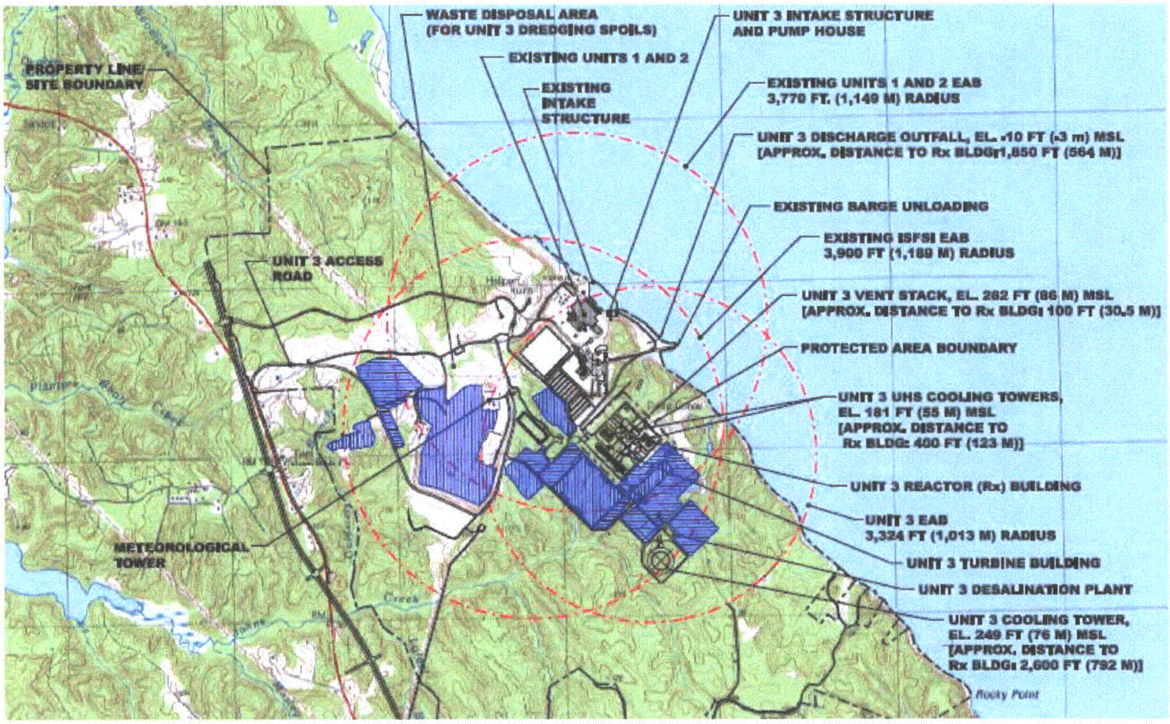
Enclosure 2

Report of the Construction Activities and Air Impacts from the Proposed Unit 3 at Calvert Cliffs Nuclear Power Plant, dated August 2008

Prepared for:
UniStar Nuclear Energy, LLC and
UniStar Nuclear Operating Services, LLC



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ENSR Corporation
August 2008
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1.0 Introduction

UniStar Nuclear Energy, LLC (UNE) 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, and will have a gross electric generation capacity of about 1,710 megawatts.

The CCNPP campus, currently owned by Calvert Cliffs Nuclear Power Plant, Inc., consists of 2,070 acres near Lusby, Calvert County, Maryland, on the west bank of the Chesapeake Bay, approximately halfway between the mouth of the bay and its headwaters at the Susquehanna River. Figure 1-1 shows the CCNPP location. The site is approximately 40 miles southeast of Washington, D.C. and 7.5 miles north of Solomons Island, Maryland.

The CCNPP property contains two existing pressurized water reactors designated as CCNPP Units 1 and 2. The proposed CCNPP Unit 3 will be located approximately 600 meters south of the existing nuclear power plant within the present CCNPP site.

Activities associated with construction of the proposed CCNPP Unit 3 will result in release of pollutants to the atmosphere. This document addresses emissions and air quality impacts from particulate matter (PM_{10}), sulfur dioxide (SO_2), carbon monoxide (CO), and oxides of nitrogen (NOx). Fugitive dust and fine particulate emissions will be generated as a result of vehicular traffic on paved and unpaved roads, earth moving, and material handing activities. The construction activities will require temporary installation of material processing and handing equipment as well as construction and operation of a concrete batch plant.

1.1 Purpose of the Report

This report provides the technical analyses and supporting data of the emissions associated with construction of the proposed CCNPP Unit 3 to ensure compliance with the National Ambient Air Quality Standards (NAAQS) during this temporary activity. The document addresses the following items:

- Calculations of PM_{10} emissions that will result from vehicle travel, disturbed earth and aggregate movement, wind erosion, material and equipment handling activities. The document also discusses PM_{10} emissions control measures, as well as SO_2, CO, and NOx emissions that will result from primarily vehicle travel and concrete batch plant operations.
- An air dispersion modeling analysis demonstrating that the impact of PM_{10}, SO_2, CO, and NOx emissions will be in compliance with the NAAQS. This analysis was completed in accordance with the U.S. EPA Guideline on Air Quality Models as codified at 40 CFR Part 51, Appendix W.

1.2 Contents of the Report

This report document consists of five sections, including this section, and one appendix. Section 2 presents a description of the construction activities and the calculated PM_{10}, SO_2, CO, and NOx emission and their control measures. The dispersion modeling approach is discussed in Section 3 and results of the impact assessment for construction emissions are presented in Section 4. References are provided in Section 5. Appendix A provides the emissions calculations. A computer modeling archive is being provided separately.

Figure 1-1: CCNPP and Unit 3 Location

2.0 Environmental Effects of Site Preparation and Construction

2.1 Estimated Air Emissions During Construction

Temporary construction related activities will result in the release of criteria pollutant emissions to the atmosphere. Oxides of nitrogen (NOx), carbon monoxide (CO), and small amounts of sulfur dioxide (SO_2), volatile organic compounds (VOC), and particulate matter (PM_{10}) will be released as a result of fuel combustion. Fuel combustion is primarily from off-road diesel engines used for generators, compressors, and construction equipment such as backhoes and bulldozers. Fugitive dust and fine particulate emissions (PM_{10}) will be generated as a result of vehicular traffic on paved and unpaved roads, earth moving, and material handling activities. Construction of Unit 3 and the cooling towers will require the temporary installation of a concrete batch plant.

The USEPA, along with several state and local air pollution control agencies, have developed methodologies and emission factors that are commonly used to develop emissions estimates from construction activities. These emission estimates are then input into an EPA developed air dispersion model along with localized metrological data to assess the net air quality impact of construction activities. The impact of construction activities must be less than the National Ambient Air Quality Standard (NAAQS), which were established to protect public health and welfare.

Portions of the CCNPP site will be cleared for roadways, facility construction, construction laydown areas, parking, and other construction-related uses. The current site elevation varies from 40 to 130 feet, with an average elevation around 100 feet. The final grading site plan leaves the majority of the impacted areas at an average elevation between 90 and 100 feet. The power block area will be slightly lower, at 80 to 85 feet. Suitable materials from grading higher elevations will be used as fill for lower elevations where possible.

Major earth moving activities that will generate air emissions include:

- Creation of construction access road from the main highway (MD 2 and 4) to CCNPP Unit 3 construction areas,
- Upgrading and extending the heavy haul road from the barge landing to CCNPP Unit 3 construction areas,
- Establishing general plant area grade,
- Excavation for building foundations, and
- Backfilling around foundations.

A variety of diesel powered equipment will be required to support construction activities. These include:

- Bulldozers, scrapers, and graders for land clearing, road construction and grading,
- Backhoes and loaders for excavating foundations and material transfer,
- Cranes for moving heavy equipment and transferring materials (such as sand and aggregate) from barges,
- Dump trucks for moving excavating earth to storage and returning as backfill material and for transferring sand and aggregates from barges, and

- Support vehicles, trucks, and compressors.

The project's temporary concrete batch plant will have a peak production of 200 cubic yards (152.9 cubic meters) per hour. The total cement production is estimated to be 555,000 cubic yards (424,328 cubic meters) over a four-year portion of the facility's construction period. This activity averages to approximately 138,750 cubic yards (106,082 cubic meters) per year. The batch plant will primarily use fabric filter baghouses to control air emissions.

Fugitive emissions will be generated by vehicular traffic on paved and unpaved (graveled) roadways on-site. An existing section of paved road leads from MD 2/4 to a branch-off onto the future unpaved construction road. The unpaved portion of the construction road will traverse the site, connecting to the heavy haul road to the barge area. Construction employee commuting and some delivery vehicles will ride on both stretches of road, while heavy construction vehicles will only use the unpaved portion. During CCNPP Unit 3 construction, a maximum of approximately 4,000 full time equivalent (FTE) workers will be employed. A concrete batch plant will be used to produce the estimated 555,000 cubic yards of concrete required. Trucks will bring sand and aggregate materials from the barge to storage piles at the concrete plant and mixed concrete from the batch plant to the construction locations.

Estimating construction-related emissions involves the use of activity data and emission factors, along with appropriate corrections as necessary. The design firm for the project, Bechtel Power, provided estimated activity data for the project. Construction activity data is summarized in Table 2-1. A detailed activity data sheet for the combustion equipment listing expected annual hours of use is located in Appendix B. Information is provided in the table for each of the various construction related activities by year. Emission factor data comes from EPA's AP-42 compilation of emission factors, EPA's NONROAD model background information, EPA's Mobile 6.2 model, and Mojave Desert AQMD Emission Inventory Guidance. Other ancillary sources of information were consulted as necessary.

Table 2-1 Construction Activity Data

Item No.	Construction Activity	Operation Type	Units	2010	2011	2012	2013	2014	2105	TOTAL
SITEWORK										
	Clear & Grub									
1	Vegetations Removal	Bulldozing (inc. w/Item 8)	Hours							
2	Scrapers removing topsoil		Tons	310,000	0	0	0	0	0	310,000
3	Scrapers in travel	Unpaved Roads	VMT	5,060	0	0	0	0	0	5,060
4	Scrapers unloading topsoil	Batch Drop	Tons	310,000	0	0	0	0	0	310,000
	General Site Grading & Fill									
5	Scrapers removing overburden		Tons	2,158,000	2,158,000	644,000	0	0	0	4,960,000
6	Scrapers in travel	Unpaved Roads	VMT	35,160	35,160	10,500	0	0	0	80,820
7	Scrapers unloading overburden as fill	Batch Drop	Tons	2,158,000	2,158,000	644,000	0	0	0	4,960,000
8	Bulldozing	Includes Items 1, 13, 17	Hours	7,800	7,800	4,100	2,000	500	0	
9	Compaction	Includes Items 18, 24	Hours	5,200	5,200	2,600	1,000	500	0	
BUILDING EXCAVATION										
10	Load Excavated Mat'l into Trucks	Batch Drop	Tons	3,410,000	0	0	0	0	0	3,410,000
11	Haul to Stockpile Area	Unpaved Roads	VMT	546,000	0	0	0	0	0	546,000
12	Truck-Dump	Batch Drop	Tons	3,410,000	0	0	0	0	0	3,410,000
13	Spread material	Bulldozing (w/Item 8)	Hours							
STRUCTURAL BACKFILL										
14	Load Stockpile into Off-Road Truck	Batch Drop	Tons	0	2,790,000	0	0	0	0	2,790,000
15	Haul to Powerblock	Unpaved Roads	VMT		447,000					447,000
16	Truck-Dump	Batch Drop	Tons	0	2,790,000	0	0	0	0	2,790,000
17	Spread material	Bulldozing (w/Item 8)	Hours							
18	Compaction	Included with Item 9	Hours							
UNPAVED ROAD CONSTRUCTION										
23	Motor Grading		VMT	2,500	3,800	2,500	1,300	0	0	10,100
24	Compaction	Included with Item 9	Hours							
CONCRETE OPERATIONS										
25	Material transfer from Barge	Batch Drop	Tons	198,800	397,600	198,800	0	0	0	795,200
26	Material Transport - Barge to Plant	Unpaved Roads	VMT	35,200	70,380	35,200	0	0	0	140,780
27	Material Transport to Pile	Batch Drop	Tons	198,800	397,600	198,800	0	0	0	795,200
28	Material Transfers - Pile to Silo/Plant	Batch Drop	Tons	60,435	187,670	246,510	240,950	59,635	0	795,200
29	Ready Mix Transport	Unpaved Roads	VMT	13,300	41,200	54,000	52,800	13,200	0	174,500
OPEN AREAS										
19	Power-Block & Cooling Tower Areas	Wind & Erosion	Acres	45	45	45	0	0	0	n/a
20	Switchyard Area	Wind & Erosion	Acres	43	43	43	0	0	0	n/a
21	Soils Stockpile	Wind & Erosion	Acres	60	60	60	60	0	0	n/a
22	Temporary Gravel Parking Areas	Wind & Erosion	Acres	70	70	70	70	70	70	n/a
VEHICLE TRAFFIC										
30	Commuters	Paved Road	VMT	44,000	179,000	356,000	540,000	184,000	15,000	1,318,000
31	Commuters	Unpaved Road	VMT	205,000	838,000	1,670,000	2,536,000	863,000	69,000	6,181,000
32	Commercial Deliveries	Paved Road	VMT	5,500	6,100	4,100	760	100	0	16,560
33	Commercial Deliveries	Unpaved Road	VMT	19,400	21,700	14,500	2,730	350	0	58,680

2.1.1 Vehicle Travel

As noted in Section 2.1, vehicle travel will occur on paved and unpaved roads as well as on disturbed earth at the site during construction. The emission factors for site preparation activities in Section 2.1.3 include disturbed earth travel for bulldozing, grading, scraping, and compacting.

Unpaved road travel will consist of construction vehicles (trucks in transport) that will operate on roads from the barge area to the concrete plant, from the concrete plant to the application sites, from soil excavation points to storage locations, and from storage to backfill locations. Commuting vehicles will travel to and from parking lots and delivery vehicles will travel to various locations. . Emissions were estimated for unpaved roads using Equation 1. Equation 1 is from AP-42 Section 13.2.2 (11/06) for Unpaved Roads.

$$E = k * \left(\frac{s}{12}\right)^{a} \left(\frac{W}{3}\right)^{b} \qquad (1)$$

where:
E size-specific emission factor (lb/VMT)
k particle size multiplier (lb/VMT)
a, b empirical constants (dimensionless)
s surface material silt content (%)
W mean vehicle weight (tons)

Paved road travel will consist of commuting construction workers and some delivery trucks. Emissions were estimated from paved roads using Equation 2. Equation 2 is from AP-42 Section 13.2.1 (11/06) for Paved Roads.

$$E = \left[k * \left(\frac{sL}{2}\right)^{0.65} \left(\frac{W}{3}\right)^{1.5} - C\right] * \left(1 - \frac{P}{4N}\right) \qquad (2)$$

where:
E particulate emission factor (lb/VMT)
k particle size multiplier (lb/VMT)
a, b empirical constants (dimensionless)
sL road surface silt loading (g/m^2)
W average vehicle weight of vehicles traveling the road (tons)
C emission factor for exhaust, break wear, and tire wear
P number of "wet" days with at least 0.01 inch of precipitation during the averaging period
N number of days in the averaging period

It is important to note that per AP-42 instructions, the W in each of the equations represents the average that represents the "fleet" average weight of all vehicles travelling the road. Inputs for the Equations 1 and 2 and calculations of emissions are presented in Appendix B. Also, the precipitation correction factor in Equation 2 is only used for estimating annual emissions.

2.1.2 Material Transfer

Materials such as excavated earth, backfill, aggregates, and sand will be hauled and transferred by trucks to and from different locations on the site. Particulate emissions are potentially generated each time a load of material is loaded into or unloaded from a truck. Estimating emissions from material transfers was performed using Equation 3. Equation 3, colloquially known as the "batch drop equation", comes from AP-42 Section 13.2.4 (11/06) Aggregate Handling and Storage Piles.

$$E = k * 0.0032 \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \quad (3)$$

where:
E emission factor (lb/ton material)
k particle size multiplier (dimensionless
U mean wind speed (miles/hour)
M material moisture content (%)

The mean wind speed is based on the on-site CCNPP wind monitor. Material moisture content is based on AP-42 Table 13.2.4-1 for earth and footnote b to Table 11.2-2 for aggregates and sand. Inputs for the Equation 3 and calculations of emissions are presented in Appendix B.

2.1.3 Site Preparation

Site preparation will be performed by bulldozers, scrapers, compactors, and graders which will shape and clear the land before and while construction occurs. Bulldozing and compaction hours are noted in Table 2-1. Scraping and grading operating hours are estimated from the combustion equipment activity data presented in Appendix A.

Estimation of emissions from material transfers was performed using Equation 4. Equation 4 comes from Mojave Desert Air Quality Management District Emissions Inventory Guidance (4/2000) Method D – Bulldozing, Scraping, and Grading of Materials. The corresponding AP-42 emission factor as presented in Section 11.9 Western Surface Coal Mining for bulldozing was judged to be not representative of activities at CCNPP. In fact, the Mojave guidance references the AP-42 section as a basis, but presents a more refined version of the calculation, presented below. No control is assumed for this emissions category.

$$E = 2.76 * k * \frac{s^{1.5}}{M^{1.4}} \quad (4)$$

where:
E emission factor (lb/hour of operation)
k particle aerodynamic factor (dimensionless)
s average silt content (%)
M average material moisture content (%)

Silt content and moisture content come from AP-42 Table 13.2.4-1. Inputs for the Equation 4 and calculations of emissions are presented in Appendix B.

2.1.4 Wind Erosion

Wind erosion causes fugitive dust to be blown from open areas and storage piles.

The emission factor for estimating wind erosion from open areas comes from Clark County, NV Department of Air Quality and Environmental Management (DAQEM). DAQEM uses a PM_{10} emission factor of 1.66 lb/acre/day to estimate wind erosion fugitive dust. Given the difference in climate between Clark County, Nevada and the CCNPP site, this is thought to be a conservative estimate.

Wind erosion will also occur at the material storage piles. The concrete batch plant will have separate storage piles for aggregates and sand. Estimating emissions from storage piles was performed using Equation 5. Equation 5 comes from Mojave Desert Air Quality Management District Emissions Inventory Guidance (4/2000) Method G – Wind Erosion from Stockpiles.

$$E = E_f * A \tag{5}$$

$$E_f = J * 1.7 * \frac{sL}{1.5} * \frac{365 - P}{235} * \frac{I}{15} * \frac{365}{2000} \tag{6}$$

where:
E Emission rate (ton/yr)
E_f Emission factor (tons/acre)
A Exposed surface area of stockpile (acres)
J Particulate aerodynamic factor
sL average silt content (%)
P Average number of days during the year with at least 0.01 inch of precipitation
I Percentage of time with unobstructed wind speed > miles/hour (%)

Inputs for the Equations 5 and 6 and calculations of emissions are presented in Appendix B. Area watering may be necessary for the open areas to minimize windblown fugitive dust

2.1.5 Concrete Batch Plant

A concrete batch plant will be used to produce all of the concrete required for construction operations. The individual operations involved in the plant are aggregate and sand delivery, aggregate and sand transfer, sand transfer to elevated storage, cement and supplement loaded into storage silo, weight hopper loading of sand, gravel and cement, and loading concrete into mix trucks.

Emissions from batch plant operation are estimated using emission factors from AP-42 Section 11.12 (6/06) Concrete Batching, Tables 11.12-2 and 11.12-5. Calculations for concrete operations are presented in Appendix B.

2.1.6 Combustion Equipment

Construction equipment will require fuels primarily in the form of diesel fuel for power. Various types of equipment will require diesel fuel including bulldozers, scrapers, graders, cranes, and many others. Gasoline automobiles and light trucks will also be needed on-site. Appendix B contains a detailed listed of the expected equipment, the approximate engine size, expected annual use, and zero-hour steady state criteria pollutant emission factors.

Criteria pollutant emissions from diesel combustion engines are estimated using two background documents to EPA's NONROAD model documentation: "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling –Compression Ignition" (EPA420-P-04-009, 4/2004) and "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" (EPA420-P-04-005, 4/2004). These two documents provide the basis for calculating emissions from diesel equipment.

For purposes of emissions estimation, all diesel engines are assumed to be Tier 2 certified. However, when construction begins actual emissions are expected to be lower due to an increasing use of newer Tier 3 and Tier 4 certified engines.

Criteria pollutant emissions from on-site gasoline pickup trucks and automobiles are estimated using EPA's Mobile 6.2 model. Emission factors in g/VMT were taken for light duty gasoline vehicles (LDGV) and two classes of light duty gasoline trucks (LDGT12 and LDGT 34). The two truck categories are for gross vehicle weight ratings of above and below 6,000 pounds. The emission factors were turned into a composite emission factor for all three vehicle types by taking a weighted average of all three model output emission factors and using adjusted vehicle distributions by only looking at these three vehicle types. The emission factors were translated into g/hp-hr by assuming an average speed of 20 miles/hr and an engine size of 231 hp.

2.1.7 Source Location

Figure 2-1 shows the modeled areas of the plant. Unpaved roads are scattered among the seven labeled areas. Emissions are divided among the areas based on traffic flows, trip purpose, and destination areas.

The Unit 3 area is the future location of the power block and reactor. Area 2 is for parking and laydown. Area 3 is the future location of the cooling towers and also includes a storage area. Area 4 will contain parking ans laydown areas and will have the future switchyard. Area 5 is an existing laydown area which will be used for Unit 3 construction. Area 6 contains the concrete batch plant. Area 7 is the haul road to the barge. It is broken into four pieces for modeling purposes.

Figure 2-1 Location of Sources Associated with the Construction of CCNPP Unit 3

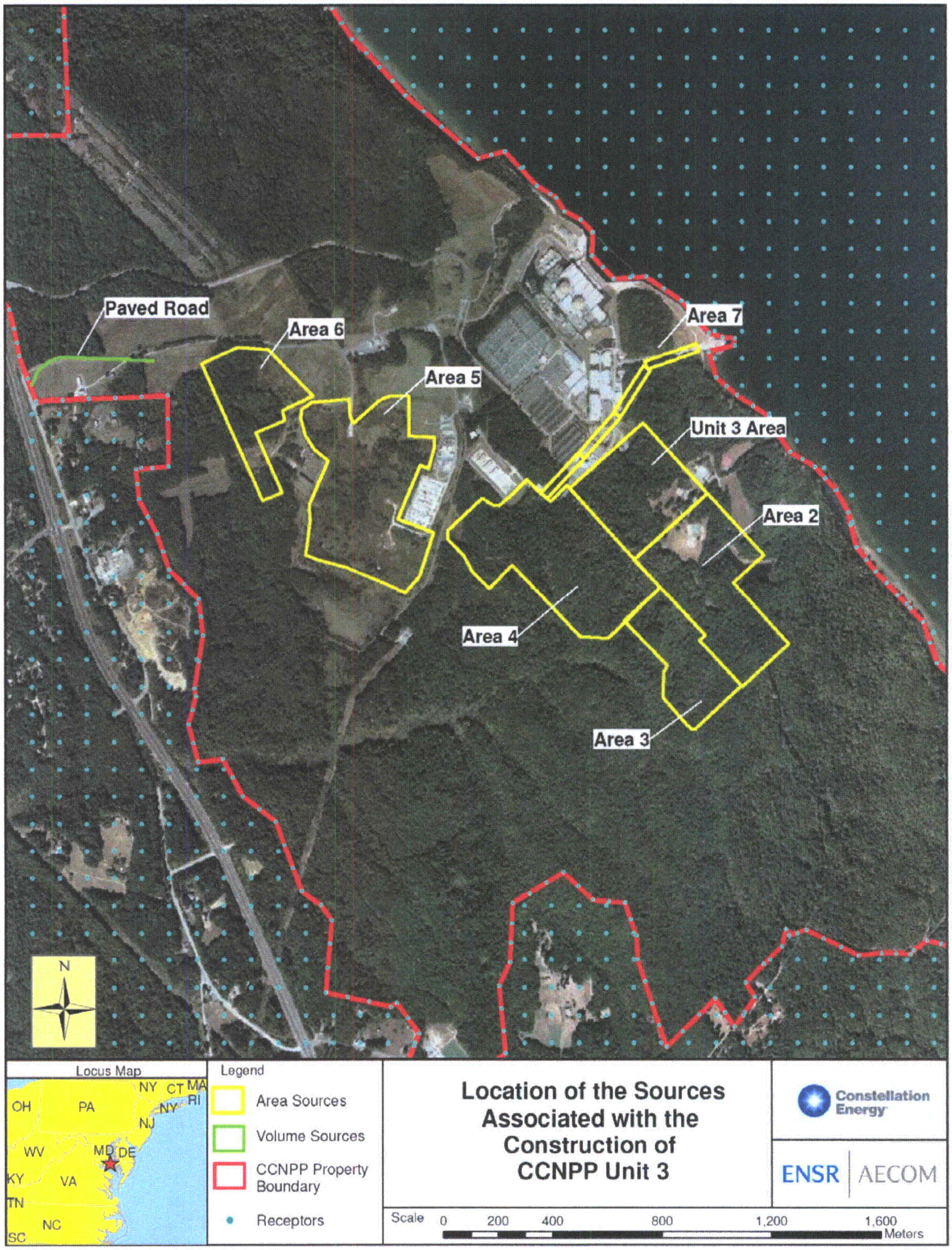


Table 2-2 Criteria Pollutant Emissions Summary

		2010	2011	2012	2013	2014	2015
Paved Roads	PM_{10}	0.07	0.27	0.53	0.8	0.27	0.02
Unpaved Roads	PM_{10}	17.48	25.10	17.56	23.58	7.75	0.56
Material Transport	PM_{10}	3.49	3.16	0.44	0.00	0.00	0.00
Site Preparation	PM_{10}	50.40	52.79	24.28	9.38	2.58	0.37
Concrete Batch Plant	PM_{10}	0.12	0.38	0.50	0.49	0.12	0.00
Wind Erosion	PM_{10}	6.91	7.09	6.91	3.94	2.12	2.12
Combustion Equipment	PM_{10}	1.54	2.27				
Total	**PM_{10}**	**80.0**	**91.1**	**52.4**	**40.0**	**18.4**	**8.0**
Combustion Equipment	NO_X *	60.92	82.48	72.61	57.04	39.03	13.92
Combustion Equipment	CO *	23.31	36.33	44.67	39.72	34.56	15.77
Combustion Equipment	VOC *	4.36	6.37	7.18	5.55	4.40	1.78
Combustion Equipment	SO_2 *	2.45	3.32	2.91	2.27	1.54	0.54

* Combustion equipment emissions are the only sources of these pollutants

2.2 Air Pollution Control Measures

During construction of CCNPP Unit 3, several measures will be undertaken to minimize potential generation of emissions. The emissions data were calculated assuming the contractor will employ the watering practices and engine types listed below.

Stabilizing unpaved areas with gravel – Construction roads, parking lots, and laydown areas will be covered with gravel to stabilize surfaces and reduce the amount of materials that could become airborne as a result of wind movement and mechanical energy from movement of vehicles and equipment.

Application of water – Application of water to paved and unpaved roads and exposed areas will be effective in reducing the potential generation of fugitive dust. Water will be applied on a daily basis to the paved and unpaved roads and open areas cleared during construction. Daily application to paved and unpaved roads has the potential to reduce fugitive dust by limiting the . Application of water to open areas as needed has the potential to reduce fugitive dust generation. Natural fugitive dust mitigation will occur through rain or snowfall. According to AP-42 Figures 13.2.1-2 and 13.2.2-1, the CCNPP area receives 140 days of 0.01 inches or more of precipitation. This negates the need to apply water manually on precipitation days.

Concrete batch plant – The concrete batch plant will utilize fabric filters or other equivalent techniques to control emissions from the material transfer operations. The contractors that will be responsible for operating these plants will be required to obtain any necessary permits as temporary sources before bringing equipment on-site, ensuring that the until will be in full compliance with MDE's requirements and standards.

Storm water pollution prevention plan (SWPPP) – A dust control program will be incorporated into the SWPPP.

Diesel Engines – As noted in Section 2.1.6, the worst-case emissions associated with using all Tier 2 certified equipment has been assumed. Tier 3 standards have begun to come into effect for larger size engines in 2006 and Tier 4 standards are slated to come into effect in 2011. The use of tiered emissions levels is EPA's way of promoting the use of lower emitting engines, while allowing older models to operate throughout their useful lives. Heavy equipment used by contractors at the time of construction should gradually shift to using newer engines as construction progresses.

3.0 Dispersion Modeling Analysis

3.1 Overview

This section presents the modeling analysis of the Unit 3 construction activities that was conducted to assess ambient air quality impacts which will demonstrate compliance with applicable state and federal ambient air quality regulations. The analyses were conducted in accordance with USEPA Guideline on Air Quality Models (GAQM; as incorporated in Appendix W of 40 CFR Part 51). Note that the USEPA recently promulgated a revision to the GAQM on November 9, 2005. The revised version of GAQM adopts AERMOD as the preferred dispersion model.

Dispersion modeling was conducted with the US EPA's AERMOD model (Version 07026) and five years of on-site meteorological data. This 5-year data set was processed with AERMET, the meteorological processor for AERMOD, in accordance with guidance provided by US EPA in the recently revised *AERMOD Implementation Guide* (AIG; US EPA, January 9, 2008).

3.2 Model Selection Criteria

The suitability of an air quality dispersion model for a particular application is dependent upon several factors. For this study, the following selection criteria have been evaluated:

- stack height relative to nearby structures, where applicable,
- dispersion environment,
- local terrain, and
- availability of on-site or representative meteorological data.

3.2.1 Dispersion Environment

The application of the model requires characterization of the local (within 3 kilometers (km)) dispersion environment as either urban or rural, based on a US EPA-recommended procedure that characterizes an area by prevalent land use. This land use approach classifies an area according to 12 land use types. In this scheme, areas of industrial, commercial, and compact residential land use are designated urban. According to US EPA modeling guidelines, if more than 50 percent of an area within a three-kilometer radius of the proposed facility is classified as rural, then rural dispersion coefficients are to be used in the dispersion modeling analysis. Conversely, if more than 50% of the area is urban, urban dispersion coefficients are used.

For this analysis, an aerial photo and a topographical map of the facility area has been reviewed. Visual inspection of the map shows that the 3-kilometer area surrounding the proposed facility (see Figure 1-1) is predominantly rural. Therefore, a rural application approach to characterize the source dispersion environment was chosen for this dispersion modeling analysis.

3.2.2 Terrain Considerations

The US EPA modeling guidelines require that the differences in terrain elevations between the stack top, plume centerline and model receptor locations be considered in the modeling analyses. There are three types of terrain:

- simple terrain – locations where the terrain elevation is at or below the exhaust height of the stacks to be modeled;

- intermediate terrain – locations where the terrain is between the top of the stack and the modeled exhaust "plume" centerline (this varies as a function of plume rise, which in turn, varies as a function of meteorological condition);
- complex terrain – locations where the terrain is above the plume centerline.

Based on a review of USGS topographical maps, the terrain within the study area is all simple terrain with respect to the Unit 3 construction sources.

3.3 Representative Meteorological Data

For this analysis, five calendar years of on-site (2001-2005) meteorological data were used. The meteorological tower for the CCNPP site is located in an open field southwest of the CCNPP Unit 1 and 2. The base elevation of the tower is approximately 120.6 ft (37 m) above mean sea level (msl). The tower instrumentation consists of wind speed, wind direction, and duplicate sets of aspirated temperature sensors located at 197 ft (60 m) and 33 ft (10 m) above ground level. A tipping bucket rain gauge is located approximately 30 ft (9.1 m) from the meteorological tower in an open field and a barometric pressure device is located in the Met Building. No moisture measurements (dew point or wet bulb temperature, relative humidity) are currently taken. The onsite meteorological monitoring program was designed, and has been operated, according to U.S. NRC Regulatory Guide 1.23, Revision 0. This guidance includes the following specifications for meteorological measurements at the 10-m and 60-m levels:

- wind direction accuracy of +/- 5 degrees;
- wind speed accuracy of +/- 0.5 mph, with a starting threshold of under 1 mile per hour;
- temperature accuracy of +/- 0.5 deg C, and delta-T accuracy of +/- 0.1 deg C.

These system accuracies are consistent with United States Environmental Protection Agency (USEPA) guidance for on-site meteorological programs.

The data recovery goal of 90% was met for each of five years of data (2001 through 2005). Figures 3-1 and 3-2 show multi-year wind roses from the 33-ft and 197-ft tower levels.

Upper air data for the concurrent period is available from the Washington Dulles Airport, Virginia (KIAD), twice-daily soundings. For parameters not observed by the on-site meteorological instrumentation, such as cloud cover, hourly observations are available from the closest representative airport, Washington Reagan Airport, Virginia (KDCA).

Figure 3-1 On-site Meteorological Tower Wind Rose, 33-ft Level

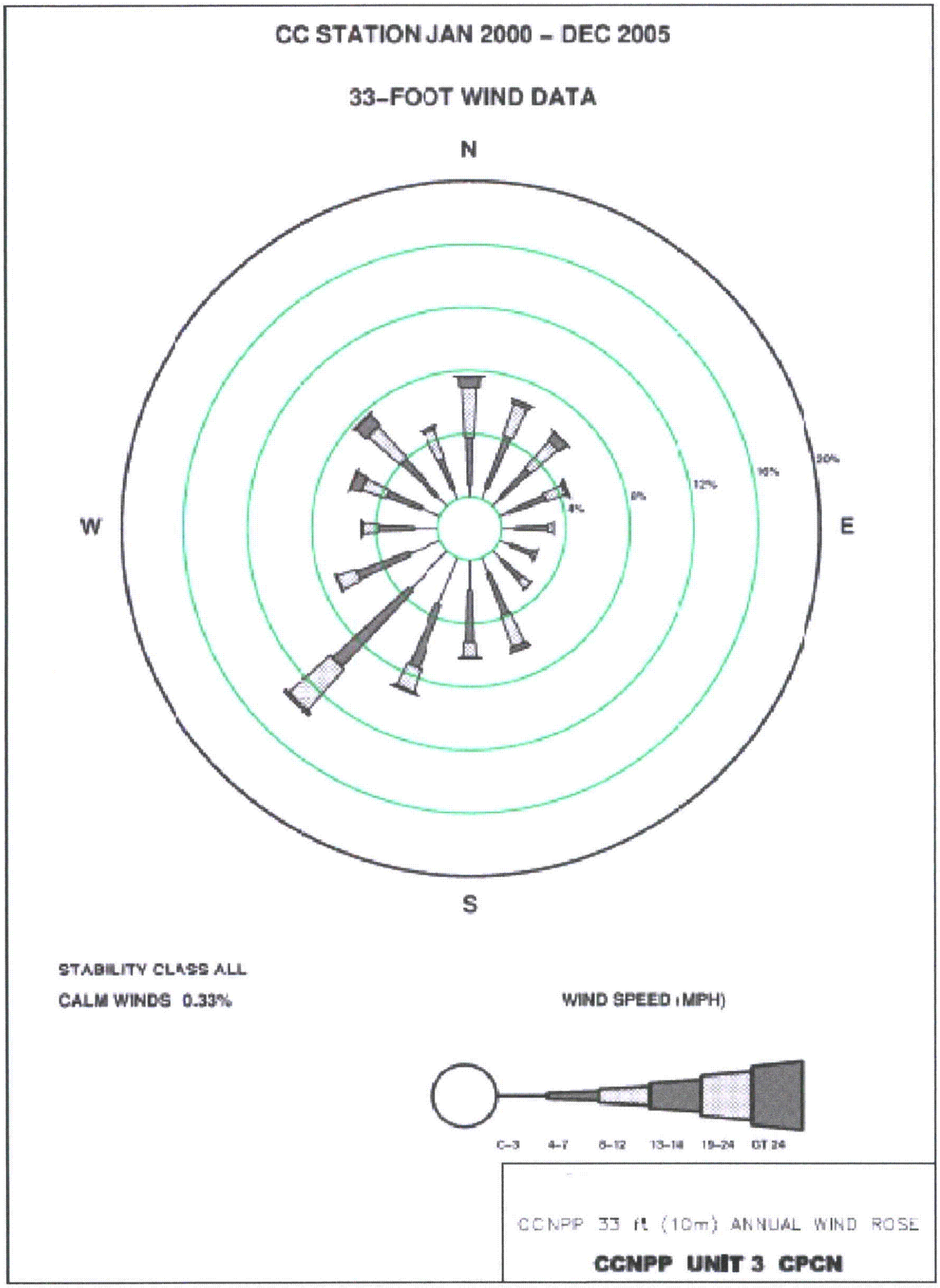
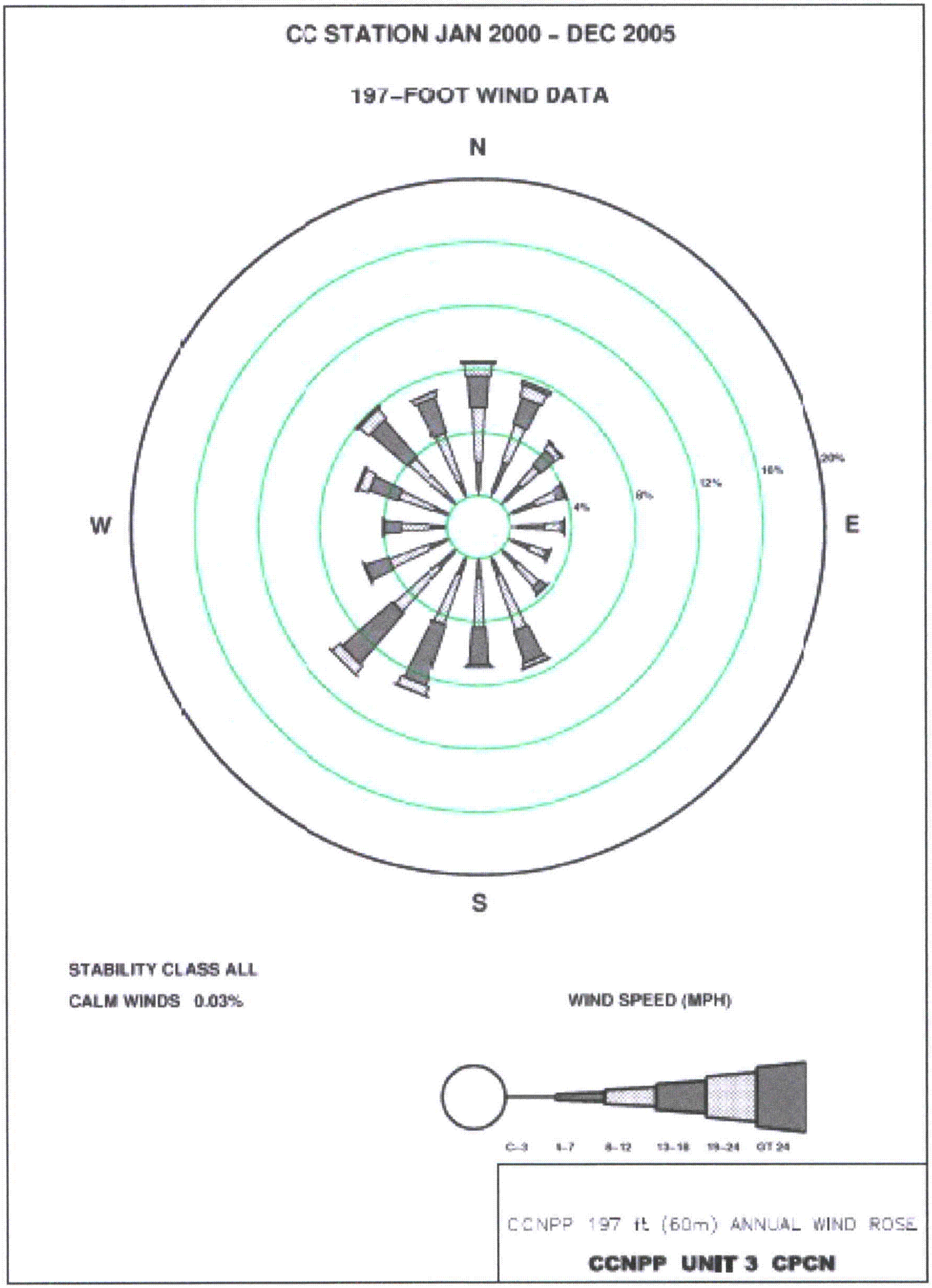


Figure 3-2 On-site Meteorological Tower Wind Rose, 197-ft Level



3.4 Dispersion Model Selection and Application

Based on a review of the factors discussed above, US EPA's preferred dispersion model, AERMOD, was used to assess air quality impacts. AERMOD is a state-of-the-art dispersion model that incorporates modeling improvements especially for applications involving building downwash. The latest version of AERMOD (07026), the AERMET (06341) meteorological preprocessor, and the AERMAP (06341) terrain preprocessor was used in this application. In the application of AERMOD, the regulatory default options were used.

3.4.1 Terrain and Receptor Data Processing with AERMAP

A comprehensive Cartesian receptor grid extending to approximately 7 km from the Unit 3 site was used in the AERMOD modeling to assess maximum ground-level pollutant concentrations. This receptor grid was sufficient to resolve the maximum impacts and any potential significant impact area(s).

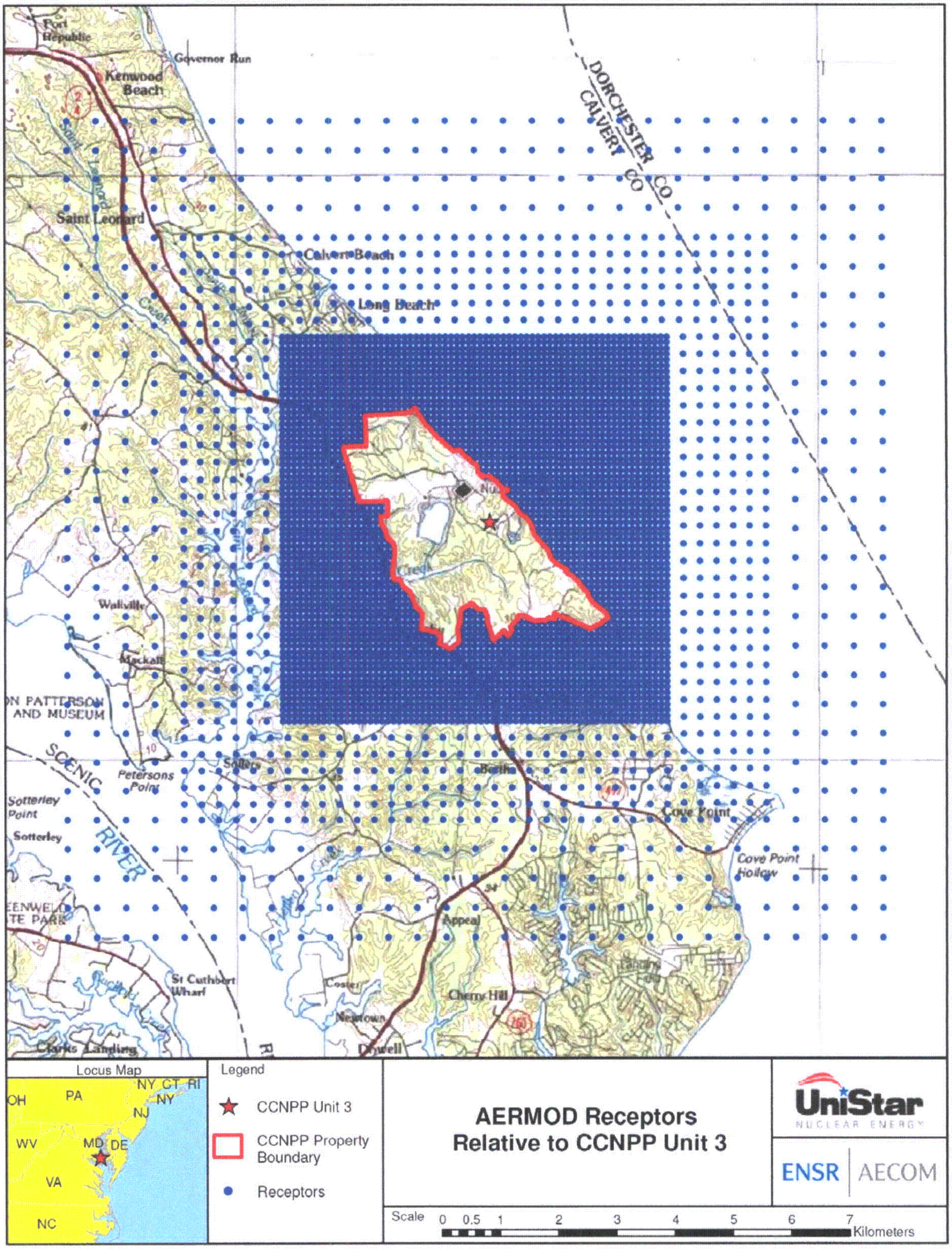
The Cartesian receptor grid consisted of the following receptor spacing:

- property boundary to approximately 1 kilometer at 100-meter increments,
- beyond 1 kilometer to 3 kilometers at 300-meter increments, and
- beyond 3 kilometers at 500-meter increments

Discrete receptors were placed at 100-meter intervals along the plant property boundary.

The AERMAP receptor locations are shown in Figure 3-3. Terrain elevations from Digital Elevation Model (DEM) data acquired from USGS were processed with AERMAP (Version 03107) to develop the receptor terrain elevations and corresponding hill height scale required by AERMOD.

Figure 3-3 AERMOD Receptors



3.4.2 Meteorological Data Processing with AERMET

The meteorological data required for input to AERMOD was created with AERMET (Version 06341), the meteorological preprocessor, which utilizes hourly on-site weather data, nearby cloud cover data from Washington National Airport, and concurrent upper air sounding data from Washington Dulles Airport, VA. (Note that the poor data capture for the Patuxent River Naval Air Station precluded use of that meteorological station for input to AERMET.) AERMET creates two output files for input to AERMOD:

- SURFACE: a file with boundary layer parameters such as sensible heat flux, surface friction velocity, convective velocity scale, vertical potential temperature gradient in the 500-meter layer above the planetary boundary layer, and convective and mechanical mixing heights. Also provided are values of Monin-Obukhov length, surface roughness, albedo, Bowen ratio, wind speed, wind direction, temperature, and heights at which measurements were taken.
- PROFILE: a file containing multi-level meteorological data with wind speed, wind direction, temperature, sigma-theta (σ_θ) and sigma-w (σ_w) when such data are available. For this application involving on-site, the profile file contains a two levels (10-m and 60-m) of wind data and temperature data.

AERMET requires specification of site characteristics including surface roughness (z_o), albedo (r), and Bowen ratio (B_o). These parameters were developed according to the guidance provided by US EPA in the recently revised AERMOD Implementation Guide (AIG).

The revised AIG provides the following recommendations for determining the site characteristics:

1. The determination of the surface roughness length should be based on an inverse distance-weighted geometric mean for a default upwind distance of 1 kilometer relative to the measurement site. Surface roughness length may be varied by sector to account for variations in land cover near the measurement site; however, the sector widths should be no smaller than 30 degrees. As discussed below, 3 sectors were used in this application.
2. The determination of the Bowen ratio should be based on a simple un-weighted geometric mean (i.e., no direction or distance dependency) for a representative domain, with a default domain defined by a 10-km by 10-km region centered on the measurement site.
3. The determination of the albedo should be based on a simple un-weighted arithmetic mean (i.e., no direction or distance dependency) for the same representative domain as defined for Bowen ratio, with a default domain defined by a 10-km by 10-km region centered on the measurement site.

The AIG recommends that the surface characteristics be determined based on digitized land cover data. US EPA has developed a tool called AERSURFACE that can be used to determine the site characteristics based on digitized land cover data in accordance with the recommendations from the AIG discussed above. AERSURFACE incorporates look-up tables of representative surface characteristic values by land cover category and seasonal category. AERSURFACE will be applied with the instructions provided in the *AERSURFACE User's Guide* (EPA, 2008).

The current version of AERSURFACE (Version 08009) supports the use of land cover data from the USGS National Land Cover Data 1992 archives[1] (NLCD92). The NLCD92 archive provides data at a spatial resolution of 30 meters based upon a 21-category classification scheme applied over the continental U.S. The

[1] http://edcftp.cr.usgs.gov/pub/data/landcover/states/

AIG recommends that the surface characteristics be determined based on the land use surrounding the site where the surface meteorological data were collected.

Since 1992, there has some conversion of the land south of the meteorological tower to native ground cover. However, that area is slated to be affected by the construction of Unit 3, will be cleared (see CPCN Technical Document, Figure 2.1-1), and will end up more like the 1992 land use characterization. Therefore, the 1992 land use characterization is reasonably representative for this application.

As recommended in the AIG for surface roughness, the 1-km radius circular area centered at the tower site can be divided into sectors for the analysis; each chosen sector has a mix of land uses that is different from that of other selected sectors. Three sectors were used for this analysis based upon visual observation of the land use about the site as shown on the land cover image (see Figure 3-4).

In AERSURFACE, the various land cover categories are linked to a set of seasonal surface characteristics. As such, AERSURFACE requires specification of the seasonal category for each month of the year. The following five seasonal categories are supported by AERSURFACE, with the applicable months of the year specified for this site.

1. Midsummer with lush vegetation (May-September).

2. Autumn with un-harvested cropland (October-November).

3. Late autumn after frost and harvest, or winter with no snow (January, February, December).

4. Winter with continuous snow on ground (Not present).

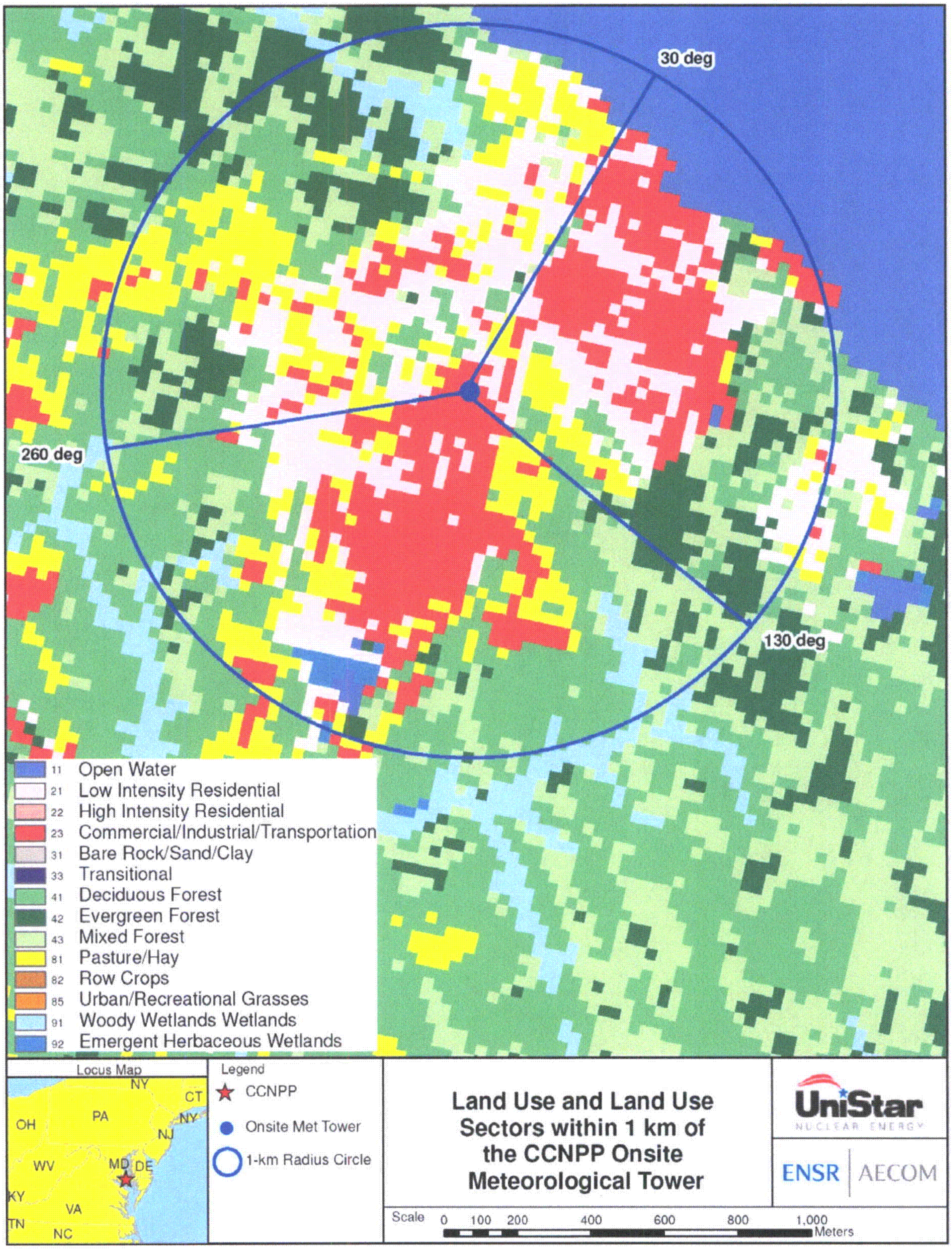
5. Transitional spring with partial green coverage or short annuals (March-April).

For Bowen ratio, the land use values are linked to three categories of surface moisture corresponding to average, wet and dry conditions. The surface moisture condition for the site may vary depending on the meteorological data period for which the surface characteristics will be applied. AERSURFACE applies the surface moisture condition for the entire data period. Therefore, if the surface moisture condition varies significantly across the data period, then AERSURFACE can be applied multiple times to account for those variations. As recommended in AERSURFACE User's Guide, the surface moisture condition for each month were determined by comparing precipitation for the period of data to be processed to the 30-year climatological record (for this application Washington Reagan Airport was used), selecting "wet" conditions if precipitation is in the upper 30th-percentile, "dry" conditions if precipitation is in the lower 30th-percentile, and "average" conditions if precipitation is in the middle 40th-percentile. The monthly designations of surface moisture input to AERSURFACE are also summarized in Table 5-1.

Table 3-1 AERSURFACE Bowen Ratio Condition Designations

Month	Bowen Ratio Category				
	2001	2002	2003	2004	2005
January	Dry	Dry	Average	Dry	Wet
February	Average	Dry	Wet	Average	Dry
March	Average	Average	Average	Dry	Wet
April	Dry	Average	Average	Wet	Wet
May	Average	Dry	Wet	Average	Wet
June	Wet	Wet	Wet	Average	Average
July	Wet	Dry	Wet	Wet	Average
August	Average	Dry	Wet	Wet	Average
September	Dry	Average	Wet	Average	Dry
October	Dry	Wet	Wet	Dry	Wet
November	Dry	Average	Average	Wet	Dry
December	Dry	Wet	Wet	Average	Average

Figure 3-4 Land-Use Sectors within 1 km of On-Site Meteorological Tower



3.5 Modeling Approach

Unit 3 construction activities were divided into seven area sources based on their location and they are shown in Figure 2-1. Emissions from activities on the paved access road were modeled as a line source. Each area source represented emissions from several types of activities. For activities that will occur less than a 24 hours per day, such as grading and compaction, dirt excavation and moving, unpaved road construction, barge to concrete plant deliveries, and dewatering and earthwork, the modeling assumed emissions only for hours between 6 AM and 6 PM. Emissions for all other activities were assumed to occur for all hours of the day.

The short-term emissions for all modeled pollutants were based on the 250 days of operation and annual emissions were based on 365 days of operations. The short-term PM_{10} emissions for the seven years of construction are listed in Appendix A in Tables A-1 through A-7 and annual PM_{10} emissions are listed in Tables A-8 through A-14. Modeling of PM_{10} emissions was conducted for the individual seven years of construction (years 2010 through 2016) due to large variations in activities relating to PM_{10} emissions from year to year. The second year of construction (year 2011) would result in the highest overall emissions from combustion sources. Therefore, modeling of SO_2, NOx, and CO was conducted using the 2011 year emissions. The short-term SO_2 and CO emissions are listed in Table A-15 and annual SO_2 and NOx emissions are listed in Table A-16.

3.5.1 $PM_{2.5}$ NAAQS Compliance Analysis

After the promulgation of the $PM_{2.5}$ National AAQS in 1997, USEPA determined that it does not have a suitable technical approach for modeling $PM_{2.5}$ concentrations. Therefore, USEPA established a policy to use the implementation of the New Source Review program for PM_{10} as a surrogate for $PM_{2.5}$ compliance until the necessary tools are in place to model $PM_{2.5}$ concentrations. This policy was articulated in a memorandum (Interim Implementation of New Source Review for $PM_{2.5}$) from John S. Seitz (Director of US EPA's Office of Air Quality Planning and Standards) to Regional Air Directors on October 23, 1997. This policy is still in effect (reaffirmed on April 5, 2005 in "Implementation of New Source Review Requirements in $PM_{2.5}$ Non-attainment Areas," by Stephen D. Page, Director, EPA Office of Air Quality Planning & Standards. The Co-Applicants are using compliance with the NAAQS for PM_{10} as a surrogate for compliance with the $PM_{2.5}$ NAAQS. Mr. William Harnett, Director of EPA's Air Quality Policy Division, has indicated (2007) that the PM_{10} surrogate policy remains in effect for attainment areas until the $PM_{2.5}$ New Source Review State Implementation Rule is promulgated and the required State Implementation Plan for Maryland is adopted by EPA.

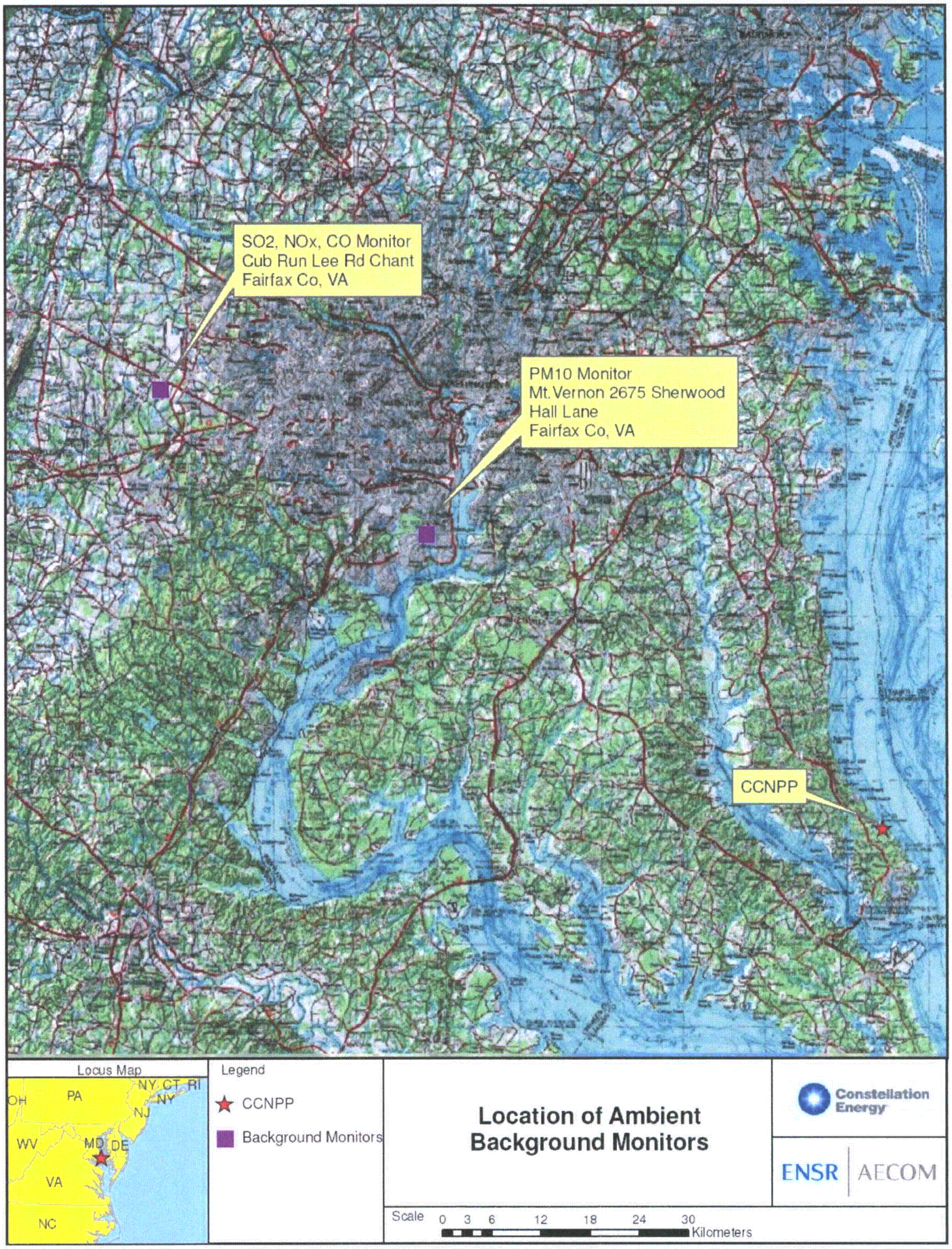
3.6 Background Air Quality

For the NAAQS compliance analysis, the modeled impacts are summed with representative background concentrations that account for distant or small local sources not explicitly modeled. The nearest available site of PM_{10} measurements is located in Virginia, about 66 km northwest of the CCNPP. The nearest available site of SO_2, CO, and NOx measurements is also located in Virginia, about 100 km northwest of the CCNPP. The latest three years of background monitoring data was used. The representative monitoring location is plotted in Figure 3-5 and the monitored values are summarized in Table 3-2.

Table 3-2 Ambient Monitoring Background Concentrations

Pollutant	Averaging Period	Ranking	Year	Concentration ($\mu g/m^3$)	Monitor ID	Monitor Address	County	State
PM_{10}	24-hour	H2H	2005	38.0	510590018	Mt.Vernon 2675 Sherwood Hall Lane	Fairfax Co	VA
		H2H	2006	40.0	510590018	Mt.Vernon 2675 Sherwood Hall Lane	Fairfax Co	VA
		H2H	2007	36.0	510590018	Mt.Vernon 2675 Sherwood Hall Lane	Fairfax Co	VA
		3-Year Average Value		**38.0**				
	Annual	H	2005	21.0	510590018	Mt.Vernon 2675 Sherwood Hall Lane	Fairfax Co	VA
		H	2006	21.0	510590018	Mt.Vernon 2675 Sherwood Hall Lane	Fairfax Co	VA
		H	2007	20.0	510590018	Mt.Vernon 2675 Sherwood Hall Lane	Fairfax Co	VA
		3-Year Average Value		**20.7**				
SO_2	3-hour	H2H	2005	65.5	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H2H	2006	52.4	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H2H	2007	49.8	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		3-Year Average Value		**55.9**				
	24-hour	H2H	2005	31.4	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H2H	2006	26.2	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H2H	2007	21.0	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		3-Year Average Value		**26.2**				
	Annual	H	2005	7.9	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H	2006	7.9	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H	2007	7.9	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		3-Year Average Value		**7.9**				
NOx	Annual	H	2005	18.8	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H	2006	15.0	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H	2007	15.0	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		3-Year Average Value		**16.3**				
CO	1-hour	H2H	2005	1,955	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H2H	2006	1,610	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H2H	2007	1,610	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		3-Year Average Value		**1725.0**				
	8-hour	H2H	2005	1,725	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H2H	2006	1,380	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		H2H	2007	1,495	510590005	Cub Run Lee Rd Chant	Fairfax Co	VA
		3-Year Average Value		**1533.3**				

Figure 3-5 Location of the Ambient Background Monitors



4.0 Modeling Results for the Unit 3 Construction Emissions

NAAQS compliance modeling results for PM_{10}, SO_2, CO, and NOx are presented in Tables 4-1 through 4-4, respectively. The short-term impacts were estimated by adding the highest, second-high impact to the monitoring background value and annual impacts were estimated by adding the highest impact to the monitoring background value.

The PM_{10} modeling results are presented for the seven years of constructions and they indicate that the second year of constructions (year 2011) would result in the highest PM_{10} concentrations. Modeling of SO_2, CO, and NOx emissions was conducted only for year 2011 since it would result in the highest combustion-related emissions over the seven years of construction activity.

The predicted short-term and annual impacts of PM_{10}, SO_2, CO, and NOx are well below their respective NAAQS, so compliance with the NAAQS is demonstrated.

Table 4-1 PM_{10} Modeling Results of Unit 3 Construction Emission Sources

Pollutant	Averaging Period	Unit 3 Construction Year	2001-2005 Modeled Concentration[1]	Ambient Monitoring Background	Total	NAAQS
			($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
PM_{10}	24-hr	2010	70.6	38	108.6	150
	24-hr	2011	88.4	38	126.4	150
	24-hr	2012	56.3	38	94.3	150
	24-hr	2013	52.2	38	90.2	150
	24-hr	2014	20.7	38	58.7	150
	24-hr	2015	10.0	38	48.0	150
	24-hr	2016	9.9	38	47.9	150
	Annual	2010	4.8	21	25.5	50
	Annual	2011	6.4	21	27.1	50
	Annual	2012	5.0	21	25.7	50
	Annual	2013	5.4	21	26.1	50
	Annual	2014	2.6	21	23.3	50
	Annual	2015	1.3	21	22.0	50
	Annual	2016	1.3	21	22.0	50

1 The reported concentration is the highest, second-highest for 24-hr periods, and the highest for annual periods.

Table 4-2 SO_2 Modeling Results of Unit 3 Construction Emission Sources

Pollutant	Averaging Period	Unit 3 Construction Year	2001-2005 Modeled Concentration[1]	Ambient Monitoring Background	Total	NAAQS
			(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)
SO_2	3-hour	2011	18.9	55.9	74.8	1,300
	24-hr	2011	3.9	26.2	30.1	365
	Annual	2011	0.5	7.9	8.4	80

1 The reported concentration is the highest, second-highest for 24-hr periods, and the highest for annual periods.

Table 4-3 CO Modeling Results of Unit 3 Construction Emission Sources

Pollutant	Averaging Period	Unit 3 Construction Year	2001-2005 H2H Modeled Concentration	Ambient Monitoring Background	Total	NAAQS
			(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)
CO	1-hour	2011	691.9	1,725.0	2,416.9	40,000
	8-hour	2011	137.7	1,533.3	1,671.0	10,000

Table 4-4 NOx Modeling Results of Unit 3 Construction Emission Sources

Pollutant	Averaging Period	Unit 3 Construction Year	2001-2005 Max Modeled Concentration	Ambient Monitoring Background	Total	NAAQS
			(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)
NOx	Annual	2011	12.9	16.3	29.2	100

5.0 References

Technical Report in Support of Application of UNISTAR Nuclear Energy, LLC and UNISTAR Nuclear Operating Services, LLC for Certificate of Public Convenience and Necessity Before the Maryland Public Service Commission for Authorization to Construct Unit 3 at Calvert Cliffs Nuclear Power Plant and Associated Transmission Lines. Available at http://webapp.psc.state.md.us/intranet/Casenum/submit.cfm?DirPath=C:\Casenum\9100-9199\9127\Item_001\&CaseN=9127\Item_001.

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U.S. EPA 2005a. Guideline on Air Quality Models (Revised). Codified in the Appendix W to 40 CFR Part 51. Office of Air Quality Planning and Standards, Research Triangle Park, NC. November.

U.S. EPA 2005a. Implementation of New Source Review Requirements in PM-2.5 Nonattainment Areas. Memo by Stephen Page, available at http://www.epa.gov/nsr/documents/nsrmemo.pdf.

U.S. EPA 2008. AERMOD Implementation Guide. Office of Air Quality Planning and Standards, Research Triangle Park, NC. Revised January 9, 2008.

Appendix A

Construction Emissions

Table A-1 PM_{10} Short-Term Emissions for Year 2010

Modeled Area ID	Modeled Area (m^2)	Assigned Acreage	Emissions Distribution (TPY) – Vehicle Travel Emissions: Commuter and Commercial Traffic	Vehicle Travel Emissions: Barge to Concrete Plant	Vehicle Travel Emissions: Unpaved road construction	Vehicle Travel Emissions: Concrete Plant to Applic. Site	Vehicle Travel Emissions: Excavated Dirt to Map Area 5	Batch Plant Operations	Grading/Excavation: Earth Moving / Excavation	Grading/Excavation: Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Diesel & Gasoline Emissions: Dewatering & Earthwork	Diesel & Gasoline Emissions: Batch Plant	Diesel & Gasoline Emissions: Concrete	Diesel & Gasoline Emissions: Others (incl. gasoline)	TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)	Commuter/Commercial Traffic ($g/m^2/s$)
Hours of Operations (hour ending)			1-24	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	126,360	31			0.01	0.05	1.74		2.51	4.66		0.95	0.16		0.023	0.03	4.104E-07	7.358E-06	
AREA2	178,435	44	0.96		0.01	0.05	1.74		3.54	6.58		1.34	0.16		0.021	0.03	4.016E-07	6.900E-06	2.731E-07
AREA3	95,106	23	0.96		0.01	0.05	1.74		1.89	3.51		0.71	0.16		0.018	0.03	4.170E-07	7.873E-06	5.124E-07
AREA4	235,625	58	0.96	0.19	0.01	0.05	2.90		4.67	8.69		1.77	0.16	0.0098	0.018	0.03	3.984E-07	7.215E-06	2.068E-07
AREA5	245,982	61	0.96	0.19	0.01	0.05	3.49		4.88	9.08		1.84	0.16	0.0098	0.015	0.03	3.971E-07	7.396E-06	1.981E-07
AREA6	99,198	24.5	0.96	0.19	0.01	0.05		0.12		3.66		0.50	0.16	0.08	0.015	0.03	3.910E-07	4.163E-06	4.912E-07
AREA7	6,000	1.48		0.05							0.22		0.04	0.0147			1.250E-07	5.127E-06	
AREA7	6,000	1.48		0.05									0.04					1.470E-06	
AREA7	6,000	1.48		0.05									0.04					1.470E-06	
AREA7	6,000	1.48		0.05									0.04					1.470E-06	
Paved Road	Line		0.081																4.113E-03
TOTAL ALL AREAS (TPY)		244	4.86	0.75	0.05	0.28	11.62	0.12	17.49	36.19	0.22	7.10	1.11	0.11	0.11	0.19			
															Total =	80.2			

Table A-2 PM_{10} Short-Term Emissions for Year 2011

Modeled Area ID	Modeled Area (m^2)	Assigned Acreage	Emissions Distribution (TPY) – Vehicle Travel Emissions: Commuter and Commercial Traffic	Vehicle Travel Emissions: Barge to Concrete Plant	Vehicle Travel Emissions: Unpaved road construction	Vehicle Travel Emissions: Concrete Plant to Applic. Site	Vehicle Travel Emissions: Excavated Dirt to Map Area 5	Batch Plant Operations	Grading/Excavation: Earth Moving / Excavation	Grading/Excavation: Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Diesel & Gasoline Emissions: Dewatering & Earthwork	Diesel & Gasoline Emissions: Batch Plant	Diesel & Gasoline Emissions: Concrete	Diesel & Gasoline Emissions: Others (incl. gasoline)	TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)	Commuter/Commercial Traffic ($g/m^2/s$)
Hours of Operations (hour ending)			1-24/ Vary	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	126,360	31			0.01	0.12	1.18		2.66	4.77		0.95	0.17		0.059	0.06	4.550E-07	7.145E-06	
AREA2	178,435	44	3.03		0.01	0.12	1.18		3.75	6.73		1.34	0.17		0.053	0.06	4.319E-07	6.809E-06	8.676E-07
AREA3	95,106	23	3.03		0.01	0.12	1.18		2.00	3.59		0.71	0.17		0.043	0.06	4.702E-07	7.523E-06	1.628E-06
AREA4	235,625	58	3.03	0.31	0.01	0.12	1.97		4.95	8.89		1.77	0.17	0.0375	0.043	0.06	4.259E-07	7.087E-06	6.570E-07
AREA5	245,982	61	3.03	0.31	0.01	0.12	2.37		5.17	9.28		1.84	0.17	0.0375	0.033	0.06	4.220E-07	7.205E-06	6.294E-07
AREA6	99,198	24.5	3.03	0.31	0.01	0.12		0.38		3.74		0.79	0.17	0.29	0.033	0.06	8.304E-07	4.418E-06	1.561E-06
AREA7	6,000	1		0.08							0.43		0.04	0.0562			4.781E-07	9.347E-06	
AREA7	6,000	1.48		0.08									0.04					2.034E-06	
AREA7	6,000	1.48		0.08									0.04					2.034E-06	
AREA7	6,000	1.48		0.08									0.04					2.034E-06	
Paved Road	Line Source		0.30																1.535E-02
TOTAL ALL AREAS (TPY)		244	15.47	1.24	0.07	0.73	7.89	0.38	18.52	37.00	0.43	7.39	1.18	0.42	0.26	0.38			
															Total =	91.4			

Table A-3 PM_{10} Short-Term Emissions for Year 2012

Modeled Area ID	Modeled Area (m^2)	Assigned Acreage	Emissions Distribution (TPY)														TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)	Commuter/Commercial Traffic ($g/m^2/s$)
			VEHICLE TRAVEL EMISSIONS						GRADING/EXCAVATION				Diesel & Gasoline Emissions						
			Commuter and Commercial Traffic	Barge to Concrete Plant	Unpaved road construction	Concrete Plant to Applic. Site	Excavated Dirt to Map Area 5	Batch Plant Operations	Earth Moving / Excavation	Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)			
Hours of Operations (hour ending)			1-24/ Vary	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	126,360	31			0.00	0.09	0.00		1.50	1.81		0.95	0.08		0.097	0.09	4.573E-07	2.816E-06	
AREA2	178,435	44	3.33		0.00	0.09	0.00		2.12	2.55		1.34	0.08		0.088	0.09	4.328E-07	2.774E-06	9.522E-07
AREA3	95,106	23	3.33		0.00	0.09	0.00		1.13	1.36		0.71	0.08		0.074	0.09	4.698E-07	2.863E-06	1.786E-06
AREA4	235,625	58	3.33	0.09	0.00	0.09	0.00		2.80	3.37		1.77	0.08	0.0527	0.074	0.09	4.290E-07	2.787E-06	7.211E-07
AREA5	245,982	61	3.33	0.09	0.00	0.09	0.00		2.93	3.52		1.84	0.08	0.0527	0.061	0.09	4.242E-07	2.782E-06	6.907E-07
AREA6	99,198	25	3.33	0.09	0.00	0.09		0.50		1.42		0.50	0.08	0.40	0.061	0.09	7.982E-07	1.731E-06	1.713E-06
AREA7	6,000	1		0.02							0.22		0.02	0.0790			6.717E-07	4.366E-06	
AREA7	6,000	1.48		0.02									0.02					7.090E-07	
AREA7	6,000	1.48		0.02									0.02					7.090E-07	
AREA7	6,000	1.48		0.02									0.02					7.090E-07	
Paved Road	Line Source		0.59																2.989E-02
TOTAL ALL AREAS (TPY)		244	17.24	0.35	0.02	0.53	0.00	0.50	10.49	14.02	0.22	7.10	0.56	0.59	0.45	0.56			
															Total =	52.6			

Table A-4 PM_{10} Short-Term Emissions for Year 2013

Modeled Area ID	Modeled Area (m^2)	Assigned Acreage	Emissions Distribution (TPY)														TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)	Commuter/Commercial Traffic ($g/m^2/s$)
			VEHICLE TRAVEL EMISSIONS						GRADING/EXCAVATION				Diesel & Gasoline Emissions						
			Commuter and Commercial Traffic	Barge to Concrete Plant	Unpaved road construction	Concrete Plant to Applic. Site	Excavated Dirt to Map Area 5	Batch Plant Operations	Earth Moving / Excavation	Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)			
Hours of Operations (hour ending)			1-24/ Vary	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	126,360	31			0.00	0.08	0.00		0.95	0.36		0.56	0.03		0.080	0.09	2.924E-07	1.154E-06	
AREA2	178,435	44	4.62		0.00	0.08	0.00		1.34	0.50		0.80	0.03		0.071	0.09	2.710E-07	1.125E-06	1.321E-06
AREA3	95,106	23	4.62		0.00	0.08	0.00		0.71	0.27		0.42	0.03		0.057	0.09	3.015E-07	1.187E-06	2.478E-06
AREA4	235,625	58	4.62	0.00	0.00	0.08	0.00		1.77	0.66		1.05	0.03	0.0527	0.057	0.09	2.690E-07	1.107E-06	1.000E-06
AREA5	245,982	61	4.62	0.00	0.00	0.08	0.00		1.85	0.69		1.10	0.03	0.0527	0.043	0.09	2.645E-07	1.105E-06	9.579E-07
AREA6	99,198	25	4.62	0.00	0.00	0.08		0.49		0.28		0.00	0.03	0.40	0.043	0.09	5.236E-07	4.150E-07	2.375E-06
AREA7	6,000	1.48		0.00							0.00		0.01	0.0790			6.717E-07	1.229E-07	
AREA7	6,000	1.48		0.00									0.01					1.229E-07	
AREA7	6,000	1.48		0.00									0.01					1.229E-07	
AREA7	6,000	1.48		0.00									0.01					1.229E-07	
Paved Road	Line Source		0.88																4.496E-02
TOTAL ALL AREAS (TPY)		244	23.97	0.00	0.01	0.48	0.00	0.49	6.62	2.76	0.00	3.94	0.20	0.59	0.35	0.56			
															Total =	40.0			

Table A-5 PM_{10} Short-Term Emissions for Year 2014

Modeled Area ID	Modeled Area (m²)	Assigned Acreage	Emissions Distribution (TPY): VEHICLE TRAVEL EMISSIONS: Commuter and Commercial Traffic	Barge to Concrete Plant	Unpaved road construction	Concrete Plant to Applic. Site	Excavated Dirt to Map Area 5	Batch Plant Operations	GRADING/EXCAVATION: Earth Moving / Excavation	Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Diesel & Gasoline Emissions: Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)	TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)	Commuter/ Commercial Traffic ($g/m^2/s$)
Hours of Operations (hour ending)			1-24	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	126,360	31			0.00	0.02	0.00		0.24	0.12		0.95	0.01		0.050	0.08	4.101E-07	3.641E-07	
AREA2	178,435	44	1.53		0.00	0.02	0.00		0.34	0.17		1.34	0.01		0.048	0.08	4.015E-07	3.417E-07	4.365E-07
AREA3	95,106	23	1.53		0.00	0.02	0.00		0.18	0.09		0.71	0.01		0.045	0.08	4.169E-07	3.894E-07	8.190E-07
AREA4	235,625	58	1.53	0.00	0.00	0.02	0.00		0.44	0.22		1.77	0.01	0.0098	0.045	0.08	3.983E-07	3.285E-07	3.306E-07
AREA5	245,982	61	1.53	0.00	0.00	0.02	0.00		0.46	0.23		1.84	0.01	0.0098	0.042	0.08	3.971E-07	3.268E-07	3.167E-07
AREA6	99,198	25	1.53	0.00	0.00	0.02		0.12		0.09		0.00	0.01	0.08	0.042	0.08	1.352E-07	1.935E-07	7.852E-07
AREA7	6,000	1.48		0.00							0.00		0.00	0.0147			1.250E-07	6.301E-08	
AREA7	6,000	1.48		0.00									0.00					6.301E-08	
AREA7	6,000	1.48		0.00									0.00					6.301E-08	
AREA7	6,000	1.48		0.00									0.00					6.301E-08	
Paved Road			0.30																1.530E-02
TOTAL ALL AREAS (TPY)		244	7.93	0.00	0.00	0.12	0.00	0.12	1.66	0.92	0.00	6.60	0.10	0.11	0.27	0.48			
															Total =	18.3			

Table A-6 PM_{10} Short-Term Emissions for Year 2015

Modeled Area ID	Modeled Area (m²)	Assigned Acreage	Emissions Distribution (TPY): VEHICLE TRAVEL EMISSIONS: Commuter and Commercial Traffic	Barge to Concrete Plant	Unpaved road construction	Concrete Plant to Applic. Site	Excavated Dirt to Map Area 5	Batch Plant Operations	GRADING/EXCAVATION: Earth Moving / Excavation	Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Diesel & Gasoline Emissions: Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)	TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)	Commuter/ Commercial Traffic ($g/m^2/s$)
Hours of Operations (hour ending)			1-24	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	126,360	31			0.00	0.00	0.00		0.05	0.00		0.95	0.00		0.017	0.03	3.892E-07	7.216E-08	
AREA2	178,435	44	0.11		0.00	0.00	0.00		0.07	0.00		1.34	0.00		0.017	0.03	3.870E-07	6.353E-08	3.211E-08
AREA3	95,106	23	0.11		0.00	0.00	0.00		0.04	0.00		0.71	0.00		0.016	0.03	3.906E-07	8.187E-08	6.024E-08
AREA4	235,625	58	0.11	0.00	0.00	0.00	0.00		0.10	0.00		1.77	0.00	0.0046	0.016	0.03	3.866E-07	5.844E-08	2.431E-08
AREA5	245,982	61	0.11	0.00	0.00	0.00	0.00		0.10	0.00		1.84	0.00	0.0046	0.015	0.03	3.862E-07	5.778E-08	2.329E-08
AREA6	99,198	25	0.11	0.00	0.00	0.00		0.00		0.00		0.00	0.00	0.04	0.015	0.03	2.658E-08	3.767E-08	5.775E-08
AREA7	6,000	1		0.00							0.00		0.00	0.0070			5.923E-08	1.441E-08	
AREA7	6,000	1.48		0.00									0.00					1.441E-08	
AREA7	6,000	1.48		0.00									0.00					1.441E-08	
AREA7	6,000	1.48		0.00									0.00					1.441E-08	
Paved Road			0.02																1.222E-03
TOTAL ALL AREAS (TPY)		244	0.59	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	6.60	0.02	0.05	0.09	0.20			
															Total =	7.9			

Table A-7 PM$_{10}$ Short-Term Emissions for Year 2016

Modeled Area ID	Modeled Area (m²)	Assigned Acreage	Emissions Distribution (TPY): Vehicle Travel Emissions: Commuter and Commercial Traffic	Vehicle Travel Emissions: Barge to Concrete Plant	Vehicle Travel Emissions: Unpaved road construction	Vehicle Travel Emissions: Concrete Plant to Applic. Site	Vehicle Travel Emissions: Excavated Dirt to Map Area 5	Batch Plant Operations	Grading/Excavation: Earth Moving / Excavation	Grading/Excavation: Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Diesel & Gasoline Emissions: Dewatering & Earthwork	Diesel & Gasoline Emissions: Batch Plant	Diesel & Gasoline Emissions: Concrete	Diesel & Gasoline Emissions: Others (incl. gasoline)	TOTAL (g/m²/s)	TOTAL (g/m²/s)	Commuter/Commercial Traffic (g/m²/s)
Hours of Operations (hour ending)			1-24	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	126,360	31			0.00	0.00	0.00		0.03	0.00		0.95	0.00		0.007	0.02	3.852E-07	3.474E-08	
AREA2	178,435	44	0.11		0.00	0.00	0.00		0.04	0.00		1.34	0.00		0.007	0.02	3.843E-07	3.082E-08	3.211E-08
AREA3	95,106	23	0.11		0.00	0.00	0.00		0.02	0.00		0.71	0.00		0.007	0.02	3.858E-07	3.916E-08	6.024E-08
AREA4	235,625	58	0.11	0.00	0.00	0.00	0.00		0.05	0.00		1.77	0.00	0.0023	0.007	0.02	3.842E-07	2.851E-08	2.431E-08
AREA5	245,982	61	0.11	0.00	0.00	0.00	0.00		0.05	0.00		1.84	0.00	0.0023	0.006	0.02	3.840E-07	2.820E-08	2.329E-08
AREA6	99,198	25	0.11	0.00	0.00	0.00		0.00		0.00			0.00	0.02	0.006	0.02	1.270E-08	1.713E-08	5.775E-08
AREA7	6,000	1		0.00							0.00		0.00	0.0034			2.880E-08	4.046E-09	
AREA7	6,000	1.48		0.00									0.00					4.046E-09	
AREA7	6,000	1.48		0.00									0.00					4.046E-09	
AREA7	6,000	1.48		0.00									0.00					4.046E-09	
Paved Road	930	0.23	0.00																0.000E+00
TOTAL ALL AREAS (TPY)		244	0.56	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	6.60	0.01	0.03	0.04	0.09			
															Total =	7.5			

Table A-8 PM$_{10}$ Annual Emissions for Year 2010

Modeled Area ID	Map Area Nos.	Modeled Area (m²)	Assigned Acreage	Emissions Distribution (TPY): Vehicle Travel Emissions: Commuter and Commercial Traffic	Vehicle Travel Emissions: Barge to Concrete Plant	Vehicle Travel Emissions: Unpaved road construction	Vehicle Travel Emissions: Concrete Plant to Applic. Site	Vehicle Travel Emissions: Excavated Dirt to Map Area 5	Batch Plant Operations	Grading/Excavation: Earth Moving / Excavation	Grading/Excavation: Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Diesel & Gasoline Emissions: Dewatering & Earthwork	Diesel & Gasoline Emissions: Batch Plant	Diesel & Gasoline Emissions: Concrete	Diesel & Gasoline Emissions: Others (incl. gasoline)	TOTAL (g/m²/s)	TOTAL (g/m²/s)	Commuter/Commercial Traffic (g/m²/s)
Hours of Operations (hour ending)				1-24	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	Unit 3 Area	126,360	31			0.01	0.05	1.74		2.51	4.66		0.95	0.16		0.023	0.03	2.811E-07	5.041E-06	
AREA2	1,2,8,9	178,435	44	0.96		0.01	0.05	1.74		3.54	6.58		1.34	0.16		0.021	0.03	2.751E-07	4.727E-06	1.871E-07
AREA3	CTCWS,10,11	95,106	23	0.96		0.01	0.05	1.74		1.89	3.51		0.71	0.16		0.018	0.03	2.856E-07	5.394E-06	3.509E-07
AREA4	3,4,7,12	235,625	58	0.96	0.19	0.01	0.05	2.90		4.67	8.69		1.77	0.16	0.0098	0.018	0.03	2.729E-07	4.942E-06	1.417E-07
AREA5	5,13	245,982	61	0.96	0.19	0.01	0.05	3.49		4.88	9.08		1.84	0.16	0.0098	0.015	0.03	2.720E-07	5.066E-06	1.357E-07
AREA6	6	99,198	24.5	0.96	0.19	0.01	0.05		0.12		3.66		0.31	0.16	0.08	0.015	0.03	2.007E-07	2.853E-06	3.365E-07
AREA7	Barge 1	6,000	1.48		0.05							0.22		0.04	0.0147			8.565E-08	3.512E-06	
AREA7	Barge 2	6,000	1.48		0.05									0.04					1.007E-06	
AREA7	Barge 3	6,000	1.48		0.05									0.04					1.007E-06	
AREA7	Barge 4	6,000	1.48		0.05									0.04					1.007E-06	
Paved Road	Paved Road			0.073																2.547E-03
TOTAL ALL AREAS (TPY)			244	4.85	0.75	0.05	0.28	11.62	0.12	17.49	36.19	0.22	6.91	1.11	0.11	0.11	0.21			
																Total =	80.0			

Table A-9 PM_{10} Annual Emissions for Year 2011

Modeled Area ID	Map Area Nos.	Modeled Area (m^2)	Assigned Acreage	Emissions Distribution (TPY)														TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)	Commuter/Commercial Traffic ($g/m^2/s$)
				VEHICLE TRAVEL EMISSIONS					Batch Plant Operations	GRADING/EXCAVATION		Sand and Aggregate at Barge	Wind Erosion	Diesel & Gasoline Emissions						
				Commuter and Commercial Traffic	Barge to Concrete Plant	Unpaved road construction	Concrete Plant to Applic. Site	Excavated Dirt to Map Area 5		Earth Moving / Excavation	Grading and Compaction			Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)			
Hours of Operations (hour ending)				1-24	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	Unit 3 Area	126,360	31			0.01	0.12	1.18		2.66	4.77		0.95	0.17		0.059	0.07	3.116E-07	4.896E-06	
AREA2	1,2,8,9	178,435	44	3.03		0.01	0.12	1.18		3.75	6.73		1.34	0.17		0.053	0.07	2.958E-07	4.665E-06	5.942E-07
AREA3	CTCWS,10,11	95,106	23	3.03		0.01	0.12	1.18		2.00	3.59		0.71	0.17		0.043	0.07	3.221E-07	5.156E-06	1.115E-06
AREA4	3,4,7,12	235,625	58	3.03	0.31	0.01	0.12	1.97		4.95	8.89		1.77	0.17	0.0375	0.043	0.07	2.917E-07	4.856E-06	4.500E-07
AREA5	5,13	245,982	61	3.03	0.31	0.01	0.12	2.37		5.17	9.28		1.84	0.17	0.0375	0.033	0.07	2.891E-07	4.936E-06	4.311E-07
AREA6	6	99,198	24.5	3.03	0.31	0.01	0.12		0.38		3.74		0.49	0.17	0.29	0.033	0.07	4.622E-07	3.030E-06	1.069E-06
AREA7	Barge 1	6,000	1		0.08							0.43		0.04	0.0562			3.275E-07	6.402E-06	
AREA7	Barge 2	6,000	1.48		0.08									0.04					1.393E-06	
AREA7	Barge 3	6,000	1.48		0.08									0.04					1.393E-06	
AREA7	Barge 4	6,000	1.48		0.08									0.04					1.393E-06	
Paved Road	Paved Road			0.27																9.505E-03
TOTAL ALL AREAS (TPY)			244	**15.44**	**1.24**	**0.07**	**0.73**	**7.89**	**0.38**	**18.52**	**37.00**	**0.43**	**7.09**	**1.18**	**0.42**	**0.26**	**0.41**			
																Total =	**91.1**			

Table A-10 PM_{10} Annual Emissions for Year 2012

Modeled Area ID	Map Area Nos.	Modeled Area (m^2)	Assigned Acreage	Emissions Distribution (TPY)														TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)	Commuter/Commercial Traffic ($g/m^2/s$)
				VEHICLE TRAVEL EMISSIONS					Batch Plant Operations	GRADING/EXCAVATION		Sand and Aggregate at Barge	Wind Erosion	Diesel & Gasoline Emissions						
				Commuter and Commercial Traffic	Barge to Concrete Plant	Unpaved road construction	Concrete Plant to Applic. Site	Excavated Dirt to Map Area 5		Earth Moving / Excavation	Grading and Compaction			Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)			
Hours of Operations (hour ending)				1-24	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	Unit 3 Area	126,360	31			0.00	0.09	0.00		1.50	1.81		0.95	0.08		0.097	0.10	3.132E-07	1.934E-06	
AREA2	1,2,8,9	178,435	44	3.33		0.00	0.09	0.00		2.12	2.55		1.34	0.08		0.088	0.10	2.964E-07	1.904E-06	6.522E-07
AREA3	CTCWS,10,11	95,106	23	3.33		0.00	0.09	0.00		1.13	1.36		0.71	0.08		0.074	0.10	3.218E-07	1.968E-06	1.224E-06
AREA4	3,4,7,12	235,625	58	3.33	0.09	0.00	0.09	0.00		2.80	3.37		1.77	0.08	0.0527	0.074	0.10	2.938E-07	1.912E-06	4.939E-07
AREA5	5,13	245,982	61	3.33	0.09	0.00	0.09	0.00		2.93	3.52		1.84	0.08	0.0527	0.061	0.10	2.905E-07	1.909E-06	4.731E-07
AREA6	6	99,198	25	3.33	0.09	0.00	0.09		0.50		1.42		0.31	0.08	0.40	0.061	0.10	4.796E-07	1.192E-06	1.173E-06
AREA7	Barge 1	6,000	1		0.02							0.22		0.02	0.0790			4.601E-07	2.990E-06	
AREA7	Barge 2	6,000	1.48		0.02									0.02					4.856E-07	
AREA7	Barge 3	6,000	1.48		0.02									0.02					4.856E-07	
AREA7	Barge 4	6,000	1.48		0.02									0.02					4.856E-07	
Paved Road	Paved Road			0.53																1.851E-02
TOTAL ALL AREAS (TPY)			244	**17.18**	**0.35**	**0.02**	**0.53**	**0.00**	**0.50**	**10.49**	**14.02**	**0.22**	**6.91**	**0.56**	**0.59**	**0.45**	**0.62**			
																Total =	**52.4**			

Table A-11 PM_{10} Annual Emissions for Year 2013

Modeled Area ID	Map Area Nos.	Modeled Area (m²)	Assigned Acreage	Emissions Distribution (TPY)														TOTAL (g/m²/s)	TOTAL (g/m²/s)	Commuter/Commercial Traffic (g/m²/s)
				VEHICLE TRAVEL EMISSIONS						GRADING/EXCAVATION				Diesel & Gasoline Emissions						
				Commuter and Commercial Traffic	Barge to Concrete Plant	Unpaved road construction	Concrete Plant to Applic. Site	Excavated Dirt to Map Area 5	Batch Plant Operations	Earth Moving / Excavation	Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)			
Hours of Operations (hour ending)				1-24	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	Unit 3 Area	126,360	31			0.00	0.08	0.00		0.95	0.36		0.56	0.03		0.080	0.10	2.003E-07	7.958E-07	
AREA2	1,2,8,9	178,435	44	4.62		0.00	0.08	0.00		1.34	0.50		0.80	0.03		0.071	0.10	1.856E-07	7.742E-07	9.045E-07
AREA3	TCWS,10,1	95,106	23	4.62		0.00	0.08	0.00		0.71	0.27		0.42	0.03		0.057	0.10	2.065E-07	8.202E-07	1.697E-06
AREA4	3,4,7,12	235,625	58	4.62	0.00	0.00	0.08	0.00		1.77	0.66		1.05	0.03	0.0527	0.057	0.10	1.843E-07	7.614E-07	6.849E-07
AREA5	5,13	245,982	61	4.62	0.00	0.00	0.08	0.00		1.85	0.69		1.10	0.03	0.0527	0.043	0.10	1.812E-07	7.598E-07	6.561E-07
AREA6	6	99,198	25	4.62	0.00	0.00	0.08		0.49		0.28		0.00	0.03	0.40	0.043	0.10	3.586E-07	2.911E-07	1.627E-06
AREA7	Barge 1	6,000	1.48		0.00							0.00		0.01	0.0790			4.601E-07	8.421E-08	
AREA7	Barge 2	6,000	1.48		0.00									0.01					8.421E-08	
AREA7	Barge 3	6,000	1.48		0.00									0.01					8.421E-08	
AREA7	Barge 4	6,000	1.48		0.00									0.01					8.421E-08	
Paved Road				0.80																2.784E-02
TOTAL ALL AREAS (TPY)			244	**23.89**	**0.00**	**0.01**	**0.48**	**0.00**	**0.49**	**6.62**	**2.76**	**0.00**	**3.94**	**0.20**	**0.59**	**0.35**	**0.62**			
																Total =	**40.0**			

Table A-12 PM_{10} Annual Emissions for Year 2014

Modeled Area ID	Map Area Nos.	Modeled Area (m²)	Assigned Acreage	Emissions Distribution (TPY)														TOTAL (g/m²/s)	TOTAL (g/m²/s)	Commuter/Commercial Traffic (g/m²/s)
				VEHICLE TRAVEL EMISSIONS						GRADING/EXCAVATION				Diesel & Gasoline Emissions						
				Commuter and Commercial Traffic	Barge to Concrete Plant	Unpaved road construction	Concrete Plant to Applic. Site	Excavated Dirt to Map Area 5	Batch Plant Operations	Earth Moving / Excavation	Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)			
Hours of Operations (hour ending)				1-24	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	Unit 3 Area	126,360	31			0.00	0.02	0.00		0.24	0.12		0.95	0.01		0.050	0.09	2.809E-07	2.548E-07	
AREA2	1,2,8,9	178,435	44	1.53		0.00	0.02	0.00		0.34	0.17		1.34	0.01		0.048	0.09	2.750E-07	2.378E-07	2.990E-07
AREA3	TCWS,10,1	95,106	23	1.53		0.00	0.02	0.00		0.18	0.09		0.71	0.01		0.045	0.09	2.855E-07	2.738E-07	5.610E-07
AREA4	3,4,7,12	235,625	58	1.53	0.00	0.00	0.02	0.00		0.44	0.22		1.77	0.01	0.0098	0.045	0.09	2.728E-07	2.279E-07	2.264E-07
AREA5	5,13	245,982	61	1.53	0.00	0.00	0.02	0.00		0.46	0.23		1.84	0.01	0.0098	0.042	0.09	2.720E-07	2.266E-07	2.169E-07
AREA6	6	99,198	25	1.53	0.00	0.00	0.02		0.12		0.09		0.00	0.01	0.08	0.042	0.09	9.258E-08	1.394E-07	5.378E-07
AREA7	Barge 1	6,000	1.48		0.00							0.00		0.00	0.0147			8.565E-08	4.315E-08	
AREA7	Barge 2	6,000	1.48		0.00									0.00					4.315E-08	
AREA7	Barge 3	6,000	1.48		0.00									0.00					4.315E-08	
AREA7	Barge 4	6,000	1.48		0.00									0.00					4.315E-08	
Paved Road				0.27																9.475E-03
TOTAL ALL AREAS (TPY)			244	**7.90**	**0.00**	**0.00**	**0.12**	**0.00**	**0.12**	**1.66**	**0.92**	**0.00**	**6.60**	**0.10**	**0.11**	**0.27**	**0.54**			
																Total =	**18.4**			

Table A-13 PM_{10} Annual Emissions for Year 2015

Modeled Area ID	Map Area Nos.	Modeled Area (m²)	Assigned Acreage	Emissions Distribution (TPY)														TOTAL (g/m²/s)	TOTAL (g/m²/s)	Commuter/ Commercial Traffic (g/m²/s)
				VEHICLE TRAVEL EMISSIONS						GRADING/EXCAVATION				Diesel & Gasoline Emissions						
				Commuter and Commercial Traffic	Barge to Concrete Plant	Unpaved road construction	Concrete Plant to Applic. Site	Excavated Dirt to Map Area 5	Batch Plant Operations	Earth Moving / Excavation	Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)			
Hours of Operations (hour ending)				1-24	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	Unit 3 Area	126,360	31			0.00	0.00	0.00		0.05	0.00		0.95	0.00		0.017	0.04	2.666E-07	5.210E-08	
AREA2	1,2,8,9	178,435	44	0.11		0.00	0.00	0.00		0.07	0.00		1.34	0.00		0.017	0.04	2.651E-07	4.541E-08	2.199E-08
AREA3	CTCWS,10,11	95,106	23	0.11		0.00	0.00	0.00		0.04	0.00		0.71	0.00		0.016	0.04	2.675E-07	5.963E-08	4.126E-08
AREA4	3,4,7,12	235,625	58	0.11	0.00	0.00	0.00	0.00		0.10	0.00		1.77	0.00	0.0046	0.016	0.04	2.648E-07	4.146E-08	1.665E-08
AREA5	5,13	245,982	61	0.11	0.00	0.00	0.00	0.00		0.10	0.00		1.84	0.00	0.0046	0.015	0.04	2.645E-07	4.095E-08	1.595E-08
AREA6	6	99,198	25	0.11	0.00	0.00	0.00		0.00		0.00		0.00	0.00	0.04	0.015	0.04	1.820E-08	2.921E-08	3.956E-08
AREA7	Barge 1	6,000	1		0.00							0.00		0.00	0.0070			4.057E-08	9.872E-09	
AREA7	Barge 2	6,000	1.48		0.00									0.00					9.872E-09	
AREA7	Barge 3	6,000	1.48		0.00									0.00					9.872E-09	
AREA7	Barge 4	6,000	1.48		0.00									0.00					9.872E-09	
Paved Road				0.02																7.569E-04
TOTAL ALL AREAS (TPY)			244	0.58	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	6.60	0.02	0.05	0.09	0.23			
																Total =	8.0			

Table A-14 PM_{10} Annual Emissions for Year 2016

Modeled Area ID	Map Area Nos.	Modeled Area (m²)	Assigned Acreage	Emissions Distribution (TPY)														TOTAL (g/m²/s)	TOTAL (g/m²/s)	Commuter/Commercial Traffic (g/m²/s)
				VEHICLE TRAVEL EMISSIONS						GRADING/EXCAVATION				Diesel & Gasoline Emissions						
				Commuter and Commercial Traffic	Barge to Concrete Plant	Unpaved road construction	Concrete Plant to Applic. Site	Excavated Dirt to Map Area 5	Batch Plant Operations	Earth Moving / Excavation	Grading and Compaction	Sand and Aggregate at Barge	Wind Erosion	Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)			
Hours of Operations (hour ending)				1-24	7-18	7-18	1-24	7-18	1-24	7-18	7-18	7-18	1-24	7-18	1-24	1-24	7-18	1-24	7-18	1-24
U3AREA	Unit 3 Area	126,360	31			0.00	0.00	0.00		0.03	0.00		0.95	0.00		0.007	0.02	2.639E-07	2.513E-08	
AREA2	1,2,8,9	178,435	44	0.11		0.00	0.00	0.00		0.04	0.00		1.34	0.00		0.007	0.02	2.632E-07	2.206E-08	2.199E-08
AREA3	TCWS,10,1	95,106	23	0.11		0.00	0.00	0.00		0.02	0.00		0.71	0.00		0.007	0.02	2.642E-07	2.860E-08	4.126E-08
AREA4	3,4,7,12	235,625	58	0.11	0.00	0.00	0.00	0.00		0.05	0.00		1.77	0.00	0.0023	0.007	0.02	2.631E-07	2.024E-08	1.665E-08
AREA5	5,13	245,982	61	0.11	0.00	0.00	0.00	0.00		0.05	0.00		1.84	0.00	0.0023	0.006	0.02	2.630E-07	2.000E-08	1.595E-08
AREA6	6	99,198	25	0.11	0.00	0.00	0.00		0.00		0.00			0.00	0.02	0.006	0.02	8.699E-09	1.344E-08	3.956E-08
AREA7	Barge 1	6,000	1		0.00							0.00		0.00	0.0034			1.972E-08	2.771E-09	
AREA7	Barge 2	6,000	1.48		0.00									0.00					2.771E-09	
AREA7	Barge 3	6,000	1.48		0.00									0.00					2.771E-09	
AREA7	Barge 4	6,000	1.48		0.00									0.00					2.771E-09	
Paved Road				0.00																0.000E+00
TOTAL ALL AREAS (TPY)			244	0.56	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	6.60	0.01	0.03	0.04	0.11			
																Total =	7.5			

Table A-15 CO and SO_2 Short-Term Emissions for Year 2011

Modeled Area ID	Map Area Nos.	Modeled Area (m²)	Assigned Acreage	MODELED CO EMISSIONS						MODELED SO2 EMISSIONS					
				Diesel & Gasoline Emissions						Diesel & Gasoline Emissions					
				Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)	TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)	Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)	TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)
Hours of Operations (hour ending)				7-18	1-24	1-24	7-18	1-24	7-18	7-18	1-24	1-24	7-18	1-24	7-18
U3AREA	Unit 3 Area	126,360	31	0.82		1.172	4.96	4.731E-07	4.675E-06	0.10		0.180	0.16	7.263E-08	2.129E-07
AREA2	1,2,8,9	178,435	44	0.82		1.084	4.96	3.098E-07	3.310E-06	0.10		0.162	0.16	4.620E-08	1.507E-07
AREA3	CTCWS,10,1	95,106	23	0.82		0.951	4.96	5.103E-07	6.211E-06	0.10		0.134	0.16	7.195E-08	2.828E-07
AREA4	3,4,7,12	235,625	58	0.82	0.5521	0.951	4.96	3.255E-07	2.507E-06	0.10	0.0666	0.134	0.16	4.347E-08	1.142E-07
AREA5	5,13	245,982	61	0.82	0.5521	0.819	4.96	2.844E-07	2.401E-06	0.10	0.0666	0.107	0.16	3.594E-08	1.093E-07
AREA6	6	99,198	25	0.82	1.3830	0.819	4.96	1.132E-06	5.955E-06	0.10	0.1653	0.107	0.16	1.399E-07	2.712E-07
AREA7	Barge 1	6,000	1	0.21	0.8281			7.041E-06	3.503E-06	0.03	0.0999			8.498E-07	4.442E-07
AREA7	Barge 2	6,000	1.48	0.21					3.503E-06	0.03					4.442E-07
AREA7	Barge 3	6,000	1.48	0.21					3.503E-06	0.03					4.442E-07
AREA7	Barge 4	6,000	1.48	0.21					3.503E-06	0.03					4.442E-07
				5.77	3.32	5.80	29.79			0.73	0.40	0.82	0.95		
						Total =	44.7					Total =	2.9		

Table A-16 NOx and SO_2 Annual Emissions for Year 2011

Modeled Area ID	Map Area Nos.	Modeled Area (m²)	Assigned Acreage	MODELED NOx EMISSIONS						MODELED SO2 EMISSIONS					
				Diesel & Gasoline Emissions						Diesel & Gasoline Emissions					
				Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)	TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)	Dewatering & Earthwork	Batch Plant	Concrete	Others (incl. gasoline)	TOTAL ($g/m^2/s$)	TOTAL ($g/m^2/s$)
Hours of Operations (hour ending)				7-18	1-24	1-24	7-18	1-24	7-18	7-18	1-24	1-24	7-18	1-24	7-18
U3AREA	Unit 3 Area	126,360	31	6.65		2.721	2.79	7.524E-07	5.223E-06	0.27		0.113	0.11	3.129E-08	2.085E-07
AREA2	1,2,8,9	178,435	44	6.65		2.381	2.79	4.662E-07	3.699E-06	0.27		0.099	0.11	1.947E-08	1.477E-07
AREA3	CTCWS,10,11	95,106	23	6.65		1.871	2.79	6.874E-07	6.940E-06	0.27		0.079	0.11	2.896E-08	2.770E-07
AREA4	3,4,7,12	235,625	58	6.65	1.2905	1.871	2.79	4.688E-07	2.801E-06	0.27	0.0513	0.079	0.11	1.929E-08	1.118E-07
AREA5	5,13	245,982	61	6.65	1.2905	1.361	2.79	3.767E-07	2.683E-06	0.27	0.0513	0.058	0.11	1.555E-08	1.071E-07
AREA6	6	99,198	25	6.65	3.0876	1.361	2.79	1.567E-06	6.653E-06	0.27	0.1259	0.058	0.11	6.485E-08	2.656E-07
AREA7	Barge 1	6,000	1	1.66	1.9357			1.127E-05	1.936E-05	0.07	0.0769			4.477E-07	7.846E-07
AREA7	Barge 2	6,000	1.48	1.66					1.936E-05	0.07					7.846E-07
AREA7	Barge 3	6,000	1.48	1.66					1.936E-05	0.07					7.846E-07
AREA7	Barge 4	6,000	1.48	1.66					1.936E-05	0.07					7.846E-07
				46.54	7.60	11.57	16.77			1.89	0.31	0.49	0.65		
						Total =	82.5					Total =	3.3		

Appendix B

Construction Emissions Calculations

Table B-1 Unpaved Road Emissions Calculation

UNPAVED ROADS

Item No.	Construction Activity	Operation Type	Mean vehicle weight (tons)	Units	2010	2011	2012	2013	2014	2015	TOTAL
11	Building Excavation	Haul to Stockpile	20.4	VMT	546,000	-	-	-	-	-	546,000
15	Structural Backfill	Haul to Power Block	20.4	VMT	-	447,000	-	-	-	-	447,000
23	Unpaved Construction	Motor Grading	29	VMT	2,500	3,800	2,500	1,300	-	-	10,100
26	Concrete Operations	Mat. Trans. Barge to	51.2	VMT	35,200	70,380	35,200	-	-	-	140,780
29	Concrete Operations	Ready Mix Transport	28.0	VMT	13,300	41,200	54,000	52,800	13,200	-	174,500
31	Vehicle Traffic	Commuters	2	VMT	205,000	838,000	1,670,000	2,536,000	863,000	69,000	6,181,000
33	Vehicle Traffic	Commercial	2	VMT	19,400	21,700	14,500	2,730	350	-	58,680

Item No.	Construction Activity	Operation Type	Units	2010	2011	2012	2013	2014	2015
		EF lb/VMT	PM_{10}	1.22	1.01	0.56	0.52	0.51	0.46
11	Building Excavation	Haul to Stockpile	tpy PM_{10}	11.62	-	-	-	-	-
15	Structural Backfill	Haul to Power Block	tpy PM_{10}	0.00	7.89	-	-	-	-
23	Unpaved Construction	Motor Grading	tpy PM_{10}	0.05	0.07	0.02	0.01	-	-
26	Concrete Operations	Mat. Trans. Barge to Batch Plant	tpy PM_{10}	0.75	1.24	0.35	-	-	-
29	Concrete Operations	Ready Mix Transport (CP tp app site)	tpy PM_{10}	0.28	0.73	0.53	0.48	0.12	-
31	Vehicle Traffic	Commuters	tpy PM_{10}	4.36	14.79	16.51	23.07	7.63	0.56
33	Vehicle Traffic	Commercial	tpy PM_{10}	0.41	0.38	0.14	0.02	0.00	-
			Total	**17.48**	**25.10**	**17.56**	**23.58**	**7.75**	**0.56**

E (lb/VMT) = k * (s/12)^a * (W/3)^b

k (PM_{10})	1.5	Particle size multiplier, lb/VMT
s	4.0	Surface Material silt content, g/m^2, Sand and Gravel Processing from AP-42 Table 13.2.2-1;used lower end.
a	0.9	exponent
b	0.45	exponent

		2010	2011	2012	2013	2014	2015
W	Mean vehicle weight, tons	16.9	11.2	3.1	2.6	2.4	2.0

Watering efficiency	95%
Gravelling efficiency	30%

Table B-2 Paved Road Emissions Calculation

PAVED ROADS

Item No.	Construction Activity	Operation Type	Units	2010	2011	2012	2013	2014	2015	TOTAL
3	Vehicle Traffic	Commuters	VMT	44,000	178,500	355,400	539,900	183,900	14,700	**1,316,400**
33	Vehicle Traffic	Commercial	VMT	5,460	6,100	4,080	760	100	0	**16,500**

E (lb/VMT) = k * (sL/2)^0.65 * (W/3)^1.5 - C * (1 - (P / (4 N))

k (PM_{10})	0.016	Particle size multiplier, lb/VMT				
k ($PM_{2.5}$)	0.0024	Particle size multiplier, lb/VMT				
sL	3	Road surface silt content, g/m^2, Air Pollution Engineering Manual, 2nd Ed. AWMA.				
W	2	Mean vehicle weight, tons				
C (PM_{10})	0.00047	Exhaust, break wear, & tire wear correction, lb/VMT				
C ($PM_{2.5}$)	0.00036	Exhaust, break wear, & tire wear correction, lb/VMT				
P	140	Number of days of 0.01 inch of precipitation or greater (Figure 13.2.1-2)				
N	365	Number of days in averaging period				
watering/flushing efficiency	70.00%					
1- (P/(4N))		**0.90411**	**0.90411**	**0.90411**	**0.90411**	**0.90411**	**0.90411**

Uncontrolled	**EF**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
	lb/VMT	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**
PM_{10}	0.011	0.27	1.00	1.95	2.94	1.00	0.08
$PM_{2.5}$	0.0013	0.03	0.12	0.24	0.36	0.12	0.01

Controlled (1)	**EF**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
	lb/VMT	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**
PM_{10}	0.01	0.07	0.27	0.53	0.80	0.27	0.02
$PM_{2.5}$	0.0012	0.01	0.03	0.07	0.10	0.03	0.00

Note: (1) Only the annual emissions have the control efficiency of precipitation built in them

Table B-3 Material Transfer Emissions Calculation

BATCH DROP OPERATIONS

Item No.	Construction Activity	Operation Type	Material	Units	2010	2011	2012	2013	2014	2105	TOTAL
4	Scrapers unloading topsoil	Batch Drop	Earth	Tons	310,000	0	0	0	0	0	310,000
7	Scrapers unloading overburden as fill	Batch Drop	Earth	Tons	2,158,000	2,158,000	644,000	0	0	0	4,960,000
10	Load Excavated Mat'l into Trucks	Batch Drop	Earth	Tons	3,410,000	0	0	0	0	0	3,410,000
12	Truck-Dump	Batch Drop	Earth	Tons	3,410,000	0	0	0	0	0	3,410,000
14	Load Stockpile into Off-Road Truck	Batch Drop	Earth	Tons	0	2,790,000	0	0	0	0	2,790,000
16	Truck-Dump	Batch Drop	Earth	Tons	0	2,790,000	0	0	0	0	2,790,000
25	Material Transfer from Barge	Batch Drop	Aggregates	Tons	198,800	397,600	198,800	0	0	0	795,200
		Batch Drop	Sand	Tons	152,218	304,436	152,218	0	0	0	608,872

AP-42 Section 13.2.4-3 Aggregate Handling and Storage Piles **E (lb/ton) = 0.0032 * k * (U/5)^1.3 / (M/2)^1.4**		
$k\ (PM_{10})$ =	0.35	
$k\ (PM_{2.5})$ =	0.053	
U =	6.2	miles per hour, Based on average of hourly values over multiyear period from CCNPP on-site monitor.
M (earth) =	3.4	%, Average moisture content Based on AP-42 Table 13.2.4-1 mean moisture content for exposed ground
M (aggregates) =	1.77	%, moisture content based on AP-42 Table 11.2.-2 footnote b
M (sand) =	4.17	%, moisture content based on AP-42 Table 11.2.-2 footnote b

		EF	2010	2011	2012	2013	2014	2015
		lb/ton	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
earth grading	PM_{10}	**7.05E-04**	0.87	0.76	0.23	-	-	-
earth moving	PM_{10}	**7.05E-04**	2.40	1.97	-	-	-	-
aggregates	PM_{10}	**1.76E-03**	0.17	0.35	0.17	-	-	-
sand	PM_{10}	**5.30E-04**	0.04	0.08	0.04	-	-	-
TOTAL	PM10		**3.49**	**3.16**	**0.44**	**-**	**-**	**-**

Table B-4 Site Preparation Emissions Calculation

BULLDOZING GRADING COMPACTION

	Item No.	Construction Activity	Operation Type	Units	2010	2011	2012	2013	2014	2015	2016	TOTAL
Bulldozing	1	Vegetation Removal	Bulldozing (w/Item 8)	Hours								
	8	Bulldozing	Includes Items 1, 13, and 17	Hours/year	8,200	9,000	5,700	3,600	900	200	100	**27,600**
	13	Spread material	Bulldozing (w/Item 8)	Hours								
	17	Spread material	Bulldozing (w/Item 8)	Hours								
		EMISSIONS (PM10)	**Units of Lb/year**		30,168	33,111	20,970	13,244	3,311	736	368	**101,541**

	Item No.	Construction Activity	Operation Type	Units	2010	2011	2012	2013	2014	2015	2016	TOTAL
Grading	2	Scrapers removing topsoil		Tons	310,000	0	0	0	0	0		310,000
	5	Scrapers removing overburden		Tons	2,158,000	2,158,000	644,000	0	0	0		4,960,000
	23	Motor Grading		VMT	2,500	3,800	2,500	1,300	0	0		10,100
		Predicted hours of operation for Items 2, 5, 23		Hours/year	14,000	14,500	4,900	500	0	0	0	33,900
		EMISSIONS (PM10)	**Units of Lb/year**		51,506	53,346	18,027	1,840	0	0	0	124,719

	Item No.	Construction Activity	Operation Type	Units	2010	2011	2012	2013	2014	2015	2016	TOTAL
Compaction	9	Compaction	Includes Items 18, 24	Hours/year	5,200	5,200	2,600	1,000	500	0	0	**14,500**
	18	Compaction	Included with Item 9	Hours								
	24	Compaction	Included with Item 9	Hours								
		EMISSIONS (PM10)	**Units of Lb/year**		19130.941	19130.941	9565.4706	3679.0272	1839.5136	0		53345.89383

		Units	2010	2011	2012	2013	2014	2015	2016
Bulldozing	EMISSIONS (PM10)	**TPY**	15.08	16.56	10.49	6.62	1.66	0.37	0.18
Grading	EMISSIONS (PM10)	**TPY**	25.75	26.67	9.01	0.92	0.00	0.00	0.00
Compaction	EMISSIONS (PM10)	**TPY**	9.57	9.57	4.78	1.84	0.92	0.00	0.00
		Total	**50.40**	**52.79**	**24.28**	**9.38**	**2.58**	**0.37**	**0.18**

Mojave Desert Air Quality Management District Emissions Inventory Guidance Method D Bulldozing., Scraping, and Grading		
E_f (lb/hr) = 2.76 * k * (s^1.5 / M^1.4)		
k (PM_{10}) =	0.36	
s =	7.5	%, Average silt content Based on AP-42 Table 13.2.4-1 mean silt content for overburden
M =	3.4	%, Average moisture content Based on AP-42 Table 13.2.4-1 mean moisture content for exposed ground
Ef (PM10)	**3.679**	**lb/hr**

Table B-5 Wind Erosion Emissions Calculation – Open Areas

Activity Data and Yearly Emissions from Wind Erosion						
Wind Erosion	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
	acres	acres	acres	acres	acres	acres
Total Disturbed Acreage[1]	**218**	**218**	**218**	**130**	**70**	**70**

Uncontr. Emis. Factor (lb/ac/dy)	PM-10 Emis Uncontr. (lb/day)					
	2010	**2011**	**2012**	**2013**	**2014**	**2015**
1.66	361.9	361.9	361.9	215.8	116.2	116.2

Moisture Control Eff. (%)	PM-10 Emis Controlled. (TPY)					
	2010	**2011**	**2012**	**2013**	**2014**	**2015**
90%	6.6	6.6	6.6	3.9	2.1	2.1

[1] Uncontrolled emission factor for windblown dust from the Clark County Department of Air Qualilty and Environmental Management (DAQEM). Sufficient water will be added to maintain a 3% moisture content at the surface. DAQEM data indicate that 3% moisture produces over 90% reduction in uncontrolled emissions. Lack of data on PM-2.5 emissions led to the conservative assumption that PM-2.5 emissions are the same as PM-10 emissions.

* Table 5.5-1 from the CPCN application. This table provides a summary of the construction activity data provided by Bechtel, the design firm for CCNPP Unit 3

Table B-6 Wind Erosion Emissions Calculation – Storage Piles

To Calculate the area of the SAND storage piles

			2010	2011	2012	2013	2014	2015
Aggregate deliveries by Barge	Tons		198,800	397,600	198,800	0	0	0
Lbs of Sand required			304,435,817.69	608,871,635.39	304,435,817.69	0	0	0
Density of Sand (lbs/cu.yd)			2,633	2,633	2,633	2,633	2,633	2,633
Volume of Sand Required (cu.yd)			**115,623.17**	**231,246.35**	**115,623.17**	**0**	**0**	**0**
Using a 1:3 ratio for h:base --- Height			36.61	46.13	36.61	0	0	0
Base			109.83	138.38	109.83	0	0	0
Slope (s)			66.00	83.16	66.00	0	0	0
Curved surface area (exposed) (square yards)			**11,386.89**	**18,075.57**	**11,386.89**	**0**	**0**	**0**

			PM10					
Units			2010	2011	2012	2013	2014	2015
TONS	E	=	**0.12**	**0.20**	**0.12**	**0**	**0**	**0**
tons/acre	E_f	=	0.053	0.053	0.053	0.053	0.053	0.053
Watering Control efficiency	e	=	90%	90%	90%	90%	90%	90%
	J	=	0.5	0.5	0.5	0.5	0.5	0.5
%	sL	=	6	6	6	6	6	6
days	P	=	140	140	140	140	140	140
%	I	=	13.3	13.3	13.3	13.3	13.3	13.3
acres	A	=	2.35	3.72	2.35	0	0	0

To Calculate the area of the AGGREGATE storage piles

			2010	2011	2012	2013	2014	2015
Aggregate deliveries by Barge	Tons		198,800	397,600	198,800	0	0	0
Lbs of Aggregate required (Lbs)			519,274,509.80	1,038,549,019.61	519,274,509.80	0	0	0
Density of Aggregate (lbs/cu.yd)			2,498	2,498	2,498	2,498	2,498	2,498
Volume of Sand Required (cu.yd)			**207,876.10**	**415,752.21**	**207,876.10**	**0**	**0**	**0**
Using a 1:3 ratio for h:base --- Height (yards)			44.52	56.09	44.52	0	0	0
Base (yards)			133.55	168.27	133.55	0	0	0
Slope (s) (yards)			80.26	101.12	80.26	0	0	0
Curved surface area (exposed) (square yards)			**16,836.24**	**26,725.86**	**16,836.24**	**0**	**0**	**0**

			PM10					
Units			2010	2011	2012	2013	2014	2015
TONS	E	=	**0.18**	**0.29**	**0.18**	**0**	**0**	**0**
tons/acre	E_f	=	0.053	0.053	0.053	0.053	0.053	0.053
Watering Control efficiency	e	=	90%	90%	90%	90%	90%	90%
	J	=	0.5	0.5	0.5	0.5	0.5	0.5
%	sL	=	6	6	6	6	6	6
days	P	=	140	140	140	140	140	140
%	I	=	13.3	13.3	13.3	13.3	13.3	13.3
acres	A	=	3.47	5.51	3.47	0	0	0

Mojave Desert Air Quality Management District Emissions Inventory Guidance Method G Wind Erosion from Stockpiles

$$E = E_f * A$$

$$E_f = J * 1.7 * (sL/1.5) * (365-P)/235 * (I / 15) * (365/2000)$$

E_f = Emission factor (tons/acre)
J = particulate aerodynamic factor
sL = silt loading
P = Average number of days in a year with at least 0.01 inches of precipitation
I = Percentage of time with unobstructed wind speed > 12 mph in %
A = Exposed surface area of stockpiles in acres

Table B-7 Concrete Batch Plant Emissions Calculation

Activity Data and Maximum Emissions from Concrete Batch Plants

Plant Data			
Maximum Concrete Production			
Plants	number	1	based on total concrete production for 1 plant from original calculations
Maximum Production Rate per Concrete Batch Plant	cu. yds/hr	200	
Annual Avg. Production Rate	cubic yds/year	125,000	
Annual Max. Production Rate	cubic yds/year	206,061	
Cement and cement amendments pneumatic transfer from truck to silos vent thru 99% efficient baghouse			

	2010	2011	2012	2013	2014	2015
Total Concrete Schedule (CY)	42250	131,000	171,750	168,000	42,000	0

Emissions

Based on Plant Wide PM-10 Emission Factors for Concrete Plants from AP-42 Table 11.12-3 and the controlled truck loading PM-10 factor in Table 11.12-2; PM-2.5=PM-10 for controlled silo cement unloading, PM-2.5/PM-10 ratio from Table 11.12-3 for truck loading, and PM-2.5/PM-10 ratio from Section 13.2.4 for other categories. A control efficiency of 90% was applied for watering to those material transfer activities without control.

			HOURLY	HOURLY	PM-10 (tons/year)					
Activity	PM-10 lbs/cu. yd	PM-2.5 lbs/cu. yd	PM-10 lbs/hr	PM-2.5 lbs/hr	2010	2011	2012	2013	2014	2015
Aggregate delivery to ground	0.00031	0.00005	0.06	0.01	0.007	0.020	0.027	0.026	0.007	0.000
Sand delivery to ground	0.00007	0.00001	0.01	0.002	0.001	0.005	0.006	0.006	0.001	0.000
Aggregate transfer to conveyor	0.00031	0.00005	0.06	0.01	0.007	0.020	0.027	0.026	0.007	0.000
Sand transfer to conveyor	0.00007	0.00001	0.01	0.002	0.001	0.005	0.006	0.006	0.001	0.000
Sand transfer to elevated storage	0.00007	0.00001	0.01	0.002	0.001	0.005	0.006	0.006	0.001	0.000
Cement delivery to silo (controlled)	0.0001	0.0001	0.02	0.02	0.002	0.007	0.009	0.008	0.002	0.000
Cement supplement to silo (controlled)	0.0002	0.0002	0.04	0.04	0.004	0.013	0.017	0.017	0.004	0.000
Weigh Hopper loading (controlled)*	0.0002	0.00003	0.05	0.01	0.005	0.015	0.020	0.019	0.005	0.000
Truck loading (controlled)*	0.0045	0.0008	0.90	0.16	0.095	0.296	0.387	0.379	0.095	0.000
Totals			**1.17**	**0.25**	**0.12**	**0.38**	**0.50**	**0.49**	**0.12**	**0.00**

**Based on applying controls to achieve the 94+% reduction in PM-10 emissions reflected in the AP-42 controlled emission factor in Table 11.12-2 for truck loading.*

Table B-8a Combustion Equipment Emissions Calculation

Activity Data and Emissions for Construction Equipment Fuel Combustion

EQUIPMENT CATEGORY	DESCRIPTION	FUEL TYPE	QTY	MOTOR SIZE (HP)	median life (note 4) hours	COMBINED YEARLY TOTAL HOURS OF USE 1	2	3	4	5	6	7	TIER [Note 1]	BSFC (lb/hp-hr)	EMISSION FACTORS** HC g/hp-hr	CO (g/hp-hr)	NOx g/hp-hr	[Note 2] PM (g/hp-hr)	TAF Assignmt (Hi/Lo)	LF Note 7	BSFC TAF Note 6
DEWATERING & EARTHWORK																					
	Dewatering Deep Well or Wellpoint Pumps (24-Hr/Da	Diesel	4	180	4667	35000	17500	0	0	0	0	0	2	0.367	0.3085	0.7475	4.000	0.1316	None	0.43	1.00
	Scraper, Self-Propelled, 24cy Struck	Diesel	10	450	7000	13000	13000	3900	0	0	0	0	2	0.367	0.1669	0.8425	4.3351	0.1316	Hi	0.59	1.01
	CAT D9 Dozer	Diesel	4	410	7000	5200	5200	2600	1500	0	0	0	2	0.367	0.1669	0.8425	4.3351	0.1316	Hi	0.59	1.01
	CAT D6 Dozer	Diesel	2	185	4667	2600	2600	1500	500	500	0	0	2	0.367	0.3085	0.7475	4.000	0.1316	Hi	0.59	1.01
	CAT 330 Crawler/Hydraulic Backhoe, 3-1/4cy Struck	Diesel	4	268	4667	2600	5200	2600	2000	1000	0	0	2	0.367	0.3085	0.7475	4.000	0.1316	Lo	0.21	1.18
	CAT 953 Crawler/Loader, 2-1/2cy	Diesel	4	133	4667	2600	5200	2600	2000	1000	0	0	2	0.367	0.3384	0.8667	4.1	0.18	Hi	0.59	1.01
	Case 521D Articulated 4X4 Wheel Loader, 2-1/4cy	Diesel	2	110	4667	2600	5200	2600	2000	1000	500	0	2	0.367	0.3384	0.8667	4.1	0.18	Lo	0.21	1.18
	Kenworth t-800 Dump Trucks, 13/15cy	Diesel	10	250	4667	6500	13000	6500	2000	1000	0	0	2	0.367	0.3085	0.7475	4.000	0.1316	Hi	0.59	1.01
	CAT 825 Vibratory Compactor	Diesel	4	354	7000	5200	5200	2600	1000	500	0	0	2	0.367	0.1669	0.8425	4.3351	0.1316	None	0.43	1.00
	Case 580 Tractor Loader/Backhoe, 1cy/18"	Diesel	2	75	4667	0	0	1000	1000	1000	1000	500	2	0.408	0.3672	2.3655	4.7	0.24	Lo	0.21	1.18
	Case Skid Loader, 1/2cy	Diesel	2	50	4667	0	0	1000	1000	1000	1000	500	2	0.408	0.2789	1.5323	4.7279	0.3389	Lo	0.21	1.18
	JCB Mini Backhoe/Loader, 1/2cy/12"	Diesel	2	50	4667	0	0	1000	1000	1000	1000	0	2	0.408	0.2789	1.5323	4.7279	0.3389	Lo	0.21	1.18
	CAT 14H Motor Grader, 14' Blade	Diesel	1	220	4667	1000	1500	1000	0	0	0	0	2	0.367	0.3085	0.7475	4.000	0.1316	Hi	0.59	1.01
	Gradall	Diesel	1	220	4667	1000	1000	500	500	500	0	0	2	0.367	0.3085	0.7475	4.000	0.1316	Hi	0.59	1.01
	GMC Truck w/6000 gal. water tank	Diesel	1	300	7000	1000	1000	1000	1000	1000	0	0	2	0.367	0.3085	0.7475	4.000	0.1316	Hi	0.59	1.01
BATCH PLANT																					
	Central Mix Plant w/chiller & heater, ~ 130 cy/hr	Electric	2	0		400	1200	1600	1600	400	200	100	N/A	0.00	0.00	0.00	0.00	0.00	None	0.43	0.00
	CAT 966F Loader, 5cy Bucket @ Stockpiles	Diesel	1	266	4667	400	1200	1600	1600	400	200	100	2	0.367	0.3085	0.7475	4.000	0.1316	Lo	0.21	1.18
	CAT D6H Dozer @ Stockpiles	Diesel	1	165	4667	400	1200	1600	1600	400	200	100	2	0.367	0.3384	0.8667	4.1	0.18	Hi	0.59	1.01
	Crawler/Backhoe, 1cy @ Spoils	Diesel	1	115	4667	100	300	400	400	100	50	40	2	0.367	0.3384	0.8667	4.1	0.18	Lo	0.21	1.18
	GMC 12/14cy Dump Truck @ Spoils	Diesel	1	300	7000	100	300	400	400	100	50	40	2	0.367	0.3085	0.7475	4.000	0.1316	Hi	0.59	1.01
	IR 375cfm Air Compressor, Trailer Mounted	Diesel	1	113	4667	100	300	400	400	100	50	40	2	0.367	0.3384	0.8667	4.1	0.18	None	0.43	1.00
	Dump Trucks for Aggregate and Sand, 30 cy	Diesel	5	480	7000	1600	5000	6500	6500	1600	800	400	2	0.367	0.1669	0.8425	4.3351	0.1316	Hi	0.59	1.01
CONCRETE																					
	Concrete Transport Trucks, Agitator/Mixer, 10cy capa	Diesel	15	250	4667	4220	13100	24000	17200	16800	4200	2100	2	0.367	0.3085	0.7475	4.000	0.1316	Hi	0.59	1.01
	Crater Crane w/Grove RT990 Hydraulic Crane & 200ft Conveyor	Diesel	1	300	7000	200	600	800	800	0	0	0	2	0.367	0.3085	0.7475	4.000	0.1316	None	0.43	1.00
	Concrete Pump Truck @ 170 cy/hr	Diesel	4	250	4667	800	2400	3200	3200	800	400	200	2	0.367	0.3085	0.7475	4.000	0.1316	None	0.43	1.00
	Concrete Pump, Trailer Mounted @ 115/120 cy/hr	Diesel	4	180	4667	800	2400	3200	3200	800	0	0	2	0.367	0.3085	0.7475	4.000	0.1316	None	0.43	1.00
	IR 375cfm Air Compressor, Trailer Mounted	Diesel	2	113	4667	800	2400	3200	3200	800	400	200	2	0.367	0.3384	0.8667	4.1	0.18	None	0.43	1.00
	IR 750cfm Air Compressor, Trailer Mounted	Diesel	1	250	4667	400	1200	1600	1600	400	200	100	2	0.367	0.3085	0.7475	4.000	0.1316	None	0.43	1.00
LIFTING/RIGGING																					
	Manitowoc 4600 S-5 Crawler Crane w/S-4 Ringer Attachment, 75	Diesel	1	685	7000	0	1000	2000	2000	2000	1000	0	2	0.367	0.1669	1.3272	4.1	0.1316	None	0.43	1.00
	Manitowoc M-250 S-2 Crawler Crane w/300' Boom Attachment & Luffing Jib, 300-ton Capacity	Diesel	2	450	7000	0	1000	2000	2000	2000	500	0	2	0.367	0.1669	0.8425	4.3351	0.1316	None	0.43	1.00
	Manitowoc 4100 S-2 Crawler Crane 230-ton Capacity, w/Tower Attachmentm 31-ton Capacity	Diesel	2	333	7000	1000	2000	4000	4000	2000	1000	0	2	0.367	0.1669	0.8425	4.3351	0.1316	None	0.43	1.00
	Manitowoc 3900W Crawler Crane, w/180' Boom & 30' Jib, 140-ton Capacity	Diesel	2	287	4667	1000	2000	4000	4000	2000	1000	0	2	0.367	0.3085	0.7475	4	0.1316	None	0.43	1.00
	Linkbelt HC248 Lattice Boom Truck Crane w/ 200' Boom Attachment & Luffing Jib, 165-ton Capacity	Diesel	2	405	7000	1000	2000	4000	4000	4000	1000	500	2	0.367	0.1669	0.8425	4.3351	0.1316	None	0.43	1.00
	Kenworth T-800 Prime Mover for Heavy-Haul Trailers	Diesel	2	330	7000	0	200	400	400	200	0	0	2	0.367	0.1669	0.8425	4.3351	0.1316	Hi	0.59	1.01
	Grove RT-635 Rough Terrain Hyd. Crane, 35-ton Capacity	Diesel	2	152	4667	2000	4000	4000	4000	4000	200	1000	2	0.367	0.3384	0.8667	4.1	0.18	None	0.43	1.00
	Grove RT-865 Rough Terrain Hyd. Crane, 65-ton Capacity	Diesel	4	250	4667	2000	4000	4000	4000	4000	2000	1000	2	0.367	0.3085	0.7475	4	0.1316	None	0.43	1.00
	IR Teleboom Forklift 4x4, 4.5-ton	Diesel	2	65	4667	0	1000	2000	2000	2000	1000	500	2	0.367	0.3672	2.3655	4.7	0.24	Hi	0.59	1.01
	GMC 16-ft Flatbed Truck to haul rigging gear	Diesel	1	180	4667	400	500	600	600	500	400	200	2	0.367	0.3085	0.7475	4	0.1316	Hi	0.59	1.01
SHOP FABRICATION																					
	Grove RT-528 Rough Terrain Hyd. Crane, 28-ton	Diesel	2	125	4667	1000	2000	2000	2000	2000	1000	500	2	0.367	0.3384	0.8667	4.1	0.18	None	0.43	1.00
	Grove AP308 Carry Deck Hyd. Crane, 8-1/2-ton	Diesel	1	76	4667	500	750	1000	1000	1000	750	500	2	0.367	0.3672	2.3655	4.7	0.24	None	0.43	1.00
	IR Teleboom Forklift 4x4, 4.5-ton	Diesel	2	65	4667	500	750	1000	1000	1000	750	500	2	0.367	0.3672	2.3655	4.7	0.24	Hi	0.59	1.01
	GMC 18' Flatbed/Stakebed Trucks	Diesel	1	165	4667	500	1000	1500	1500	1000	750	500	2	0.367	0.3384	0.8667	4.1	0.18	Hi	0.59	1.01
	IR 375cfm Air Compressor, Trailer Mtd	Diesel	1	113	4667	500	750	1000	1000	1000	750	500	2	0.367	0.3384	0.8667	4.7	0.18	None	0.43	1.00
WAREHOUSE																					
	Linkbelt 228 Lattice Boom Truck Crane, 180-ft Boom, 30-ft Jib	Diesel	1	250	4667	500	750	750	750	750	500	250	2	0.367	0.3085	0.7475	4	0.1316	None	0.43	1.00
	Grove RT-528 Rough Terrain Hyd. Crane, 28-ton	Diesel	2	125	4667	1000	2000	2000	2000	2000	1000	500	2	0.367	0.3384	0.8667	4.1	0.18	None	0.43	1.00
	IR Teleboom Forklift 4x4, 4.5-ton	Diesel	2	65	4667	500	750	1000	1000	1000	750	500	2	0.367	0.3672	2.3655	4.7	0.24	Hi	0.59	1.01
	GMC Topkick Knuckle Boom Truck w/6-ton Capacity	Diesel	2	180	4667	0	500	750	750	750	500	500	2	0.367	0.3085	0.7475	4	0.1316	Hi	0.59	1.01
	Grove AP308 Carry Deck Hyd. Crane, 8-1/2-ton	Diesel	1	76	4667	500	750	750	750	750	500	500	2	0.367	0.3672	2.3655	4.7	0.24	None	0.43	1.00
	GMC 18' Flatbed/Stakebed Trucks	Diesel	4	165	4667	1000	2000	3000	3000	3000	1500	1000	2	0.367	0.3384	0.8667	4.1	0.18	Hi	0.59	1.01
EQUIPMENT MAINTENANCE																					
	GMC Fuel Truck w/Meters, 4000gal Diesel Fuel	Diesel	3	250	4667	1500	1500	1500	1500	1000	500	0	2	0.367	0.3085	0.7475	4	0.1316	Hi	0.59	1.01
	GMC Fuel & Lubrication Truck w/Pwr Wash; Cont/Waste Oil Tank; 2000 gal Diesel Fuel	Diesel	2	250	4667	1000	1000	1000	1000	1000	500	500	2	0.367	0.3085	0.7475	4	0.1316	Hi	0.59	1.01
	GMC 3500 HD Mechanics Truck, w/Tools, Welder, Air Comp;	Diesel	2	180	4667	1000	1000	1000	1000	1000	500	0	2	0.367	0.3085	0.7475	4	0.1316	Hi	0.59	1.01
	GMC Wrecker & Tire Service Truck	Diesel	1	300	7000	500	500	500	500	250	0	0	2	0.367	0.3085	0.7475	4	0.1316	Hi	0.59	1.01
	Utility, Gasoline-powered Pick-up Trucks & Automobiles	Gasoline	100	231	4667	26,400	52,800	105,600	105,600	105,600	52,800	26,400	4		0.0633	0.8749	0.0603	0.0022			

Table B-8b Combustion Equipment Emissions Calculation (cont.)

Activity Data and Emissions for Construction Equipr

EQUIPMENT CATEGORY	DESCRIPTION	FUEL TYPE	Year 1 HC	Year 1 CO	Year 1 NOx	Year 1 PM	Year 1 SO2	Year 2 HC	Year 2 CO	Year 2 NOx	Year 2 PM	Year 2 SO2	Year 3 HC	Year 3 CO	Year 3 NOx	Year 3 PM	Year 3 SO2
			ANNUAL EMISSIONS (lbs)					ANNUAL EMISSIONS (lbs)					ANNUAL EMISSIONS (lbs)				
	DEWATERING & EARTHWORK																
	Dewatering Deep Well or Wellpoint Pumps (24-Hr/Da	Diesel	1,905	4,915	24,104	375	970	953	2,458	12,052	187	485	921	0	0	0	0
	Scraper, Self-Propelled, 24cy Struck	Diesel	1,379	10,799	31,619	710	1,249	1,379	10,799	31,619	710	1,249	1,348	3,040	9,429	258	375
	CAT D9 Dozer	Diesel	493	3,733	11,466	337	455	493	3,733	11,466	337	456	490	1,827	5,722	145	228
	CAT D6 Dozer	Diesel	205	739	2,384	71	103	205	739	2,384	71	103	204	421	1,374	37	59
	CAT 330 Crawler/Hydraulic Backhoe, 3-1/4cy Struck	Diesel	229	627	1,421	60	62	459	1,269	2,845	130	123	458	627	1,421	60	62
	CAT 953 Crawler/Loader, 2-1/2cy	Diesel	162	816	1,757	82	74	327	1,272	3,525	184	148	323	816	1,757	82	74
	Case 521D Articulated 4X4 Wheel Loader, 2-1/4cy	Diesel	103	298	588	38	25	207	604	1,197	81	51	206	298	598	38	25
	Kenworth t-800 Dump Trucks, 13/15cy	Diesel	704	2,818	8,091	319	347	1,418	5,323	16,208	395	693	1,408	2,618	8,091	319	347
	CAT 825 Vibratory Compactor	Diesel	294	1,518	7,587	136	284	294	1,518	7,587	136	284	293	747	3,788	60	142
	Case 580 Tractor Loader/Backhoe, 1cy/18"	Diesel	0	0	0	0	0	0	0	0	0	0	0	212	180	13	7
	Case Skid Loader, 1/2cy	Diesel	0	0	0	0	0	0	0	0	0	0	0	92	120	14	5
	JCB Mini Backhoe/Loader, 1/2cy/12"	Diesel	0	0	0	0	0	0	0	0	0	0	0	92	120	14	5
	CAT 14H Motor Grader, 14' Blade	Diesel	93	331	1,089	28	47	140	500	1,634	44	70	140	331	1,089	28	47
	Gradall	Diesel	93	331	1,089	28	47	93	331	1,089	28	47	93	165	544	13	23
	GMC Truck w/6000 gal. water tank	Diesel	127	450	1,484	37	64	127	450	1,484	37	64	127	450	1,484	37	64
	BATCH PLANT																
	Central Mix Plant w/chiller & heater, ~130 cy/hr	Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CAT 966F Loader, 5cy Bucket @ Stockpiles	Diesel	35	85	217	9	9	105	285	651	27	28	105	381	868	36	38
	CAT D8H Dozer @ Stockpiles	Diesel	31	114	335	13	14	92	347	1,004	42	42	92	465	1,340	58	56
	Crawler/Backhoe, 1cy @ Spoils	Diesel	4	12	24	1	1	12	36	72	4	3	12	48	96	6	4
	GMC 12/14cy Dump Truck @ Spoils	Diesel	13	45	148	3	6	38	134	445	11	19	38	179	593	14	26
	IR 375cfm Air Compressor, Trailer Mounted	Diesel	4	9	44	1	2	11	28	132	4	5	11	37	176	5	7
	Dump Trucks for Aggregate and Sand, 30 cy	Diesel	176	1,305	4,119	98	164	555	4,195	12,905	375	513	557	5,521	16,795	527	668
	CONCRETE																
	Concrete Transport Trucks, Agitator/Mixer, 10cy capa	Diesel	453	1,654	5,240	177	225	1,427	5,364	16,333	396	699	1,427	9,827	29,923	728	1,280
	Creter Crane w/Grove RT990 Hydraulic Crane & 200ft Conveyo	Diesel	16	43	228	3	9	53	128	683	10	28	53	171	910	14	37
	Concrete Pump Truck @ 170 cy/hr	Diesel	59	143	759	12	31	177	435	2,280	41	92	177	584	3,042	58	123
	Concrete Pump, Trailer Mounted @ 115/120 cy/hr	Diesel	42	103	546	9	22	127	313	1,641	30	67	126	420	2,190	42	89
	IR 375cfm Air Compressor, Trailer Mounted	Diesel	29	75	352	10	14	88	226	1,056	32	42	88	306	1,409	45	56
	IR 750cfm Air Compressor, Trailer Mounted	Diesel	29	71	379	6	15	88	213	1,138	17	46	88	283	1,517	22	62
	LIFTING/RIGGING																
	Manitowoc 4600 S-5 Crawler Crane w/S-4 Ringer Attachment, 75	Diesel	0	0	0	0	0	109	867	2,664	40	106	109	1,745	5,331	86	211
	Manitowoc M-250 S-2 Crawler Crane w/300' Boom Attachment & Luffing Jib, 300-ton Capacity	Diesel	0	0	0	0	0	71	362	1,850	26	69	71	728	3,703	56	139
	Manitowoc 4100 S-2 Crawler Crane 230-ton Capacity, w/Tower Attachmentm 31-ton Capacity	Diesel	53	268	1,369	20	51	106	539	2,740	42	103	106	1,090	5,486	93	205
	Manitowoc 3900W Crawler Crane, w/180' Boom & 30' Jib, 140-ton Capacity	Diesel	84	205	1,089	17	44	169	414	2,180	38	88	170	844	4,368	88	177
	Linkbelt HC248 Lattice Boom Truck Crane w/ 200' Boom Attachment & Luffing Jib, 165-ton Capacity	Diesel	64	325	1,665	24	62	129	655	3,332	51	125	129	1,326	6,672	113	250
	Kenworth T-800 Prime Mover for Heavy-Haul Trailers	Diesel	0	0	0	0	0	16	111	354	8	14	15	222	707	16	28
	Grove RT-635 Rough Terrain Hyd. Crane, 35-ton Capacity	Diesel	98	254	1,184	35	47	197	518	2,371	80	94	197	518	2,371	80	94
	Grove RT-865 Rough Terrain Hyd. Crane, 65-ton Capacity	Diesel	147	361	1,899	33	77	296	735	3,804	77	154	296	735	3,804	77	154
	IR Teleboom Forklift 4x4, 4.5-ton	Diesel	0	0	0	0	0	33	310	378	20	14	33	628	757	43	28
	GMC 16-ft Flatbed Truck to haul rigging gear	Diesel	30	106	356	9	15	38	135	445	11	19	38	162	534	13	23
	SHOP FABRICATION																
	Grove RT-528 Rough Terrain Hyd. Crane, 28-ton	Diesel	40	104	486	14	19	81	209	973	29	38	81	209	973	29	38
	Grove AP308 Carry Deck Hyd. Crane, 8-1/2-ton	Diesel	13	86	169	6	6	20	129	254	9	9	20	172	339	13	12
	IR Teleboom Forklift 4x4, 4.5-ton	Diesel	16	154	189	10	7	25	232	283	15	10	25	310	378	20	14
	GMC 18' Flatbed/Stakebed Trucks	Diesel	38	143	418	17	18	77	288	837	34	35	77	435	1,256	54	53
	IR 375cfm Air Compressor, Trailer Mtd	Diesel	18	47	252	6	9	27	70	378	9	13	27	94	504	12	17
	WAREHOUSE																
	Linkbelt 228 Lattice Boom Truck Crane, 180-ft Boom, 30-ft Jib	Diesel	37	89	474	7	19	55	134	711	11	29	55	134	711	11	29
	Grove RT-528 Rough Terrain Hyd. Crane, 28-ton	Diesel	40	104	486	14	19	81	209	973	29	38	81	209	973	29	38
	IR Teleboom Forklift 4x4, 4.5-ton	Diesel	16	154	189	10	7	25	232	283	15	10	25	310	378	20	14
	GMC Topkick Knuckle Boom Truck w/6-ton Capacity	Diesel	0	0	0	0	0	38	135	445	11	19	38	203	668	17	29
	Grove AP308 Carry Deck Hyd. Crane, 8-1/2-ton	Diesel	13	86	169	6	6	20	129	254	9	9	20	129	254	9	9
	GMC 18' Flatbed/Stakebed Trucks	Diesel	77	288	837	34	35	154	584	1,676	75	70	154	686	2,516	120	106
	EQUIPMENT MAINTENANCE																
	GMC Fuel Truck w/Meters, 4000gal Diesel Fuel	Diesel	159	569	1,857	50	80	159	569	1,857	50	80	159	569	1,857	50	80
	GMC Fuel & Lubrication Truck w/Pwr Wash; Cont/Waste Oil Tank; 2000 gal Diesel Fuel	Diesel	106	377	1,237	32	53	106	377	1,237	32	53	106	377	1,237	32	53
	GMC 3500 HD Mechanics Truck, w/Tools, Welder, Air Comp;	Diesel	76	271	891	23	38	76	271	891	23	38	76	271	891	23	38
	GMC Wrecker & Tire Service Truck	Diesel	63	224	742	18	32	63	224	742	18	32	63	224	742	18	32
	Utility, Gasoline-powered Pick-up Trucks & Automobiles	Gasoline	851	11,762	811	29	10	1,702	23,525	1,621	58	20	3,404	47,049	3,242	116	39
			8,719	46,622	121,847	2,874	4,896	12,734	72,441	164,962	4,158	6,647	14,360	89,335	145,227	3,909	5,818

DESCRIPTION	Year 4 HC	Year 4 CO	Year 4 NOx	Year 4 PM	Year 4 SO2	Year 5 HC	Year 5 CO	Year 5 NOx	Year 5 PM	Year 5 SO2	Year 6 HC	Year 6 CO	Year 6 NOx	Year 6 PM	Year 6 SO2	Year 7 HC	Year 7 CO	Year 7 NOx	Year 7 PM	Year 7 SO2
	ANNUAL EMISSIONS (lbs)					ANNUAL EMISSIONS (lbs)					ANNUAL EMISSIONS (lbs)					ANNUAL EMISSIONS (lbs)				
DEWATERING & EARTHWORK																				
Dewatering Deep Well or Wellpoint Pumps (24-Hr/Da	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scraper, Self-Propelled, 24cy Struck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT D9 Dozer	141	1,044	3,298	78	131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT D6 Dozer	39	138	457	11	20	39	138	457	11	20	0	0	0	0	0	0	0	0	0	0
CAT 330 Crawler/Hydraulic Backhoe, 3-1/4cy Struck	176	481	1,093	46	47	88	239	546	22	24	0	0	0	0	0	0	0	0	0	0
CAT 953 Crawler/Loader, 2-1/2cy	124	471	1,351	60	57	62	232	675	28	28	0	0	0	0	0	0	0	0	0	0
Case 521D Articulated 4X4 Wheel Loader, 2-1/4cy	79	229	460	29	19	40	114	230	14	10	20	57	115	7	5	0	0	0	0	0
Kenworth t-800 Dump Trucks, 13/15cy	212	763	2,477	70	107	106	377	1,237	32	53	0	0	0	0	0	0	0	0	0	0
CAT 825 Vibratory Compactor	56	284	1,456	21	55	28	142	728	10	27	0	0	0	0	0	0	0	0	0	0
Case 580 Tractor Loader/Backhoe, 1cy/18"	29	212	180	13	7	29	212	180	13	7	29	212	180	13	7	15	106	90	7	4
Case Skid Loader, 1/2cy	15	92	120	14	5	15	92	120	14	5	15	92	120	14	5	7	46	60	7	2
JCB Mini Backhoe/Loader, 1/2cy/12"	15	92	120	14	5	15	92	120	14	5	15	92	120	14	5	0	0	0	0	0
CAT 14H Motor Grader, 14' Blade	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gradall	46	165	544	13	23	46	165	544	13	23	0	0	0	0	0	0	0	0	0	0
GMC Truck w/6000 gal. water tank	127	450	1,484	37	64	127	450	1,484	37	64	0	0	0	0	0	0	0	0	0	0
BATCH PLANT																				
Central Mix Plant w/chiller & heater, ~130 cy/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 966F Loader, 5cy Bucket @ Stockpiles	140	381	868	36	38	35	95	217	9	9	17	47	108	4	5	9	24	54	2	2
CAT D8H Dozer @ Stockpiles	123	465	1,340	58	56	31	114	335	13	14	15	57	167	6	7	8	28	84	3	4
Crawler/Backhoe, 1cy @ Spoils	17	48	96	6	4	4	12	24	1	1	2	6	12	1	1	2	5	10	1	0
GMC 12/14cy Dump Truck @ Spoils	51	179	593	14	26	13	45	148	3	6	6	22	74	2	3	5	18	59	1	3
IR 375cfm Air Compressor, Trailer Mounted	15	37	176	5	7	4	9	44	1	2	2	5	22	1	1	1	4	18	0	1
Dump Trucks for Aggregate and Sand, 30 cy	724	5,521	16,795	527	668	176	1,305	4,119	98	164	88	648	2,058	48	82	44	323	1,029	23	41
CONCRETE																				
Concrete Transport Trucks, Agitator/Mixer, 10cy capa	1,873	7,043	21,445	522	917	1,830	6,879	20,946	510	896	450	1,646	5,215	175	224	223	802	2,601	74	112
Creter Crane w/Grove RT990 Hydraulic Crane & 200ft Conveyo	70	171	910	14	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Pump Truck @ 170 cy/hr	236	584	3,042	58	123	59	143	759	12	31	29	71	379	6	15	15	35	190	3	6
Concrete Pump, Trailer Mounted @ 115/120 cy/hr	170	420	2,190	42	89	42	103	546	9	22	0	0	0	0	0	0	0	0	0	0
IR 375cfm Air Compressor, Trailer Mounted	117	306	1,409	45	56	29	75	352	10	14	15	37	176	5	7	7	19	88	2	3
IR 750cfm Air Compressor, Trailer Mounted	117	283	1,517	22	62	29	71	379	6	15	15	35	190	3	8	7	18	95	1	4
LIFTING/RIGGING																				
Manitowoc 4600 S-5 Crawler Crane w/S-4 Ringer Attachment, 75	218	1,745	5,331	86	211	218	1,745	5,331	86	211	109	867	2,664	40	106	0	0	0	0	0
Manitowoc M-250 S-2 Crawler Crane w/300' Boom Attachment & Luffing Jib, 300-ton Capacity	143	728	3,703	56	139	143	728	3,703	56	139	36	180	925	13	35	0	0	0	0	0
Manitowoc 4100 S-2 Crawler Crane 230-ton Capacity, w/Tower Attachmentm 31-ton Capacity	213	1,090	5,486	93	205	106	539	2,740	42	103	53	268	1,369	20	51	0	0	0	0	0
Manitowoc 3900W Crawler Crane, w/180' Boom & 30' Jib, 140-ton Capacity	340	844	4,368	88	177	169	414	2,180	38	88	84	205	1,089	17	44	0	0	0	0	0
Linkbelt HC248 Lattice Boom Truck Crane w/ 200' Boom Attachment & Luffing Jib, 165-ton Capacity	258	1,326	6,672	113	250	258	1,326	6,672	113	250	64	325	1,665	24	62	32	162	832	12	31
Kenworth T-800 Prime Mover for Heavy-Haul Trailers	30	222	707	16	28	15	111	354	8	14	0	0	0	0	0	0	0	0	0	0
Grove RT-635 Rough Terrain Hyd. Crane, 35-ton Capacity	197	518	2,371	80	94	197	518	2,371	80	94	10	25	118	3	5	49	126	591	17	23
Grove RT-865 Rough Terrain Hyd. Crane, 65-ton Capacity	296	735	3,804	77	154	296	735	3,804	77	154	147	361	1,899	33	77	73	179	949	15	38
IR Teleboom Forklift 4x4, 4.5-ton	66	628	757	43	28	66	628	757	43	28	33	310	378	20	14	16	154	189	10	7
GMC 16-ft Flatbed Truck to haul rigging gear	46	162	534	13	23	38	135	445	11	19	30	106	356	9	15	15	54	178	4	8
SHOP FABRICATION																				
Grove RT-528 Rough Terrain Hyd. Crane, 28-ton	81	209	973	29	38	81	209	973	29	38	40	104	486	14	19	20	62	243	7	10
Grove AP308 Carry Deck Hyd. Crane, 8-1/2-ton	27	172	339	13	12	27	172	339	13	12	20	129	254	9	9	13	86	169	6	6
IR Teleboom Forklift 4x4, 4.5-ton	33	310	378	20	14	33	310	378	20	14	25	232	283	15	10	16	154	189	10	7
GMC 18' Flatbed/Stakebed Trucks	115	435	1,256	54	53	77	288	837	34	35	57	215	627	25	26	38	143	418	17	18
IR 375cfm Air Compressor, Trailer Mtd	36	94	504	12	17	36	94	504	12	17	27	70	378	9	13	18	47	252	6	9
WAREHOUSE																				
Linkbelt 228 Lattice Boom Truck Crane, 180-ft Boom, 30-ft Jib	55	134	711	11	29	55	134	711	11	29	37	89	474	7	19	18	44	237	4	10
Grove RT-528 Rough Terrain Hyd. Crane, 28-ton	81	209	973	29	38	81	209	973	29	38	40	104	486	14	19	20	52	243	7	10
IR Teleboom Forklift 4x4, 4.5-ton	33	310	378	20	14	33	310	378	20	14	25	232	283	15	10	16	154	189	10	7
GMC Topkick Knuckle Boom Truck w/6-ton Capacity	57	203	668	17	29	57	203	668	17	29	38	135	445	11	19	38	135	445	11	19
Grove AP308 Carry Deck Hyd. Crane, 8-1/2-ton	20	129	254	9	9	20	129	254	9	9	13	86	169	6	6	13	86	169	6	6
GMC 18' Flatbed/Stakebed Trucks	232	886	2,516	120	106	232	886	2,516	120	106	115	435	1,256	54	53	77	288	837	34	35
EQUIPMENT MAINTENANCE																				
GMC Fuel Truck w/Meters, 4000gal Diesel Fuel	159	569	1,857	50	80	106	377	1,237	32	53	53	187	618	15	27	0	0	0	0	0
GMC Fuel & Lubrication Truck w/Pwr Wash; Cont/Waste Oil Tank; 2000 gal Diesel Fuel	106	377	1,237	32	53	106	377	1,237	32	53	53	187	618	15	27	53	187	618	15	27
GMC 3500 HD Mechanics Truck, w/Tools, Welder, Air Comp;	76	271	891	23	38	76	271	891	23	38	38	135	445	11	19	0	0	0	0	0
GMC Wrecker & Tire Service Truck	63	224	742	18	32	32	112	371	9	16	0	0	0	0	0	0	0	0	0	0
Utility, Gasoline-powered Pick-up Trucks & Automobiles	3,404	47,049	3,242	116	39	3,404	47,049	3,242	116	39	1,702	23,525	1,621	58	20	851	11,762	811	29	10
	11,096	79,436	114,072	2,991	4,531	6,804	69,110	78,064	1,958	3,062	3,564	31,539	27,846	753	1,080	1,721	15,290	11,936	341	463

Enclosure 3

Regulatory Commitment

The regulatory commitment in this correspondence is summarized below:

Regulatory Commitment No.	Regulatory Commitment Description	Regulatory Commitment Due Date
CC-09-0002	UNE will prepare an updated construction emissions analysis for CCNPP Unit 3 in order to determine if emissions are still within threshold values. UNE will provide the NRC with the schedule for completion of this emissions analysis by October 2, 2009.	October 2, 2009 schedule for completion of analysis.