Enclosure 2

Report of the Calvert Cliffs Unit 3 NO_X and VOC Emissions from Construction Activities, dated December 2009

AECOM Environment

Submitted to:
Calvert Cliffs 3 Nuclear Project, LLC and
UniStar Nuclear Operating Services, LLC
Baltimore, MD

Submitted by:
AECOM
Westford, MA
Project No. 60136676
December, 2009

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1.0 Introduction

Calvert Cliffs 3 Nuclear Project LLC ("CC3") and UniStar Nuclear Operating Services, LLC ("UNO") (Co-Applicants) are proposing to construct and operate a new nuclear power unit on the existing Calvert Cliffs Nuclear Power Plant (CCNPP) site. The new unit will be designated as CCNPP Unit 3 (CC3), and will have a gross electric generation capacity of about 1,710 megawatts.

Pursuant to the General Conformity Requirements under 40 CFR 93.150 et seq, the Nuclear Regulatory Commission (NRC) as the lead federal agency is required to make a conformity determination with regard to the proposed construction and operation of CC3. The General Conformity Rule applies only in locations designated in 40 CFR Part 81 as maintenance or nonattainment areas for any criteria air pollutant. As shown in Figure 1-1, the CC3 project site in Calvert County, Maryland is located within the Washington, DC-MD-VA moderate nonattainment area for the 8-hour ambient ozone standard. As such, construction-related emissions of ozone precursors, i.e., oxides of nitrogen (NO_X) and volatile organic compounds (VOC) from both direct and indirect project-related emissions have been evaluated to determine if annual emissions of these pollutants during the years of construction are above the applicable tonnage thresholds for applicability of General Conformity requirements. The applicable de minimis thresholds are 100 tons per year of NO_X and 50 tons per year of VOC emissions per 40 CFR 93.153.

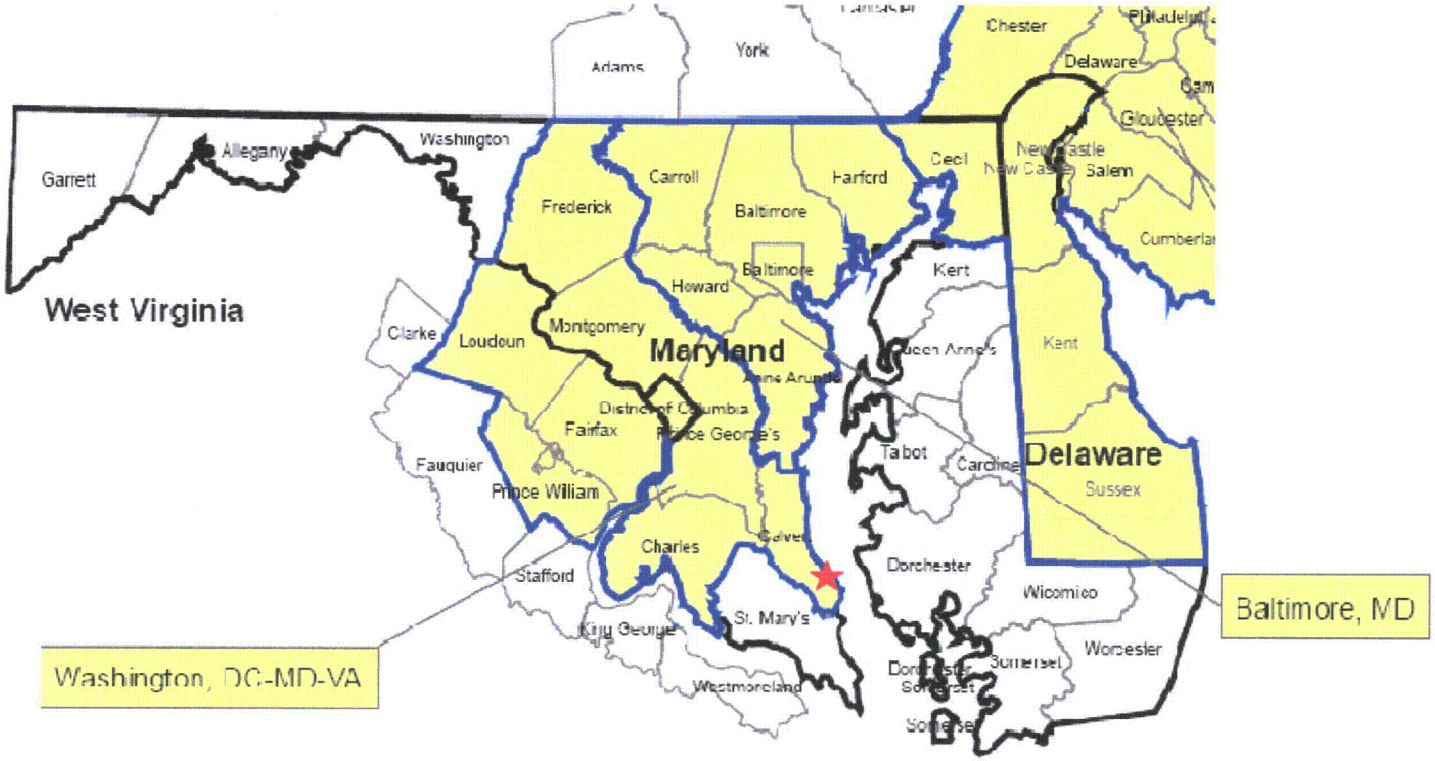
Note that operation of CC3 will not result in significant generation of NO_X emissions, or significant releases of VOCs. Typical sources of NO_X during operation of CC3 will include vehicle operations (mobile sources) and periodic operation of diesel generators that are used to provide backup power (stationary sources). Potential emissions of NO_X and VOCs from CC3 stationary source operations will also be subject to restrictions imposed under the Certificate of Public Convenience and Necessity (CPCN) issued by Maryland Public Service Commission for CCNPP Unit 3 effective June 26, 2009. The CPCN constitutes the issuance of the Air Quality Minor New Source Review Permit to Construct, and a Major Prevention of Significant Deterioration (PSD) permit that was based on review by the Power Plant Research Program (PPRP) and the Maryland Department of the Environment (MDE). Potential NO_X and VOC emissions from operations will be below de minimis threshold values listed in 40 CFR 93.153(b). Mobile source emissions from operations were estimated by proportioning the worst case year of on-road emission during construction by the ratio of operational employees to the number of construction workers. Permitted emissions from the CC3 stationary sources are 24 tpy of NO_X and 4 tpy of VOC but these emissions are specifically excluded from the requirements for a conformity determination per the exclusion found in 40 CFR 93.153(d) for major new sources subject to PSD.

This report documents the NO_X and VOC emissions associated with the construction of CC3 for purposes of determining applicability to the federal Clean Air Act General Conformity Rule. This report satisfies the commitment by CC3 and UNO pursuant to CC-09-0002 (dated October 2, 2009) to provide updated construction emissions to the NRC by December 11, 2009. Prior estimates of construction-related emissions were provided in the CPCN Technical Reports filed with the Maryland Public Service Commission (PSC) in November 2007 and later amended in August 2008. These reports only evaluated onsite NO_X and VOC emissions related to construction and did not address indirect emissions from activities outside the construction site that are required in a formal conformity applicability analysis. Indirect activities included in this analysis are employee commuting, commercial deliveries, and emissions from materials delivered by barge to the on-site dock. Moreover, the construction equipment schedule and timeline has been revised since the previous filings.

1.1 Content of the Report

This report consists of four sections and two appendices. Section 2.1 presents the estimated direct and indirect VOC and NO_X emissions from construction of the project. Section 2.2 provides estimates of the indirect emissions associated with CC3 operations. Section 3 describes the methodology for the emission inventory. Technical references are provided in section 4. Appendix A contains the projected construction equipment details and hours of use for each year of construction Appendix B contains detailed emissions calculations for the direct construction equipment and indirect emissions.

Figure 1-1 Washington, DC-MD-VA and Baltimore, MD 8-hr Ozone Nonattainment Regions



★ Location of CC3

2.0 Emissions Estimates

2.1 Construction/Pre-Construction Emissions

Tables 2-1 and 2-2 present the total VOC and NO_X emissions estimates over the construction of the project. These are broken up into separate tables for the two ozone nonattainment regions which are affected. As seen in Figure 1-1, CC3 is located in the Washington DC-MD-VA nonattainment area, but is also close to the Baltimore nonattainment area. Indirect emissions from employee commuting, commercial deliveries and barge deliveries are expected to be generated in both nonattainment areas.

At the request of NRC, Table 2-3 presents a breakout of construction emissions as defined under 10 CFR Part 50 – Domestic Licensing for Production and Utilization Facilities. The level of detail to precisely breakout preconstruction and construction activities as defined by NRC is unknown at this time so the emissions reported in Table 2-3 are based on estimated equipment types not expected to perform construction activities as defined in 10 CFR 50; for example: direct or indirect emissions from motor vehicles (except concrete trucks), air compressors, generation equipment, and small capital equipment. Equipment groups included are earthmoving, compacting, cranes, forklifts, manlifts, welding equipment, and concrete equipment.

The definition of construction under 10 CFR 50.2 reads as follows:

> *Construction* or *constructing* means, for the purposes of §50.55(e), the analysis, design, manufacture, fabrication, quality assurance, placement, erection, installation, modification, inspection, or testing of a facility or activity which is subject to the regulations in this part and consulting services related to the facility or activity that are safety related.

Additional delineation of construction versus "pre-construction" activities is found under 10 CFR 50.10(a)(1) and (2) under limited work authorization. These are paraphrased below.

> (1) Activities constituting construction are the driving of piles, subsurface preparation, placement of backfill, concrete, or permanent retaining walls within an excavation, installation of foundations, or in-place assembly, erection, fabrication, or testing, which are for: safety-related structures, systems, or components (SSCs)
>
> (2) Construction does not include: Site exploration, preparation of a site for construction of a facility, including clearing of the site, grading, installation of drainage, erosion and other environmental mitigation measures, and construction of temporary roads and borrow areas; excavation; erection of support buildings building of service facilities

Table 2-1 CC3 Total Construction Emissions within the Washington DC-MD-VA Ozone Nonattainment Area

Year	Off-Road Diesel VOC	Off-Road Gasoline VOC	On-Road Vehicles VOC	Marine VOC	Boiler VOC	VOC (Tons)	Exceeds Conformity Threshold (Yes/No)	Off-Road Diesel NOx	Off-Road Gasoline NOx	On-Road Vehicles NOx	Marine NOx	Boiler NOx	NOx (Tons)	Exceeds Conformity Threshold (Yes/No)
2010	2.6	1.6	3.9	0	0	8.2	No	36.4	0.12	4.0	0	0	40.5	No
2011	9.9	5.2	17.3	0.34	0	32.7	No	138.1	0.5	20.6	6.8	0	166.0	Yes
2012	3.3	1.1	19.9	0.11	0.02	24.4	No	48.1	0.4	24.3	2.1	1.5	76.5	No
2013	9.9	3.8	26.8	0.11	0.05	40.7	No	150.9	1.8	34.4	2.1	4.6	193.8	Yes
2014	12.4	4.8	29.5	0.11	0.05	46.8	No	188.8	2.4	43.1	2.1	4.6	241.0	Yes
2015	12.7	4.8	25.8	0.11	0.05	43.4	No	193.0	2.4	39.8	2.1	4.6	242.0	Yes
2016	11.3	4.6	21.2	0.11	0.03	37.3	No	170.9	2.3	29.3	2.1	3.1	207.8	Yes
2017	6.7	4.5	10.0	0	0	21.2	No	101.3	2.2	14.5	0	0	118.0	Yes
2018	1.3	1.3	3.5	0	0	6.2	No	19.4	0.9	4.1	0	0	24.4	No

Includes activities not defined as construction under 10 CFR 50.

Table 2-2 CC3 Total Construction Emissions within Baltimore Nonattainment Area

Year	Off-Road Diesel VOC	Off-Road Gasoline VOC	On-Road Vehicles VOC	Marine VOC	Boiler VOC	VOC (Tons)	Exceeds Conformity Threshold (Yes/No)	Off-Road Diesel NOx	Off-Road Gasoline NOx	On-Road Vehicles NOx	Marine NOx	Boiler NOx	NOx (Tons)	Exceeds Conformity Threshold (Yes/No)
2010	0	0	0.3	0	0	0.35	No	0	0	0.27	0	0	0.27	No
2011	0	0	1.5	0	0	1.48	No	0	0	1.1	0	0	1.1	No
2012	0	0	2.1	0.35	0	2.49	No	0	0	2.1	6.8	0	8.9	No
2013	0	0	2.7	0.35	0	3.06	No	0	0	2.5	6.8	0	9.3	No
2014	0	0	2.9	0.35	0	3.20	No	0	0	2.4	6.8	0	9.2	No
2015	0	0	2.4	0.35	0	2.71	No	0	0	1.8	6.8	0	8.6	No
2016	0	0	1.8	0.35	0	2.18	No	0	0	1.3	6.8	0	8.2	No
2017	0	0	0.8	0	0	0.82	No	0	0	0.6	0	0	0.6	No
2018	0	0	0.3	0	0	0.27	No	0	0	0.19	0	0	0.19	No

Includes activities not defined as construction under 10 CFR 50.

Table 2-3 CC3 10 CFR 50 Construction Emissions within the Washington DC-MD-VA Ozone Nonattainment Area

Year	Off-Road Diesel VOC	Off-Road Gasoline VOC	On-Road Vehicles VOC	Marine VOC	Boiler VOC	VOC (Tons)	Exceeds Conformity Threshold (Yes/No)	Off-Road Diesel NOx	Off-Road Gasoline NOx	On-Road Vehicles NOx	Marine NOx	Boiler NOx	NOx (Tons)	Exceeds Conformity Threshold (Yes/No)
2010	0	0	0	0	0	0	No	0	0	0	0	0	0	No
2011	0	0	0	0	0	0	No	0	0	0	0	0	0	No
2012	1.3	0.02	0.19	0	0	1.5	No	19.6	0.05	3.1	0	0	22.8	No
2013	7.5	0.15	0.37	0	0	8.1	No	113.6	0.29	5.5	0	0	119.3	Yes
2014	9.5	0.23	0.36	0	0	10.0	No	143.6	0.44	4.7	0	0	148.7	Yes
2015	9.6	0.23	0.34	0	0	10.2	No	146.3	0.44	4.1	0	0	150.8	Yes
2016	8.7	0.23	0.31	0	0	9.2	No	130.9	0.44	3.4	0	0	134.7	Yes
2017	4.5	0.23	0	0	0	4.7	No	68.5	0.44	0	0	0	69.0	No
2018	0.4	0.12	0	0	0	0.52	No	5.3	0.22	0	0	0	5.5	No

As stated previously the emissions in Table 2-3 represent the best estimate of "construction" emissions as defined by 10 CFR Part 50. Construction of the reactor and cooling tower are not expected to start in great capacity until the middle of 2012. A detailed plan of construction has not yet been developed in order to specify the start of construction of individual equipment. For example, backfilling and soil compaction are considered construction so the entire group of operating earthmoving and compacting equipment is included in the emissions estimate. Other equipment groups included are cranes, forklifts, manlifts, welding equipment, and concrete equipment.

Based on the NRC definition of construction, Table 2-3 shows the same conclusion as Table 2-1 in regard to exceeding the conformity threshold for NO_X with the exception of 2011 and 2017. Pre-construction are the only activities expected to take place in 2011 and 2017 represents the beginning finalization of 10 CFR 50 defined construction activities.

2.2 Operational Emissions

As noted in Section 1, the operational emissions from CC3 stationary sources required a permit under the PSD program. As such, these emissions are specifically excluded from the requirements for a conformity determination per the exclusion found in 40 CFR 93.153(d).

The only other emissions of NOx and VOC from CC3 operations are indirect emissions associated with vehicular emissions from employee traffic. As stated in the Phase II traffic study prepared in June 2009 (Reference 10), 363 permanent employees are expected once CC3 begins operations resulting in at most 363 additional round trips. This is very similar to the 379 round trips estimated for the construction workforce in 2018 but well below the estimated number of peak daily round trips during construction of 3,000.

Using similar assumptions as with the construction workforce, emissions from indirect operational employee commuting are expected to be only 1.4 tons/yr of NO_X and 2.0 tons/yr of VOC in the Washington DC nonattainment area and 0.2 tons/yr of NO_X and 0.3 tons/yr of VOC in the Baltimore nonattainment area. These levels are well below the respective applicability thresholds of 100 tons/yr and 50 tons/yr.

3.0 Emission Estimation Methodology

Bechtel North American Power Corporation (Bechtel), UniStar's current project/construction engineering firm, was responsible for developing an estimate of fuel-burning equipment (non-road and on-road) needed to construct the proposed Unit 3. Bechtel provided an equipment schedule with equipment sizes and estimated annual hours of operation. This information is provided in Appendix A. Emissions calculations based on this equipment along with indirect NO_X and VOC emissions are presented in Appendix B.

3.1 Emissions from Non-Road Equipment

Emissions from non-road equipment (mobile, portable, and stationary fuel-burning equipment) were estimated using EPA's NONROAD2008 model and methodology. Bechtel provided a study of engines with horsepower and annual hours of operation for construction of CC3. Similar to the previously submitted construction emissions from 2008, AECOM developed a spreadsheet -based approach to estimate non-road engine emissions based on the NONROAD model guidance and NONROAD model data files. This allows the emissions estimates to be thoroughly checked and allows transparency to how emissions are developed.

Applicable engine tiers for this analysis are based on the estimated usage dates and the phase-in years for engine size ranges given in Table 1 of Reference 2 for diesel engines and Tables 1 through 7 of Reference 3 for gasoline engines. The applicable SCC codes for equipment were chosen (based on engine duty and fuel type) from the list in Appendix A of Reference 4. This cross reference allowed AECOM to match equipment from Bechtel's list to the NONROAD data files which contain the steady state pollutant emission factors and load factors. Note that this methodology is slightly different than that submitted in 2008, because the NONROAD 2008 data file used here has the transient adjustment factor (TAF) built into the steady state emission factor.

The Equation involved in determining the non-road construction emissions is as follows (from Page 1 of Reference 4):

$$EF_{adj} = EFss * DF \quad \text{.....Equation 1}$$

EF_{adj} = Final emission factor used in model after adjustments to account for transient operation and deterioration (g/hp-hr)

EFss = NONROAD 2008 steady state emission factor (g/hp-hr)

DF = Deterioration factor

The deterioration factor (DF) is a function of the technology type and age of the engine.

The NONROAD methodology addresses the effects of deterioration in the engines by multiplying the steady state emission factor for each category of engine by deterioration factor (DF). The following equation (from p 19 of Reference 2 and p 3 of Reference 5) is used to calculate DF as a function of engine age

$$DF = 1 + A * (Age\ factor)^b \quad for\ Age\ Factor \leq 1 \quad \text{.....Equation 2}$$

$$DF = 1 + A \quad for\ Age\ Factor > 1 \quad \text{.....Equation 3}$$

Where Age factor = fraction of median life expended = (cumulative hours * load factor) / median life at full load, in hours.

A = constants for a given pollutant / technology type

b ≤ 1, for most engines or 0.5 for 2-stroke engines less than 25 Hp

Deterioration is capped at the end of an engine's median life (age factor = 1), under the assumption that an engine deteriorated to a point where any increased deterioration is offset by maintenance. For this analysis, all age factors were set to 1 ("fully deteriorated") in order to simplify the calculations.

Annual non-road emissions were estimated using the following equation from Page 1 of Reference 4

$$E_{Sta} = EF_{adj} * HP * Hours * Load\ Factor * \frac{Ton}{2000\ lb} * \frac{lb}{453.6\ g}$$ **Equation 4**

E_{Sta} = Annual stationary source emissions in tons

EF_{adj} = Final adjusted emission factor (g/hp-hr)

HP = Rated horsepower hp

Hours = Annual operating hours of the equipment

Load Factor = fraction of available rated power

The load factor is an adjustment included in the model to avoid grossly over counting emissions. It is the average fraction of the rated power of an engine that is expected to be actually used in annual operation. This factor takes into account idling, partial load operation, and transient operation. For instance, a 100 hp diesel powered crane has a load factor of 0.43 from the NONROAD data table based on the SCC code. This means that in normal operation, the crane is expected to use an average of 43 hp for every available 100 hp capacity. These factors are based on surveys of equipment users.

One final adjustment that is special to VOC is the conversion from total hydrocarbons (HC). The NONROAD model steady state emission factors are all in terms of HC. This is so the model has a common basis to output emissions in terms of VOC, total organic gasses (TOG), or non-methane hydrocarbons (NMHC). Reference 6 gives the conversion from HC to VOC as 1.053 for diesel engines, 1.034 for 2-stroke gasoline engines, and 0.933 for 4-stroke gasoline engines.

3.2 On-Road Vehicles

Estimation of on-road vehicular emissions was calculated with EPA's MOBILE6.2 Vehicle Emission Modeling Software. MOBILE6.2 is an emission factor model for predicting gram of emissions (VOC, and NO_X) per mile as well as other criteria and air toxic emissions from cars, trucks, and motorcycles. The MOVES model (as a replacement for Mobile 6.2) is currently under development by EPA but has not been finalized at the time of this report.

Mobile 6.2 gives emission rates in terms of grams per vehicle mile traveled. To obtain miles traveled for on-site vehicles, the estimated hours of vehicle use was multiplied by an estimated annual speed in mile/hr. Specific vehicle categories from Mobile6.2 for on-site vehicles are given in Appendix B. For employee commuting, the estimated annual number of construction employees was multiplied by a factor of 1.3 (for estimating carpooling) to get a number of vehicles. This assumption is consistent with the Phase II traffic study prepared in June 2009. Employees are assumed to have a typical daily commute which is constant for 312 working days per calendar year and have vehicles which fall into the LDGV category. The geographic breakdown was assumed to be 10% from St. Mary's County to the south and west (an attainment area for ozone), 25% from the Baltimore nonattainment area to the north, and the rest from the Washington DC-MD-VA ozone nonattainment area. The number of commercial deliveries was determined based on the expected goods to be delivered to the site during construction by truck. For this analysis, commercial deliveries are assumed to be in the HDDV8b category. Thirty percent of the commercial deliveries were assumed to come from the Baltimore nonattainment area with the balance from the Washington DC-MD-VA nonattainment area.

For indirect emissions from employee commuting and commercial deliveries, AECOM assumed a 15 year time span for the vehicle population as a reasonable estimation of typical vehicle ownership. That is, beginning in 2010, the emissions model used a vehicle population mix from model years 1995-2010. This progressively increased by one year until 2018.

Fuel consumption for these vehicles is gasoline and transportation diesel as noted in Appendix B. Emissions from on-road vehicles are estimated using Equation 1.

$$E_{Mob} = VMT * EF * \frac{Ton}{2000\ lb} * \frac{lb}{453.6\ g}$$ .....Equation 5

E_{Mob} = On-road vehicle emissions in tons per year

VMT = Vehicle miles travelled in a year

EF = Mobile 6.2 emission factor for on road vehicles in grams/mile.

3.3 Marine Equipment

The current Calvert Cliffs Nuclear Plant has an existing barge dock on-site which UniStar plans to use for receipt of some equipment by delivery. Additionally, UniStar will be dredging some off-shore areas during the CC3 construction period. Emissions from marine equipment used in these activities are included in this emissions inventory. Ancillary on-shore equipment (such as dump trucks or cranes) related to dredging and barge deliveries are accounted for in the non-road category.

US EPA has released a final report in April 2009 describing the methodologies used for the preparation of port-related emission inventory. This report is identified as reference number 8. Equations involved in determining the emissions from the marine sources are:

$$E_{Mar} = EF_{Pol} * HP * Hours * Load\ Factor * \frac{kWh}{1.341\ HP-hr} * \frac{Ton}{2000\ lb} * \frac{lb}{453.6\ g}$$ .....Equation 6

Where
E_{Mar} = Annual marine emissions in tons
EF_{pol} = Emission factor in (g/kW-hr)
HP = Rated horse power (hp)
Hours = Annual operating hours
Load Factor = Fraction of available operating rated power

Emission factors, load factors, and guidance on typical engine sizes are taken from the referenced port inventory document. All of the marine dredging operations for this project occur during 2011 for barge dock preparation. Deliveries of materials by barge are assumed to begin in 2012 after dredging is completed. The dredging operations are expected to occur from October through December 2011, 10 hours per day, 6 days per week. Dredging is assumed to be performed by crane and dredged materials will be disposed of on-site. Deliveries of materials by barge are expected to originate at Harve de Grace, MD which is in the Baltimore nonattainment area. By ship, the distance is approximately 75 nautical miles (nm) with 18 nm assumed to occur within the state maritime zone boundaries of Calvert County and 57 nm occurring within the maritime zone boundaries of the Baltimore nonattainment area. Transportation emissions from barge deliveries were divided accordingly.

3.4 Boiler

The proposed concrete batch plant will require a small boiler (~ 20 MMBtu/hr) for the winter months to ensure the concrete does not freeze and to maintain consistency in batch preparation. The boiler is assumed to only use distillate oil for fuel. Emission factors for the boiler were taken from EPA's AP-42 document for fuel oil combustion. When operated, the boiler was assumed to operate at maximum capacity.

4.0 References

1. EPA's "MOBILE6.2 Vehicle Emission Modeling Software"
2. EPA's "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling—Compression-Ignition" NR-009c April 2004, EPA420-P-04-009.
3. EPA's "Exhaust Emission Factors for Nonroad Engine Modeling: Spark Ignition" NR-010e December 2005, EPA420-R-05-019.
4. EPA's "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" NR-005c April 2004, EPA420-P-04-005
5. EPA's "Nonroad Spark-Ignition Engine Emission Deterioration Factors" NR-011c December 2005, EPA420-R-05-023.
6. EPA's "Conversion Factors for Hydrocarbon Emission Components" NR-002c December 2005, EPA420-R-05-015
7. EPA's "NONROAD08 Model (nonroad engines, equipment, and vehicles)"
8. US EPA / ICF International "Current Methodologies in Preparing Mobile Source Port-Related Emission inventories" Final Report April 2009.
9. EPA's AP-42 Compilation of Emission Factors, Section 3.1 Fuel Oil Combustion, 9/98
10. Traffic Impact Study at the Calvert Cliffs Nuclear Power Plant Draft Final Report, KLD Engineering, June 13, 2009 Rev. 1

Appendix A

Construction Schedule

Table A-1 Construction Equipment List / Hours of Operation

CONSTRUCTION EQUIPMENT & VEHICLES Based on categories from Mobile 6.2 and NONROAD2008	Gas/Diesel	HORSEPOWER	Oct-10 – Dec-10	Jan-11 – Dec-11	Jan-12 – Jun-12	Jul-12 – Dec-12	Jan-13 – Dec-13	Jan-14 – Dec-14	Jan-15 – Dec-15	Jan-16 – Dec-16	Jan-17 – Dec-17	Jan-18 – Dec-18	Jan-19
AUTOMOTIVE													
Light-Duty Gasoline Vehicle	G	263			187	624	1,497	1,497	1,497	1,497	1,497	1,372	
LIGHT DUTY													
Light-Duty Gasoline Truck 2	G	292	1,404	5,616	4,212	4,680	9,360	9,360	9,360	9,360	9,360	8,580	
Light-Duty Gasoline Truck 2	G	292				3,900	14,040	14,976	16,848	18,720	17,940	7,800	
Light-Duty Gasoline Truck 4	G	325				3,432	14,664	14,976	14,976	14,976	14,976	7,488	
Light-Duty Gasoline Truck 4	G	325				2,184	10,296	11,232	11,232	11,232	6,864		
Light-Duty Gasoline Truck 3	G	225			468	1,872	3,744	3,744	3,744	3,744	3,744	3,432	
Light-Duty Gasoline Truck 4	G	200			936	1,872	7,956	9,360	9,360	7,800	4,992	2,184	
TRUCKS - HEAVY DUTY													
Heavy-Duty Diesel Vehicle 8A	D	350			2,246	7,300	15,724	15,724	15,724	15,537	10,296	5,990	
Heavy-Duty Deisel Vehicle 2B	D	230				1,872	7,862	11,232	11,232	11,232	11,044	4,492	
Heavy-Duty Deisel Vehicle 6	D	350				1,123	6,177	8,985	8,985	8,985	7,300	1,872	
Light-Duty Diesel Truck 1 and 2	D	210			748	1,123	7,113	11,232	11,232	11,232	7,862	3,556	
Light-Duty Diesel Truck 1 and 2	D	210				1,497	7,113	8,985	8,985	8,985	5,616	1,497	
Heavy-Duty Diesel Vehicle 8B	D	350			234	1,872	7,020	8,424	8,424	8,424	8,424	3,978	
Heavy-Duty Diesel Vehicle 8B	D	350			234	1,872	7,020	8,424	8,424	8,424	5,616	1,872	
Light-Duty Diesel Truck 1 and 2	D	222			388	1,497	4,492	4,492	4,922	4,922	4,922	1,872	
Heavy-Duty Diesel Vehicle 8B	D	350				2,246	6,240	8,985	8,985	8,985	7,826	2,620	
Heavy-Duty Diesel Vehicle 7	D	350			312	2,496	12,324	12,048	12,048	12,048	14,976	2,808	
TRAILERS													
Heavy-Duty Diesel Vehicle 5	D	483					1,684	4,492	4,492	2,620	748		
PERSONNEL CARRIERS													
Light-Duty Diesel Truck 1 and 2	D	56	936	7,488	3,744	5,928	35,888	53,352	56,160	56,160	26,208	12,792	
Diesel Commercial Bus	D	290						28,080	40,524	23,712	19344	2808	
Light-Duty Diesel Truck 1 and 2	D	20				5,928	16,692	18,720	18,720	18,720	6,240		
EMERGENCY VEHICLES													
Light-Duty Diesel Truck 1 and 2	D	195				561	1,591	2,246	2,246	2,246	2,246	842	
Heavy-Duty Diesel Vehicle 3	D	300				62	374	374	374	374	374	218	
EARTHMOVING													
Sweeper/Scrubber	D	85				156	936	936	936	936	936	858	
Crawler Tractor	D	105				312	4,992	5,616	5,616	5,616	3,588	625	
Crawler Tractor	D	210				1,404	7,332	7,800	7,488	5,304	3,588	312	
Crawler Tractor	D	307				1,404	7,332	7,800	7,488	3,666	1,092		
Excavator	D	30				312	4,056	4,056	4,056	2,496	468		
Excavator	D	268				936	6,864	7,488	7,488	6,084	936		
Excavator	D	321				312	4,056	4,056	3,744	2,340	156		
Excavator	D	404				312	1,872	1,872	1,872	1,248			
Crawler Tractor	D	426			187	1,123	2,246	2,246	2,246	2,246	1,872		
Grader	D	135				1,248	5,865	5,990	4,992	2,995	2,995	1,248	
Tractor/Loader/Backhoe	D	80				1,497	5,990	6,739	6,739	3,739	1,310		
Tractor/Loader/Backhoe	D	174				1,684	8,049	8,049	6,739	6,739	1,872		
Skid Steer Loader	D	75				312	4,056	4,056	3,744	3,744	624		
Tractor/Loader/Backhoe	D	199				312	5,304	5,616	5,616	5,616	312		
Tractor/Loader/Backhoe	D	349				312	4,056	4,056	3,744	3,744	312		
Tractor/Loader/Backhoe	D	224				312	3,900	5,616	4,524	3,744	312		
Off-Higway Truck	D	302			936	2,496	16,380	22,464	22,464	14,040	2,184		
Off-Highway Tractor	D	115				748	5,491	5,990	5,990	5,616	374		
PIPELAYING / TRENCHING EQUIPMENT													
Trencher	D	51			374	561	93 280	187			468		
COMPACTION													
Plate Compactor	D	339				748	1,555	2,995	2,995	2,995	2,496		
Plate Compactor	D	185				2,246	7,488	7,488	7,488	6,364	2,745		
CRANES													
Crane	D	510				1,497	5,990	5,990	5,990	5,990			
Crane	D	340				1,622	9,734	9,734	9,734	9,734	4,056		
Crane	D	330					17,971	25,958	22,464	7,488			
Crane	D	340				811	7,300	9,734	9,734	9,734	6,489		
Crane	D	340					17,035	24,336	24,336	24,336	14,601		
Crane	D	600				811	4,056	9,734	9,734	9,734	6,489		
Crane	D	600				1,662	9,734	9,734	9,734	9,734	4,056		
Crane	D	500				3,744	20,592	22,464	22,464	22,464	16,848		
Crane	D	152				1,747	13,104	15,724	15,724	15,724	14,851	1,747	
Crane	D	174			873	2,620	9,609	10,483	10,483	10,483	10,046	2,184	
Crane	D	215			873	2,620	13,104	31,449	47,174	48,484	21,403	2,184	
Crane	D	250			873	2,620	9,609	10,483	10,483	10,483	9,609		
Crane	D	250				873	4,368	10,483	10,483	10,483	9,172	1,310	
FORKLIFT													
Forklift	D	142				748	9,734	13,478	13,478	13,478	13,104	5,241	
Crane	D	290				624	5,616	7,488	7,488	7,488	3,744	2,184	
Forklift	G	52				3,369	17,596	22,464	22,464	22,464	22,089	9,734	
Forklift	D	89				748	9,734	13,478	13,478	13,478	11,232		
Forklift	D	113				8,424	33,696	33,696	33,696	33,696	15,912	468	
Forklift	D	110				7,956	40,248	44,928	44,928	44,928	17,784	2,808	
CONCRETE / AGGREGATE													
Pump	D	80					2,096	5,390	4,192	1,497			
Heavy-Duty Diesel Vehicle 8B	D	350			624		624 312	936					
Heavy-Duty Diesel Vehicle 8B	D	350			624	936	3,900	4,212	5,616	1,482			
Heavy-Duty Diesel Vehicle 6	D	400				780	1,170	780					
AIR COMPRESSORS													
Air Compressor	D	80			1,248	3,744	7,956	9,360	9,360	9,360	9,204	4,056	
Air Compressor	D	115				1,248	6,552	9,360	9,360	9,360	8,892	3,744	
Air Compressor	D	275				624	8,112	11,232	11,232	11,232	10,920	4,368	
Air Compressor	D	275				624	8,112	11,232	11,232	11,232	10,920	4,368	
Air Compressor	D	310				624	5,616	7,488	7,488	7,488	7,488	3,120	
CLASS 25 CABLE LAYING / PULLING EQUIPMENT													
Other Construction Equipment	D	30					2,496	4,492	4,492	4,492	4,492	624	
Other Construction Equipment	D	30					2,496	4,492	4,492	4,492	4,492	624	
Other Construction Equipment	D	30					2,496	4,492	4,492	4,492	4,492	624	
WINCHES AND TUGGERS													
Other Construction Equipment	D	140						2,246	6,739	6,177	2,246		
WELDING EQUIPMENT													
Welder	D	26				3,744	14,976	14,976	14,976	14,976	11,107		
Welder	D	35				1,996	14,976	14,976	14,976	14,976	11,107		
Welder	D	48				2,995	14,976	14,976	14,976	14,976	11,232	374	

Table A-1 Construction Equipment List / Hours of Operation

CONSTRUCTION EQUIPMENT & VEHICLES Based on categories from Mobile 6.2 and NONROAD2008	Gas/Diesel	HORSEPOWER	Oct-10 Nov-10 Dec-10	Jan-11 Feb-11 Mar-11 Apr-11 May-11 Jun-11 Jul-11 Aug-11 Sep-11 Oct-11 Nov-11 Dec-11	Jan-12 Feb-12 Mar-12 Apr-12 May-12 Jun-12	Jul-12 Aug-12 Sep-12 Oct-12 Nov-12 Dec-12	Jan-13 Feb-13 Mar-13 Apr-13 May-13 Jun-13 Jul-13 Aug-13 Sep-13 Oct-13 Nov-13 Dec-13	Jan-14 Feb-14 Mar-14 Apr-14 May-14 Jun-14 Jul-14 Aug-14 Sep-14 Oct-14 Nov-14 Dec-14	Jan-15 Feb-15 Mar-15 Apr-15 May-15 Jun-15 Jul-15 Aug-15 Sep-15 Oct-15 Nov-15 Dec-15	Jan-16 Feb-16 Mar-16 Apr-16 May-16 Jun-16 Jul-16 Aug-16 Sep-16 Oct-16 Nov-16 Dec-16	Jan-17 Feb-17 Mar-17 Apr-17 May-17 Jun-17 Jul-17 Aug-17 Sep-17 Oct-17 Nov-17 Dec-17	Jan-18 Feb-18 Mar-18 Apr-18 May-18 Jun-18 Jul-18 Aug-18 Sep-18 Oct-18 Nov-18 Dec-18	Jan-19
GENERATION EQUIPMENT													
Generator	D	150	655	2,620	1,310	3,057	15,069	15,724	15,724	15,724	14,414	5,241	
Generator	D	86				436	4,804	5,241	5,241	5,241	5,241	3,057	
Generator	D	345					4,804	5,241	5,241	5,241	5,241	3,057	
Generator	D	200					6,552	7,862	7,862	7,862	7,862	3,712	
Generator	D	143				2,839	12,876	13,104	13,104	13,104	13,104	6,115	
Generator	D	143				873	8,299	10,483	10,483	10,483	10,483	4,804	
Generator	D	14				8,798	52,603	81,806	83,088	23,328	37,440	20,592	
MANLIFTS / SCISSORLIFTS													
Aerial Lift	D	28					748	17,971	22,464	22,464	6,552		
Aerial Lift	D	65					374	11,980	15,724	15,724	9,360		
Aerial Lift	D	48					2,995	11,232	11,232	11,232	10,670	2,246	
Aerial Lift	D	48					1,497	4,492	4,492	4,492	4,492	1,123	
Aerial Lift	D	78						3,931	23,774	33,508	17,305	1,872	
Aerial Lift	D	70				748	5,616	6,739	6,739	6,739			
Aerial Lift	D	75				748	5,616	6,739	6,739	6,739	6,739		
Aerial Lift	D	28						2,246	2,246	2,246	2,246	1,497	
Aerial Lift	D	32					2,246	6,739	6,739	6,739	6,739	3,183	
Aerial Lift	G	75					1,497	4,492	4,492	4,492	4,492	2,995	
SMALL CAPITAL EQUIPMENT													
Plate Compactor	D	8			936	9,594	33,696	33,696	33,696	33,696	33,696	11,636	
Plate Compactor	D	15				2,340	12,636	16,848	16,848	16,848	16,848	7,254	
Plate Compactor	D	19				2,808	16,380	22,464	22,464	22,464	21,762	12,870	
Plate Compactor	G	7				4,212	21,762	30,654	29,688	30,888	39,520	12,402	
Generator	D	11				5,850	34,866	49,842	50,544	50,544	47,502	19,656	
Chipper/Stump Grinder	G	11				468	2,106	2,106	2,106	2,106	1,754		
Lawn Mower	G	3				936	5,616	5,616	5,616	5,616	5,616	3,276	
Cement & Mortar Mixer	G	13				936	7,020	8,424	8,424	8,424	8,424	3,978	
Pump	G	6				2,808	16,380	22,464	22,464	22,464	19,332	9,360	
Pump	D	7				468	5,148	5,616	5,616	5,616	5,616	3,276	
Pump	D	15				468	5,148	5,616	5,616	5,616	5,616	3,276	
Concrete/Industrial Saw	D	65				702	7,020	8,424	8,424	8,424	8,424	3,978	
Snowblower	G	11				468	5,148	5,616	5,616	5,616	5,616	3,276	
Tamper/Rammer	D	3				2,808	14,508	22,464	22,464	22,464	19,332	9,360	
Tamper/Rammer	D	3				2,808	14,508	22,464	22,464	22,464	19,332	9,360	
Cement & Mortar Mixer	G	6			1,404	4,914	16,146	16,848	16,848	11,700	9,360		
Cement & Mortar Mixer	G	8			1,404	4,914	16,146	16,848	16,848	11,700	9,360		
Concrete Equipment	G	3			702	5,148	23,868	33,462	33,696	33,696	27,378		
Pump	D	24				4,914	16,614	30,654	39,688	30,888	30,450	12,402	
CONCRETE BATCH PLANT													
Generator	D					6,240	12,480	12,480	12,480	7,280			
Oil-Fired Boiler	D					1,040	2,080 1,040	2,080 1,040	2,080 1,040	2,080			
Tractor/Loader/Backhoe	D	80				6,240	12,480	12,480	12,480	7,280			
Heavy-Duty Diesel Vehicle 8B	D	350				37,440	74,880	74,880	74,880	43,680			
SITE PREPARATION													
All Terrain Vehicle/MC	D	10	2,340	9,360	2,340								
Tractor/Loader/Backhoe	D	124	1,560	6,240	1,560								
Chain Saw	G	3	11,700	35,100									
Chipper/Stump Grinder	D	75	1,560	4,680									
Plate Compactor	D	354	4,680	18,720	4,680								
Air Compressor	D	55	2,340	9,360									
Crawler Tractor	D	96	1,560	6,240									
Crawler Tractor	D	145	2,340	9,360									
Crawler Tractor	D	308	4,680	18,720									
Excavator	D	250	4,680	18,720									
Excavator	D	380	6,240	24,960									
Excavator	D	513	4,680	18,720									
Excavator	D	258	1,560	6,240									
Generator	D	80	3,120	12,480	3,120								
Grader	D	259	1,560	4,160									
Heavy-Duty Diesel Vehicle 3	D	400	2,340	9,360	2,340								
Heavy-Duty Diesel Vehicle 8A	D	400	2,340	9,360	2,340								
Heavy-Duty Diesel Vehicle 3	D	200	1,560	6,240	1,560								
Light-Duty Diesel Truck 1 and 2	D	365	11,700	46,800	11,700								
Roller	G	6	2,340	9,360	3,900								
Rubber Tire Loader	D	168	2,340	6,240									
Scraper	D	181	3,120	5,200									
Tractor/Loader/Backhoe	D	75	1,560	4,160									
Tractor/Loader/Backhoe	D	189	2,340	6,240									
Trencher	D	450	1,560										
Grinder	D	200	780	2,080									
Pump	G	4	3,120	12,480									
Off-Higway Truck	D	325	2,340	9,360	4,680								
Off-Higway Truck	D	469	17,160	68,640	17,160								
DREDGING AND RELATED EQUIPMENT													
Excavator	D	345		720									
Excavator	D	247		720									
Tractor/Loader/Backhoe	D	200		1,440									
Tractor/Loader/Backhoe	D	66		720									
Plate Compactor	D	99		720									
Crane	D	300		1,440									
Welder	D	33		4,320									
Other Construction Equipment	D	548		720									
All Terrain Vehicle/MC	D	10		2,160									
Tug Boat	D	1,200		720									
18' Boat	G	225		720									

Appendix B

Emissions Calculations

Table B-1 Diesel Non-Road Engine Emissions

Equipment category based on NONROAD classification	SCC[1]	Fuel Type	Engine Technology Type	Equipment Horsepower										BSFC[2]	EFss (g/hp-hr)[2]		Load Factor[2]	Age Factor[3]	"A"[3]		Deterioration factor[3]		Adjusted EF (g/hp-hr) 4	
					2010 hrs	2011 hrs	2012 hrs	2013 hrs	2014 hrs	2015 hrs	2016 hrs	2017 hrs	2018 hrs	lb/hp-hr	HC	NOx			HC	NOx	HC	NOx	HC	NOx
Eartmoving																								
Sweeper/Scrubber	2270003030	Diesel	T3	85	0	0	156	936	936	936	936	936	858	0.408	0.18	3	0.43	1	0.027	0.008	1.027	1.008	0.185	3.024
Crawler Tractor	2270002069	Diesel	T3	105	0	0	312	4992	5616	5616	5616	3588	625	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Crawler Tractor	2270002069	Diesel	T3	210	0	0	1404	7332	7800	7488	5304	3588	312	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Crawler Tractor	2270002069	Diesel	T3	307	0	0	1404	7332	7800	7488	3666	1092	0	0.371	0.17	2.61	0.59	1	0.027	0.008	1.027	1.008	0.175	2.631
Excavator	2270002036	Diesel	T4	30	0	0	312	4056	4056	4056	2496	468	0	0.412	0.13	3	0.59	1	0.027	0.008	1.027	1.008	0.134	3.024
Excavator	2270002036	Diesel	T3	268	0	0	936	6864	7488	7488	6084	936	0	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Excavator	2270002036	Diesel	T4	321	0	0	312	4056	4056	3744	2340	156	0	0.371	0.13	2.5	0.59	1	0.027	0.008	1.027	1.008	0.134	2.520
Excavator	2270002036	Diesel	T4	404	0	0	312	1872	1872	1872	1248	0	0	0.371	0.13	2.5	0.59	1	0.027	0.008	1.027	1.008	0.134	2.520
Crawler Tractor	2270002069	Diesel	T4	426	0	0	1310	2246	2246	2246	2246	1872	0	0.371	0.13	2.5	0.59	1	0.027	0.008	1.027	1.008	0.134	2.520
Grader	2270002048	Diesel	T3	135	0	0	1248	5865	5990	4992	2995	2995	1248	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Tractor/Loader/Backhoe	2270002066	Diesel	T3	80	0	0	1497	5990	6739	6739	3739	1310	0	0.481	0.42	3.64	0.21	1	0.027	0.008	1.027	1.008	0.431	3.669
Tractor/Loader/Backhoe	2270002066	Diesel	T3	174	0	0	1684	8049	8049	6739	6739	1872	0	0.433	0.42	3.03	0.21	1	0.027	0.008	1.027	1.008	0.431	3.054
Skid Steer Loader	2270002072	Diesel	T4	75	0	0	312	4056	4056	3744	3744	624	0	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Tractor/Loader/Backhoe	2270002066	Diesel	T3	199	0	0	312	5304	5616	5616	5616	312	0	0.433	0.42	3.03	0.21	1	0.027	0.008	1.027	1.008	0.431	3.054
Tractor/Loader/Backhoe	2270002066	Diesel	T4	349	0	0	312	4056	4056	3744	3744	312	0	0.433	0.13	2.5	0.21	1	0.027	0.008	1.027	1.008	0.134	2.520
Tractor/Loader/Backhoe	2270002066	Diesel	T3	224	0	0	312	3900	5616	4524	3744	312	0	0.433	0.42	3.03	0.21	1	0.027	0.008	1.027	1.008	0.431	3.054
Off-Higway Truck	2270002051	Diesel	T4	302	0	0	3432	16380	22464	22464	14040	2184	0	0.371	0.13	2.5	0.59	1	0.027	0.008	1.027	1.008	0.134	2.520
Off-Highway Tractor	2270002075	Diesel	T3	115	0	0	748	5491	5990	5990	5616	374	0	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Compaction																								
Plate Compactor	2270002009	Diesel	T4	339	0	0	748	1555	2995	2995	2995	2496	0	0.367	0.13	2.5	0.43	1	0.027	0.008	1.027	1.008	0.134	2.520
Plate Compactor	2270002009	Diesel	T3	185	0	0	2246	7488	7488	7488	6364	2745	0	0.367	0.18	2.5	0.43	1	0.027	0.008	1.027	1.008	0.185	2.520
Cranes																								
Crane	2270002045	Diesel	T4	510	0	0	1497	5990	5990	5990	5990	0	0	0.367	0.13	2.5	0.43	1	0.027	0.008	1.027	1.008	0.134	2.520
Crane	2270002045	Diesel	T4	340	0	0	1622	9734	9734	9734	9734	4056	0	0.367	0.13	2.5	0.43	1	0.027	0.008	1.027	1.008	0.134	2.520
Crane	2270002045	Diesel	T4	330	0	0	0	17971	25958	22464	7488	0	0	0.367	0.13	2.5	0.43	1	0.027	0.008	1.027	1.008	0.134	2.520
Crane	2270002045	Diesel	T4	340	0	0	811	7300	9734	9734	9734	6489	0	0.367	0.13	2.5	0.43	1	0.027	0.008	1.027	1.008	0.134	2.520
Crane	2270002045	Diesel	T4	340	0	0	0	17035	24336	24336	24336	14601	0	0.367	0.13	2.5	0.43	1	0.027	0.008	1.027	1.008	0.134	2.520
Crane	2270002045	Diesel	T4	600	0	0	811	4056	9734	9734	9734	6489	0	0.367	0.13	2.5	0.43	1	0.027	0.008	1.027	1.008	0.134	2.520
Crane	2270002045	Diesel	T4	600	0	0	1662	9734	9734	9734	9734	4056	0	0.367	0.13	2.5	0.43	1	0.027	0.008	1.027	1.008	0.134	2.520
Crane	2270002045	Diesel	T4	500	0	0	3744	20592	22464	22464	22464	16848	0	0.367	0.13	2.5	0.43	1	0.027	0.008	1.027	1.008	0.134	2.520
Crane	2270002045	Diesel	T3	152	0	0	1747	13104	15724	15724	15724	14851	1747	0.367	0.18	2.5	0.43	1	0.027	0.008	1.027	1.008	0.185	2.520
Crane	2270002045	Diesel	T3	174	0	0	3493	9609	10483	10483	10483	10046	2184	0.367	0.18	2.5	0.43	1	0.027	0.008	1.027	1.008	0.185	2.520
Crane	2270002045	Diesel	T3	215	0	0	3493	13104	31449	47174	48484	21403	2184	0.367	0.18	2.5	0.43	1	0.027	0.008	1.027	1.008	0.185	2.520
Crane	2270002045	Diesel	T3	250	0	0	3493	9609	10483	10483	10483	9609	0	0.367	0.18	2.5	0.43	1	0.027	0.008	1.027	1.008	0.185	2.520
Crane	2270002045	Diesel	T3	250	0	0	873	4368	10483	10483	10483	9172	1310	0.367	0.18	2.5	0.43	1	0.027	0.008	1.027	1.008	0.185	2.520
Forklift																								
Forklift	2270003020	Diesel	T3	142	0	0	748	9734	13478	13478	13478	13104	5241	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Crane	2270002045	Diesel	T3	290	0	0	624	5616	7488	7488	7488	3744	2184	0.367	0.18	2.5	0.43	1	0.027	0.008	1.027	1.008	0.185	2.520
Forklift	2270003020	Diesel	T3	89	0	0	748	9734	13478	13478	13478	11232	0	0.412	0.19	3.13	0.59	1	0.027	0.008	1.027	1.008	0.195	3.155
Forklift	2270003020	Diesel	T3	113	0	0	8424	33696	33696	33696	33696	15912	468	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Forklift	2270003020	Diesel	T3	110	0	0	7956	40248	44928	44928	44928	17784	2808	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Manlift / Scossorlifts																								
Aerial Lift	2270003010	Diesel	T4	28	0	0	0	748	17971	22464	22464	6552	0	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Aerial Lift	2270003010	Diesel	T4	65	0	0	0	374	11980	15724	15724	9360	0	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Aerial Lift	2270003010	Diesel	T4	48	0	0	0	2995	11232	11232	11232	10670	2246	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Aerial Lift	2270003010	Diesel	T4	48	0	0	0	1497	4492	4492	4492	4492	1123	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Aerial Lift	2270003010	Diesel	T4	78	0	0	0	0	3931	23774	33508	17305	1872	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Aerial Lift	2270003010	Diesel	T4	70	0	0	748	5616	6739	6739	6739	0	0	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Aerial Lift	2270003010	Diesel	T4	75	0	0	748	5616	6739	6739	6739	6739	0	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Aerial Lift	2270003010	Diesel	T4	28	0	0	0	0	2246	2246	2246	2246	1497	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Aerial Lift	2270003010	Diesel	T4	32	0	0	0	2246	6739	6739	6739	6739	3183	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Welding Equipment																								
Welder	2270006025	Diesel	T4	26	0	0	3744	14976	14976	14976	14976	11107	0	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Welder	2270006025	Diesel	T4	35	0	0	1996	14976	14976	14976	14976	11107	0	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Welder	2270006025	Diesel	T4	48	0	0	2995	14976	14976	14976	14976	11232	374	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Concrete / Aggregate																								
Pump	2270002039	Diesel	T4	80	0	0	0	2096	5390	4192	1497	0	0	0.412	0.13	3	0.59	1	0.027	0.008	1.027	1.008	0.134	3.024
Air Compressors																								
Air Compressor	2270006015	Diesel	T3	80	0	0	4992	7956	9360	9360	9360	9204	4056	0.408	0.3672	4.7	0.43	1	0.027	0.008	1.027	1.008	0.377	4.738
Air Compressor	2270006015	Diesel	T3	115	0	0	1248	6552	9360	9360	9360	8892	3744	0.367	0.1836	2.5	0.43	1	0.027	0.008	1.027	1.008	0.189	2.520
Air Compressor	2270006015	Diesel	T3	275	0	0	624	8112	11232	11232	11232	10920	4368	0.367	0.1836	2.5	0.43	1	0.027	0.008	1.027	1.008	0.189	2.520
Air Compressor	2270006015	Diesel	T3	275	0	0	624	8112	11232	11232	11232	10920	4368	0.367	0.1836	2.5	0.43	1	0.027	0.008	1.027	1.008	0.189	2.520
Air Compressor	2270006015	Diesel	T4	310	0	0	624	5616	7488	7488	7488	7488	3120	0.367	0.1314	2.5	0.43	1	0.027	0.008	1.027	1.008	0.135	2.520
Pipelaying / Trenching Equipment																								
Trencher	2270002030	Diesel	T4	51	0	0	935	373	187	0	0	468	0	0.412	0.13	3	0.59	1	0.027	0.008	1.027	1.008	0.134	3.024
Class 25 Cable Laying/Pulling Equ.																								
Other Construction Equipment	2270002081	Diesel	T4	30	0	0	0	2496	4492	4492	4492	4492	624	0.412	0.13	3	0.59	1	0.027	0.008	1.027	1.008	0.134	3.024
Other Construction Equipment	2270002081	Diesel	T4	30	0	0	0	2496	4492	4492	4492	4492	624	0.412	0.13	3	0.59	1	0.027	0.008	1.027	1.008	0.134	3.024
Other Construction Equipment	2270002081	Diesel	T4	30	0	0	0	2496	4492	4492	4492	4492	624	0.412	0.13	3	0.59	1	0.027	0.008	1.027	1.008	0.134	3.024

Table B-1 Diesel Non-Road Engine Emissions

Equipment category based on NONROAD classification	VOC[5] tons	VOC tons	VOC tons	VOC tons	VOC tons	VOC tons	VOC tons	VOC tons	VOC tons	NOx[6] tons	NOx tons	NOx tons	NOx tons	NOx tons	NOx tons	NOx tons	NOx tons	NOx tons
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2010	2011	2012	2013	2014	2015	2016	2017	2018
Eartmoving																		
Sweeper/Scrubber	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.02	0.11	0.11	0.11	0.11	0.11	0.10
Crawler Tractor	0.00	0.00	0.00	0.07	0.08	0.08	0.08	0.05	0.01	0.00	0.00	0.06	0.90	1.01	1.01	1.01	0.64	0.11
Crawler Tractor	0.00	0.00	0.04	0.21	0.22	0.21	0.15	0.10	0.01	0.00	0.00	0.50	2.63	2.80	2.69	1.91	1.29	0.11
Crawler Tractor	0.00	0.00	0.05	0.27	0.29	0.27	0.13	0.04	0.00	0.00	0.00	0.74	3.85	4.10	3.93	1.93	0.57	0.00
Excavator	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.24	0.24	0.24	0.15	0.03	0.00
Excavator	0.00	0.00	0.03	0.25	0.27	0.27	0.22	0.03	0.00	0.00	0.00	0.43	3.15	3.43	3.43	2.79	0.43	0.00
Excavator	0.00	0.00	0.01	0.12	0.12	0.11	0.07	0.00	0.00	0.00	0.00	0.16	2.13	2.13	1.97	1.23	0.08	0.00
Excavator	0.00	0.00	0.01	0.07	0.07	0.07	0.05	0.00	0.00	0.00	0.00	0.21	1.24	1.24	1.24	0.83	0.00	0.00
Crawler Tractor	0.00	0.00	0.05	0.09	0.09	0.09	0.09	0.07	0.00	0.00	0.00	0.91	1.57	1.57	1.57	1.57	1.31	0.00
Grader	0.00	0.00	0.02	0.11	0.11	0.09	0.05	0.05	0.02	0.00	0.00	0.29	1.35	1.38	1.15	0.69	0.69	0.29
Tractor/Loader/Backhoe	0.00	0.00	0.01	0.05	0.06	0.06	0.03	0.01	0.00	0.00	0.00	0.10	0.41	0.46	0.46	0.25	0.09	0.00
Tractor/Loader/Backhoe	0.00	0.00	0.03	0.15	0.15	0.12	0.12	0.03	0.00	0.00	0.00	0.21	0.99	0.99	0.83	0.83	0.23	0.00
Skid Steer Loader	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.21	0.21	0.20	0.20	0.03	0.00
Tractor/Loader/Backhoe	0.00	0.00	0.01	0.11	0.12	0.12	0.12	0.01	0.00	0.00	0.00	0.04	0.75	0.79	0.79	0.79	0.04	0.00
Tractor/Loader/Backhoe	0.00	0.00	0.00	0.05	0.05	0.04	0.04	0.00	0.00	0.00	0.00	0.06	0.83	0.83	0.76	0.76	0.06	0.00
Tractor/Loader/Backhoe	0.00	0.00	0.01	0.09	0.13	0.11	0.09	0.01	0.00	0.00	0.00	0.05	0.62	0.89	0.72	0.59	0.05	0.00
Off-Higway Truck	0.00	0.00	0.09	0.45	0.62	0.62	0.39	0.06	0.00	0.00	0.00	1.70	8.11	11.12	11.12	6.95	1.08	0.00
Off-Highway Tractor	0.00	0.00	0.01	0.08	0.09	0.09	0.09	0.01	0.00	0.00	0.00	0.15	1.08	1.18	1.18	1.11	0.07	0.00
Compaction																		
Plate Compactor	0.00	0.00	0.02	0.04	0.07	0.07	0.07	0.06	0.00	0.00	0.00	0.30	0.63	1.21	1.21	1.21	1.01	0.00
Plate Compactor	0.00	0.00	0.04	0.13	0.13	0.13	0.11	0.05	0.00	0.00	0.00	0.50	1.65	1.65	1.65	1.41	0.61	0.00
Cranes																		
Crane	0.00	0.00	0.05	0.20	0.20	0.20	0.20	0.00	0.00	0.00	0.00	0.91	3.65	3.65	3.65	3.65	0.00	0.00
Crane	0.00	0.00	0.04	0.22	0.22	0.22	0.22	0.09	0.00	0.00	0.00	0.66	3.95	3.95	3.95	3.95	1.65	0.00
Crane	0.00	0.00	0.00	0.40	0.57	0.49	0.16	0.00	0.00	0.00	0.00	0.00	7.08	10.23	8.85	2.95	0.00	0.00
Crane	0.00	0.00	0.02	0.17	0.22	0.22	0.22	0.15	0.00	0.00	0.00	0.33	2.96	3.95	3.95	3.95	2.64	0.00
Crane	0.00	0.00	0.00	0.39	0.55	0.55	0.55	0.33	0.00	0.00	0.00	0.00	6.92	9.88	9.88	9.88	5.93	0.00
Crane	0.00	0.00	0.03	0.16	0.39	0.39	0.39	0.26	0.00	0.00	0.00	0.58	2.91	6.98	6.98	6.98	4.65	0.00
Crane	0.00	0.00	0.07	0.39	0.39	0.39	0.39	0.16	0.00	0.00	0.00	1.19	6.98	6.98	6.98	6.98	2.91	0.00
Crane	0.00	0.00	0.12	0.69	0.75	0.75	0.75	0.56	0.00	0.00	0.00	2.24	12.30	13.42	13.42	13.42	10.06	0.00
Crane	0.00	0.00	0.02	0.18	0.22	0.22	0.22	0.21	0.02	0.00	0.00	0.32	2.38	2.85	2.85	2.85	2.70	0.32
Crane	0.00	0.00	0.06	0.15	0.17	0.17	0.17	0.16	0.04	0.00	0.00	0.73	2.00	2.18	2.18	2.18	2.09	0.45
Crane	0.00	0.00	0.07	0.26	0.62	0.94	0.96	0.42	0.04	0.00	0.00	0.90	3.37	8.08	12.11	12.45	5.50	0.56
Crane	0.00	0.00	0.08	0.22	0.24	0.24	0.24	0.22	0.00	0.00	0.00	1.04	2.87	3.13	3.13	3.13	2.87	0.00
Crane	0.00	0.00	0.02	0.10	0.24	0.24	0.24	0.21	0.03	0.00	0.00	0.26	1.30	3.13	3.13	3.13	2.74	0.39
Forklift																		
Forklift	0.00	0.00	0.01	0.18	0.26	0.26	0.26	0.25	0.10	0.00	0.00	0.18	2.37	3.27	3.27	3.27	3.18	1.27
Crane	0.00	0.00	0.02	0.15	0.20	0.20	0.20	0.10	0.06	0.00	0.00	0.22	1.95	2.59	2.59	2.59	1.30	0.76
Forklift	0.00	0.00	0.01	0.12	0.16	0.16	0.16	0.13	0.00	0.00	0.00	0.14	1.78	2.46	2.46	2.46	2.05	0.00
Forklift	0.00	0.00	0.13	0.51	0.51	0.51	0.51	0.24	0.01	0.00	0.00	1.63	6.51	6.51	6.51	6.51	3.08	0.09
Forklift	0.00	0.00	0.12	0.59	0.66	0.66	0.66	0.26	0.04	0.00	0.00	1.50	7.58	8.46	8.46	8.46	3.35	0.53
Manlift / Scossorlifts																		
Aerial Lift	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.35	0.44	0.44	0.13	0.00
Aerial Lift	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.02	0.55	0.72	0.72	0.43	0.00
Aerial Lift	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.10	0.38	0.38	0.38	0.36	0.08
Aerial Lift	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.05	0.15	0.15	0.15	0.15	0.04
Aerial Lift	0.00	0.00	0.00	0.00	0.01	0.06	0.09	0.04	0.00	0.00	0.00	0.00	0.00	0.21	1.30	1.83	0.94	0.10
Aerial Lift	0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.04	0.28	0.33	0.33	0.33	0.00	0.00
Aerial Lift	0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.04	0.29	0.35	0.35	0.35	0.35	0.00
Aerial Lift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.04	0.03
Aerial Lift	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.05	0.15	0.15	0.15	0.15	0.07
Welding Equipment																		
Welder	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.07	0.27	0.27	0.27	0.27	0.20	0.00
Welder	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.05	0.37	0.37	0.37	0.37	0.27	0.00
Welder	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.10	0.50	0.50	0.50	0.50	0.38	0.01
Concrete / Aggregate																		
Pump	0.00	0.00	0.00	0.02	0.04	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.33	0.85	0.66	0.24	0.00	0.00
Air Compressors																		
Air Compressor	0.00	0.00	0.08	0.12	0.14	0.14	0.14	0.14	0.06	0.00	0.00	0.90	1.43	1.68	1.68	1.68	1.65	0.73
Air Compressor	0.00	0.00	0.01	0.07	0.10	0.10	0.10	0.10	0.04	0.00	0.00	0.17	0.90	1.29	1.29	1.29	1.22	0.51
Air Compressor	0.00	0.00	0.02	0.21	0.29	0.29	0.29	0.28	0.11	0.00	0.00	0.20	2.66	3.69	3.69	3.69	3.59	1.43
Air Compressor	0.00	0.00	0.02	0.21	0.29	0.29	0.29	0.28	0.11	0.00	0.00	0.20	2.66	3.69	3.69	3.69	3.59	1.43
Air Compressor	0.00	0.00	0.01	0.12	0.16	0.16	0.16	0.16	0.07	0.00	0.00	0.23	2.08	2.77	2.77	2.77	2.77	1.16
Pipelaying / Trenching Equipment																		
Trencher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.04	0.02	0.00	0.00	0.05	0.00
Class 25 Cable Laying/Pulling Equ.																		
Other Construction Equipment	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.15	0.27	0.27	0.27	0.27	0.04
Other Construction Equipment	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.15	0.27	0.27	0.27	0.27	0.04
Other Construction Equipment	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.15	0.27	0.27	0.27	0.27	0.04

Table B-1 Diesel Non-Road Engine Emissions

Winches and Tuggers																								
Other Construction Equipment	2270002081	Diesel	T4	140	0	0	0	0	2246	6739	6177	2246	0	0.371	0.13	2.5	0.59	1	0.027	0.008	1.027	1.008	0.134	2.520
Generation Equipment																								
Generator	2270006005	Diesel	T3	150	655	2620	4367	15069	15724	15724	15724	14414	5241	0.367	0.18	2.5	0.43	1	0.027	0.008	1.027	1.008	0.185	2.520
Generator	2270006005	Diesel	T3	86	0	0	436	4804	5241	5241	5241	5241	3057	0.408	0.18	3	0.43	1	0.027	0.008	1.027	1.008	0.185	3.024
Generator	2270006005	Diesel	T4	345	0	0	0	4804	5241	5241	5241	5241	3057	0.367	0.13	2.5	0.43	1	0.027	0.008	1.027	1.008	0.134	2.520
Generator	2270006005	Diesel	T4	200	0	0	0	6552	7862	7862	7862	7862	3712	0.367	0.13	2.5	0.43	1	0.027	0.008	1.027	1.008	0.134	2.520
Generator	2270006005	Diesel	T3	143	0	0	2839	12876	13104	13104	13104	13104	6115	0.367	0.18	2.5	0.43	1	0.027	0.008	1.027	1.008	0.185	2.520
Generator	2270006005	Diesel	T3	143	0	0	873	8299	10483	10483	10483	10483	4804	0.367	0.18	2.5	0.43	1	0.027	0.008	1.027	1.008	0.185	2.520
Generator	2270006005	Diesel	T4	14	0	0	8798	52603	81806	83088	23328	37440	20592	0.408	0.13	4.44	0.43	1	0.027	0.008	1.027	1.008	0.134	4.476
Small Capital Equipment																								
Plate Compactor	2270002009	Diesel	T4	8	0	0	10530	33696	33696	33693	33696	33696	11636	0.408	0.13	4.3	0.43	1	0.027	0.008	1.027	1.008	0.134	4.334
Plate Compactor	2270002009	Diesel	T4	15	0	0	2340	12636	16848	16848	16848	16848	7254	0.408	0.13	4.44	0.43	1	0.027	0.008	1.027	1.008	0.134	4.476
Plate Compactor	2270002009	Diesel	T4	19	0	0	2808	16380	22464	22464	22464	21762	12870	0.408	0.13	4.44	0.43	1	0.027	0.008	1.027	1.008	0.134	4.476
Generator	2270006005	Diesel	T4	11	0	0	5850	34866	49842	50544	50544	47502	19656	0.408	0.13	4.44	0.43	1	0.027	0.008	1.027	1.008	0.134	4.476
Pump	2270006010	Diesel	T4	7	0	0	468	5148	5616	5616	5616	5616	3276	0.408	0.5508	4.3	0.43	1	0.027	0.008	1.027	1.008	0.566	4.334
Pump	2270006010	Diesel	T4	15	0	0	468	5148	5616	5616	5616	5616	3276	0.408	0.438	4.4399	0.43	1	0.027	0.008	1.027	1.008	0.450	4.475
Concrete Saw	2270002039	Diesel	T4	65	0	0	702	7020	8424	8424	8424	8424	3978	0.412	0.13	3	0.59	1	0.027	0.008	1.027	1.008	0.134	3.024
Tamper/Rammer	2270002006	Diesel	T4	3	0	0	2808	14508	22464	22464	22464	19332	9360	0.408	0.13	4.3	0.43	1	0.027	0.008	1.027	1.008	0.134	4.334
Tamper/Rammer	2270002006	Diesel	T4	3	0	0	2808	14508	22464	22464	22464	19332	9360	0.408	0.13	4.3	0.43	1	0.027	0.008	1.027	1.008	0.134	4.334
Pump	2270006010	Diesel	T4	24	0	0	4914	16614	30654	39688	30888	30450	12402	0.408	0.438	4.4399	0.43	1	0.027	0.008	1.027	1.008	0.450	4.475
Concrete Batch Plant																								
Generator	2270002081	Diesel	T4	470	0	0	6240	12480	12480	12480	7280	0	0	0.371	0.13	2.5	0.59	1	0.027	0.008	1.027	1.008	0.134	2.520
Tractor/Loader/Backhoe	2270002066	Diesel	T3	80	0	0	6240	12480	12480	12480	7280	0	0	0.481	0.42	3.64	0.21	1	0.027	0.008	1.027	1.008	0.431	3.669
Site Preparation																								
All Terrain Vehicle/MC	2270001030	Diesel	T4	10	2340	9360	2340	0	0	0	0	0	0	0.408	0.5508	4.3	0.42	1	0.027	0.008	1.027	1.008	0.566	4.334
Tractor/Loader/Backhoe	2270002066	Diesel	T3	124	1560	6240	1560	0	0	0	0	0	0	0.433	0.42	3.03	0.21	1	0.027	0.008	1.027	1.008	0.431	3.054
Chipper/Stump Grinder	2270004066	Diesel	T4	75	1560	4680	0	0	0	0	0	0	0	0.408	0.1314	3	0.43	1	0.027	0.008	1.027	1.008	0.135	3.024
Plate Compactor	2270002009	Diesel	T3	354	4680	18720	4680	0	0	0	0	0	0	0.367	0.17	2.5	0.43	1	0.027	0.008	1.027	1.008	0.175	2.520
Air Compressor	2270006015	Diesel	T4	55	2340	9360	0	0	0	0	0	0	0	0.408	0.1314	3	0.43	1	0.027	0.008	1.027	1.008	0.135	3.024
Crawler Tractor	2270002069	Diesel	T3	96	1560	6240	0	0	0	0	0	0	0	0.412	0.19	3.13	0.59	1	0.027	0.008	1.027	1.008	0.195	3.155
Crawler Tractor	2270002069	Diesel	T3	145	2340	9360	0	0	0	0	0	0	0	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Crawler Tractor	2270002069	Diesel	T3	308	4680	18720	0	0	0	0	0	0	0	0.371	0.17	2.61	0.59	1	0.027	0.008	1.027	1.008	0.175	2.631
Excavator	2270002036	Diesel	T3	250	4680	18720	0	0	0	0	0	0	0	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Excavator	2270002036	Diesel	T3	380	6240	24960	0	0	0	0	0	0	0	0.371	0.17	2.61	0.59	1	0.027	0.008	1.027	1.008	0.175	2.631
Excavator	2270002036	Diesel	T3	513	4680	18720	0	0	0	0	0	0	0	0.371	0.17	2.61	0.59	1	0.027	0.008	1.027	1.008	0.175	2.631
Excavator	2270002036	Diesel	T3	258	1560	6240	0	0	0	0	0	0	0	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Generator	2270006005	Diesel	T3	80	3120	12480	3120	0	0	0	0	0	0	0.408	0.18	3	0.43	1	0.027	0.008	1.027	1.008	0.185	3.024
Grader	2270002048	Diesel	T3	259	1560	4160	0	0	0	0	0	0	0	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Rubber Tire Loader	2270002060	Diesel	T3	168	2340	6240	0	0	0	0	0	0	0	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Scraper	2270002018	Diesel	T3	181	3120	5200	0	0	0	0	0	0	0	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Tractor/Loader/Backhoe	2270002066	Diesel	T4	75	1560	4160	0	0	0	0	0	0	0	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Tractor/Loader/Backhoe	2270002066	Diesel	T3	189	2340	6240	0	0	0	0	0	0	0	0.433	0.42	3.03	0.21	1	0.027	0.008	1.027	1.008	0.431	3.054
Trencher	2270002030	Diesel	T3	450	1560	0	0	0	0	0	0	0	0	0.371	0.17	2.61	0.59	1	0.027	0.008	1.027	1.008	0.175	2.631
Grinder	2270004066	Diesel	T3	200	780	2080	0	0	0	0	0	0	0	0.367	0.1836	2.5	0.43	1	0.027	0.008	1.027	1.008	0.189	2.520
Off-Higway Truck	2270002051	Diesel	T3	325	2340	9360	4680	0	0	0	0	0	0	0.371	0.17	2.61	0.59	1	0.027	0.008	1.027	1.008	0.175	2.631
Off-Higway Truck	2270002051	Diesel	T3	469	17160	68640	17160	0	0	0	0	0	0	0.371	0.17	2.61	0.59	1	0.027	0.008	1.027	1.008	0.175	2.631
Excavator	2270002036	Diesel	T3	345	0	720	0	0	0	0	0	0	0	0.371	0.17	2.61	0.59	1	0.027	0.008	1.027	1.008	0.175	2.631
Excavator	2270002036	Diesel	T3	247	0	720	0	0	0	0	0	0	0	0.371	0.19	2.61	0.59	1	0.027	0.008	1.027	1.008	0.195	2.631
Tractor/Loader/Backhoe	2270002066	Diesel	T3	200	0	1440	0	0	0	0	0	0	0	0.433	0.42	3.03	0.21	1	0.027	0.008	1.027	1.008	0.431	3.054
Tractor/Loader/Backhoe	2270002066	Diesel	T4	66	0	720	0	0	0	0	0	0	0	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Plate Compactor	2270002009	Diesel	T3	99	0	720	0	0	0	0	0	0	0	0.408	0.18	3	0.43	1	0.027	0.008	1.027	1.008	0.185	3.024
Crane	2270002045	Diesel	T3	300	0	1440	0	0	0	0	0	0	0	0.367	0.17	2.5	0.43	1	0.027	0.008	1.027	1.008	0.175	2.520
Welder	2270006025	Diesel	T4	33	0	4320	0	0	0	0	0	0	0	0.481	0.13	3	0.21	1	0.027	0.008	1.027	1.008	0.134	3.024
Other Construction Equipment	2270002081	Diesel	T3	548	0	720	0	0	0	0	0	0	0	0.371	0.17	2.61	0.59	1	0.027	0.008	1.027	1.008	0.175	2.631
All Terrain Vehicle/MC	2270001030	Diesel	T4	10	0	2160	0	0	0	0	0	0	0	0.408	0.5508	4.3	0.42	1	0.027	0.008	1.027	1.008	0.566	4.334
TOTAL (Tons)																								

NOTES:

Note 1: SCC code based on Appendix A of "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling", April 2004, EPA-420-P-04-005.

Note 2: Brake-specific fuel consumption, zero hour steady state emission factor (EFss; g/hp-hr), and load factor are from NMIM/NONROAD08 model factors dated April 5, 2009.
EFss from NMIM/NONROAD08 have transient adjustment factors built in.

Note 3: Age factor and Deterioration factors calculated using Equation 4 from "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition", April 2004, EPA-420-P-04-009.
Age Factor = LF * cumulative hours / median life {where Age factor is capped at 1. For this calculation, age factor is assumed to be 1 for simplification purposes}.
Deterioration Factor = 1 + (A * Age Factor^b), where b = 1 for desel engines and A is taken from Table A4 from source

Note 4: Adjusted Emission Factors for HC and NOx are calculated using Equation 1 from; "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition"; April 2004, EPA-420-P-04-009.
Adjusted EF = Efss * TAF * DF (as stated in Note 2, EFss have TAFs built in)

Note 5: Annual VOC Emissions are calculated using the following calculation (1.053 * Adj. HC emission factor (g/hp-hr) * horsepower * hours operated * load factor) / (2000 lb/ton * 453.6 g/lb)
1.053 is the ratio of VOC to HC from "Conversion Factors for Hydrocarbon Components", December 2005, EPA-420-P-05-015.

Note 6: Annual NOx Emissions are calculated using the following calculation (Adj. NOx emission factor (g/hp-hr) * horsepower * hours operated * load factor) / (2000 lb/ton * 453.6 g/lb)

Table B-1 Diesel Non-Road Engine Emissions

Winches and Tuggers																		
Other Construction Equipment	0.00	0.00	0.00	0.00	0.03	0.09	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.52	1.55	1.42	0.52	0.00
Generation Equipment																		
Generator	0.01	0.04	0.06	0.21	0.22	0.22	0.22	0.20	0.07	0.12	0.47	0.78	2.70	2.82	2.82	2.82	2.58	0.94
Generator	0.00	0.00	0.00	0.04	0.04	0.04	0.04	0.04	0.02	0.00	0.00	0.05	0.59	0.65	0.65	0.65	0.65	0.38
Generator	0.00	0.00	0.00	0.11	0.12	0.12	0.12	0.12	0.07	0.00	0.00	0.00	1.98	2.16	2.16	2.16	2.16	1.26
Generator	0.00	0.00	0.00	0.09	0.10	0.10	0.10	0.10	0.05	0.00	0.00	0.00	1.57	1.88	1.88	1.88	1.88	0.89
Generator	0.00	0.00	0.04	0.17	0.17	0.17	0.17	0.17	0.08	0.00	0.00	0.48	2.20	2.24	2.24	2.24	2.24	1.04
Generator	0.00	0.00	0.01	0.11	0.14	0.14	0.14	0.14	0.06	0.00	0.00	0.15	1.42	1.79	1.79	1.79	1.79	0.82
Generator	0.00	0.00	0.01	0.05	0.08	0.08	0.02	0.03	0.02	0.00	0.00	0.26	1.56	2.43	2.47	0.69	1.11	0.61
Small Capital Equipment																		
Plate Compactor	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.00	0.00	0.17	0.55	0.55	0.55	0.55	0.55	0.19
Plate Compactor	0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.01	0.00	0.00	0.07	0.40	0.54	0.54	0.54	0.54	0.23
Plate Compactor	0.00	0.00	0.00	0.02	0.03	0.03	0.03	0.03	0.02	0.00	0.00	0.11	0.66	0.91	0.91	0.91	0.88	0.52
Generator	0.00	0.00	0.00	0.03	0.04	0.04	0.04	0.03	0.01	0.00	0.00	0.14	0.81	1.16	1.18	1.18	1.11	0.46
Pump	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.07	0.08	0.08	0.08	0.08	0.05
Pump	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.01	0.00	0.00	0.01	0.16	0.18	0.18	0.18	0.18	0.10
Concrete Saw	0.00	0.00	0.00	0.04	0.05	0.05	0.05	0.05	0.02	0.00	0.00	0.09	0.90	1.08	1.08	1.08	1.08	0.51
Tamper/Rammer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.09	0.14	0.14	0.14	0.12	0.06
Tamper/Rammer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.09	0.14	0.14	0.14	0.12	0.06
Pump	0.00	0.00	0.03	0.09	0.17	0.21	0.17	0.16	0.07	0.00	0.00	0.25	0.85	1.56	2.02	1.57	1.55	0.63
Concrete Batch Plant																		
Generator	0.00	0.00	0.27	0.54	0.54	0.54	0.31	0.00	0.00	0.00	0.00	4.81	9.61	9.61	9.61	5.61	0.00	0.00
Tractor/Loader/Backhoe	0.00	0.00	0.05	0.10	0.10	0.10	0.06	0.00	0.00	0.00	0.00	0.42	0.85	0.85	0.85	0.49	0.00	0.00
Site Preparation																		
All Terrain Vehicle/MC	0.01	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.19	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Tractor/Loader/Backhoe	0.02	0.08	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.55	0.14	0.00	0.00	0.00	0.00	0.00	0.00
Chipper/Stump Grinder	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0.14	0.58	0.14	0.00	0.00	0.00	0.00	0.00	0.00	1.98	7.92	1.98	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractor	0.02	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	1.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractor	0.05	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	2.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractor	0.17	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.47	9.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator	0.16	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	8.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator	0.28	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.06	16.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator	0.29	1.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.11	16.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator	0.05	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.02	0.09	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.36	1.43	0.36	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0.05	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	1.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tire Loader	0.05	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper	0.08	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	1.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractor/Loader/Backhoe	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractor/Loader/Backhoe	0.05	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trencher	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grinder	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Higway Truck	0.09	0.36	0.18	0.00	0.00	0.00	0.00	0.00	0.00	1.30	5.20	2.60	0.00	0.00	0.00	0.00	0.00	0.00
Off-Higway Truck	0.96	3.85	0.96	0.00	0.00	0.00	0.00	0.00	0.00	13.77	55.08	13.77	0.00	0.00	0.00	0.00	0.00	0.00
Excavator	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavator	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractor/Loader/Backhoe	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractor/Loader/Backhoe	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactor	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welder	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Construction Equipment	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Terrain Vehicle/MC	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL (Tons)	**2.62**	**9.93**	**3.29**	**9.94**	**12.37**	**12.67**	**11.33**	**6.71**	**1.34**	**36.38**	**138.12**	**48.12**	**150.85**	**188.77**	**193.03**	**170.90**	**101.31**	**19.44**	**Total construction sum**
	0	**0**	**1.33**	**7.53**	**9.46**	**9.64**	**8.69**	**4.52**	**0.40**	**0.00**	**0**	**19.57**	**113.57**	**143.57**	**146.30**	**130.88**	**68.53**	**5.32**	**10 CFR 50 construction total**

NOTES:

Note 1: SCC code based on Appendix A of "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling", April 2004, EPA-420-P-04-005.

Note 2: Brake-specific fuel consumption, zero hour steady state emission factor (EFss; g/hp-hr), and load factor are from NMIM/NONROAD08 model factors dated April 5, 2009.
EFss from NMIM/NONROAD08 have transient adjustment factors built in.

Note 3: Age factor and Deterioration factors calculated using Equation 4 from "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition", April 2004, EPA-420-P-04-009.
Age Factor = LF * cumulative hours / median life {where Age factor is capped at 1. For this calculation, age factor is assumed to be 1 for simplification purposes}.
Deterioration Factor = 1 + (A * Age Factor^b), where b = 1 for desel engines and A is taken from Table A4 from source

Note 4: Adjusted Emission Factors for HC and NOx are calculated using Equation 1 from, "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition", April 2004, EPA-420-P-04-009.
Adjusted EF = Efss * TAF * DF (as stated in Note 2, EFss have TAFs built in)

Note 5: Annual VOC Emissions are calculated using the following calculation (1.053 * Adj. HC emission factor (g/hp-hr) * horsepower * hours operated * load factor) / (2000 lb/ton * 453.6 g/lb)
1.053 is the ratio of VOC to HC from "Conversion Factors for Hydrocarbon Components", December 2005, EPA-420-P-05-015.

Note 6: Annual NOx Emissions are calculated using the following calculation (Adj. NOx emission factor (g/hp-hr) * horsepower * hours operated * load factor) / (2000 lb/ton * 453.6 g/lb)

Table B-2 Gasoline Non-Road Engine Emissions

Equipment category based on NONROAD classification	SCC [1]	Fuel Type	Engine Technology Type	Equipment Horsepower	2010 hrs	2011 hrs	2012 hrs	2013 hrs	2014 hrs	2015 hrs	2016 hrs	2017 hrs	2018 hrs	BSFC [2] lb/hp-hr	EFss (g/hp-hr) [2] HC	EFss (g/hp-hr) [2] NOx	Load Factor [2]	Age Factor [3]	"A" [3] HC	"A" [3] NOx	Deterioration factor [3] HC	Deterioration factor [3] NOx	Adjusted EF (g/hp-hr) [4] HC	Adjusted EF (g/hp-hr) [4] NOx
Forklift	2265003020	Gasoline	G4GT252	52	0	0	3369	17596	22464	22464	22464	22089	9734	0.484	0.27	0.69	0.3	1	0.64	0.15	1.640	1.150	0.443	0.79
Aerial Lift	2265003010	Gasoline	G4GT252	75	0	0	0	1497	4492	4492	4492	4492	2995	0.484	0.27	0.69	0.46	1	0.64	0.15	1.640	1.150	0.443	0.79
Plate Compactor	2260002009	Gasoline	G4N2O2	7	0	0	4212	21762	30654	29688	30888	39520	12402	0.74	4.16	2.77	0.55	1	1.095	0	2.095	1.000	9	2.770
Chipper/Stump Grinder	2265004066	Gasoline	L4N1	11	0	0	468	2106	2106	2106	2106	1754	0	0.693	3.91	5.25	0.78	1	1.095	0	2.095	1.000	8	5.250
Lawn Mower	2265004011	Gasoline	G4N1O2	3	0	0	936	5616	5616	5616	5616	5616	3276	0.781	6.51	2.446	0.78	1	1.753	0	2.753	1.000	18	2.446
Cement & Mortar Mixer	2260002042	Gasoline	G4N2O2	13	0	0	936	7020	8424	8424	8424	8424	3978	0.74	4.16	2.77	0.33	1	1.095	0	2.095	1.000	9	2.770
Pump	2265006010	Gasoline	G4GT25	6	0	0	2808	16380	22464	22464	22464	19332	9360	0.605	3.85	8.43	0.69	1	1.095	0	2.095	1.000	8	8.430
Snowblower	2265004036	Gasoline	G4N2O	11	0	0	468	5148	5616	5616	5616	5616	3276	0.94	5.2	3.5	0.35	1	1.095	0	2.095	1.000	11	3.500
Cement & Mortar Mixer	2260002042	Gasoline	G4N2O2	6	0	0	6318	16146	16848	16848	11700	9360	0	0.74	4.16	2.77	0.33	1	1.095	0	2.095	1.000	9	2.770
Cement & Mortar Mixer	2260002042	Gasoline	G4N2O2	8	0	0	6318	16146	16848	16848	11700	9360	0	0.74	4.16	2.77	0.33	1	1.095	0	2.095	1.000	9	2.770
Concrete Equipment	2260002039	Gasoline	G4N1O2	3	0	0	5850	23868	33462	33696	33696	27378	0	0.921	6.13	2.446	0.63	1	1.753	0	2.753	1.000	17	2.446
Chain Saw	2260004021	Gasoline	G2H52	3	11700	35100	0	0	0	0	0	0	0	0.608	47.98	0.91	0.59	1	0.266	0	1.266	1.000	61	0.910
Roller	2265002015	Gasoline	G4N1O2	6	2340	9360	3900	0	0	0	0	0	0	0.781	6.51	2.446	0.62	1	1.095	0	2.095	1.000	14	2.446
Pump	2265006010	Gasoline	G4GT25	4	3120	12480	0	0	0	0	0	0	0	0.605	3.85	8.43	0.69	1	1.753	0	2.753	1.000	11	8.430
TOTAL (Tons)																								

NOTES:

Note 1: SCC code based on Appendix A of "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling", April 2004, EPA-420-P-04-005.

Note 2: Brake-specific fuel consumption, zero hour steady state emission factor (EFss; g/hp-hr), and load factor are from NMIM/NONROAD08 model factors dated April 5, 2009. Except forklift, aerial lift and cement/concrete equipment.

EFss from NMIM/NONROAD08 have transient adjustment factors built in.

Forklift, aerial lift, and concrete/cement equipment values are from Tables 1-7 of "Exhaust Emission Factors for Nonroad Engine Modeling: Spark-Ignition", December2005, EPA420-R-05R-019

Note 3: Age factor and Deterioration factors calculated using Equation 4 from "Nonroad Spark-Ignition Engine Emission Deterioration Factors", December 2005, EPA-420-R-05-023.

Age Factor = LF * cumulative hours / median life {where Age factor is capped at 1. For this calculation, age factor is assumed to be 1 for simplification purposes}.

Deterioration Factor = 1 + (A * Age Factor^b), where b = 1 for 2-stroke engines =0.5 for 4-stroke engines and A is taken from Tables 1-7 from source

Note 4: Adjusted Emission Factors for HC and NOx are calculated using Equation 1 from, "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition", April 2004, EPA-420-P-04-009.

Adjusted EF = Efss * TAF * DF (as stated in Note 2, EFss have TAFs built in)

Note 5: Annual VOC Emissions are calculated using the following calculation (VOC/HC * Adj. HC emission factor (g/hp-hr) * horsepower * hours operated * load factor) / (2000 lb/ton * 453.6 g/lb)

VOC/HR is the ratio of VOC to HC from "Conversion Factors for Hydrocarbon Components", December 2005, EPA-420-P-05-015. 0.933 for 4-stoke engines and 1.034 for 2-stroke engines

Note 6: Annual NOx Emissions are calculated using the following calculation (Adj. NOx emission factor (g/hp-hr) * horsepower * hours operated * load factor) / (2000 lb/ton * 453.6 g/lb)

Table B-2 Gasoline Non-Road Engine Emissions

Equipment category based on NONROAD classification	VOC[5] tons 2010	VOC tons 2011	VOC tons 2012	VOC tons 2013	VOC tons 2014	VOC tons 2015	VOC tons 2016	VOC tons 2017	VOC tons 2018	NOx[6] tons 2010	NOx tons 2011	NOx tons 2012	NOx tons 2013	NOx tons 2014	NOx tons 2015	NOx tons 2016	NOx tons 2017	NOx tons 2018	
Forklift	0.00	0.00	0.02	0.13	0.16	0.16	0.16	0.16	0.07	0.00	0.00	0.05	0.24	0.31	0.31	0.31	0.30	0.13	
Aerial Lift	0.00	0.00	0.00	0.02	0.07	0.07	0.07	0.07	0.05	0.00	0.00	0.00	0.05	0.14	0.14	0.14	0.14	0.09	
Plate Compactor	0.00	0.00	0.15	0.75	1.06	1.02	1.07	1.36	0.43	0.00	0.00	0.05	0.26	0.36	0.35	0.36	0.46	0.15	
Chipper/Stump Grinder	0.00	0.00	0.03	0.15	0.15	0.15	0.15	0.13	0.00	0.00	0.00	0.02	0.10	0.10	0.10	0.10	0.09	0.00	
Lawn Mower	0.00	0.00	0.04	0.24	0.24	0.24	0.24	0.24	0.14	0.00	0.00	0.01	0.04	0.04	0.04	0.04	0.04	0.02	
Cement & Mortar Mixer	0.00	0.00	0.04	0.27	0.32	0.32	0.32	0.32	0.15	0.00	0.00	0.01	0.09	0.11	0.11	0.11	0.11	0.05	
Pump	0.00	0.00	0.10	0.56	0.77	0.77	0.77	0.66	0.32	0.00	0.00	0.11	0.63	0.86	0.86	0.86	0.74	0.36	
Snowblower	0.00	0.00	0.02	0.22	0.24	0.24	0.24	0.24	0.14	0.00	0.00	0.01	0.08	0.08	0.08	0.08	0.08	0.05	
Cement & Mortar Mixer	0.00	0.00	0.11	0.29	0.30	0.30	0.21	0.17	0.00	0.00	0.00	0.04	0.10	0.10	0.10	0.07	0.06	0.00	
Cement & Mortar Mixer	0.00	0.00	0.15	0.38	0.40	0.40	0.28	0.22	0.00	0.00	0.00	0.05	0.13	0.14	0.14	0.09	0.08	0.00	
Concrete Equipment	0.00	0.00	0.19	0.78	1.10	1.11	1.11	0.90	0.00	0.00	0.00	0.03	0.12	0.17	0.17	0.17	0.14	0.00	
Chain Saw	1.43	4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Roller	0.12	0.49	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.09	0.04	0.00	0.00	0.00	0.00	0.00	0.00	
Pump	0.09	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
TOTAL (Tons)	**1.65**	**5.17**	**1.05**	**3.80**	**4.82**	**4.79**	**4.62**	**4.48**	**1.30**	**0.12**	**0.48**	**0.41**	**1.83**	**2.41**	**2.40**	**2.34**	**2.23**	**0.85**	**Total construction sum**
	0	**0**	**0.02**	**0.15**	**0.23**	**0.23**	**0.23**	**0.23**	**0.12**	**0.00**	**0**	**0.05**	**0.29**	**0.44**	**0.44**	**0.44**	**0.44**	**0.22**	**10 CFR 50 construction total**

NOTES:

Note 1: SCC code based on Appendix A of "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling", April 2004, EPA-420-P-04-005.

Note 2: Brake-specific fuel consumption, zero hour steady state emission factor (EFss; g/hp-hr), and load factor are from NMIM/NONROAD08 model factors dated April 5, 2009. Except forklift, aerial lift and cement/concrete equipment.

EFss from NMIM/NONROAD08 have transient adjustment factors built in.

Forklift, aerial lift, and concrete/cement equipment values are from Tables 1-7 of "Exhaust Emission Factors for Nonroad Engine Modeling: Spark-Ignition", December2005, EPA420-R-05R-019

Note 3: Age factor and Deterioration factors calculated using Equation 4 from "Nonroad Spark-Ignition Engine Emission Deterioration Factors", December 2005, EPA-420-R-05-023.

Age Factor = LF * cumulative hours / median life (where Age factor is capped at 1. For this calculation, age factor is assumed to be 1 for simplification purposes).

Deterioration Factor = 1 + (A * Age Factor^b), where b = 1 for 2-stroke engines =0.5 for 4-stroke engines and A is taken from Tables 1-7 from source

Note 4: Adjusted Emission Factors for HC and NOx are calculated using Equation 1 from, "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition", April 2004, EPA-420-P-04-009.

Adjusted EF = Efss * TAF * DF (as stated in Note 2, EFss have TAFs built in)

Note 5: Annual VOC Emissions are calculated using the follow (VOC/HC * Adj. HC emission factor (g/hp-hr) * horsepower * hours operated * load factor) / (2000 lb/ton * 453.6 g/lb)

VOC/HR is the ratio of VOC to HC from "Conversion Factors for Hydrocarbon Components", December 2005, EPA-420-P-05-015. 0.933 for 4-stoke engines and 1.034 for 2-stroke engines

Note 6: Annual NOx Emissions are calculated using the followi (Adj. NOx emission factor (g/hp-hr) * horsepower * hours operated * load factor) / (2000 lb/ton * 453.6 g/lb)

Table B-3a On-Road Vehicle Emissions 2010

Vehcle Classification	Fuel Type	Vehicle Class	SCC	2010 Total operated hrs	Avg. mph	Vehicular Miles Trav VMT	Mobile 6.2 EFs (g/mi) [1] VOC	Mobile 6.2 EFs (g/mi) [1] NOx	2010 Emissions (tons)[2] VOC	2010 Emissions (tons)[2] NOx
Automotive										
Light-Duty Gasoline Vehicle	Gasoline	LDGV	2201011	0	30.0	0	0.737	0.568	0.00	0.00
Light Duty										
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	1404	20.0	28,080	0.785	0.731	0.02	0.02
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	0	20.0	0	0.785	0.731	0.00	0.00
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	0	20.0	0	1.421	1.375	0.00	0.00
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	0	20.0	0	1.421	1.375	0.00	0.00
Light-Duty Gasoline Truck 3	Gasoline	LDGT3	2201040	0	20.0	0	1.363	1.07	0.00	0.00
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	0	20.0	0	1.421	1.375	0.00	0.00
Trucks -Heavy Duty						0				
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	0	15.0	0	0.411	7.776	0.00	0.00
Heavy-Duty Deisel Vehicle 2B	Diesel	HDDV2b	2230071	0	15.0	0	0.168	2.664	0.00	0.00
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	0	15.0	0	0.324	5.169	0.00	0.00
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	0	15.0	0	0.168	2.664	0.00	0.00
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	0	15.0	0	0.168	2.664	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.493	9.388	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.493	9.388	0.00	0.00
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	0	15.0	0	0.168	2.664	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.493	9.388	0.00	0.00
Heavy-Duty Diesel Vehicle 7	Diesel	HDDV7	2230073	0	15.0	0	0.402	6.444	0.00	0.00
Trailers										
Heavy-Duty Diesel Vehicle 5	Diesel	HDDV5	2230072	0	2.0	0	0.252	4.043	0.00	0.00
Personnel Carrier										
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	936	20.0	18,720	2.587	2.725	0.05	0.06
Diesel Commercial Bus	Diesel	HDDBT	2230075	0	35.0	0	0.29	13.105	0.00	0.00
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	0	20.0	0	2.587	2.725	0.00	0.00
Emergency Vehicles						0				
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	0	30.0	0	2.587	2.725	0.00	0.00
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	0	20.0	0	0.18	2.831	0.00	0.00
Concrete / Aggregate										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.493	9.388	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.493	9.388	0.00	0.00
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	0	15.0	0	0.324	5.169	0.00	0.00
Concrete Batch Plant										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	10.0	0	0.493	9.388	0.00	0.00
Site Preparation										
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	2340	25.0	58,500	0.18	2.831	0.01	0.18
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	2340	20.0	46,800	0.411	7.776	0.02	0.40
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	1560	25.0	39,000	0.18	2.831	0.01	0.12
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	11700	30.0	351,000	2.587	2.725	1.00	1.05
Description	**Fuel Type**	**Vehicle Class**	**SCC**	**Number of Vehicles [3]**	**Round-Distance miles**	**Vehicular Miles Trav VMT**	**Mobile 6.2 EFs (g/mi) [1] VOC**	**Mobile 6.2 EFs (g/mi) [1] NOx**	**2010 Emissions (tons)[2] VOC**	**2010 Emissions (tons)[2] NOx**
Employee Commute/ Delivery										
Light-Duty Gasoline Vehicle in DC NA Area	Gasoline	LDGV	2201011	275	40.0	3432000	0.737	0.568	2.79	2.15
Heavy-Duty Diesel Vehicle 8B in DC NA Area	Diesel	HDDV8b	2230074	0	100.0	0	0.493	9.388	0.00	0.00
								DC NA Area onroad vehicle total (direct & indirect)	**3.91**	**3.99**
Employee Commute/ Delivery										
Light-Duty Gasoline Vehicle in Balt. NA Area	Gasoline	LDGV	2201011	69	20.0	430560	0.737	0.568	0.35	0.27
Heavy-Duty Diesel Vehicle 8B in Balt. NA Area	Diesel	HDDV8b	2230074	0	50.0	0	0.493	9.388	0.00	0.00
								Baltimore NA Area onroad vehicle total	**0.35**	**0.27**

Notes

Note 1: U.S. Environmental Protection Agency "Mobile Source Emission Factor Model". Values generated by simulating the model at the project conditions

Note 2: Annual Emissions are calculated using the following calculation (VMT (miles) * Emission factor (g/mi)) / (2000 lb/ton * 453.6 g/lb)

Note 3: Number of vehicles is daily vehciles for employee commuting and annual number of trips for commerical deliveries

Table B-3b On-Road Vehicle Emissions 2011

Vehcle Classification	Fuel Type	Vehicle Class	SCC	2011 Total operated hrs	Avg. Speed mph	Vehicular Miles Trav VMT	Mobile 6.2 EFs (g/mi) [1] VOC	NOx	2011 Emissions (tons) VOC	NOx
Automotive										
Light-Duty Gasoline Vehicle	Gasoline	LDGV	2201011	0	30.0	0	0.743	0.571	0.00	0.00
Light Duty										
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	5616	20.0	112,320	0.827	0.715	0.10	0.09
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	0	20.0	0	0.827	0.715	0.00	0.00
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	0	20.0	0	1.488	1.182	0.00	0.00
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	0	20.0	0	1.488	1.182	0.00	0.00
Light-Duty Gasoline Truck 3	Gasoline	LDGT3	2201040	0	20.0	0	1.488	1.182	0.00	0.00
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	0	20.0	0	1.488	1.182	0.00	0.00
Trucks -Heavy Duty										
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	0	15.0	0	0.39	6.593	0.00	0.00
Heavy-Duty Deisel Vehicle 2B	Diesel	HDDV2b	2230071	0	15.0	0	0.156	2.238	0.00	0.00
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	0	15.0	0	0.304	4.409	0.00	0.00
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	0	15.0	0	0.156	2.238	0.00	0.00
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	0	15.0	0	0.156	2.238	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.467	8.081	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.467	8.081	0.00	0.00
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	0	15.0	0	0.156	2.238	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.467	8.081	0.00	0.00
Heavy-Duty Diesel Vehicle 7	Diesel	HDDV7	2230073	0	15.0	0	0.376	5.501	0.00	0.00
Trailers										
Heavy-Duty Diesel Vehicle 5	Diesel	HDDV5	2230072	0	2.0	0	0.241	3.562	0.00	0.00
Personnel Carrier										
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	7488	20.0	149,760	2.595	2.727	0.43	0.45
Diesel Commercial Bus	Diesel	HDDBT	2230075	0	35.0	0	0.278	11.752	0.00	0.00
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	0	20.0	0	2.595	2.727	0.00	0.00
Emergency Vehicles										
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	0	30.0	0	2.595	2.727	0.00	0.00
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	0	20.0	0	0.168	2.329	0.00	0.00
Concrete / Aggregate										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.467	8.081	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.467	8.081	0.00	0.00
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	0	15.0	0	0.304	4.409	0.00	0.00
Concrete Batch Plant										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	10.0	0	0.467	8.081	0.00	0.00
Site Preparation										
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	9360	25.0	234,000	0.168	2.329	0.04	0.60
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	9360	20.0	187,200	0.39	6.593	0.08	1.36
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	6240	25.0	156,000	0.168	2.329	0.03	0.40
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	46800	30.0	1,404,000	2.595	2.727	4.02	4.22
Dredging Equipment										
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	18000	30.0	540000	0.39	6.593	0.23	3.92
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	4320	45.0	194400	1.488	1.182	0.32	0.25
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	4320	45.0	194400	0.827	0.715	0.18	0.15
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	720	30.0	21600	0.168	2.329	0.00	0.06

Description	Fuel Type	Vehicle Class	SCC	Number of Vehicles [3]	Round-trip Distance miles	Vehicular Miles Trav VMT	Mobile 6.2 EFs (g/mi) [1] VOC	NOx	2010 Emissions (tons)[2] VOC	NOx
Employee Commute/ Delivery										
Light-Duty Gasoline Vehicle in DC NA Area	Gasoline	LDGV	2201011	1161	40.0	14489280	0.743	0.571	11.87	9.12
Heavy-Duty Diesel Vehicle 8B in DC NA Area	Diesel	HDDV8b	2230074	0	100.0	0	0.168	2.329	0.00	0.00
								DC NA Area onroad vehicle total (direct & indirect)	**17.30**	**20.63**
Employee Commute/ Delivery										
Light-Duty Gasoline Vehicle in Balt. NA Area	Gasoline	LDGV	2201011	290	20.0	1809600	0.743	0.571	1.48	1.14
Heavy-Duty Diesel Vehicle 8B in Balt. NA Area	Diesel	HDDV8b	2230074	0	50.0	0	0.168	2.329	0.00	0.00
								Baltimore NA Area onroad vehicle total	**1.48**	**1.14**

Notes

Note 1: U.S. Environmental Protection Agency "Mobile Source Emission Factor Model". Values generated by simulatin g the model at the project conditions

Note 2: Annual Emissions are calculated using the following calculation (VMT (miles) * Emission factor (g/mi)) / (2000 lb/ton * 453.6 g/lb)

Note 3: Number of vehicles is daily vehciles for employee commuting and annual number of trips for commerical deliveries

Table B-3c On-Road Vehicle Emissions 2012

Description	Fuel Type	Vehicle Class	SCC	2012 Total operated	Avg.	Vehicular Miles Trav	Mobile 6.2 EFs (g/mi) [1]		2012 Emissions (tons)	
				hrs	mph	VMT	HC	NOx	HC	NOx
Automotive										
Light-Duty Gasoline Vehicle	Gasoline	LDGV	2201011	811	30.0	24,330	0.612	0.47	0.02	0.01
Light Duty					0	0	0	0		
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	8892	20.0	177,840	0.666	0.611	0.13	0.12
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	3900	20.0	78,000	0.666	0.611	0.06	0.05
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	3432	20.0	68,640	1.243	1.234	0.09	0.09
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	2184	20.0	43,680	1.243	1.234	0.06	0.06
Light-Duty Gasoline Truck 3	Gasoline	LDGT3	2201040	2340	20.0	46,800	1.187	0.961	0.06	0.05
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	2808	20.0	56,160	1.243	1.234	0.08	0.08
Trucks -Heavy Duty					0	0	0	0		
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	9546	15.0	143,190	0.36	5.588	0.06	0.88
Heavy-Duty Deisel Vehicle 2B	Diesel	HDDV2b	2230071	1872	15.0	28,080	0.146	1.874	0.00	0.06
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	1123	15.0	16,845	0.282	3.754	0.01	0.07
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	1871	15.0	28,065	0.146	1.874	0.00	0.06
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	1497	15.0	22,455	0.146	1.874	0.00	0.05
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	2106	15.0	31,590	0.429	6.98	0.01	0.24
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	2106	15.0	31,590	0.429	6.98	0.01	0.24
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	1885	15.0	28,275	0.146	1.874	0.00	0.06
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	2246	15.0	33,690	0.429	6.98	0.02	0.26
Heavy-Duty Diesel Vehicle 7	Diesel	HDDV7	2230073	2808	15.0	42,120	0.349	4.705	0.02	0.22
Trailers					0	0	0	0		
Heavy-Duty Diesel Vehicle 5	Diesel	HDDV5	2230072		2.0	0	0.232	3.132	0.00	0.00
Personnel Carrier					0	0	0	0		
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	9672	20.0	193,440	2.595	2.727	0.55	0.58
Diesel Commercial Bus	Diesel	HDDBT	2230075		35.0	0	0.264	10.469	0.00	0.00
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	5928	20.0	118,560	2.595	2.727	0.34	0.36
Emergency Vehicles					0	0	0	0		
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	561	30.0	16,830	2.595	2.727	0.05	0.05
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	62	20.0	1,240	0.155	1.871	0.00	0.00
Concrete / Aggregate					0	0	0	0		
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	624	15.0	9,360	0.429	6.98	0.00	0.07
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	1560	15.0	23,400	0.429	6.98	0.01	0.18
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	0	15.0	0	0.282	3.754	0.00	0.00
Concrete Batch Plant										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	37440	10.0	374,400	0.429	6.98	0.18	2.88
Site Preparation					0	0	0	0		
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	2340	25.0	58,500	0.155	1.871	0.01	0.12
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	2340	20.0	46,800	0.36	5.588	0.02	0.29
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	1560	25.0	39,000	0.155	1.871	0.01	0.08
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	11700	30.0	351,000	2.595	2.727	1.00	1.06
Description	**Fuel Type**	**Vehicle Class**	**SCC**	**Number of Vehicles [3]**	**Round-Distance**	**Vehicular Miles Trav**	**Mobile 6.2 EFs (g/mi) [1]**		**2010 Emissions (tons)[2]**	
					miles	**VMT**	**VOC**	**NOx**	**VOC**	**NOx**
Employee Commute/ Delivery					0		0	0		
Light-Duty Gasoline Vehicle in DC NA Area	Gasoline	LDGV	2201011	2008	40.0	25059840	0.612	0.47	16.91	12.98
Heavy-Duty Diesel Vehicle 8B in DC NA Area	Diesel	HDDV8b	2230074	3930	100.0	393000	0.429	6.98	0.19	3.02
								DC NA Area onroad vehicle total (direct & indirect)	**19.90**	**24.28**
Employee Commute/ Delivery										
Light-Duty Gasoline Vehicle in Balt. NA Area	Gasoline	LDGV	2201011	502	20.0	3132480	0.612	0.47	2.11	1.62
Heavy-Duty Diesel Vehicle 8B in Balt. NA Area	Diesel	HDDV8b	2230074	1179	50.0	58950	0.429	6.98	0.03	0.45
								Baltimore NA Area onroad vehicle total	**2.14**	**2.08**

Notes

Note 1: U.S. Environmental Protection Agency "Mobile Source Emission Factor Model". Values generated by simulating the model at the project conditions

Note 2: Annual Emissions are calculated using the following calculation

Note 3: Number of vehicles is daily vehciles for employee commuting and annual number of trips for commerical deliveries

Table B-3d On-Road Vehicle Emissions 2013

Description	Fuel Type	Vehicle Class	SCC	2013 Total operated	Average Speed	Vehicular Miles Trav	Criteria Pollutants EFs (g/mi) [1]		2013 Emissions (tons)	
				hrs	mph	VMT	HC	NOx	HC	NOx
Automotive										
Light-Duty Gasoline Vehicle	Gasoline	LDGV	2201011	1,497	30.0	44,910	0.563	0.428	0.03	0.02
Light Duty										
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	9360	20.0	187,200	0.624	0.554	0.13	0.11
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	14040	20.0	280,800	0.624	0.554	0.19	0.17
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	14664	20.0	293,280	1.175	1.158	0.38	0.37
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	10296	20.0	205,920	1.175	1.158	0.27	0.26
Light-Duty Gasoline Truck 3	Gasoline	LDGT3	2201040	3744	20.0	74,880	1.12	0.9	0.09	0.07
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	7956	20.0	159,120	1.175	1.158	0.21	0.20
Trucks -Heavy Duty										
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	15724	15.0	235,860	0.345	4.764	0.09	1.24
Heavy-Duty Deisel Vehicle 2B	Diesel	HDDV2b	2230071	7862	15.0	117,930	0.14	1.601	0.02	0.21
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	6177	15.0	92,655	0.268	3.237	0.03	0.33
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	7113	15.0	106,695	0.14	1.601	0.02	0.19
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	7113	15.0	106,695	0.14	1.601	0.02	0.19
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	7020	15.0	105,300	0.41	6.028	0.05	0.70
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	7020	15.0	105,300	0.41	6.028	0.05	0.70
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	4492	15.0	67,380	0.14	1.601	0.01	0.12
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	6240	15.0	93,600	0.41	6.028	0.04	0.62
Heavy-Duty Diesel Vehicle 7	Diesel	HDDV7	2230073	12324	15.0	184,860	0.331	4.054	0.07	0.83
Trailers										
Heavy-Duty Diesel Vehicle 5	Diesel	HDDV5	2230072	1684	2.0	3,368	0.225	2.792	0.00	0.01
Personnel Carrier										
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	35888	20.0	717,760	2.595	2.727	2.05	2.16
Diesel Commercial Bus	Diesel	HDDBT	2230075		35.0	0	0.258	9.26	0.00	0.00
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	16692	20.0	333,840	2.595	2.727	0.95	1.00
Emergency Vehicles										
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	1591	30.0	47,730	2.595	2.727	0.14	0.14
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	374	20.0	7,480	0.148	1.556	0.00	0.01
Concrete / Aggregate										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	936	15.0	14,040	0.41	6.028	0.01	0.09
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	3900	15.0	58,500	0.41	6.028	0.03	0.39
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	0	15.0	0	0.268	3.237	0.00	0.00
Concrete Batch Plant										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	74880	10.0	748,800	0.41	6.028	0.34	4.98
Site Preparation										
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	0	25.0	0	0.148	1.556	0.00	0.00
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	0	20.0	0	0.345	4.764	0.00	0.00
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	0	25.0	0	0.148	1.556	0.00	0.00
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	0	30.0	0	2.595	2.727	0.00	0.00
Description	**Fuel Type**	**Vehicle Class**	**SCC**	**Number of Vehicles [3]**	**Round-Distance**	**Vehicular Miles Trav**	**Mobile 6.2 EFs (g/mi) [1]**		**2010 Emissions (tons) [2]**	
					miles	VMT	VOC	NOx	VOC	NOx
Employee Commute/ Delivery					0					
Light-Duty Gasoline Vehicle in DC NA Area	Gasoline	LDGV	2201011	2769	40.0	34557120	0.563	0.428	21.45	16.30
Heavy-Duty Diesel Vehicle 8B in DC NA Area	Diesel	HDDV8b	2230074	4400	100.0	440000	0.41	6.028	0.20	2.92
								DC NA Area onroad vehicle total (direct & indirect)	**26.84**	**34.35**
Employee Commute/ Delivery										
Light-Duty Gasoline Vehicle in Balt. NA Area	Gasoline	LDGV	2201011	692	20.0	4318080	0.563	0.428	2.68	2.04
Heavy-Duty Diesel Vehicle 8B in Balt. NA Area	Diesel	HDDV8b	2230074	1320	50.0	66000	0.41	6.028	0.03	0.44
								Baltimore NA Area onroad vehicle total	**2.71**	**2.48**

Notes

Note 1: U.S. Environmental Protection Agency "Mobile Source Emission Factor Model". Values generated by simulating the model at the project conditions

Note 2: Annual Emissions are calculated using the following calculation

Note 3: Number of vehicles is daily vehciles for employee commuting and annual number of trips for commerical deliveries

Table B-3e On-Road Vehicle Emissions 2014

Description	Fuel Type	Vehicle Class	SCC	2014 Total operated hrs	Average Speed mph	Vehicular Miles Trav VMT	Criteria Pollutants EFs (g/mi) [1] HC	NOx	2014 Emissions (tons) HC	NOx
Automotive										
Light-Duty Gasoline Vehicle	Gasoline	LDGV	2201011	1,497	30.0	44,910	0.52	0.391	0.03	0.02
Light Duty										
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	9360	20.0	187,200	0.590	0.507	0.12	0.10
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	14976	20.0	299,520	0.590	0.507	0.19	0.17
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	14976	20.0	299,520	1.113	1.092	0.37	0.36
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	11232	20.0	224,640	1.113	1.092	0.28	0.27
Light-Duty Gasoline Truck 3	Gasoline	LDGT3	2201040	3744	20.0	74,880	1.06	0.848	0.09	0.07
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	9360	20.0	187,200	1.113	1.092	0.23	0.23
Trucks -Heavy Duty										
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	15724	15.0	235,860	0.332	3.998	0.09	1.04
Heavy-Duty Deisel Vehicle 2B	Diesel	HDDV2b	2230071	11232	15.0	168,480	0.133	1.384	0.02	0.26
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	8985	15.0	134,775	0.254	2.774	0.04	0.41
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	11232	15.0	168,480	0.133	1.384	0.02	0.26
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	8985	15.0	134,775	0.133	1.384	0.02	0.21
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	8424	15.0	126,360	0.392	5.122	0.05	0.71
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	8424	15.0	126,360	0.392	5.122	0.05	0.71
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	4492	15.0	67,380	0.133	1.384	0.01	0.10
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	8985	15.0	134,775	0.392	5.122	0.06	0.76
Heavy-Duty Diesel Vehicle 7	Diesel	HDDV7	2230073	12048	15.0	180,720	0.312	3.454	0.06	0.69
Trailers										
Heavy-Duty Diesel Vehicle 5	Diesel	HDDV5	2230072	4492	2.0	8,984	0.213	2.491	0.00	0.02
Personnel Carrier										
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	53352	20.0	1,067,040	2.595	2.727	3.05	3.21
Diesel Commercial Bus	Diesel	HDDBT	2230075	28080	35.0	982,800	0.253	8.118	0.27	8.79
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	18720	20.0	374,400	2.595	2.727	1.07	1.13
Emergency Vehicles										
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	2246	30.0	67,380	2.595	2.727	0.19	0.20
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	374	20.0	7,480	0.142	1.309	0.00	0.01
Concrete / Aggregate										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	936	15.0	14,040	0.392	5.122	0.01	0.08
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	4212	15.0	63,180	0.392	5.122	0.03	0.36
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	0	15.0	0	0.254	2.774	0.00	0.00
Concrete Batch Plant										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	74880	10.0	748,800	0.392	5.122	0.32	4.23
Site Preparation										
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	0	25.0	0	0.142	1.309	0.00	0.00
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	0	20.0	0	0.332	3.998	0.00	0.00
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	0	25.0	0	0.142	1.309	0.00	0.00
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	0	30.0	0	2.595	2.727	0.00	0.00

Description	Fuel Type	Vehicle Class	SCC	Number of Vehicles [3]	Round-Distance miles	Vehicular Miles Trav VMT	Mobile 6.2 EFs (g/mi) [1] VOC	NOx	2010 Emissions (tons)[2] VOC	NOx
Employee Commute/ Delivery										
Light-Duty Gasoline Vehicle in DC NA Area	Gasoline	LDGV	2201011	3167	40.0	39524160	0.52	0.391	22.66	17.04
Heavy-Duty Diesel Vehicle 8B in DC NA Area	Diesel	HDDV8b	2230074	2940	100.0	294000	0.392	5.122	0.13	1.66
								DC NA Area onroad vehicle total (direct & indirect)	**29.47**	**43.09**
Employee Commute/ Delivery										
Light-Duty Gasoline Vehicle in Balt. NA Area	Gasoline	LDGV	2201011	792	20.0	4942080	0.52	0.391	2.83	2.13
Heavy-Duty Diesel Vehicle 8B in Balt. NA Area	Diesel	HDDV8b	2230074	882	50.0	44100	0.392	5.122	0.02	0.25
								Baltimore NA Area onroad vehicle total	**2.85**	**2.38**

Notes

Note 1: U.S. Environmental Protection Agency "Mobile Source Emission Factor Model". Values generated by simulating the model at the project conditions

Note 2: Annual Emissions are calculated using the following calculation

Note 3: Number of vehicles is daily vehciles for employee commuting and annual number of trips for commerical deliveries

Table B-3f On-Road Vehicle Emissions 2015

Description	Fuel Type	Vehicle Class	SCC	2015 Total operated	Average Speed	Vehicular Miles Trav	Criteria Pollutants EFs (g/mi) [1]		2015 Emissions (tons)	
				hrs	mph	VMT	HC	NOx	HC	NOx
Automotive										
Light-Duty Gasoline Vehicle	Gasoline	LDGV	2201011	1,497	30.0	44,910	0.483	0.359	0.02	0.02
Light Duty										
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	9360	20.0	187,200	0.561	0.468	0.12	0.10
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	16848	20.0	336,960	0.561	0.468	0.21	0.17
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	14976	20.0	299,520	1.056	1.033	0.35	0.34
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	11232	20.0	224,640	1.056	1.033	0.26	0.26
Light-Duty Gasoline Truck 3	Gasoline	LDGT3	2201040	3744	20.0	74,880	1.004	0.802	0.08	0.07
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	9360	20.0	187,200	1.056	1.033	0.22	0.21
Trucks -Heavy Duty										
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	15724	15.0	235,860	0.316	3.425	0.08	0.89
Heavy-Duty Deisel Vehicle 2B	Diesel	HDDV2b	2230071	11232	15.0	168,480	0.128	1.188	0.02	0.22
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	8985	15.0	134,775	0.241	2.397	0.04	0.36
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	11232	15.0	168,480	0.128	1.188	0.02	0.22
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	8985	15.0	134,775	0.128	1.188	0.02	0.18
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	8424	15.0	126,360	0.37	4.455	0.05	0.62
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	8424	15.0	126,360	0.37	4.455	0.05	0.62
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	4922	15.0	73,830	0.128	1.188	0.01	0.10
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	8985	15.0	134,775	0.37	4.455	0.05	0.66
Heavy-Duty Diesel Vehicle 7	Diesel	HDDV7	2230073	12048	15.0	180,720	0.297	2.983	0.06	0.59
Trailers										
Heavy-Duty Diesel Vehicle 5	Diesel	HDDV5	2230072	4492	2.0	8,984	0.204	2.183	0.00	0.02
Personnel Carrier										
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	56160	20.0	1,123,200	2.595	2.727	3.21	3.38
Diesel Commercial Bus	Diesel	HDDBT	2230075	40524	35.0	1,418,340	0.25	7.082	0.39	11.07
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	18720	20.0	374,400	2.595	2.727	1.07	1.13
Emergency Vehicles										
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	2246	30.0	67,380	2.595	2.727	0.19	0.20
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	374	20.0	7,480	0.137	1.095	0.00	0.01
Concrete / Aggregate										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.37	4.455	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	5616	15.0	84,240	0.37	4.455	0.03	0.41
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	0	15.0	0	0.241	2.397	0.00	0.00
Concrete Batch Plant										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	74880	10.0	748,800	0.37	4.455	0.31	3.68
Site Preparation										
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	0	25.0	0	0.137	1.095	0.00	0.00
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	0	20.0	0	0.316	3.425	0.00	0.00
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	0	25.0	0	0.137	1.095	0.00	0.00
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	0	30.0	0	2.595	2.727	0.00	0.00

Description	Fuel Type	Vehicle Class	SCC	Number of Vehicles [3]	Round-Distance miles	Vehicular Miles Trav VMT	Mobile 6.2 EFs (g/mi) [1] VOC	NOx	2010 Emissions (tons) [2] VOC	NOx
Employee Commute/ Delivery					0		0	0		
Light-Duty Gasoline Vehicle in DC NA Area	Gasoline	LDGV	2201011	2838	40.0	35418240	0.483	0.359	18.86	14.02
Heavy-Duty Diesel Vehicle 8B in DC NA Area	Diesel	HDDV8b	2230074	500	100.0	50000	0.37	4.455	0.02	0.25
								DC NA Area onroad vehicle total (direct & indirect)	**25.76**	**39.78**
Employee Commute/ Delivery										
Light-Duty Gasoline Vehicle in Balt. NA Area	Gasoline	LDGV	2201011	710	20.0	4430400	0.483	0.359	2.36	1.75
Heavy-Duty Diesel Vehicle 8B in Balt. NA Area	Diesel	HDDV8b	2230074	150	50.0	7500	0.37	4.455	0.00	0.04
								Baltimore NA Area onroad vehicle total	**2.36**	**1.79**

Notes

Note 1: U.S. Environmental Protection Agency "Mobile Source Emission Factor Model". Values generated by simulating the model at the project conditions

Note 2: Annual Emissions are calculated using the following calculation

Note 3: Number of vehicles is daily vehciles for employee commuting and annual number of trips for commerical deliveries

Table B-3g On-Road Vehicle Emissions 2016

Description	Fuel Type	Vehicle Class	SCC	2016 Total operated hrs	Average Speed mph	Vehicular Miles Trav VMT	Criteria Pollutants EFs (g/mi) [1] HC	NOx	2016 Emissions (tons) HC	NOx
Automotive										
Light-Duty Gasoline Vehicle	Gasoline	LDGV	2201011	1,497	30.0	44,910	0.453	0.33	0.02	0.02
Light Duty										
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	9360	20.0	187,200	0.536	0.431	0.11	0.09
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	2201020	18720	20.0	374,400	0.536	0.431	0.22	0.18
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	14976	20.0	299,520	0.997	0.97	0.33	0.32
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	11232	20.0	224,640	0.997	0.97	0.25	0.24
Light-Duty Gasoline Truck 3	Gasoline	LDGT3	2201040	3744	20.0	74,880	0.947	0.752	0.08	0.06
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2201040	7800	20.0	156,000	0.997	0.97	0.17	0.17
Trucks -Heavy Duty										
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	15537	15.0	233,055	0.308	2.973	0.08	0.76
Heavy-Duty Deisel Vehicle 2B	Diesel	HDDV2b	2230071	11232	15.0	168,480	0.124	1.019	0.02	0.19
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	8985	15.0	134,775	0.232	2.073	0.03	0.31
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	11232	15.0	168,480	0.124	1.019	0.02	0.19
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	8985	15.0	134,775	0.124	1.019	0.02	0.15
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	8424	15.0	126,360	0.359	3.942	0.05	0.55
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	8424	15.0	126,360	0.359	3.942	0.05	0.55
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	2230060	4922	15.0	73,830	0.124	1.019	0.01	0.08
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	8985	15.0	134,775	0.359	3.942	0.05	0.59
Heavy-Duty Diesel Vehicle 7	Diesel	HDDV7	2230073	12048	15.0	180,720	0.286	2.587	0.06	0.52
Trailers										
Heavy-Duty Diesel Vehicle 5	Diesel	HDDV5	2230072	2620	2.0	5,240	0.198	1.957	0.00	0.01
Personnel Carrier										
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	56160	20.0	1,123,200	2.595	2.727	3.21	3.38
Diesel Commercial Bus	Diesel	HDDBT	2230075	23712	35.0	829,920	0.247	6.117	0.23	5.60
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	18720	20.0	374,400	2.595	2.727	1.07	1.13
Emergency Vehicles										
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	2246	30.0	67,380	2.595	2.727	0.19	0.20
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	374	20.0	7,480	0.133	0.927	0.00	0.01
Concrete / Aggregate										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	0	15.0	0	0.359	3.942	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	1482	15.0	22,230	0.359	3.942	0.01	0.10
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	2230073	0	15.0	0	0.232	2.073	0.00	0.00
Concrete Batch Plant										
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2230074	74880	10.0	748,800	0.359	3.942	0.30	3.25
Site Preparation										
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	0	25.0	0	0.133	0.927	0.00	0.00
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	2230074	0	20.0	0	0.308	2.973	0.00	0.00
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	2230072	0	25.0	0	0.133	0.927	0.00	0.00
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2230060	0	30.0	0	2.595	2.727	0.00	0.00

Description	Fuel Type	Vehicle Class	SCC	Number of Vehicles [3]	Round-Distance miles	Vehicular Miles Trav VMT	Mobile 6.2 EFs (g/mi) [1] VOC	NOx	2010 Emissions (tons)[2] VOC	NOx
Employee Commute/ Delivery										
Light-Duty Gasoline Vehicle in DC NA Area	Gasoline	LDGV	2201011	2352	40.0	29352960	0.453	0.33	14.66	10.68
Heavy-Duty Diesel Vehicle 8B in DC NA Area	Diesel	HDDV8b	2230074	70	100.0	7000	0.359	3.942	0.00	0.03
								DC NA Area onroad vehicle total (direct & indirect)	**21.25**	**29.33**

Employee Commute/ Delivery										
Light-Duty Gasoline Vehicle in Balt. NA Area	Gasoline	LDGV	2201011	588	20.0	3669120	0.453	0.33	1.83	1.33
Heavy-Duty Diesel Vehicle 8B in Balt. NA Area	Diesel	HDDV8b	2230074	21	50.0	1050	0.359	3.942	0.00	0.00
								Baltimore NA Area onroad vehicle total	**1.83**	**1.34**

Notes

Note 1: U.S. Environmental Protection Agency "Mobile Source Emission Factor Model". Values generated by simulating the model at the project conditions

Note 2: Annual Emissions are calculated using the following calculation

Note 3: Number of vehicles is daily vehciles for employee commuting and annual number of trips for commerical deliveries

Table B-3h On-Road Vehicle Emissions 2017

Description	Fuel Type	Vehicle Class	2017 Total operated hrs	Average Speed mph	Vehicular Miles Trav VMT	Criteria Pollutants EFs (g/mi) [1] HC	NOx	2017 Emissions (tons) HC	NOx
Automotive									
Light-Duty Gasoline Vehicle	Gasoline	LDGV	1,497	30.0	44,910	0.428	0.306	0.02	0.02
Light Duty									
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	9360	20.0	187,200	0.514	0.404	0.11	0.08
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	17940	20.0	358,800	0.514	0.404	0.20	0.16
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	14976	20.0	299,520	0.946	0.92	0.31	0.30
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	6864	20.0	137,280	0.946	0.92	0.14	0.14
Light-Duty Gasoline Truck 3	Gasoline	LDGT3	3744	20.0	74,880	0.896	0.712	0.07	0.06
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	4992	20.0	99,840	0.946	0.92	0.10	0.10
Trucks -Heavy Duty									
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	10296	15.0	154,440	0.301	2.578	0.05	0.44
Heavy-Duty Deisel Vehicle 2B	Diesel	HDDV2b	11044	15.0	165,660	0.121	0.891	0.02	0.16
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	7300	15.0	109,500	0.225	1.817	0.03	0.22
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	7862	15.0	117,930	0.121	0.891	0.02	0.12
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	5616	15.0	84,240	0.121	0.891	0.01	0.08
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	8424	15.0	126,360	0.349	3.401	0.05	0.47
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	5616	15.0	84,240	0.349	3.401	0.03	0.32
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	4922	15.0	73,830	0.121	0.891	0.01	0.07
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	7826	15.0	117,390	0.349	3.401	0.05	0.44
Heavy-Duty Diesel Vehicle 7	Diesel	HDDV7	14976	15.0	224,640	0.278	2.261	0.07	0.56
Trailers									
Heavy-Duty Diesel Vehicle 5	Diesel	HDDV5	748	2.0	1,496	0.193	1.757	0.00	0.00
Personnel Carrier									
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	26208	20.0	524,160	2.595	2.727	1.50	1.58
Diesel Commercial Bus	Diesel	HDDBT	19344	35.0	677,040	0.24	5.21	0.18	3.89
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	6240	20.0	124,800	2.595	2.727	0.36	0.38
Emergency Vehicles									
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	2246	30.0	67,380	2.595	2.727	0.19	0.20
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	374	20.0	7,480	0.131	0.794	0.00	0.01
Concrete / Aggregate									
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	0	15.0	0	0.349	3.401	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	0	15.0	0	0.349	3.401	0.00	0.00
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	0	15.0	0	0.225	1.817	0.00	0.00
Concrete Batch Plant									
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	0	10.0	0	0.349	3.401	0.00	0.00
Site Preparation									
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	0	25.0	0	0.131	0.794	0.00	0.00
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	0	20.0	0	0.301	2.578	0.00	0.00
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	0	25.0	0	0.131	0.794	0.00	0.00
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	0	30.0	0	2.595	2.727	0.00	0.00
Description	**Fuel Type**	**Vehicle Class**	**Number of Vehicles [3]**	**Round-Distance miles**	**Vehicular Miles Trav VMT**	**Mobile 6.2 EFs (g/mi) [1] VOC**	**NOx**	**2010 Emissions (tons)[2] VOC**	**NOx**
Employee Commute/ Delivery									
Light-Duty Gasoline Vehicle in DC NA Area	Gasoline	LDGV	1108	40.0	13827840	0.428	0.306	6.52	4.66
Heavy-Duty Diesel Vehicle 8B in DC NA Area	Diesel	HDDV8b	0	100.0	0	0.349	3.401	0.00	0.00
		DC NA Area onroad vehicle total (direct & indirect)						**10.05**	**14.46**
Employee Commute/ Delivery									
Light-Duty Gasoline Vehicle in Balt. NA Area	Gasoline	LDGV	277	20.0	1728480	0.428	0.306	0.82	0.58
Heavy-Duty Diesel Vehicle 8B in Balt. NA Area	Diesel	HDDV8b	0	50.0	0	0.349	3.401	0.00	0.00
							Baltimore NA Area onroad vehicle total	**0.82**	**0.58**

Notes

Note 1: U.S. Environmental Protection Agency "Mobile Source Emission Factor Model". Values generated by simulating the model at the project conditions

Note 2: Annual Emissions are calculated using the following calculation

Note 3: Number of vehicles is daily vehciles for employee commuting and annual number of trips for commerical deliveries

Table B-3I On-Road Vehicle Emissions 2018

Description	Fuel Type	Vehicle Class	2018 operating hrs	Average Speed mph	Vehicular Miles Trav VMT	Mobile 6.2 EFs (g/mi) [1] HC	Mobile 6.2 EFs (g/mi) [1] NOx	2018 Emissions (tons) HC	2018 Emissions (tons) NOx
Automotive									
Light-Duty Gasoline Vehicle	Gasoline	LDGV	1,372	30.0	41,160	0.407	0.285	0.02	0.01
Light Duty									
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	8580	20.0	171,600	0.494	0.381	0.09	0.07
Light-Duty Gasoline Truck 2	Gasoline	LDGT2	7800	20.0	156,000	0.494	0.381	0.08	0.07
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	7488	20.0	149,760	0.891	0.866	0.15	0.14
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	0	20.0	0	0.891	0.866	0.00	0.00
Light-Duty Gasoline Truck 3	Gasoline	LDGT3	3432	20.0	68,640	0.843	0.669	0.06	0.05
Light-Duty Gasoline Truck 4	Gasoline	LDGT4	2184	20.0	43,680	0.891	0.866	0.04	0.04
Trucks -Heavy Duty									
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	5990	15.0	89,850	0.295	2.183	0.03	0.22
Heavy-Duty Deisel Vehicle 2B	Diesel	HDDV2b	4492	15.0	67,380	0.115	0.754	0.01	0.06
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	1872	15.0	28,080	0.217	1.577	0.01	0.05
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	3556	15.0	53,340	0.115	0.754	0.01	0.04
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	1497	15.0	22,455	0.115	0.754	0.00	0.02
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	3978	15.0	59,670	0.341	2.843	0.02	0.19
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	1872	15.0	28,080	0.341	2.843	0.01	0.09
Heavy-Duty Deisel Vehicle 2B	Diesel	LDDT12	1872	15.0	28,080	0.115	0.754	0.00	0.02
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	2620	15.0	39,300	0.341	2.843	0.01	0.12
Heavy-Duty Diesel Vehicle 7	Diesel	HDDV7	2808	15.0	42,120	0.268	1.968	0.01	0.09
Trailers									
Heavy-Duty Diesel Vehicle 5	Diesel	HDDV5	0	2.0	0	0.181	1.533	0.00	0.00
Personnel Carrier									
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	12792	20.0	255,840	2.595	2.727	0.73	0.77
Diesel Commercial Bus	Diesel	HDDBT	2808	35.0	98,280	0.236	4.41	0.03	0.48
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	0	20.0	0	2.595	2.727	0.00	0.00
Emergency Vehicles									
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	842	30.0	25,260	2.595	2.727	0.07	0.08
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	218	20.0	4,360	0.127	0.682	0.00	0.00
Concrete / Aggregate									
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	0	15.0	0	0.341	2.843	0.00	0.00
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	0	15.0	0	0.341	2.843	0.00	0.00
Heavy-Duty Deisel Vehicle 6	Diesel	HDDV6	0	15.0	0	0.217	1.577	0.00	0.00
Concrete Batch Plant									
Heavy-Duty Diesel Vehicle 8B	Diesel	HDDV8b	0	10.0	0	0.341	2.843	0.00	0.00
Site Preparation									
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	0	25.0	0	0.127	0.682	0.00	0.00
Heavy-Duty Diesel Vehicle 8A	Diesel	HDDV8a	0	20.0	0	0.295	2.183	0.00	0.00
Heavy-Duty Diesel Vehicle 3	Diesel	HDDV3	0	25.0	0	0.127	0.682	0.00	0.00
Light-Duty Diesel Truck 1 and 2	Diesel	LDDT12	0	30.0	0	2.595	2.727	0.00	0.00

Description	Fuel Type	Vehicle Class	Number of Vehicles [3]	Round-Distance miles	Vehicular Miles Trav VMT	Mobile 6.2 EFs (g/mi) [1] VOC	Mobile 6.2 EFs (g/mi) [1] NOx	2010 Emissions (tons)[2] VOC	2010 Emissions (tons)[2] NOx
Employee Commute/ Delivery									
Light-Duty Gasoline Vehicle in DC NA Area	Gasoline	LDGV	379	40.0	4729920	0.407	0.285	2.12	1.49
Heavy-Duty Diesel Vehicle 8B in DC NA Area	Diesel	HDDV8b	0	100.0	0	0.341	2.843	0.00	0.00
							DC NA Area onroad vehicle total (direct & indirect)	**3.52**	**4.09**
Employee Commute/ Delivery									
Light-Duty Gasoline Vehicle in Balt. NA Area	Gasoline	LDGV	95	20.0	592800	0.407	0.285	0.27	0.19
Heavy-Duty Diesel Vehicle 8B in Balt. NA Area	Diesel	HDDV8b	0	50.0	0	0.341	2.843	0.00	0.00
							Baltimore NA Area onroad vehicle total	**0.27**	**0.19**

Notes

Note 1: U.S. Environmental Protection Agency "Mobile Source Emission Factor Model". Values generated by simulating the model at the project conditions

Note 2: Annual Emissions are calculated using the following calculation

Note 3: Number of vehicles is daily vehciles for employee commuting and annual number of trips for commerical deliveries

Table B-4 Marine Engine Emissions

Description	Fuel Type	Equipment Horsepower							Load Factor [1]	Emission Factor (g/kW-hr) [2]		Correction Factor [3]		VOC tons	VOC tons	VOC tons	VOC tons	VOC tons	VOC tons	NOx tons	NOx tons	NOx tons	NOx tons	NOx tons	NOx tons
		hp	2011 hrs	2012 hrs	2013 hrs	2014 hrs	2015 hrs	2016 hrs		HC (VOC)	NOx	HC	NOx	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
Barge - in DC-MD-VA nonattainment area	Diesel	2400	0	135	135	135	135	135	0.79	0.50	9.8	1.00	1.00	0.00	0.11	0.11	0.11	0.11	0.11	0.00	2.06	2.06	2.06	2.06	2.06
Barge Auxiliary - in DC-MD-VA NA area	Diesel	205	0	135	135	135	135	135	0.56	0.27	6.8	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.09	0.09
TugBoat - for degding activity	Diesel	1200	720	0	0	0	0	0	0.79	0.50	9.8	1.00	1.00	0.28	0.00	0.00	0.00	0.00	0.00	5.50	0.00	0.00	0.00	0.00	0.00
TugBoat Auxiliary - for dredging activity	Diesel	100	720	0	0	0	0	0	0.56	0.27	6.8	1.00	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00
18' Boat - for dredging activity	Gasoline	225	720	0	0	0	0	0	0.79	0.50	9.8	1.00	1.00	0.05	0.00	0.00	0.00	0.00	0.00	1.03	0.00	0.00	0.00	0.00	0.00
												TOTAL DC area(Tons)		0.34	0.11	0.11	0.11	0.11	0.11	6.75	2.15	2.15	2.15	2.15	2.15

Description	Fuel Type	Equipment Horsepower							Load Factor [1]	Emission Factor (g/kW-hr) [2]		Correction Factor [3]		VOC tons	VOC tons	VOC tons	VOC tons	VOC tons	VOC tons	NOx tons	NOx tons	NOx tons	NOx tons	NOx tons	NOx tons
		hp	2011 hrs	2012 hrs	2013 hrs	2014 hrs	2015 hrs	2016 hrs		HC (VOC)	NOx	HC	NOx	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
Barge - in Baltimore nonattainment area	Diesel	2400	0	430	430	430	430	430	0.79	0.50	9.8	1.00	1.00	0.00	0.34	0.34	0.34	0.34	0.34	0.00	6.57	6.57	6.57	6.57	6.57
Barge Auxiliary - in Baltimore NA area	Diesel	205	0	430	430	430	430	430	0.56	0.27	6.8	1.00	1.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.28	0.28	0.28	0.28	0.28
										TOTAL Baltimore area(Tons)				0.00	0.35	0.35	0.35	0.35	0.35	0.00	6.84	6.84	6.84	6.84	6.84

NOTES:

Note 1: EPA Load Factors for Harbor Crafts from Table 3-3 of " USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories Final Report" April 2009

Note 2: Harbor Craft Emission Factors from Table 3-8 of " USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories Final Report" April 2009

Note 3: Harbor Craft Fuel Correction Factors from Offroad Diesel Fuel from Table 3-9 of " USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories Final Report" April 2009

Note 4: Annual Emissions are calculated using the following equation from Section 3.0 Harbor Craft of " USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories Final Report" April 2009

(Emission factor (g/kW-hr) * horsepower * hours operated * load factor*correction factor) / (1.341 hp-hr/kWh*2000 lb/ton * 453.59 g/lb)

Table B-5 Boiler Emissions

	2010 hrs	2011 hrs	2012 hrs	2013 hrs	2014 hrs	2015 hrs	2016 hrs	2017 hrs	2018 hrs
Concrete Batch Plant Auxiliary Oil-fired Boiler	0	0	1040	3120	3120	3120	2080	0	0
NOx emissions (tons)	**0**	**0**	**1.54**	**4.62**	**4.62**	**4.62**	**3.08**	**0**	**0**
VOC emissions (tons)	**0**	**0**	**0.02**	**0.05**	**0.05**	**0.05**	**0.03**	**0**	**0**

Boiler Heat Input Rating	20	MMBtu/hr (assumed)	
Typical Distillate Oil HHV	0.135	MMBtu/gallon	
NOx emission factor	20	lb/1,000 gallons	AP-42 Section 1.3 9/98, Table 1.3-1
VOC emission factor	0.2	lb/1,000 gallons	AP-42 Section 1.3 9/98, Table 1.3-3

Enclosure 3

Regulatory Commitment

The regulatory commitment in this correspondence is summarized below:

Regulatory Commitment No.	Regulatory Commitment Description	Regulatory Commitment Due Date
CC-09-0009	UNE will transmit the proposed mitigation measures for CCNPP Unit 3 NOx emissions to the NRC.	March 31, 2010