2_D10**
	µg/m^3								
10	4.51E+06	3.00E+06	2.25E+06	1.80E+06	1.50E+06	1.29E+06	1.13E+06	1.00E+06	9.01E+05
20	5.79E+06	3.86E+06	2.90E+06	2.32E+06	1.93E+06	1.66E+06	1.45E+06	1.29E+06	1.16E+06
30	6.96E+06	4.64E+06	3.48E+06	2.78E+06	2.32E+06	1.99E+06	1.74E+06	1.55E+06	1.39E+06
40	8.01E+06	5.34E+06	4.00E+06	3.20E+06	2.67E+06	2.29E+06	2.00E+06	1.78E+06	1.60E+06
50	8.35E+06	5.57E+06	4.18E+06	3.34E+06	2.78E+06	2.39E+06	2.09E+06	1.86E+06	1.67E+06
60	7.61E+06	5.08E+06	3.81E+06	3.05E+06	2.54E+06	2.18E+06	1.90E+06	1.69E+06	1.52E+06
70	6.74E+06	4.49E+06	3.37E+06	2.69E+06	2.25E+06	1.92E+06	1.68E+06	1.50E+06	1.35E+06
80	5.96E+06	3.98E+06	2.98E+06	2.39E+06	1.99E+06	1.70E+06	1.49E+06	1.33E+06	1.19E+06
90	5.32E+06	3.54E+06	2.66E+06	2.13E+06	1.77E+06	1.52E+06	1.33E+06	1.18E+06	1.06E+06
100	4.77E+06	3.18E+06	2.39E+06	1.91E+06	1.59E+06	1.36E+06	1.19E+06	1.06E+06	9.55E+05
200	2.11E+06	1.41E+06	1.06E+06	8.44E+05	7.03E+05	6.03E+05	5.27E+05	4.69E+05	4.22E+05
300	1.19E+06	7.91E+05	5.93E+05	4.75E+05	3.96E+05	3.39E+05	2.97E+05	2.64E+05	2.37E+05
400	7.70E+05	5.13E+05	3.85E+05	3.08E+05	2.57E+05	2.20E+05	1.93E+05	1.71E+05	1.54E+05
500	5.42E+05	3.62E+05	2.71E+05	2.17E+05	1.81E+05	1.55E+05	1.36E+05	1.21E+05	1.08E+05
600	4.04E+05	2.69E+05	2.02E+05	1.62E+05	1.35E+05	1.15E+05	1.01E+05	8.98E+04	8.08E+04
700	3.14E+05	2.09E+05	1.57E+05	1.26E+05	1.05E+05	8.96E+04	7.84E+04	6.97E+04	6.27E+04
800	2.51E+05	1.68E+05	1.26E+05	1.01E+05	8.38E+04	7.18E+04	6.28E+04	5.59E+04	5.03E+04
900	2.07E+05	1.38E+05	1.03E+05	8.26E+04	6.88E+04	5.90E+04	5.16E+04	4.59E+04	4.13E+04
1000	1.73E+05	1.15E+05	8.66E+04	6.93E+04	5.77E+04	4.95E+04	4.33E+04	3.85E+04	3.46E+04
1200	1.31E+05	8.74E+04	6.55E+04	5.24E+04	4.37E+04	3.74E+04	3.28E+04	2.91E+04	2.62E+04
1400	1.04E+05	6.90E+04	5.18E+04	4.14E+04	3.45E+04	2.96E+04	2.59E+04	2.30E+04	2.07E+04
1600	8.44E+04	5.62E+04	4.22E+04	3.37E+04	2.81E+04	2.41E+04	2.11E+04	1.87E+04	1.69E+04
1800	7.04E+04	4.69E+04	3.52E+04	2.82E+04	2.35E+04	2.01E+04	1.76E+04	1.57E+04	1.41E+04
2000	5.99E+04	3.99E+04	2.99E+04	2.40E+04	2.00E+04	1.71E+04	1.50E+04	1.33E+04	1.20E+04

Table D-61 Results From SCREEN3 Output Files, 1 g/s Release Rate for Phase 2 Construction (Continued)

Stability	4	5	5	5	5	5	6	6	6
Wind	11	1	2	3	4	5	1	2	3
Emission	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Distance	**CO_D11**	**CO_E01**	**CP2_E02**	**CP2_E03**	**CP2_E04**	**CP2_E05**	**CP2_F01**	**CP2_F02**	**CP2_F03**
	µg/m^3								
10	8.19E+05	8.18E+06	4.09E+06	2.73E+06	2.05E+06	1.64E+06	5.19E+06	2.59E+06	1.73E+06
20	1.05E+06	1.11E+07	5.56E+06	3.71E+06	2.78E+06	2.22E+06	8.22E+06	4.11E+06	2.74E+06
30	1.27E+06	1.39E+07	6.93E+06	4.62E+06	3.47E+06	2.77E+06	1.13E+07	5.67E+06	3.78E+06
40	1.46E+06	1.64E+07	8.20E+06	5.47E+06	4.10E+06	3.28E+06	1.44E+07	7.22E+06	4.81E+06
50	1.52E+06	1.82E+07	9.11E+06	6.07E+06	4.55E+06	3.64E+06	1.74E+07	8.69E+06	5.79E+06
60	1.38E+06	1.79E+07	8.93E+06	5.95E+06	4.47E+06	3.57E+06	1.94E+07	9.67E+06	6.45E+06
70	1.23E+06	1.66E+07	8.29E+06	5.52E+06	4.14E+06	3.32E+06	1.98E+07	9.92E+06	6.61E+06
80	1.08E+06	1.52E+07	7.58E+06	5.05E+06	3.79E+06	3.03E+06	1.94E+07	9.72E+06	6.48E+06
90	9.66E+05	1.39E+07	6.93E+06	4.62E+06	3.46E+06	2.77E+06	1.87E+07	9.33E+06	6.22E+06
100	8.68E+05	1.27E+07	6.35E+06	4.23E+06	3.17E+06	2.54E+06	1.77E+07	8.87E+06	5.91E+06
200	3.84E+05	6.42E+06	3.21E+06	2.14E+06	1.60E+06	1.28E+06	1.05E+07	5.27E+06	3.52E+06
300	2.16E+05	3.93E+06	1.97E+06	1.31E+06	9.82E+05	7.86E+05	7.12E+06	3.56E+06	2.37E+06
400	1.40E+05	2.69E+06	1.35E+06	8.96E+05	6.72E+05	5.38E+05	5.16E+06	2.58E+06	1.72E+06
500	9.86E+04	1.96E+06	9.80E+05	6.53E+05	4.90E+05	3.92E+05	3.91E+06	1.96E+06	1.30E+06
600	7.35E+04	1.50E+06	7.48E+05	4.99E+05	3.74E+05	2.99E+05	3.06E+06	1.53E+06	1.02E+06
700	5.70E+04	1.18E+06	5.91E+05	3.94E+05	2.96E+05	2.36E+05	2.47E+06	1.23E+06	8.23E+05
800	4.57E+04	9.60E+05	4.80E+05	3.20E+05	2.40E+05	1.92E+05	2.06E+06	1.03E+06	6.85E+05
900	3.75E+04	7.98E+05	3.99E+05	2.66E+05	1.99E+05	1.60E+05	1.74E+06	8.71E+05	5.80E+05
1000	3.15E+04	6.75E+05	3.38E+05	2.25E+05	1.69E+05	1.35E+05	1.50E+06	7.49E+05	4.99E+05
1200	2.38E+04	5.15E+05	2.57E+05	1.72E+05	1.29E+05	1.03E+05	1.16E+06	5.78E+05	3.86E+05
1400	1.88E+04	4.09E+05	2.04E+05	1.36E+05	1.02E+05	8.17E+04	9.26E+05	4.63E+05	3.09E+05
1600	1.53E+04	3.34E+05	1.67E+05	1.11E+05	8.36E+04	6.68E+04	7.61E+05	3.81E+05	2.54E+05
1800	1.28E+04	2.80E+05	1.40E+05	9.32E+04	6.99E+04	5.59E+04	6.40E+05	3.20E+05	2.13E+05
2000	1.09E+04	2.39E+05	1.19E+05	7.95E+04	5.96E+04	4.77E+04	5.47E+05	2.73E+05	1.82E+05

Table D- 62 Frequency Adjusted Results Based on 1 g/s/m^2 for Phase 2 Construction

Distance	D02	D03	D04	D05	D06	D07	D08	D09	D10
	µg/m^3								
10	1.33E+05	2.70E+05	2.14E+05	2.19E+05	1.77E+05	9.33E+04	4.58E+04	2.38E+04	1.12E+04
20	1.71E+05	3.48E+05	2.75E+05	2.81E+05	2.28E+05	1.20E+05	5.88E+04	3.06E+04	1.44E+04
30	2.05E+05	4.17E+05	3.30E+05	3.38E+05	2.73E+05	1.44E+05	7.07E+04	3.67E+04	1.73E+04
40	2.36E+05	4.80E+05	3.80E+05	3.89E+05	3.14E+05	1.66E+05	8.13E+04	4.22E+04	1.99E+04
50	2.47E+05	5.01E+05	3.97E+05	4.06E+05	3.28E+05	1.73E+05	8.48E+04	4.41E+04	2.07E+04
60	2.25E+05	4.57E+05	3.61E+05	3.70E+05	2.99E+05	1.58E+05	7.73E+04	4.02E+04	1.89E+04
70	1.99E+05	4.04E+05	3.20E+05	3.27E+05	2.65E+05	1.39E+05	6.84E+04	3.55E+04	1.67E+04
80	1.76E+05	3.58E+05	2.83E+05	2.90E+05	2.34E+05	1.24E+05	6.06E+04	3.15E+04	1.48E+04
90	1.57E+05	3.19E+05	2.52E+05	2.58E+05	2.09E+05	1.10E+05	5.40E+04	2.80E+04	1.32E+04
100	1.41E+05	2.86E+05	2.27E+05	2.32E+05	1.87E+05	9.89E+04	4.85E+04	2.52E+04	1.18E+04
200	6.22E+04	1.27E+05	1.00E+05	1.02E+05	8.28E+04	4.37E+04	2.14E+04	1.11E+04	5.23E+03
300	3.50E+04	7.12E+04	5.63E+04	5.77E+04	4.66E+04	2.46E+04	1.21E+04	6.26E+03	2.94E+03
400	2.27E+04	4.62E+04	3.66E+04	3.74E+04	3.02E+04	1.59E+04	7.82E+03	4.06E+03	1.91E+03
500	1.60E+04	3.25E+04	2.57E+04	2.63E+04	2.13E+04	1.12E+04	5.51E+03	2.86E+03	1.34E+03
600	1.19E+04	2.42E+04	1.92E+04	1.96E+04	1.59E+04	8.37E+03	4.10E+03	2.13E+03	1.00E+03
700	9.26E+03	1.88E+04	1.49E+04	1.52E+04	1.23E+04	6.50E+03	3.19E+03	1.65E+03	7.78E+02
800	7.42E+03	1.51E+04	1.19E+04	1.22E+04	9.87E+03	5.21E+03	2.55E+03	1.33E+03	6.24E+02
900	6.09E+03	1.24E+04	9.80E+03	1.00E+04	8.11E+03	4.28E+03	2.10E+03	1.09E+03	5.12E+02
1000	5.11E+03	1.04E+04	8.22E+03	8.41E+03	6.80E+03	3.59E+03	1.76E+03	9.13E+02	4.29E+02
1200	3.87E+03	7.87E+03	6.22E+03	6.37E+03	5.15E+03	2.71E+03	1.33E+03	6.91E+02	3.25E+02
1400	3.05E+03	6.21E+03	4.91E+03	5.03E+03	4.07E+03	2.14E+03	1.05E+03	5.46E+02	2.57E+02
1600	2.49E+03	5.06E+03	4.01E+03	4.10E+03	3.31E+03	1.75E+03	8.57E+02	4.45E+02	2.09E+02
1800	2.08E+03	4.23E+03	3.34E+03	3.42E+03	2.77E+03	1.46E+03	7.15E+02	3.72E+02	1.75E+02
2000	1.77E+03	3.60E+03	2.84E+03	2.91E+03	2.35E+03	1.24E+03	6.08E+02	3.16E+02	1.49E+02

Table D-62 Frequency Adjusted Results Based on 1 g/s/m^2 for Phase 2 Construction (Continued)

Distance	D11	E01	E02	E03	E04	E05	F01	F02	F03	Wt Avg
	μg/m^3									
10	5.08E+03	3.68E+04	1.08E+05	1.60E+05	2.68E+05	1.15E+05	1.01E+05	1.23E+05	2.22E+04	1.18E+05
20	6.53E+03	4.99E+04	1.46E+05	2.17E+05	3.64E+05	1.56E+05	1.60E+05	1.94E+05	3.52E+04	1.59E+05
30	7.85E+03	6.22E+04	1.82E+05	2.71E+05	4.54E+05	1.95E+05	2.21E+05	2.68E+05	4.85E+04	1.97E+05
40	9.02E+03	7.37E+04	2.16E+05	3.20E+05	5.37E+05	2.31E+05	2.81E+05	3.41E+05	6.17E+04	2.32E+05
50	9.42E+03	8.18E+04	2.40E+05	3.56E+05	5.97E+05	2.56E+05	3.38E+05	4.11E+05	7.43E+04	2.54E+05
60	8.58E+03	8.02E+04	2.35E+05	3.49E+05	5.85E+05	2.51E+05	3.77E+05	4.57E+05	8.28E+04	2.46E+05
70	7.60E+03	7.44E+04	2.18E+05	3.24E+05	5.43E+05	2.33E+05	3.86E+05	4.69E+05	8.48E+04	2.29E+05
80	6.72E+03	6.81E+04	1.99E+05	2.96E+05	4.97E+05	2.13E+05	3.78E+05	4.59E+05	8.31E+04	2.10E+05
90	5.99E+03	6.22E+04	1.82E+05	2.71E+05	4.54E+05	1.95E+05	3.63E+05	4.41E+05	7.98E+04	1.92E+05
100	5.38E+03	5.70E+04	1.67E+05	2.48E+05	4.16E+05	1.79E+05	3.45E+05	4.19E+05	7.58E+04	1.76E+05
200	2.38E+03	2.88E+04	8.44E+04	1.25E+05	2.10E+05	9.03E+04	2.05E+05	2.49E+05	4.51E+04	8.87E+04
300	1.34E+03	1.76E+04	5.17E+04	7.68E+04	1.29E+05	5.53E+04	1.39E+05	1.68E+05	3.04E+04	5.45E+04
400	8.68E+02	1.21E+04	3.54E+04	5.25E+04	8.81E+04	3.78E+04	1.00E+05	1.22E+05	2.21E+04	3.75E+04
500	6.11E+02	8.80E+03	2.58E+04	3.83E+04	6.42E+04	2.76E+04	7.61E+04	9.24E+04	1.67E+04	2.74E+04
600	4.56E+02	6.72E+03	1.97E+04	2.92E+04	4.90E+04	2.10E+04	5.96E+04	7.24E+04	1.31E+04	2.10E+04
700	3.54E+02	5.31E+03	1.55E+04	2.31E+04	3.87E+04	1.66E+04	4.80E+04	5.83E+04	1.06E+04	1.66E+04
800	2.83E+02	4.31E+03	1.26E+04	1.88E+04	3.15E+04	1.35E+04	4.00E+04	4.85E+04	8.79E+03	1.36E+04
900	2.33E+02	3.58E+03	1.05E+04	1.56E+04	2.61E+04	1.12E+04	3.39E+04	4.12E+04	7.45E+03	1.13E+04
1000	1.95E+02	3.03E+03	8.88E+03	1.32E+04	2.21E+04	9.50E+03	2.91E+04	3.54E+04	6.41E+03	9.64E+03
1200	1.48E+02	2.31E+03	6.77E+03	1.01E+04	1.69E+04	7.24E+03	2.25E+04	2.73E+04	4.95E+03	7.37E+03
1400	1.17E+02	1.84E+03	5.37E+03	7.98E+03	1.34E+04	5.75E+03	1.80E+04	2.19E+04	3.96E+03	5.86E+03
1600	9.51E+01	1.50E+03	4.40E+03	6.53E+03	1.10E+04	4.70E+03	1.48E+04	1.80E+04	3.26E+03	4.80E+03
1800	7.94E+01	1.26E+03	3.68E+03	5.46E+03	9.17E+03	3.94E+03	1.24E+04	1.51E+04	2.74E+03	4.02E+03
2000	6.75E+01	1.07E+03	3.14E+03	4.66E+03	7.82E+03	3.36E+03	1.06E+04	1.29E+04	2.34E+03	3.43E+03
Max Wt Avg =	8.28E+05									

Table D- 63 One Hour Pollutant Concentrations Based On One Hour Average Emissions Rates for Phase 2 Construction

G/S/M^2 ==>	8.30E-05	2.68E-04	2.02E-05	2.41E-05	7.85E-06
Distance	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	µg/m^3				
10	9.80E+00	3.16E+01	2.38E+00	2.85E+00	9.27E-01
20	1.32E+01	4.25E+01	3.20E+00	3.82E+00	1.25E+00
30	1.63E+01	5.27E+01	3.97E+00	4.74E+00	1.55E+00
40	1.93E+01	6.22E+01	4.68E+00	5.60E+00	1.82E+00
50	2.10E+01	6.79E+01	5.12E+00	6.11E+00	1.99E+00
60	2.04E+01	6.60E+01	4.97E+00	5.93E+00	1.93E+00
70	1.90E+01	6.12E+01	4.61E+00	5.51E+00	1.79E+00
80	1.74E+01	5.62E+01	4.23E+00	5.05E+00	1.65E+00
90	1.59E+01	5.14E+01	3.87E+00	4.63E+00	1.51E+00
100	1.46E+01	4.72E+01	3.55E+00	4.24E+00	1.38E+00
200	7.36E+00	2.38E+01	1.79E+00	2.14E+00	6.97E-01
300	4.52E+00	1.46E+01	1.10E+00	1.31E+00	4.28E-01
400	3.11E+00	1.00E+01	7.56E-01	9.03E-01	2.94E-01
500	2.27E+00	7.34E+00	5.53E-01	6.61E-01	2.15E-01
600	1.74E+00	5.62E+00	4.23E-01	5.06E-01	1.65E-01
700	1.38E+00	4.45E+00	3.35E-01	4.01E-01	1.31E-01
800	1.13E+00	3.64E+00	2.74E-01	3.27E-01	1.07E-01
900	9.41E-01	3.04E+00	2.29E-01	2.73E-01	8.90E-02
1000	8.00E-01	2.58E+00	1.94E-01	2.32E-01	7.57E-02
1200	6.12E-01	1.98E+00	1.49E-01	1.78E-01	5.79E-02
1400	4.87E-01	1.57E+00	1.18E-01	1.41E-01	4.60E-02
1600	3.99E-01	1.29E+00	9.69E-02	1.16E-01	3.77E-02
1800	3.34E-01	1.08E+00	8.12E-02	9.70E-02	3.16E-02
2000	2.85E-01	9.20E-01	6.92E-02	8.27E-02	2.70E-02
Maximum:	2.10E+01	6.79E+01	5.12E+00	6.11E+00	1.99E+00
Property Boundary:	9.41E-01	3.04E+00	2.29E-01	2.73E-01	8.90E-02
One Mile:	3.99E-01	1.29E+00	9.69E-02	1.16E-01	3.77E-02

Table D- 64 One Hour Pollutant Concentrations Based On Three Hour Average Emissions Rates for Phase 2 Construction

G/S/M^2 ==>	8.30E-05	2.68E-04	2.02E-05	2.41E-05	7.85E-06
Distance	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	µg/m^3				
10	9.80E+00	3.16E+01	2.38E+00	2.85E+00	9.27E-01
20	1.32E+01	4.25E+01	3.20E+00	3.82E+00	1.25E+00
30	1.63E+01	5.27E+01	3.97E+00	4.74E+00	1.55E+00
40	1.93E+01	6.22E+01	4.68E+00	5.60E+00	1.82E+00
50	2.10E+01	6.79E+01	5.12E+00	6.11E+00	1.99E+00
60	2.04E+01	6.60E+01	4.97E+00	5.93E+00	1.93E+00
70	1.90E+01	6.12E+01	4.61E+00	5.51E+00	1.79E+00
80	1.74E+01	5.62E+01	4.23E+00	5.05E+00	1.65E+00
90	1.59E+01	5.14E+01	3.87E+00	4.63E+00	1.51E+00
100	1.46E+01	4.72E+01	3.55E+00	4.24E+00	1.38E+00
200	7.36E+00	2.38E+01	1.79E+00	2.14E+00	6.97E-01
300	4.52E+00	1.46E+01	1.10E+00	1.31E+00	4.28E-01
400	3.11E+00	1.00E+01	7.56E-01	9.03E-01	2.94E-01
500	2.27E+00	7.34E+00	5.53E-01	6.61E-01	2.15E-01
600	1.74E+00	5.62E+00	4.23E-01	5.06E-01	1.65E-01
700	1.38E+00	4.45E+00	3.35E-01	4.01E-01	1.31E-01
800	1.13E+00	3.64E+00	2.74E-01	3.27E-01	1.07E-01
900	9.41E-01	3.04E+00	2.29E-01	2.73E-01	8.90E-02
1000	8.00E-01	2.58E+00	1.94E-01	2.32E-01	7.57E-02
1200	6.12E-01	1.98E+00	1.49E-01	1.78E-01	5.79E-02
1400	4.87E-01	1.57E+00	1.18E-01	1.41E-01	4.60E-02
1600	3.99E-01	1.29E+00	9.69E-02	1.16E-01	3.77E-02
1800	3.34E-01	1.08E+00	8.12E-02	9.70E-02	3.16E-02
2000	2.85E-01	9.20E-01	6.92E-02	8.27E-02	2.70E-02
Maximum:	2.10E+01	6.79E+01	5.12E+00	6.11E+00	1.99E+00
Property Boundary:	9.41E-01	3.04E+00	2.29E-01	2.73E-01	8.90E-02
One Mile:	3.99E-01	1.29E+00	9.69E-02	1.16E-01	3.77E-02

Table D- 65 One Hour Pollutant Concentrations Based On Eight Hour Average Emissions Rates Phase 2 Construction

G/S/M^2 ==>	8.30E-05	2.68E-04	2.02E-05	2.41E-05	7.85E-06
Distance	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	µg/m^3				
10	9.80E+00	3.16E+01	2.38E+00	2.85E+00	9.27E-01
20	1.32E+01	4.25E+01	3.20E+00	3.82E+00	1.25E+00
30	1.63E+01	5.27E+01	3.97E+00	4.74E+00	1.55E+00
40	1.93E+01	6.22E+01	4.68E+00	5.60E+00	1.82E+00
50	2.10E+01	6.79E+01	5.12E+00	6.11E+00	1.99E+00
60	2.04E+01	6.60E+01	4.97E+00	5.93E+00	1.93E+00
70	1.90E+01	6.12E+01	4.61E+00	5.51E+00	1.79E+00
80	1.74E+01	5.62E+01	4.23E+00	5.05E+00	1.65E+00
90	1.59E+01	5.14E+01	3.87E+00	4.63E+00	1.51E+00
100	1.46E+01	4.72E+01	3.55E+00	4.24E+00	1.38E+00
200	7.36E+00	2.38E+01	1.79E+00	2.14E+00	6.97E-01
300	4.52E+00	1.46E+01	1.10E+00	1.31E+00	4.28E-01
400	3.11E+00	1.00E+01	7.56E-01	9.03E-01	2.94E-01
500	2.27E+00	7.34E+00	5.53E-01	6.61E-01	2.15E-01
600	1.74E+00	5.62E+00	4.23E-01	5.06E-01	1.65E-01
700	1.38E+00	4.45E+00	3.35E-01	4.01E-01	1.31E-01
800	1.13E+00	3.64E+00	2.74E-01	3.27E-01	1.07E-01
900	9.41E-01	3.04E+00	2.29E-01	2.73E-01	8.90E-02
1000	8.00E-01	2.58E+00	1.94E-01	2.32E-01	7.57E-02
1200	6.12E-01	1.98E+00	1.49E-01	1.78E-01	5.79E-02
1400	4.87E-01	1.57E+00	1.18E-01	1.41E-01	4.60E-02
1600	3.99E-01	1.29E+00	9.69E-02	1.16E-01	3.77E-02
1800	3.34E-01	1.08E+00	8.12E-02	9.70E-02	3.16E-02
2000	2.85E-01	9.20E-01	6.92E-02	8.27E-02	2.70E-02
Maximum:	2.10E+01	6.79E+01	5.12E+00	6.11E+00	1.99E+00
Property Boundary:	9.41E-01	3.04E+00	2.29E-01	2.73E-01	8.90E-02
One Mile:	3.99E-01	1.29E+00	9.69E-02	1.16E-01	3.77E-02

Table D- 66 One Hour Pollutant Concentrations Based On Twenty-Four Hour Average Emissions Rates for Phase 2 Construction

G/S/M^2 ==>	3.46E-05	1.12E-04	8.41E-06	1.00E-05	3.27E-06
Distance	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	µg/m^3				
10	4.08E+00	1.32E+01	9.93E-01	1.19E+00	3.86E-01
20	5.49E+00	1.77E+01	1.33E+00	1.59E+00	5.19E-01
30	6.80E+00	2.20E+01	1.65E+00	1.98E+00	6.44E-01
40	8.03E+00	2.59E+01	1.95E+00	2.33E+00	7.60E-01
50	8.77E+00	2.83E+01	2.13E+00	2.55E+00	8.30E-01
60	8.51E+00	2.75E+01	2.07E+00	2.47E+00	8.05E-01
70	7.90E+00	2.55E+01	1.92E+00	2.30E+00	7.48E-01
80	7.25E+00	2.34E+01	1.76E+00	2.10E+00	6.86E-01
90	6.64E+00	2.14E+01	1.61E+00	1.93E+00	6.28E-01
100	6.09E+00	1.97E+01	1.48E+00	1.77E+00	5.76E-01
200	3.07E+00	9.90E+00	7.46E-01	8.91E-01	2.90E-01
300	1.89E+00	6.09E+00	4.58E-01	5.47E-01	1.78E-01
400	1.29E+00	4.18E+00	3.15E-01	3.76E-01	1.23E-01
500	9.48E-01	3.06E+00	2.30E-01	2.75E-01	8.97E-02
600	7.26E-01	2.34E+00	1.76E-01	2.11E-01	6.87E-02
700	5.75E-01	1.86E+00	1.40E-01	1.67E-01	5.44E-02
800	4.70E-01	1.52E+00	1.14E-01	1.36E-01	4.44E-02
900	3.92E-01	1.27E+00	9.53E-02	1.14E-01	3.71E-02
1000	3.33E-01	1.08E+00	8.10E-02	9.68E-02	3.15E-02
1200	2.55E-01	8.23E-01	6.20E-02	7.40E-02	2.41E-02
1400	2.03E-01	6.55E-01	4.93E-02	5.89E-02	1.92E-02
1600	1.66E-01	5.36E-01	4.04E-02	4.82E-02	1.57E-02
1800	1.39E-01	4.49E-01	3.38E-02	4.04E-02	1.32E-02
2000	1.19E-01	3.83E-01	2.89E-02	3.45E-02	1.12E-02
Maximum:	8.77E+00	2.83E+01	2.13E+00	2.55E+00	8.30E-01
Property Boundary:	3.92E-01	1.27E+00	9.53E-02	1.14E-01	3.71E-02
One Mile:	1.66E-01	5.36E-01	4.04E-02	4.82E-02	1.57E-02

Table D- 67 One Hour Pollutant Concentrations Based On Annual Average Emissions Rates for Phase 2 Construction

$G/S/M_2$ ==>	1.25E-05	4.44E-05	3.48E-06	4.52E-06	1.31E-06
Distance	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	$\mu g/m^3$				
10	1.48E+00	5.24E+00	4.11E-01	5.33E-01	1.54E-01
20	1.99E+00	7.04E+00	5.52E-01	7.17E-01	2.07E-01
30	2.46E+00	8.73E+00	6.84E-01	8.89E-01	2.57E-01
40	2.91E+00	1.03E+01	8.07E-01	1.05E+00	3.04E-01
50	3.17E+00	1.12E+01	8.81E-01	1.15E+00	3.31E-01
60	3.08E+00	1.09E+01	8.56E-01	1.11E+00	3.22E-01
70	2.86E+00	1.01E+01	7.95E-01	1.03E+00	2.99E-01
80	2.62E+00	9.30E+00	7.29E-01	9.47E-01	2.74E-01
90	2.40E+00	8.51E+00	6.67E-01	8.67E-01	2.51E-01
100	2.20E+00	7.81E+00	6.12E-01	7.95E-01	2.30E-01
200	1.11E+00	3.94E+00	3.08E-01	4.01E-01	1.16E-01
300	6.82E-01	2.42E+00	1.90E-01	2.46E-01	7.13E-02
400	4.69E-01	1.66E+00	1.30E-01	1.69E-01	4.90E-02
500	3.43E-01	1.22E+00	9.53E-02	1.24E-01	3.58E-02
600	2.63E-01	9.31E-01	7.29E-02	9.48E-02	2.74E-02
700	2.08E-01	7.37E-01	5.78E-02	7.51E-02	2.17E-02
800	1.70E-01	6.03E-01	4.72E-02	6.13E-02	1.78E-02
900	1.42E-01	5.03E-01	3.94E-02	5.12E-02	1.48E-02
1000	1.21E-01	4.27E-01	3.35E-02	4.35E-02	1.26E-02
1200	9.23E-02	3.27E-01	2.56E-02	3.33E-02	9.64E-03
1400	7.34E-02	2.60E-01	2.04E-02	2.65E-02	7.67E-03
1600	6.01E-02	2.13E-01	1.67E-02	2.17E-02	6.28E-03
1800	5.04E-02	1.78E-01	1.40E-02	1.82E-02	5.26E-03
2000	4.30E-02	1.52E-01	1.19E-02	1.55E-02	4.49E-03
Maximum:	3.17E+00	1.12E+01	8.81E-01	1.15E+00	3.31E-01
Property Boundary:	1.42E-01	5.03E-01	3.94E-02	5.12E-02	1.48E-02
One Mile:	6.01E-02	2.13E-01	1.67E-02	2.17E-02	6.28E-03

For ground level releases, SCREEN3 results are scalable. Therefore, SCREEN3 is applied to determine downwind pollutant concentrations based on a unit release rate of 1 g/s/m^2. SCREEN3 results are obtained for each of the stability class and wind speed combinations shown in Table D-53 (RAI Attachment Table 11-1). See Tables D-54 and D-55 for Pre-construction and Phase 1 construction. See Tables D-61 and D-62 for Phase 2 construction. SCREEN3 results for each receptor location are then frequency weighted and the average is selected to represent the concentration.

Table D- 68 SCREEN3 Scale Factors

(Also RAI Attachment Table 13-1)

Time Average	Multiply SCREEN3 Result By
1-hr	1.00
3-hr	0.90
8-hr	0.70
24-hr	0.40
8,760-hr	0.08

Source: CDPHE 2005

SCREEN3 is designed to estimate impacts for steady releases. Because construction activities are performed only in day time hours and for no more than 160 hours per month, to estimate an average release rate for extended time spans, the area emission rates must be adjusted. One-hour, 3-hour, and 8-hour impacts do not need to be adjusted, because these time spans are smaller than the standard 10 hour construction day. The 24-hour impacts, however, must be adjusted to account for intermittent pollutant releases. Equations to determine area release rates as input to SCREEN3 are listed below:

Avg 1-hr Emission Rate, g/s/m^2 = (Monthly Emissions, lb) / (Construction Work Time, hrs) [EQN_02]

Avg 3-hr Emission Rate, g/s/m^2 = (Monthly Emissions, lb) / (Construction Work Time, hrs) [EQN_03]

Avg 8-hr Emission Rate, g/s/m^2 = (Monthly Emissions, lb) / (Construction Work Time, hrs) [EQN_04]

Avg 24-hr Emission Rate, g/s/m^2 = (10 / 24) x (Monthly Emissions, lb) / (Construction Work Time, hrs) [EQN_05]

Avg 8,760-hr Emission Rate, g/s/m^2 = (Annual Emissions, lb) / (8,760 hrs) [EQN_06]

13.0 Impact Calculations

Frequency-weighted results from SCREEN3 are scaled to determine 1-hour impacts. For example, to estimate the impact for a 1-hr concentration, SCREEN3 results are scaled based on the average 1-hr emission rates as determined by EQN_02. Similarly, to estimate the impacts based on 3-hr, 8-hr, 24-hr, and 8,760-hr average area release rates, SCREEN3 results are scaled based on the average emission rates as determined by EQN_03, EQN_04, EQN_05, EQN_06, respectively. It is important to remember that SCREEN3 will estimate only the 1-hr average concentration – it does not reveal the average concentration for other time spans, such as 3-hr, 8-hr, 24-hr, and 8,760-hr. However, EPA has identified a set of scale factors that may be applied to estimate the 3-hr, 8-hr, 24-hr, and 8760-hr average concentrations based on the 1-hr average concentration. Table D-68 (also RAI Attachment Table 13-1)

illustrates these scale factors. Additionally, an example is provided below to illustrate this process. Emissions and impacts are determined separately for Construction Phase 1 and Construction Phase 2.

Example: Assume the maximum monthly SO_2 emissions are 62 pounds; the annual SO_2 emissions are 511 pounds; construction occurs 208 hours per month; and the dimensions of the area with active construction at any given time are 274 meters by 354 meters (96,996 square meters). Further assume that based on the site-specific meteorology and a unit area release rate (1 g/s/m2), the frequency-weighted SCREEN3 result at 200 meters is 8.28E+05 $\mu g/m^3$. There are four NAAQS for SO_2 (1-hr, 3-hr, 8-hr, and 8,760-hr). Calculations are illustrated below to determine the project impact for comparison with each SO_2 NAAQS.

1-hr impact

As shown in Table 13-1, for a 1-hr impact, the SCREEN3 scale factor is 1.

Release Rate = { (62 lb) / (208 hr) / (96996 m^2) } × (453.59 g/lb) / (3600 s/hr) = 3.87E-7 $g/s/m^2$

1-hr average impact at 200 meters = (SF) × (SCREEN3 1-hr concentration) × (SO_2 1-hr Release Rate) / (Unit Release Rate)

1-hr average impact at 200 meters = (1) × (8.28E+05 $\mu g/m^3$) x (3.87E-7 $g/s/m^2$) / (1 $g/s/m^2$) = 0.32 $\mu g/m^3$

3-hr impact

As shown in Table 13-1, for a 1-hr impact, the SCREEN3 scale factor is 0.9. The average release rate over a three hour span is the same as the release rate for a one hour span.

Release Rate = { (62 lb) / (208 hr) / (96996 m^2) } × (453.59 g/lb) / (3600 s/hr) = 3.87E-7 $g/s/m^2$

3-hr average impact at 200 meters = (SF) × (SCREEN3 1-hr concentration) × (SO_2 3-hr Release Rate) / (Unit Release Rate)

3-hr average impact at 200 meters = (0.9) × (8.28E+05 $\mu g/m^3$) x (3.87E-7 $g/s/m^2$) / (1 $g/s/m^2$) = 0.29 $\mu g/m^3$

8-hr impact

As shown in Table 13-1, for a 1-hr impact, the SCREEN3 scale factor is 0.7. The average release rate over an 8-hour span is the same as the release rate for a one hour span.

8-hr Release Rate = { (62 lb) / (208 hr) / (96,996 m^2) } × (453.59 g/lb) / (3600 s/hr) = 3.87E-7 $g/s/m^2$

8-hr average impact at 200 meters = (SF) × (SCREEN3 1-hr concentration) × (SO_2 8-hr Release Rate) / (Unit Release Rate)

8-hr average impact at 200 meters = (0.7) × (8.28E+05 $\mu g/m^3$) x (3.87E-7 $g/s/m^2$) / (1 $g/s/m^2$) = 0.22 $\mu g/m^3$

8,760-hr impact

As shown in Table D-72, for a 1-hr impact, the SCREEN3 scale factor is 0.08. The average release rate over an 8,760 hour span is determined based on annual release total and 8,760 hours.

Release Rate = { (511 lb) / (8760 hr) / (96996 m^2) } × (453.59 g/lb) / (3600 s/hr) = 7.57E-08 $g/s/m^2$

8,760-hr average impact at 200 meters = (SF) × (SCREEN3 1-hr concentration) × (SO_2 Annual Release Rate) / (Unit Release Rate)

8,760-hr average impact at 200 meters = (0.08) × (8.28E+05 µg/m^3) x (7.57E-08 g/s/m^2) / (1 g/s/m^2) = 0.005 µg/m^3

Table D-69 (RAI 8-a-11) was modified to present the maximum impacts, the property boundary impacts, and the one-mile impacts from the pre-construction/Phase 1 construction. Table D-70 (also Table RAI 8-a-21) also shows the maximum impacts, the property boundary impacts, and the one-mile impacts from the Phase 2 construction.

Table D- 69 Maximum, Property Boundary, and One-Mile Impacts From Pre-construction/Phase 1 Construction

(Also RAI Table 8-a-11 which has been modified)

Maximum Impact

Average	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	µg /m^3				
1-hr	5.650	18.400	12.200	23.400	0.538
3-hr	5.650	18.400	12.200	23.400	0.538
8-hr	5.650	18.400	12.200	23.400	0.538
24-hr	2.350	7.690	5.080	9.750	0.224
Annual	1.080	3.500	1.780	3.380	0.101

CO – Carbon Monoxide; NO_2 – Nitrogen Dioxide, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns,

Property Boundary Impact

Average	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	(µg /m^3)				
1-hr	1.420	4.620	3.060	5.860	0.135
3-hr	1.420	4.620	3.060	5.860	0.135
8-hr	1.420	4.620	3.060	5.860	0.135
24-hr	0.590	1.930	1.270	2.440	0.056
Annual	0.270	0.877	0.447	0.847	0.025

One Mile Impact

Average	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	µg /m^3				
1-hr	0.832	2.710	1.790	3.440	0.079
3-hr	0.832	2.710	1.790	3.440	0.079
8-hr	0.832	2.710	1.790	3.440	0.079
24-hr	0.347	1.130	0.748	1.430	0.033
Annual	0.159	0.515	0.262	0.497	0.015

Table D- 70 Maximum, Property Boundary, and One-Mile Impacts From Phase 2 Construction

(Also Table RAI 8-a-21 which has been modified)

Maximum Impact

Average	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	$\mu g/m^3$				
1-hr	21.000	67.900	5.120	6.110	1.990
3-hr	21.000	67.900	5.120	6.110	1.990
8-hr	21.000	67.900	5.120	6.110	1.990
24-hr	8.770	28.300	2.130	2.550	0.830
Annual	3.170	11.200	0.881	1.150	0.331

CO – Carbon Monoxide; NO_2 – Nitrogen Dioxide, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns,

Property Boundary Impact

Average	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	$\mu g/m^3$				
1-hr	0.941	3.040	0.229	0.273	0.089
3-hr	0.941	3.040	0.229	0.273	0.089
8-hr	0.941	3.040	0.229	0.273	0.089
24-hr	0.392	1.270	0.095	0.114	0.037
Annual	0.142	0.503	0.039	0.051	0.015

CO – Carbon Monoxide; NO_2 – Nitrogen Dioxide, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns,

One Mile Impact

Average	CO	NO_2	$PM_{2.5}$	PM_{10}	SO_2
	$\mu g/m^3$				
1-hr	0.399	1.290	0.097	0.116	0.038
3-hr	0.399	1.290	0.097	0.116	0.038
8-hr	0.399	1.290	0.097	0.116	0.038
24-hr	0.166	0.536	0.040	0.048	0.016
Annual	0.060	0.213	0.017	0.022	0.006

CO – Carbon Monoxide; NO_2 – Nitrogen Dioxide, , SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns,

13.1 Comparison With NAAQS Standards

Table D-71 (RAI 8-a-12) was also modified to compare the emission results with the NAAQS standards. Table D-72 (also Table RAI 8-a-22 modified) compares the Phase 2 construction results with the NAAQS standards.

Table D- 71 Pre-Construction/Phase 1 Construction Results Compared with NAAQS Standards

(Also Table RAI 8-a-12 which has been modified)

Pollutant	Average	NAAQS µ/m^3	Maximum Impact µg/m^3	Property Boundary µg/m^3	One Mile Impact µg/m^3
CO	1-hr	10,000	5.652	1.416	0.832
CO	8-hr	40,000	3.956	0.991	0.582
NO_2	1-hr	188	18.449	4.623	2.715
NO_2	Annual	100	0.280	0.070	0.041
$PM_{2.5}$	24-hr	35	2.032	0.509	0.299
$PM_{2.5}$	Annual	15	0.143	0.036	0.021
PM_{10}	24-hr	150	3.898	0.977	0.574
SO_2	1-hr	200	0.538	0.135	0.079
SO_2	3-hr	1300	0.484	0.121	0.071
SO_2	24-hr	365	0.090	0.022	0.013
SO_2	Annual	80	0.008	0.002	0.001

CO – Carbon Monoxide; NO_2 – Nitrogen Dioxide, VOC – Volatile Organic Compound, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns, HAP – Hazardous Air Pollutant

Assumptions:

1. Pollutant impacts are determined based on the peak emissions generated by site preparation.
2. The peak one-hour concentrations are as determined by SCREEN3.
3. To determine the peak 3-hour concentration, the peak one-hour concentration is scaled by 0.9 based on EPA guidance on EPA guidance.
4. To determine the peak 8-hour concentration, the peak one-hour concentration is scaled by 0.7 based on EPA guidance.
5. To determine the peak 24-hour concentration, the peak one-hour concentration is scaled by 0.4 based on EPA guidance and by 10/24 to account for limited work day.
6. To determine the peak annual concentration, the peak one-hour concentration is scaled by 0.07 based on EPA guidance, by 10/24 to account for limited work day, then adjusted to account for 4 months of peak emissions (site preparation), 7.5 months of reduced emissions (post site preparation), and two weeks of zero emissions.
7. Scale Factors to estimate impact concentrations other than one hour based on Average 1-hr as 1.00, 3-hr as 0.9, 8-hr as 0.7, 24-hr as 0.4, and annual as 0.08.

Table D- 72 Phase 2 Construction Results Compared with NAAQS Standards

(Also Table RAI 8-a-22 which has been modified)

Pollutant	Average	NAAQS Standard	Maximum Impact	Property Boundary	One Mile Impact
		μg/m^3			
CO	1-hr	10,000	21.000	0.941	0.399
CO	8-hr	40,000	14.700	0.659	0.279
NO_2	1-hr	188	67.900	3.040	1.290
NO_2	Annual	100	0.900	0.040	0.017
$PM_{2.5}$	24-hr	35	0.853	0.038	0.016
$PM_{2.5}$	Annual	15	0.071	0.003	0.001
PM_{10}	24-hr	150	1.020	0.046	0.019
SO_2	1-hr	200	1.990	0.089	0.038
SO_2	3-hr	1300	1.790	0.080	0.034
SO_2	24-hr	365	0.332	0.015	0.006
SO_2	Annual	80	0.027	0.001	0.001

CO – Carbon Monoxide; NO_2 – Nitrogen Dioxide, SO_2 – Sulfur Dioxide, PM_{10} Particulate Matter less than 10 microns, $PM_{2.5}$ Particulate Matter less than 2.5 microns

1. Pollutant impacts are determined based on the peak emissions generated by site preparation.
2. The peak one-hour concentrations are as determined by SCREEN3.
3. To determine the peak 3-hour concentration, the peak one-hour concentration is scaled by 0.9 based on EPA guidance (EPA-454/R-92-019).
4. To determine the peak 8-hour concentration, the peak one-hour concentration is scaled by 0.7 based on EPA guidance (EPA-454/R-92-019).
5. To determine the peak 24-hour concentration, the peak one-hour concentration is scaled by 0.4 based on EPA guidance (EPA-454/R-92-019) and by 10/24 to account for limited work day.
6. To determine the peak annual concentration, the peak one-hour concentration is scaled by 0.08 based on EPA guidance (EPA-454/R-92-019).
7. Scale Factors to estimate impact concentrations other than one hour based on Average 1-hr as 1.00, 3-hr as 0.9, 8-hr as 0.7, 24-hr as 0.4, and annual as 0.08.

14.0 References

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